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EXPORT TAX INCENTIVES AND THE PRODUCTION ACTIVITIES DEDUCTION

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ABSTRACT

Export tax incentives have been a part of the income tax landscape in the United States for more than 40 years, beginning with the Domestic International Sales Corporation. As various incentives have been declared invalid by international agencies, Congress has attempted different versions of these incentives. Only the relatively minor Interest Charge - Domestic International Sales Corporation (IC-DISC) remains. In 2004 Congress tried a new approach with the Domestic Production Activities Deduction (PAD). This incentive gives taxpayers a tax deduction for defined domestic production activities. The IC-DISC and the PAD are evaluated in light of tax policy considerations and found lacking.

INTRODUCTION

The United States government has taken a number of measures over the past four decades to encourage export activity. Several of these measures have taken the form of tax incentives for export activity. However, these measures have raised the ire of the European Union (EU) and other international bodies. Some have been found to be in violation of the General Agreement on Tariffs and Trade (GATT), others have run afoul of the rules and regulations of the World Trade Organization. Each time one of these has been found in violation, the U. S. Congress has gone “back to the drawing board,” so to speak, to seek an export incentive that will not violate international agreements. One export incentive, the Interest Charge – Domestic International Sales Corporation (IC-DISC) remains. It has been unsuccessfully challenged by the EU before the WTO. However, it is not an incentive that has found widespread application.

After the Exterritorial Income Exclusion (ETI) was struck down by the WTO in 2002, the United States took a different approach, enacting the Production Activities Deduction (PAD), or Section 199 of the Internal Revenue Code. This deduction did not focus on exports, but was designed to encourage domestic production and create new jobs within the United States.

This paper will examine export incentives that have not survived international scrutiny, along with the IC-DISC. It will then examine the basics of the PAD, and illustrate the significance of this deduction. The PAD and the IC-DISC will be evaluated in light of tax policy principles.

EXPORT INCENTIVES OF THE PAST

Over the last four decades there have been a number of attempts to promote export activities through the tax code. However, most of these have been found in violation of international agreements that the United States had signed. Congress passed the Revenue Act of 1971 creating Domestic International Sales Corporations (DISC), which provided a tax incentive to export. [4] Under provisions of this act, a DISC was not subject to U. S. corporate income taxes. [1] However, the DISC legislation soon ran into difficulties with the General Agreement on Tariffs and Trade (GATT), a trade agreement to which the United States was a signatory. Members of the European Union (EU) submitted a complaint to GATT that DISC was an export subsidy and in violation of Article XVI of the GATT. The United States filed a counter-claim that the “territorial tax” systems of France, the Netherlands, and Belgium conferred export subsidies. A GATT panel subsequently rendered a decision in 1976 declaring that both DISC and the territorial tax systems were in violation of GATT. [4]

The year 1984 saw the introduction of two export incentives to replace the discredited DISC. These included the Foreign Sales Corporation (FSC) and a variation of the DISC, the Interest Charge – Domestic International Sales Corporation (IC-DISC). Only the IC-DISC remains today. The FSC was designed to conform to GATT by providing an export tax benefit incorporating elements of the 1981 understanding based on findings from the GATT council [4].

In order to qualify as an FSC the corporation must have its main office in the United States or certain other qualified nations. It must have at least one director who is not a U. S. resident, maintain an offshore office, have no more than 25 shareholders, and file an election with the IRS. An FSC is entitled to an exemption on a portion of its earnings from the sale or lease of export property. This exemption can be as great as 15% on gross export income. [12] European countries were not fully satisfied of the GATT-legality of the FSC concept, but the controversy remained somewhat dormant until November, 1997. At this juncture, the EU requested consultations with the United States over FSC. This “consultation process” is the prescribed first step in the dispute settlement process under WTO. [4]

These consultations were unproductive, so the EU nations took the next step of requesting that a panel examine the issue. The panel generally supported the complaints of the EU, finding that FSCs violated subsidy obligations under the WTO Agreement on Subsidies and Countervailing Measures and the WTO Agreement on Agriculture. Understandably, the United States filed an appeal. However, the appeal was unsuccessful. [4] Having exhausted legal remedies, the United States had until October 1, 2000 to bring its systems into compliance or face sanctioning retaliatory measures from the WTO. An alternative to FSC was presented to the WTO, which was subsequently rejected. [4]

The source of the controversy lay in the fact that the United States generally taxes its resident corporations on their worldwide income. However, the FSC carved out a benefit that allowed a portion of FSC income to be defined as “not in the conduct of an active U. S. trade or business,” and therefore exempt from corporate taxation. Ordinarily, this could still be taxed when remitted to the U. S. based parent as an intra-firm dividend, but FSC provisions provide a 100% deduction for such dividends. [4]

With the demise of the Foreign Sales Corporation, Congress acted quickly to provide a new incentive for export sales – the Extraterritorial Income (ETI) exclusion, enacted in 2000. This legislation simplified the requirements under FSC and expanded eligibility for benefits. The ETI legislation allowed

individuals, S corporations, partnerships, U. S. companies with net operating losses or in an alternative minimum tax position to benefit from the legislation. [13] The amount of tax savings was the same as under the FSC regime, but the cost to the government was larger due to a wider range of included entities. [23]

The ETI did not require the establishment of a separate entity, as under the FSC. Taxpayers merely needed to satisfy the foreign economic presence test by soliciting, negotiating, or making contracts with respect to export sales transactions outside the United States. Certain costs, such as advertising and transportation must also be incurred outside the United States. [13] Under ETI rules, goods may be manufactured outside the United States, provided that 50 percent or less of the value was attributable to articles manufactured and produced or grown outside the U. S. It also allowed foreign corporations to elect to be treated as domestic corporations and become eligible for ETI benefits. [13] It is apparent that this legislation was an attempt to streamline the old FSC process and, at the same time open the eligibility for the tax benefit to a broader constituency and, in the process, satisfy the rules of the WTO.

However, it was not to be. The ETI legislation took effect in October, 2000 and in January, 2002, the EU challenged the ETI regime and a WTO appellate body ruled that the ETI constituted a prohibited export subsidy. Furthermore, in August of that year the WTO ruled that if the United States did not come into compliance with the appellate decision, the EU could impose more than \$4 billion in sanctions against U. S. products. [21] Apparently, the WTO was tiring of the U. S. offering different versions of illegal export subsidies. Subsequently, the ETI provisions were repealed for transactions after 2004, subject to a transition rule which allowed some ETI exclusions into 2005 and 2006. [20]

INTEREST CHARGE – DOMESTIC INTERNATIONAL SALES CORPORATION

With the Domestic International Sales Corporation being found in violation of GATT rules, a modified version of the DISC was enacted by Congress in 1984. DISC became IC-DISC, Interest Charge - Domestic International Sales Corporation. [7] Even though the name was similar, the structure of the two laws was considerably different. The focus of IC-DISC is for smaller companies, creating a deferral for profits on the first \$10,000,000 in export sales. [14]

An IC-DISC begins when an S Corporation or partnership in the United States forms a subsidiary corporation and applies for tax exempt status as an IC-DISC. The parent then pays a commission for export sales to the IC-DISC, deducting the commission from ordinary income. This saves the parent up to 35 percent in taxes on the commission amount. As the IC-DISC is a tax-exempt entity, it pays no tax on the commission received. The IC-DISC then pays a dividend to the parent, which passes the dividend on to the shareholders or owners. Cash is actually transferred to the IC-DISC, but the subsidiary is not required to perform any services. [5]

The “interest charge” portion of this scheme comes into play if the IC-DISC does not pay out the dividend. In this case, the shareholders are required to pay interest to the IRS on the accumulated but untaxed income. The interest rate paid to the IRS is the base period T-bill rate [7], which can be a very favorable rate. There is also a great deal of flexibility built into the operational rules for these corporations, as the IC-DISC may lend funds back to the parent company in exchange for an interest-bearing note. This helps mitigate any cash drain caused by paying the commission. [16]

When IC-DISCs were first formed, they did not offer much potential for tax savings. Other export incentives were more beneficial. This is evidenced by the fact that only 727 IC-DISC returns were filed in 2000, 16 years after they were made a part of the tax code. [9] This is understandable, as the owner/shareholders would pay tax as high as 35 percent, giving little or no opportunity for tax savings, only a deferment of taxes payable. That changed with The Jobs and Growth Tax Relief Reconciliation Act of 2003. That act created a reduced tax rate for qualified dividends, tied to the capital gains rate. Overnight, the IC-DISC became a very effective tax strategy for exporters. Paying a commission to the IC-DISC enabled the parent to avoid tax at a maximum 35 percent, convert the commission to a qualified dividend with a 15 percent rate and save 20 percent in the process. [14]

The IC-DISC concept has been held to be valid by the World Trade Organization on two different occasions. [25] However, this concept has limited applicability and remains a little-used tax strategy.

THE DOMESTIC PRODUCTION ACTIVITIES DEDUCTION

Between 1971 and 2004 the United States lost the Domestic International Sales Corporation, the Foreign Sales Corporation, and the Extraterritorial Income Exclusion due to challenges from other nations. Faced with international concerns over U. S. tax treatment of exports along with a need to create new jobs in the United States, the Domestic Production Activities Deduction (PAD) was established as a part of the American Jobs Creation Act of 2004. As a part of this act, the ETI was repealed. [8] Rather than create an incentive for exported goods, the PAD created an incentive for companies to produce domestically with the anticipation that increased domestic production would lead to increases in exports.

The basics of the Production Activities Deduction are that businesses with “qualified production activities” can take a tax deduction of three to nine percent of qualified production activity income (QPAI) from net income. One commentator stated that this is a “tax break, pure and simple.” [15] There is not much argument that it is a pure tax break, however it is anything but simple. This is a complicated piece of legislation. This is to be expected when income from one type of activity is singled out for special treatment. In this case the problems are compounded, as income from selected activities, related deductions, and related wages must be isolated. In addition there are rules regarding pass-through entities, related taxpayers, and groups that have foreign and domestic components. It is easy to conclude that the PAD is an administrative nightmare, adding much complexity to the income tax system. It creates problems not only for the taxpayer in attempting to comply, but for the IRS in monitoring that the proper deduction is taken. [24]

Companies not already utilizing cost accounting may be forced to adopt a cost accounting system in order to take advantage of the PAD, and comply with its complex set of rules. It is a deduction that an eligible company should not overlook. It has been described as a “gimmie” deduction requiring no special expenditures [11], a significant tax benefit for a wide range of taxpayers [24], and a deduction that “every small business in the manufacturing sector should be looking at.” [15]

WHO IS ELIGIBLE TO TAKE THE PAD?

Taxpayers eligible to take the Production Activities Deduction are broadly defined. Even though this tax benefit was created out of the ashes of the ETI, it is not limited to companies who export. Also, unlike many of the export-incentive predecessors, the type of organization that may take the PAD is

virtually unlimited. The deduction is available to individuals, C corporations, farming cooperatives, estates, and trusts. In addition, the deduction may be passed through from estates and trusts to their beneficiaries and farming cooperatives may pass it through to their patrons. Although partnerships and S corporations cannot take the deduction, it may be passed through to shareholders and partners. [3]

With seemingly no limit on the type of organization that may take advantage of the PAD, the next question must be “What constitutes ‘domestic production activities?’” This is where application of the deduction starts to get complicated. The Department of the Treasury stated that the following are qualified production activities:

- The manufacture, production, growth, or extraction in whole or significant part in the United States of tangible personal property (e.g., clothing, goods, and food), software development, or music recordings;
- Film production (with exclusions provided in the statute), provided at least 50 percent of the total compensation relating to the production of the film is compensation for specified production services performed in the United States;
- Production of electricity, natural gas, or water in the United States;
- Construction or substantial renovation of real property in the United States including residential and commercial buildings and infrastructure such as roads, power lines, water systems, and communications facilities; or
- Engineering and architectural services performed in the United States and relating to construction of real property. [6]

An item will qualify if it is manufactured in whole or substantial part in the United States. This begs the question, “What is a ‘substantial part’?” The law provides a 20 percent safe harbor. An item will qualify if 20 percent of the cost of goods sold for that item are costs incurred in the United States. The full sales price is then considered domestic production gross receipts. The domestic production requirement must be applied to each item, the company cannot state that 20 percent of their cost of goods sold is U.S.-based and claim that 100 percent of their activities are domestic production activities. [11]

In the event the item does not qualify, the law allows the company to “shrinkback” the item to its largest qualifying component. This is known as the “shoelace rule.” For example, if the company imports a pair of shoes and adds a U. S. shoelace, the sales price attributable to the shoelace qualifies. [11] This will require good record-keeping and the application of a rational allocation base.

HOW IS THE DEDUCTION DETERMINED?

Having determined what constitutes qualified production activities, the company must then convert those activities to dollars, known as domestic production gross receipts (DPGR). This is simply all income arising from qualified production activities. The next step is somewhat more complex as the company must determine the expenses related to that income. By definition, qualified production activity expenses are all expenses directly related to the qualified production activities. If a company has multiple lines of business, this requires an allocation – another task for the cost accountant. [15] The end result is that qualified production activity income (QPAI) is defined as DPGR minus cost of goods sold allocable to these gross receipt minus other direct costs allocable to these receipts minus a ratable portion of indirect costs allocable to DPGR. [22]

The Production Activities Deduction is currently equal to six percent of the company's QPAI. In 2005 and 2006, this percentage was three percent, and is scheduled to increase to nine percent for tax years beginning after December 31, 2010. [10] There are two limitations placed on this deduction. The deduction may not exceed adjusted gross income (for sole proprietor, partnerships, S-corporations or LLCs) or taxable income for C corporations. Additionally, the deduction may not exceed 50 percent of W-2 wages paid. [15] This latter limitation is the portion of Section 199 that is targeted toward job creation.

SURVEYING THE IC-DISC AND THE PAD

A survey was undertaken to determine awareness of accounting professionals in regard to the Interest Charge – Domestic International Sales Corporations and of the Production Activities Deduction. Respondents were asked to indicate their level of knowledge of these two statutes on a six-point scale from “excellent” to “no experience.” The survey was distributed to an online discussion group, the IMA Financial Management Email Exchange. In addition, it was distributed at a meeting of the Polk County Florida Institute of CPAs and to an accounting CPE seminar held at Florida Southern College.

Eighty-one responses were received. Of these, 67 hold some type of professional certification and 59 were CPAs. Forty-seven are employed in CPA firms and eight are in manufacturing. Forty-seven respondents indicated some paid income tax preparation activity, including 26 who prepare over 100 returns annually.

The following summarizes responses to the question “How would you rate your level of knowledge of the Domestic Production Activities Deduction?”

Excellent	2
Very Good	3
Good	15
Fair	13
Poor	14
No Experience	34

Responses to the question, “How would you rate your level of knowledge of the Interest Charge-Domestic International Sales Corporation (IC-DISC)?” were as follows:

Excellent	0
Very Good	0
Good	0
Fair	7
Poor	20
No Experience	54

This survey indicates that many do not understand the Production Activities Deduction, with 75.3 percent indicating a fair understanding or less. The survey indicates an even lesser awareness and understanding of the IC-DISC, with all respondents indicating a fair understanding or less of the IC-DISC.

A majority of respondents (55) are involved in the manufacturing function or as tax return preparers. These are the individuals who should know about this legislation. One comment by a CPA preparing 201-500 returns annually stated “This is the first time I have ever heard about these.” Another stated, “PAD is a pain to calculate!” Two manufacturing CFO’s indicated a lack of awareness of these tax benefits. It is understandable that someone not involved in export activity would not know about the IC-DISC. However, since the PAD is available to so many taxpayers, anyone in manufacturing can potentially benefit from it. Preparers are not helping their clients minimize their tax liability if they do not consider the PAD for their clients.

ANALYZING THE PRODUCTION ACTIVITIES DEDUCTION AS TAX POLICY

There is no agreement on what constitutes good tax policy. In his 1776 classic, *The Wealth of Nations*, Adam Smith set forth four principles that he said should guide the making of tax policy. These principles serve as the foundation of today’s concepts of what principles should guide our tax policy decisions. These principles bear repeating here:

- The subjects of every State ought to contribute toward the support of the Government as nearly as possible in proportion to their respective abilities.
- The tax which each individual is bound to pay ought to be certain and not arbitrary. The time of payment, the manner of payment, the quantity to be paid, ought all to be clear and plain to the contributor and to every other person.
- Every tax ought to be so levied as the time or in the manner in which it is most likely to be convenient for the contributor to pay it.
- Every tax ought to be so contrived as both to take out and keep out of the pockets of the people as little as possible over and above what it brings into the public treasury of the State. [19]

In today’s terminology, we would place these into the broad objectives of Equity, Simplicity, and Efficiency. [19] The AICPA, the Tax Foundation, the Organisation for Economic Co-operation and Development, and universaltax.com have all set forth their lists of good tax policy. Numerous individuals have also contributed their views on good tax policy. [17]

The Production Activities Deduction and the Interest Charge – Domestic International Sales Corporation will be evaluated in view of Adam Smith’s principles, breaking equity into the two components of horizontal and vertical equity.

Horizontal equity, according to Eugene Steuerle, is almost universally accepted as a principal. By horizontal equity, Steuerle asserts that those with equal ability pay equal taxes. Even when one group is favored by tax legislation, horizontal equity is achieved internally within that group. As an example, if the law allows a deduction for charitable contributions, the group making such contributions is the favored group, receiving specialized treatment compared to other taxpayers. However, horizontal equity is applied internally to those with the group, allowing a charitable contribution for all who make such contributions. [18] Since the Production Activities Deduction applies to any company with defined domestic production activities, horizontal equity is present in this legislation.

IC-DISCs do not measure up in regard to horizontal equity. Unlike the PAD, it is not available to as many types of organizations. Additionally, it is limited to companies with profits of \$10,000,000 or

less. As the IC-DISC is an export incentive and all exporters are not eligible for this tax benefit, horizontal equity is not present as all exporters are not eligible for the IC-DISC.

Vertical equity is the principle that those with greater ability to pay should pay more in taxes. This is reflected in our income tax system of progressively higher marginal tax brackets as income increases. It is argued that this is a desirable principle, as those in lower economic straits cannot afford to pay an equal share for the support of the government. Vertical equity, then, is a function of how progressive the tax rates are. [18]

The PAD is not progressive as the amount of the deduction is the same percentage for all. However, the amount of the deduction is limited by taxable income and W-2 wages. The effect is that the greater one's income level, the greater amount of potential deduction. Vertical equity is achieved in the Production Activities Deduction.

The IC-DISC can reduce the tax liability from export sales to as low as 15 percent. The greater the income (up to the statutory limits), the greater the savings in dollars and as a percentage. Vertical equity is present in the IC-DISC.

In its "Ten Guiding Principles of Good Tax Policy," the AICPA states that tax law should be simple so that taxpayers understand the rules and can comply with them correctly and in a cost-efficient manner. [2] The Production Activities Deduction does not achieve simplicity. It has already been observed that a company with more than one line of business will need to utilize a cost accounting system in order to properly allocate costs between revenues generated as qualified production activities and those that do not qualify. In addition, several observers have commented on the complexity of this law.

The implications of the survey are substantial. If taxpayers do not understand a piece of tax legislation that will lower their tax liability, they will fail to take advantage of it. As one writer stated, "Many practitioners weren't convinced the Sec. 199 deduction was applicable or cost-effective for their clients. Consequently, many practitioners failed to evaluate the applicability of the deduction to their clients." [24] The fact that practitioners failed to evaluate the applicability indicates a level of complexity that should not exist. However, the second part of this statement is even more troubling. That a significant tax break is available to taxpayers is so complex that it is not cost effective to take that deduction carries two implications. First, this violates the cost-benefit principle that the benefits to be derived from an action should exceed the cost of taking that action. In avoiding the PAD, companies are seemingly taking the rational approach in applying the cost-benefit principle. Whether this is a correct approach is beyond the scope of this paper, but deserves consideration. The second implication is that when taxpayers do not take the deduction, the law is not achieving its intended purpose of encouraging domestic production and the creation of new jobs. In this respect both the Production Activities Deduction and the Interest Charge – Domestic International Sales Corporations must be judged a failure. They are not simple provisions in the tax code.

The final principle of tax policy is that of efficiency. Efficiency suggests that programs should not operate in a way that makes someone better off at the expense of making someone else worse off. This is a situation that can rarely be achieved in the tax policy arena. However, tax policy must seek to produce gains in the overall economic output even at the expense of losses to some individuals. Since by their very nature, taxes distort behavior, efficiency is lost as this change in behavior increases. Therefore,

the principle of efficiency should seek to minimize these changes, not eliminate them. Taken a step further, it is stated that the changes in behavior that occur should be justified by gains from the programs the taxes support. [18] Given that those taking the deduction are encouraged to increase domestic production activities and to increase employment, it can be argued that the Production Activities Deduction meets the efficiency criteria. However, due to the lack of simplicity in the Section 199, it becomes apparent that it is not an efficient piece of legislation. If the process of determining the eligible deduction were simplified, more benefit would apparently be realized from this legislation.

For the IC – DISC, there are significant changes in behavior as a separate corporate structure must be formed and maintained. The steps that must be taken in order to comply with the IC-DISC requirements are ones that require planning, and significant changes in behavior. From a macro view, given the limited use of the IC-DISC, one can conclude that the costs involved exceed the benefits to society. Efficiency is not an element of this tax legislation.

SUMMARY AND CONCLUSION

Both the IC-DISC and the PAD do not meet the principles of good tax policy. The Interest Charge-Domestic International Sales Corporation meets only the principle of vertical equity. The Production Activities Deduction meets the principles of horizontal and vertical equity. Both acts fail miserably in regard to simplicity and efficiency.

Three observations can be made from this paper. First, with the introduction of the Production Activities Deduction, it appears that the United States has abandoned any attempt to achieve a tax preference for export activity. After the Domestic International Sales Corporation, the Foreign Sales Corporation, and the Extraterritorial Income Exclusion were determined to be in violation of international agreements, the PAD represents a different approach that may help achieve the same objective.

Second, the Interest Charge – Domestic International Sales Corporation has been upheld as not in violation of any international agreements. However, it continues to be an under-utilized section of the Tax Code. One can speculate as to the reasons, but it seems likely that it has not received more widespread adoption due to the procedures that must be followed in order to comply with this section of the tax code. Exporters who are aware of its existence likely feel that the costs of complying with this act are not worth the benefits received. Additionally, one should note that this is available to “small” corporations – those not as likely to have the tax expertise and ability to easily comply with the requirements of the IC-DISC.

Third, the Production Activities Deduction is a very lucrative deduction. As has already been observed, this deduction is a “gimmie,” a company does not have to spend any money to take this deduction – just take a percentage of domestic production activity income. However, determining the base on which to take that percentage deduction is the catch in this legislation. The PAD is a very complicated piece of legislation and many companies and practitioners simply do not bother with it. This raises the issue of tax complexity. Our tax code should not be so complex that taxpayers do not take advantage of a tax break simply because it is too complex to determine the amount of the benefit. There are two sides to this complexity. In addition to it being difficult for taxpayers to compute the correct amount of the deduction, it is equally difficult for the IRS to determine if a taxpayer has properly

complied with this portion of the tax code. Future legislation should make the tax policy principle of simplicity a priority.

APPENDIX

Income Tax Export Incentives - PAD and IC-DISC

In the past 40 years, the Income Tax Code has included a number of incentives to boost export activities. After several of these were struck down by the World Trade Organization the U. S. ended up with two - the Interest Charge - Domestic International Sales Corporation and the Domestic Production Activities Deduction. I appreciate your input on this short survey to determine your level of familiarity with these tax provisions. This is for research purposes and your response will remain totally anonymous.

1) How would you rate your level of knowledge of the Domestic Production Activities Deduction?

- Excellent
- Very Good
- Good
- Fair
- Poor
- No Experience

2) How would you rate your level of knowledge of the Interest Charge - Domestic International Sales Corporation (IC-DISC)?

- Excellent
- Very Good
- Good
- Fair
- Poor
- No Experience

3) How many income tax returns do you prepare annually as a paid preparer?

- Zero
- 1-25
- 26-100
- 101-200
- 201-500
- 500 or more

4) What professional certifications do you hold? Check all that apply.

- CPA
 - CMA
 - CIA
 - Enrolled Agent
 - None
 - Other, please indicate what additional certifications you hold
-

5) In what industry are you employed?

- CPA firm
- Non-CPA Accounting Firm
- Manufacturing
- Retail
- Other service
- Government

6) Please include any comments you may have about the Domestic Production Activities Deduction or Interest Charge - Domestic International Sales Corporations.

Thank you for your input. If you have any additional comments or questions feel free to contact me at jstancil@verizon.net

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Today's Cost Accounting Systems – Problem or Solution?

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Meeting: 2008 SEINFORMS

Suggested Track: Accounting

Cost Accounting Systems – Today’s Problem or Solution?

ABSTRACT

A number of writers have criticized cost accounting systems in recent years. This paper examines a number of the limitations of present cost accounting systems and some of the solutions proposed. The conclusion is that companies should first decide how they will use the product cost information and then decide how to adapt the cost accounting system to satisfy those needs.

INTRODUCTION

Some major issues have surfaced in recent years concerning the inadequacies of most management/cost accounting systems in the United States. We will discuss cost accounting as a subset of management accounting in this paper because of our focus on product costs. Critics state that the future of many businesses depends on proper cost accounting and advocate major revisions in both cost accounting concepts and systems. Even the most sympathetic supporters of cost accounting recognize that companies need to take steps to make the cost information more timely and useful.

BACKGROUND

Writers have been critical of "present-day" cost accounting, some as far back as the early 1980s. They reported that cost accounting systems are inadequate to meet management's needs, especially regarding product costs. Kaplan has been a prominent critic and pointed out that there are problems with product costs (1984), use of cost accounting information for performance measurement (1983), and weaknesses in capital investment decisions (1986). Goldratt (1983) called attention to the distortion of profits through excessive allocation of "value-added" costs to inventory. Edwards (1985) maintained that cost accounting is not bad, just misused; however, Edwards and Heard (1984) agreed that there are several issues to resolve through the joint efforts of accounting and other management functions. Miller and Vollmann (1985) called overhead costs "the hidden factory" and pointed out that these costs were increasing, often caused by increased transactions, not product costs.

More recently, writers proposed new cost accounting systems such as activity-based costing (Cooper et al. 1992; Beischel 1990; Turney 1991), lean accounting (Maskell and Kennedy 2007; Drickelhammer 2004) and resource consumption accounting (RCA) by van der Merwe and Keys (2002). This paper describes how these new systems can help to answer some, but not all, of the issues associated with present-day cost accounting systems.

The principal uses proposed for product costs are inventory valuation, product pricing, performance measurement, cost analysis and reduction, capital investment analysis, business planning, strategic planning, and supply chain collaboration. The weaknesses often suggested for product costs are "incorrect" distribution of overhead costs, failure to recognize specific value-added costs, lack of sufficient discrimination among products, and an emphasis on financial measures over physical measures.

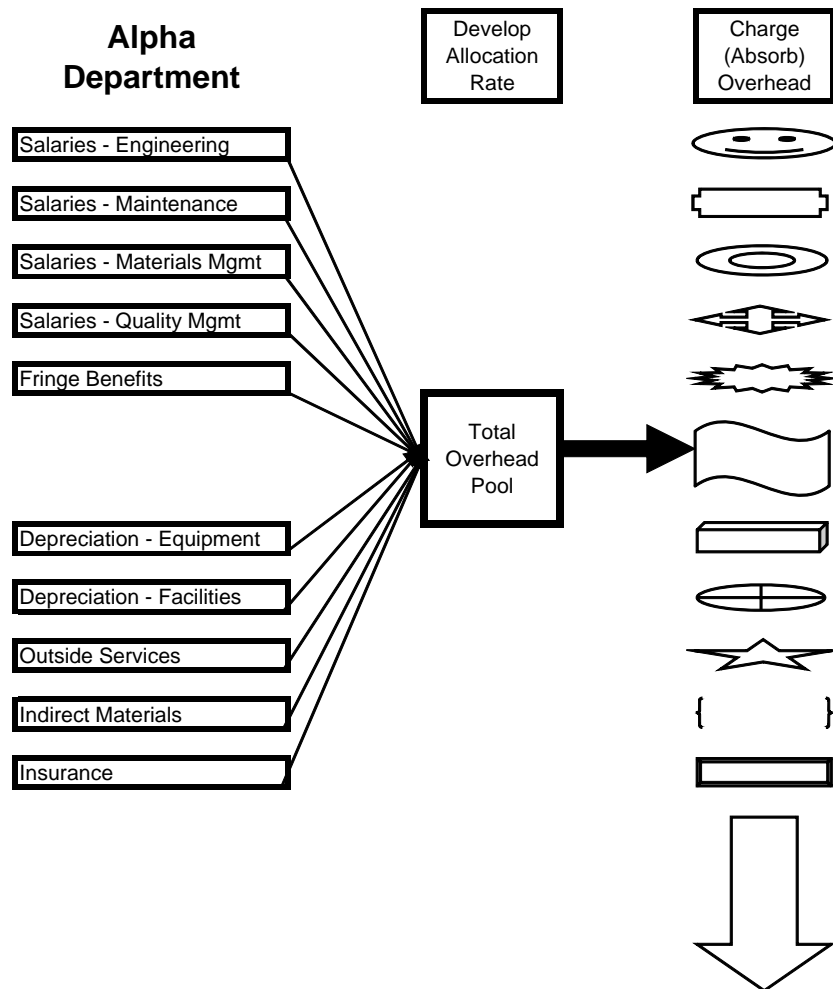
COST SYSTEM MODELS

Some writers portray a typical cost system as consisting of one large overhead pool in a plant with one large work center that processes a variety of products, ranging from custom, low volume products with long setup times to standard, high volume products with negligible setup times. Figure 1 shows a schematic of how overhead expenses are distributed in such a cost system. This, of course, is an extreme simplification and, while such systems probably exist, their application is limited.

Figure 1. Schematic of Overhead Cost Allocation

Overhead Allocation and Absorption

Traditional Method - Single Overhead Pool; Single Rate



If a company attempted to develop product costs using this limited system, even for a few products, they would likely misapply overhead expenses. For that reason, most cost accounting systems have greater flexibility in distributing overhead expenses to products.

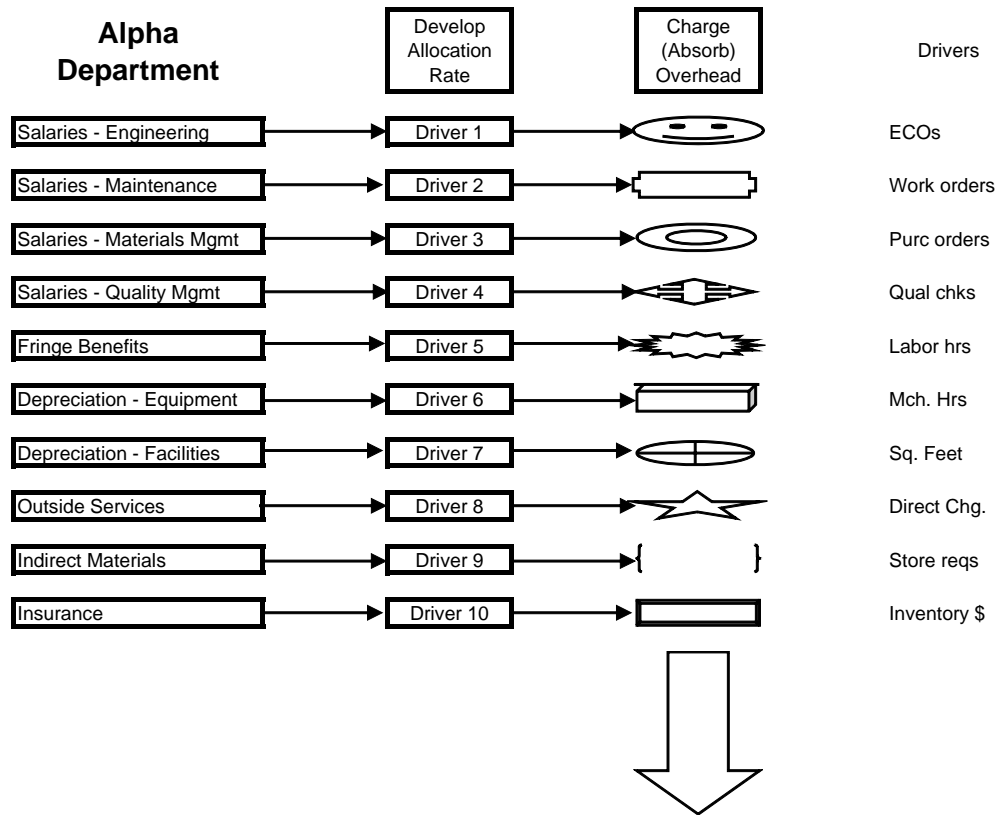
Figure 2 shows a model of a cost system that more precisely allocates overhead costs, exemplified by the activity-based costing (ABC) approach. In this model, costs of overhead departments are allocated to other overhead departments and to production work centers on some appropriate allocation basis, such as square footage (plant expenses), number of employees (human resources), indirect labor hours (maintenance or engineering), or consensus (plant management). Then, the accumulated costs

from these departments are assigned (absorbed) to products as they pass through the transformation process in each department.

Figure 2. Schematic of Overhead Cost Allocation
(Typical Application)

Overhead Allocation and Absorption

Activity-based-costing Method - Multiple Drivers



Use of this overhead allocation system makes it possible to more precisely match the overhead costs with the product. True, not all companies take advantage of a system's capability; then, the problem is management of the system, not the system itself. In the following discussion of criticisms of standard product costs, we will assume that the system shown as Figure 2 is available for use by companies, if they so desire to use it.

Figure 3 compares the best-known cost systems, including the widely accepted absorption cost method, which is the standard for financial accounting purposes. A brief description of each system follows.

Figure 3. Comparison of Cost Accounting Methods

		Management Accounting Methods						
		Theory of Constraints	Direct Costs	Standard Costs	Absorption costs	Activity-based costs	Resource consumption accounting	Lean accounting
								VS1 VS2 VS3
Costs included in Cost of Goods Sold	Direct materials - actual	Direct materials - actual	Direct materials - actual	Direct materials - standard Variance	Direct materials - actual	Direct materials - actual	Direct materials - actual	Procurement i i
		Direct labor - actual	Direct labor - actual	Direct labor - standard Variance	Direct labor - actual	Direct labor - actual	Direct labor - actual	Conversion
		Variable overhead		Variable and fixed overhead - standard Variance	Variable and fixed overhead	Overhead 1 Overhead 2 Overhead 3 Overhead 4 Overhead 5 Overhead 6 Overhead 7	Overhead A Overhead B Overhead C Overhead D Overhead E Overhead F Variance	Distribution
								Support
								Inventory adj
Overhead allocation basis		Direct labor	Direct labor	Direct labor				
Overhead assignment basis					Cost driver	Resource unit	Process step	
Uses								
Product pricing - full	Primary							
Product pricing - incremental	Primary							
Value inventory	Primary							
Budgeting - financial								
Budgeting - operations	Primary							
Performance measurement	Primary							
Analysis and improvement	Primary						Primary	
Complies with FASB	Primary							

- Theory of constraints accounting** – A cost and managerial accounting system that accumulates costs and revenues into three areas—throughput, inventory, and operating expense. It does not create incentives (through allocation of overhead) to build up inventory. The system attempts to provide a truer reflection of actual revenues and costs than traditional cost accounting. It is closer to a cash flow concept of income than is traditional accounting. The theory of constraints (TOC) accounting provides a simplified and more accurate form of direct costing that subtracts true variable costs (those costs that vary with throughput quantity). Unlike traditional cost accounting systems in which the focus is generally placed on reducing costs in all the various accounts, the primary focus of TOC accounting is on aggressively exploiting the constraint(s) to make more money for the firm (Blackstone and Cox 2005).
- Direct (variable) costing** – An inventory valuation method in which only variable production costs are applied to the product; fixed factory overhead is not assigned to the product. Traditionally, variable production costs are direct labor, direct material, and variable overhead costs. Variable costing can be helpful for internal management analysis but is not widely accepted for external financial reporting. For inventory order quantity purposes, however, the unit costs must include both the variable and allocated fixed costs to be compatible with the other terms in the order quantity formula. For make-or-buy decisions, variable costing should be used rather than full absorption costing (Blackstone and Cox 2005).

- **Standard cost accounting** – A cost accounting system that uses cost units determined before production for estimating the cost of an order or product. For management control purposes, the standards are compared to actual costs, and variances are computed (Blackstone and Cox 2005).
- **Absorption costing** – An approach to inventory valuation in which variable costs and a portion of fixed costs are assigned to each unit of production. The fixed costs are usually allocated to units of output based on direct labor hours, machine hours, or material costs (Blackstone and Cox 2005).
- **Activity-based cost accounting (ABC)** – A cost accounting system that accumulates costs based on activities performed and then uses cost drivers to allocate these costs to products or other bases, such as customer markets, or projects. It is an attempt to allocate overhead costs on a more realistic basis than direct labor or machine hours (Blackstone and Cox 2005).
- **Resource consumption accounting (RCA)** – A dynamic, integrated, and comprehensive cost management system that combines German cost management principles with activity based costing (ABC). RCA is dynamic in that changes in the environment are reflected in the cost model in a timely manner. RCA is integrated with all relevant organization systems. RCA is comprehensive in that it focuses on resources but readily includes ABC, ABM, variable costing, absorption costing, actual costs, standard costs (set in a formal process), a complete set of segmented income statements, activity based resource planning, primary costs, secondary costs and more. RCA is typically applied as part of an enterprise resource planning (ERP) system effort to achieve the best combination of cost management principles implemented in an integrated fashion. (Clinton and Keys 2007)
- **Lean accounting** – An accounting system designed for lean manufacturing. The traditional accounting systems were designed for mass production, and lean thinking violates these rules. Lean accounting addresses these needs: (1) replaces traditional measurements with few and focused lean performance measurements that motivate lean behavior at all levels of the organization, (2) Identifies the financial impact of lean improvements and establishes a strategy to maximize these benefits, (3) implements better ways to understand product costs and value stream costs, and use this cost information to drive improvement, make better business decisions, and enhance profitability, (4) Save money by eliminating large amounts of waste from the accounting, control, and measurements systems, (5) frees up time of finance people to work on strategic issues, lean improvement, and to become change agents within the organization, and (6) focuses the business around the value created for customers (Maskell and Baggaley 2004).

MAJOR CRITICISMS OF COST ACCOUNTING SYSTEMS

This section addresses the major criticisms of standard costs. We identify eight different uses of product costs and the various criticisms associated with each use of the product cost. Writers have suggested many solutions, so the problem is not a lack of ideas; on the contrary, there may be more ideas than needed, suggesting that some of them are treating symptoms, not causes.

The issues described below have different causes and different solutions. There is no single, quick fix. In addition, accounting cannot do it alone, but only with help from the other members of the management team.

Inventory Valuation

Accountants use product costs to value inventories, and this value has a direct impact on the profit reported for the company. A build-up of inventory causes profits to be higher, while a reduction of inventory causes profits to be lower (Fry 1992). The major issue for this application is the treatment of fixed overhead expenses. Generally accepted financial accounting practices require matching product costs with product sales; as a result, they cause fixed overhead costs to be stored in inventory. If the product is readily salable, the fixed overhead costs will quickly flow from the inventory value, and almost any method of valuing inventory will be satisfactory. However, if the product doesn't sell, or sells at a substantially discounted price, the value of the inventory will eventually have to be written off as an expense, often long after its creation. This means that profits were overstated when the inventory was produced, and understated when it was finally sold. Table 1 shows some possible solutions; however, only the prevention of excess inventory will produce a completely satisfactory result. Most cost accounting systems can handle any of the remaining alternatives. As a result, this is primarily a concept problem, not a system design or management problem.

Table 1. Inventory Valuation Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none">Absorption of overhead costs into inventory distorts (overstates) profit if there is a buildup of inventory (production exceeds sales).	<ul style="list-style-type: none">Control allowable level of inventory through business plan (do not plan to build unneeded inventory).Charge appropriate value of excess inventory to period expense.Charge only standard costs to inventory; expense the variances.Charge only direct costs to inventory; expense indirect expenses.

The major problem with traditional methods of allocating overhead may be that absorbing overhead costs into inventory can disguise the need for action. A benefit of ABC is that it forces the identification of all overhead expenses at a level of detail susceptible to analysis and reduction. Lean accounting carries with it the implication that inventories will be minimal and fast moving. In the short-term (month-to-month), profits may be distorted. In the long-term (year), profits will be the same for all methods.

Pricing

The marketplace heavily influences prices; however, there are occasions when a company bases its prices, or the decision to add or remove a product from its line, on the projected product costs. In this situation, the major issue concerning product costs is the allocation, and absorption, of overhead costs to products. The traditional method tends to overcharge established products and undercharge new products. As a result, established products often have prices set by the marketplace; they may appear to have low profit margins and become candidates for elimination from the product line. Conversely, new products may be underpriced, thereby reducing the total income for the company. This is primarily a problem in correctly designing and managing the cost system. Table 2 identifies the problems and some possible solutions.

Table 2. Pricing Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> Allocate overhead costs based on direct labor. This often overcharges older, more standard products that do not need as much overhead (interpret engineering help; and undercharge newer, less standard products that are in the early part of the product life cycle and need more support. 	<ul style="list-style-type: none"> Establish separate product lines (SBU) or manufacturing cells (JIT) to reflect clearly the difference in process requirements. Adjust costs by using supplemental overhead allocation bases, such as in ABC, by which to allocate different kinds of overhead more appropriately to the work centers (pounds of material, square footage, and kilowatts of power). Organize process steps into different work centers and develop different overhead pools for each work center with different overhead rates. Use job costing to charge all costs (direct and indirect) directly to the product as it moves through production. Machine charges would have to be based on some prorated cost per piece.

An increase in the number of product lines, work centers, overhead allocation bases, and overhead absorption bases, such as proposed for Activity-Based Costing (ABC) and Resource Consumption Accounting (RCA) increases the complexity of the cost accounting system. While the assignment of costs to products will be better, at least theoretically, this added complexity should be evaluated against the increased benefits expected. Prices should never be based solely on product cost; conversely, prices should not be set without regard to product costs.

Performance Planning and Measurement

Performance measures should be objective and fair to satisfy the needs of both the person measured and the manager. Many managers agree there is a need to use more nonfinancial measures in performance measurement. Today, such a requirement exceeds the capability of most cost accounting systems. Although most systems use physical units such as hours, pounds and pieces for inputs and convert them to dollars, the systems do not have a data retrieval system to extract these physical units in a usable form. Therefore, there is a systems design requirement to provide integrated physical and financial measures. Table 3 summarizes the problems and possible solutions.

Table 3. Performance Measurement Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> Performance measurement often is more meaningful with nonfinancial measures; cost accounting systems do not provide the nonfinancial measures. 	<ul style="list-style-type: none"> Product (standard) costs contain nonfinancial inputs such as pounds of material, hours of labor, and units of product, that are extracted for use in performance measurement. Other measures, such as number of orders, on-time deliveries, and so on, must be extracted from other systems, not the cost accounting subsystem. Use selected key indicators for performance measurement (with data from a variety of subsystems).
<ul style="list-style-type: none"> Performance measures derived from cost accounting systems satisfy external reporting requirements, but not internal management use. 	<ul style="list-style-type: none"> Develop internal measures (profit contribution instead of net profit after taxes or ROA instead of ROI). Change top management emphasis to internal performance measures.

It is unrealistic to expect a cost accounting system to provide all performance measurement information. Companies that rely only on the accounting reports for performance reporting usually limit their measures to financial ones. There should be a total integrated planning and control system, within which the cost accounting subsystem resides. The same measures can then be used in planning and actual performance measurement. This integrated system should be able to retrieve both physical and financial information for use in performance measurement.

Cost Analysis and Improvement

Costs must be analyzed before plans are developed to reduce costs or increase productivity, or both. Usually such an analysis involves choosing among alternatives. The most typical mistake is to work on average costs, as if all costs were equally shared by all products (Ames and Hlavacek 1990). Analysts struggle with how to identify the major overhead (value added) costs that vary among alternatives. One approach developed by Hewlett-Packard was to divide overhead costs into procurement overhead,

production overhead, and support overhead to better identify the causes (drivers) of costs. (Berlant, Browning and Foster 1990) Presently, the information among these detailed expenses is in the expense budget portion of the financial plan, and is often not in a format easily reviewed by operating managers. These expense budgets may not include reference to specific product lines and the resulting expense reports may not (usually do not) have any indication of the fixed and variable portion of costs. As a result, managers who review these financial reports have a difficult time relating to their department's activities. This is both a systems design and an educational problem (for non-financial persons). Table 4 lists some problems and possible solutions.

Table 4. Cost Analysis Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> • Cost accounting systems do not distinguish between value-added and non-value-added costs; as a result, product costs contain unnecessary costs. 	<ul style="list-style-type: none"> • Overhead costs can be separated into those costs that are to be allocated (value-added) and those that are to be expensed (non-value-added). • Some overhead costs, such as defects and excess hours, may not be included in the product costs; they are charged as variances (defects and excess hours).
<ul style="list-style-type: none"> • Cost accounting systems do not clearly identify line items of overhead; therefore, there is little effort to reduce those costs. 	<ul style="list-style-type: none"> • Analysts should use the overhead line item expense reports, or budgets, as a source of information. • The budgeting process offers the point in the process where overhead costs should be planned (and controlled). • Transactions should be analyzed to see what is causing the need for overhead costs (often as employees and space). This is an extension of the zero-base-budgeting process that was popular a few years ago.
<ul style="list-style-type: none"> • Cost accounting systems do not identify such special cost areas as “cost of quality” or cost of “going green.” 	<ul style="list-style-type: none"> • Trace special costs on a project basis or until the chart of accounts can be revised to more easily collect the special costs

Cost analysis involves extracting cost information from the cost accounting system and other sources. Cost control occurs at the point when expenditures are approved, not after the action has been completed. Cost improvement programs are separate projects from the everyday assigning of costs to products, and should involve the collection of project costs separately, as in job costs, that can then be entered into the cost accounting system.

Capital Equipment Justification

Capital equipment justification usually differs from operating cost analysis and improvement, because of the need to evaluate investments over a multiyear period. The major issue is the lack of use of long-term intangible factors in the evaluation process. One study showed that, although capital investment in new equipment is necessary to sustain growth, capital investment may result in reduced productivity for up to a year. A process for managing change must accompany the investment to maximize productivity benefits (Hayes and Wheelwright 1986). In most companies, accounting directly performs, or controls an analysis process that requires justification based on demonstrated cost savings, perhaps using discounted cash flow (DCF) techniques. Few companies incorporate the evaluation of intangible factors that cannot be readily quantified, and even fewer companies attempt to assess the value of (1) avoiding loss of market share, (2) preventing product or process obsolescence, or another similar considerations. This is primarily a concept problem in deciding how to structure the investment analysis. Table 5 describes some problems and possible solutions.

Table 5. Capital Investment Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> • Cost accountants do not consider factors other than direct financial payback effects, such as quality, delivery performance, and customer service. 	<ul style="list-style-type: none"> • Ignore DCF and make decisions within the framework of management, and manufacturing strategy, guidelines. • Supplement traditional DCF analysis with intangible factors. Evaluate project with objective measures; use intangible when objective DCF is negative (project would be rejected) (13). • Use incremental costing (do not apply overhead on some predetermined allocation or absorption basis) to consider all changes in costs. • Use holistic costing to consider the effect of a single project on other phases of the operation (integrated approach). • Use life cycle costing to show the expected life of the product as well as the expected life of the equipment.

Discounted cash flow techniques are not to blame; they are valid methods when appropriately applied and properly used. However, they should be supplemented as appropriate. Capital budgeting and project evaluation should not be done solely by accounting; it is a multi-function process and top management should be active in the process.

Business Planning

Business plans, or the annual plans, prepared by many companies, should integrate the plans from each functional area of the organization, both financial and nonfinancial. The major issue is the level of cost detail and the relationships between costs and other planning variables. At present, business plans tend to be overaggregated and do very little to provide meaningful cost relationships; such information may only be found in the working papers of the public accountants. This is a systems design problem.

Table 6 shows the problems and possible solutions.

Table 6. Business Planning Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> Use aggregate costs instead of costs broken down by major products or major process steps. 	<ul style="list-style-type: none"> Reorganize operation into profit centers, or cells, and work centers, or process steps. Develop fixed and variable relationships; plan at + (-) levels for optimistic or conservative plans.
<ul style="list-style-type: none"> Overhead costs do not properly reflect the effect of volume changes (fixed and variable) or other factors, such as product mix changes. 	<ul style="list-style-type: none"> Provide simulation capability to test the sensitivity of product mix changes. Use direct charges to products to assign these charges (involves having engineers, customer service, accounting, and top management employees filling out a job card).
<ul style="list-style-type: none"> Product costs do not include all costs (selling, engineering and administrative) because of accounting convention or other reasons. 	<ul style="list-style-type: none"> Use some consensus method of allocation (for a fixed period in the future) to allocate expected SG&A expenses.

Business planning usually corresponds to the fiscal year; however, action programs do not necessarily conform to the fiscal year. As a result, it is sometimes difficult to make programs fit the fiscal period. The exclusion of selling, general and administrative expenses (SG&A) from product costs is a financial accounting practice, not management accounting. For cost analysis leading to product line planning, the incremental effect for these costs should be included.

Strategic Planning

The major cost accounting issue in strategic planning is the need for non-financial factors to be used. At present, there is an overemphasis on financial projections, often because other non-financial information is not readily available, or is not compatible with the financial information. The core of lean accounting is using value stream costing and actual product costs in an effort to provide more accurate and timely information that is relevant to both current decisions and future strategies (Kennedy and Huntzinger 2005). This is an organizational concept problem. Table 7 shows some problems and possible solutions.

Table 7. Strategic Planning Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> • Cost accounting does not identify non-value-added costs in preparing product costs. • Cost accounting does not reflect the true cost drivers (what makes the costs increase). • Product costs do not usually identify cost reduction opportunities. • Cost accounting does not involve other functions enough in the preparation of product (standard) costs. 	<ul style="list-style-type: none"> • Distinguish between customer requirements and process inefficiencies; eliminate the latter. • Study costs more carefully to identify the drivers (usually transactions or some type of customer-related problem). • More carefully detail the process steps (with process flow charts). Question each cost to be sure it provides enhanced order-qualifying or order-winning capabilities. • Top management should insist on shared responsibilities in the preparation of product costs and financial plans.

Strategic planning should be the driver and cost accounting a source of information (not the other way around). Top management and other functional managers should understand the numbers they have to work with and use them in an appropriate fashion. As in equipment justification, the cost accounting function should only be one of the participants in generating the numbers used to describe the strategic plan. In addition, strategic plans should not be constrained by the fiscal year; they should be geared to events, not time periods.

Supply Chain Collaboration

Advocates of supply chain collaboration suggest that information sharing is a part of the collaboration process, and that cost information may be an important element of the information shared. Cost information is one of the more sensitive areas for most companies; in fact, many companies may still not share some cost information within their company, much less with other companies. Even if companies are willing to share cost information with other members of their supply chain, the technical problem of how best to do this remains daunting. As described above, some of the most useful information is not

easily available from the present cost accounting systems. Does this mean that sharing with external companies will require customized cost studies, perhaps slightly different for each contact? That appears to be undesirable, if not unrealistic. Table 8 lists some of the problems and possible solutions for supply chain cost information sharing.

Table 8. Supply Chain Information Sharing Issues and Possible Actions

Issues	Possible Actions
<ul style="list-style-type: none"> • There is insufficient trust among supply chain participants to share cost information. • There is uncertainty about the correct information to share. • The cost information to be shared is not routinely available from the cost accounting system. • The interorganizational communication systems are not capable of transmitting the cost information. • The cost information is not sufficiently accurate or consistently reliable. 	<ul style="list-style-type: none"> • Develop the collaborative relationship that fosters trust among participants. • Requires consultation among supply chain members. • Begin with selected bits of information and build toward a fuller range of information. • Begin the process of making the IOS compatible. • Decide what information is important and work to make it accurate.

As Table 8 indicates, there are a number of issues with supply chain cost information sharing and none of them has easy answers. This is certainly one of the major areas to be considered by the cost accounting system designers.

CONCLUSIONS

Problems fall into two broad groups: systems issues and concept issues. Companies have probably made more progress in dealing with the former group than with the latter group.

Systems

The cost accounting issues that are the result of inadequate systems include identification of nonvalue-added costs, allocation of overhead, frequency of standard cost changes, separation of direct

and absorption costs, development of physical and financial measures, and the like. Most of these needs can be satisfied with today's integrated systems that include accounting modules, along with marketing and production planning and control modules. The system capability exists; what a rational company chooses to use depends on the economic implications of the choice. If management chooses not to use the system capability for irrational reasons, they should not fault the system.

To say that many of the cost accounting questions or issues can be solved through the proper choice and use of an integrated information system is an oversimplification; the choice and implementation of an appropriate cost accounting system is a major project. However, good software packages are available with enough features to satisfy most applications. While a full discussion of this systems topic is beyond the scope of this paper, companies can consider the following:

- Look at their information needs from a global perspective, to include marketing, production, engineering and other functions, as well as accounting and finance. This requires an integrated information system.
- Consider buying software "off the rack" instead of having it custom-tailored. Many companies cling to outdated or unnecessary practices that could be changed to fit the system instead of insisting on changing the system to fit them.

If a company's cost accounting system is inadequate, they should look around to see what is available.

Table 9 summarizes the major modifications needed to adapt the cost accounting systems to be more useful for the various applications discussed earlier.

Table 9. Major System Modifications

Application	System Modification
Inventory valuation Product pricing	Refine the cost accounting system to allocate overhead costs in an acceptable manner
Performance measurement Cost analysis for improvement Capital equipment analysis	Supplement the cost accounting system to include the physical units that are more meaningful for analysts
Business (annual) planning Strategic planning Supply chain collaboration	Extend the system to link past cost relationships with future (projected or targeted) cost relationships that are compatible among entities

Concepts

The deeper-rooted issues, of a conceptual nature, are just beginning to get attention. The following observations address these long-term opportunities.

- Both accountants and nonaccountants have focused widespread attention on cost accounting and product costs. This is a positive step because, in the past, while management accountants recognized the need, they were not motivated, or not able, to convince others of the need to act. As a result, only a few companies understood why they should do something and what they should do.
- Non-accountants have been willing, even eager, to identify the problem; hopefully, they will be just as willing to participate in the solution. The solution requires a holistic (multi-functional) approach to management, just as with most of today's vital programs, such as Total Quality Management or Six Sigma, Just-in-Time or lean manufacturing, and Strategic Planning.
- Management accounting must be reestablished as the primary reason for accounting; financial accounting must learn to adapt. If managers have better cost information, they will do a better job of managing, the financial results will be better, and satisfying external financial reporting requirements will be easier. If the news is good, the form of the report is less important.
- All managers need to have a better understanding of accounting and its use in business applications. Too many accounting courses for non-financial managers teach bookkeeping methods, not accounting issues and logic. The universities have a responsibility to provide the technical and conceptual skills required in this area.
- There are no quick fixes; the answer lies in communication and cooperation, which are behavioral and systems (as in General Systems Theory) issues. There is adequate systems technology (hardware and software) available to do a much better job; the bottleneck is in understanding what needs to be done and then adapting attitudes to make action effective.

- The trend toward simplicity, such as in JIT and lean manufacturing, will reduce the complexity of the accounting environment. As a result, the mystery of some cost accounting areas, such as in transfer pricing, equivalent units, and joint costs, will become less relevant.
- Fixing some other problems (process and product focus, technology development and application, quality and productivity) may clear up some of the accounting problems. Accounting only reports the marketing and operations problems; it does not cause them. If businesses do a better job, there will be fewer controversial "accounting" rules and practices.

One of the more innovative ideas has been proposed by Johnson (2006 and 2006a). He suggests that it may be time to consider eliminating the link between management accounting and financial accounting; rather, companies should design a management accounting system that helps management and is not constrained by the need to link directly with the externally reported financial results. He suggests that the emphasis should be on improving operations and that other approaches should be used to measure and report results.

There is reason to expect that cost accounting can become more useful; however, the problems are not all caused by the system or accounting rules. Management must be willing to deal with the real problems in a constructive way, by supporting a multi-function approach to identifying their specific needs and implementing a program to satisfy those needs.

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HUMAN RESOURCE ACCOUNTING FROM AN INTERNATIONAL PERSPECTIVE

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ABSTRACT

Human Resource Accounting (HRA) involves accounting for the company's management and employees as human capital that provides future benefits. In the HRA approach, expenditures related to human resources are reported as assets on the balance sheet as opposed to traditional accounting which treats costs related to a company's human resources as expenses on the income statement that reduce profit. HRA suggests that in addition to the measures themselves, the process of measurement has relevance in decision-making involving organizations. Although the origins and early development of HRA occurred mostly in the United States, interest and contributions to growth in the field have been evident in a number of other countries. This paper provides a brief overview of HRA and sample of work in the area from an international perspective.

INTRODUCTION

In the United States and many other countries, the economic environment has seen a fundamental change from industry based with a focus on physical assets such as machines and equipment to a high technology, information, innovation based environment with a focus on the expertise, education, creativity, skills, and experience of people—human capital. However despite the human capital intensive economy, traditional accounting continues to focus on traditional assets to the exclusion of the more important human assets. Traditional financial accounting in external financial reporting, including annual report statements, still treats human resource-related costs as expenses which reduce profit on the income statement, rather than as assets on the balance sheet which provide future benefits.

Early Developments of HRA in the United States

Early organizational psychologists studied leadership effectiveness from a human resource perspective based on the premise that people were valuable organizational resources. (Likert, 1961, 1967; Odiorne, 1963). The recognition that organizations' human capital should be considered valuable human assets led in the 1960s to the development of the field of "Human Resource Accounting." Roger Hermanson, while he was a Ph.D. candidate at Michigan State University, conducted one of the earliest works in HRA. In a

pioneering monograph, Hermanson (1964, 1986) suggested a model to measure human resource value in external financial reports. Additional research during the early stages of development of HRA was conducted at the University of Michigan by a research team including the late organizational psychologist Rensis Likert referred to above, founder of the University of Michigan Institute of Social Research and well known for his work on management styles and management theory, faculty member R. Lee Brummet, and then Ph.D. candidates William C. Pyle and Eric Flamholtz. The group worked on a series of research projects designed to develop concepts and methods of accounting for human resources. One outcome of this research Brummet *et al.* (1968a) was a paper representing one of the earliest studies dealing with human resource measurement-- and the one in which the term "Human Resource Accounting" was used for the first time. Brummet *et al.* (1968b) also published another article in which they assessed the impact that HRA can have on management. Flamholtz's (1969) Ph.D. dissertation, an exploratory study in the area of HRA, developed a theory of an individual's value to an organization and how it could be measured through HRA. Brummet *et al.* (1969) focused on HRA as a tool for increasing managerial effectiveness in the acquisition, development, allocation, maintenance, and utilization of its human resources. The authors' work represented one of the first attempts to develop a system of accounting for a firm's investments and studied the application of HRA in R.G. Barry Company, a public entrepreneurial firm.

The early work in HRA provided inspiration for the next phase of early HRA development, basic academic research developing measurement models. Interest in HRA was evident in the many studies conducted since its inception, as noted in Sackmann, Flamholtz and Bullen (1989), Flamholtz, Bullen and Hua (2002), and Flamholtz, Kannan-Narasimhan and Bullen (2004).

Human Resource Accounting in External Financial Reporting

HRA has implications for both external financial reporting and internal managerial reporting. External financial reporting is utilized in financial statements in organizations' annual reports distributed to external users such as stockholders, bankers, and potential investors and lenders. External reports for public companies, and often for private companies seeking financing, must follow "generally accepted accounting principles" (GAAP) in order to encourage objective, reliable and verifiable measurement to facilitate assessment of the company's financial standing and comparability among organizations. It is recognized that there are problems with reporting human assets on the balance sheet for external financial reporting because there is subjectivity in measuring human assets. The same is true for reporting intangible assets such as goodwill and patents that have been internally generated rather than paid for through a corporate acquisition. Just as GAAP does not allow reporting of human resources as assets, accounting rules do not allow for these intangible assets to be reported as assets.

Another problem in the development of HRA for external reporting purposes is the possibility that the benefits from investment in intangible assets are uncertain both in terms of economic feasibility and the duration of benefits. Lack of transferability refers to the possibility that intangible assets are firm specific and cannot be transferred from one

organizational entity to another in case of liquidation. Researchers in HRA have been highlighting the invalidity of these reasons for exclusion of human assets in the financial statements. For example, in a study of 350 companies, Jensen (2001) found that the most severe barriers to measuring intangibles included lack of concrete tools, time and resources, and that one of the significant barriers for reporting of human resources included the lack of recognized valuation approaches. Turner (1996) stated that inclusion of capital value of human resources as an asset would assist stakeholders in deciding if the organization has generated an acceptable rate of return on the assets invested. Moore (2007) argues that timely and appropriate training activities are needed to get the employee “installed and started up.” Under traditional accounting, typically installment and setup costs for machinery and equipment are capitalized as assets, although employee training is not. Moore continues to argue that in same way that installation of capital equipment and effective training of the workforce is essential to the startup phase and to the planned return on a company’s investment, identifying, selecting, and recruiting the best qualified individuals are also crucial for the company realizing a return on its investment. However Moore laments that nowhere does the balance sheet state the value of the company’s human capital assets, and that it should at the very least allow an estimation and notation of that asset value. He notes that while most companies acknowledge the contributions of its employees, they do not treat the acquisition and disposal of human capital assets in the same way or with the same thoughtful and strategic planning as they do fixed capital assets.

Despite these arguments, researchers have not succeeded in convincing the accounting profession of the logic behind including the monetary value of human resources in the financial statements. Identification of problems in the field of HRA is a necessary part of the growth of the field so that these problems and bottlenecks to growth can be addressed. As noted in Flamholtz, Kannan-Narasimhan, and Bullen (2004), some of the main stumbling blocks identified in the last decade include lack of a meaningful system of measurement, appropriateness of measuring human assets by a monetary value, and the fear in organizations about the disarranging of the existing social order due to HRA implementation.

Whereas some proponents of HRA argue that it should be on the balance sheet now, it is acknowledged that more applied research, case and field studies are needed in the development of HRA measurement techniques. Until HRA measures become widely accepted and used, the role of HRA in external financial reporting may best work as supplemental information to the external financial statements.

Human Resource Accounting in Managerial Reporting and Decision-Making

The best use of HRA may be as a managerial tool to aid in making decisions that will benefit the long-run strategic goals and profitability of the company. As opposed to external financial reporting, managerial reporting does not require adherence to a strict set of GAAP in specific financial statements in acceptable format reported to the public. However even if human assets are not reported on the face of external financial statements, HRA can play a crucial role in internal managerial decision-making, and HRA measures

can be used to show that investments in a company's human resources may result in long-term profit for the company.

When managers go through the process of HRA measurement treating human resources as capital assets, they are more likely to make decisions that treat the company's employees as long-term investments of the company. Flamholtz (1979) describes the HRA paradigm in terms of the "psycho-technical systems" (PTS) approach to organizational measurement. According to the PTS approach, the two functions of measurement are: 1) process functions in the process of measurement and 2) numerical information from the numbers themselves. Whereas one role of HRA is to provide numerical measures, an even more important role is the measurement process itself. The HRA measurement process as a dual function attempts to increase recognition that human capital is paramount to the organization's short and long-term productivity and growth. When managers go through the process of measuring human resources, they are more likely to focus on the human side of the organization and are more likely to consider human resources as valuable organizational resources who should be managed as such.

For example in a potential layoff decision, with use of HRA measures in addition to only traditional accounting measures, management is better likely to see the hidden costs to the company's human resources and the long-term implications to the human assets. This is because HRA views human resources as assets or investments which must be maintained for long-run productivity. Layoffs may affect future long-term flows profits from lost productivity, costs of rehiring and retraining when business returns, and costs of lower morale of existing workforce. If management quantified the actually costs of layoffs, management might be less inclined to use layoffs as a way to cut costs and boost short-term profits at the expense of long-run productivity and profits.

Hermanson, Ivancevich and Hermanson (1992) commented on the pitfalls of layoff decisions made based solely on traditional financial accounting measures which treat employees as expenses. These authors note that whereas some downsizing of U.S. firms is justified, some companies have gone too far, and that the culprit is overemphasis on traditional financial statement effects. Because financial accounting emphasizes the good side of layoffs and ignores the bad side of human asset depletion, it is easy to see how companies can be led astray when they focus primarily on the traditional financial statements effects of their decisions.

Wilson (2001) notes that the words "downsizing" and "rightsizing" became popular business jargon during the 1991-1992 recession, and given the uncertain financial climate, many companies have again looked toward downsizing. Wilson indicates that downsizing may result in more problems than it solves because it puts the organization's survivors on overload and often doing work for which they were not trained, stressed, and burned out sometimes even to the point of leaving, and often resulting in decline of morale which may adversely affect the bottom line. The author suggests taking a more strategic approach using the fundamental business performance measure of return on investment—but including employee costs such as salary, benefits, training, payroll taxes and share of administrative costs as investments in the Return on Investment (ROI) calculation.

In evaluating management and employee educational and training programs, management's involvement in a measurement process which analyzes these outlays as investments in human resources will likely result in management taking a longer-term approach. This will benefit the company, as opposed to a short-term cost-cutting approach to boost short-term profits at the expense of long-run productivity and competitiveness.

Flamholtz, Bullen and Hua (2003) utilized the HRA measure of expected realizable value, and found that employees' participation in a management development program increased the value of the individuals to the firm. In addition the authors noted (p. 40) that the HRA measures provided upper level management with an alternative accounting system to measure the cost and value of people to an organization. Thus HRA represented both a paradigm or way of viewing human resource decisions, and the set of measures for quantifying the effects of human resource management strategies upon the cost and value of people as organizational resources.

Davidove and Schroeder (1992) indicate that too many business leaders have no generally accepted definition or accounting procedure for tracking training investments, and note that a lower training investment is not automatically better for an overall return on investment. The authors suggest that although many business leaders still view training as an overhead expense, with thorough ROI evaluations training departments can convince business to view them as partners in creating the assets crucial to organizational success.

Other authors have expressed similar views suggesting the benefits of HRA measurements and the process of measuring human resources. For example Johanson and Mabon (1998) indicate that expressing human resource interventions in financial terms and /or cost benefit terms is more effective than using soft accounting information such as data on job satisfaction. Because the classical function of accounting is the determination of the value of the economic activity, performing analysis with hard numbers such as cost-benefit analyses helps us determine how resources should be used by human resources for various interventions. Toulson and Dewe (2004) conducted a survey study utilizing component analysis and found two reasons why measuring human resources is important. The first is that measurement reflects the strategic and competitive importance of human resources, and the second suggests that to earn credibility, human resources must be expressed in financial terms. McKenzie and Melling (2001) suggest that, if properly implemented, the human capital planning and budgeting process will become a key driver of strategy in that strategic human capital planning and budgeting ensures that the best resources are mobilized for each internal process. They indicate that too often organizations focus 100% on meeting the financial budget first without consideration of the effect the cost slashing will have on strategy, and note that the financial numbers are a lagging indicator of where a firm has been and should not be substituted for leading indicators of where the firm is going. Rather management should focus clearly on causal, leading indicators that drive successful financial measures, and that it is through skills-based budgeting that the fallacy of financial focus can be avoided.

Moore (2007) suggests that the value of human capital should be more fully considered when making decisions about the acquisition and disposal of people—and notes that the

accounting practices currently employed by companies can have an undue influence in driving the strategic decisions of these companies. Moore notes that there are parallels between the process of acquiring an employee (a human capital asset) and that of acquiring a fixed capital asset. However while most companies acknowledge the contributions of its employees, they do not think of the acquisition or disposal of human capital assets in the same way or with the same thoughtful planning or strategic thinking as they do fixed capital assets.

HRA Measurement Models

Human Resource Accounting may be measured in terms of human resource cost or in terms of human resource value. According to Flamholtz's model for measurement of original human resource costs (1973, 1999, p. 59), human resource costs may be explained in terms of the two major categories of acquisition costs and learning costs. Acquisition costs include the direct costs of recruitment, selection, hiring and placement, and the indirect costs of promotion or hiring from within the firm. Learning costs include the direct costs of formal training and orientation and on-the-job training. In a human resource accounting system, these costs are reported in asset accounts with future economic benefits rather than as expenses.

Flamholtz (1999, p. 160) noted that the concept of human resource value is derived from general economic value theory, and like all resources people possess value because they are capable of rendering future service. Thus as Flamholtz notes, an individual's value to an organization can be defined as the present value of the future services the individual is expected to provide for the period of time the individual is expected to remain in the organization.

The Stochastic Rewards Valuation Model, originally developed by Flamholtz (1971) for human resource valuation, and further explained in Flamholtz (1999), is a five step process that begins with defining the various service states or organizational positions that an individual may occupy in the organization. The next step is to determine the value of each state to the organization, the service state values, which can be calculated either by using a number of methods such as the price-quantity method or the income method. Then the person's expected tenure or service life in the organization is calculated and the person's mobility probability or the probability that a person will occupy each possible state at specified future times is derived from archival data. Next the expected future cash flows that the person generates are discounted in order to determine their present value. According to Flamholtz (1999, pp 160-161), there is a dual aspect to an individual's value. First, the person's "expected conditional value," is the amount the organization could potentially realize from his or her services if the person maintains organizational membership during the period of his or her productive service life. Second, the person's "expected realizable value." is the amount actually expected to be derived, taking into account the person's likelihood of turnover.

Using the SRVM, Flamholtz, Bullen and Hua (2003) showed a practical method for calculating ROI on management development, and showed the incremental cash flows that

an organization will receive due to investment in management development. The article concluded that use of HRA as a tool to measure the value of management development enhances not only the value of human capital but also the value of management accounting.

One of the earliest models of human resource value measures human capital by calculating the present value of a person's future earnings (Lev and Schwartz, (1971). Dobija (1998) proposes an alternate model for capitalization, where the rate of capitalization is determined through the natural and the social conditions of the environment. Utilizing a compound interest approach, this method takes into account the three factors for valuing the human capital embodied in a person. These include the capitalized value of cost of living, the capitalized value of the cost of professional education, and the value gained through experience. Alternately, Turner (1996) refers to the framework issued by the International Accounting Standards Committee and recommends the use of the present value of the value added by enterprise, and measures assets by the four methods of historical cost, current cost, realizable value and present value. Cascio (1998) proposed a method for measuring human capital based on indicators of human capital of innovation, employee attitudes and the inventory of knowledgeable employees. According to this method, innovation commands a premium and therefore needs to be measured, for example by comparing gross profit margins from new products to the profit margins from old products. Employee attitudes predicting customer satisfaction and retention are an important indicator of human capital and therefore need to be measured, as well as measures of tenure, turnover, experience and learning.

HUMAN RESOURCE ACCOUNTING FROM AN INTERNATIONAL PERSPECTIVE

Interest in HRA related reporting has grown in a number of countries across continents. In discussing "HR metrics," Hansen (2007) notes that two thirds of the 250 largest companies in the world now issue sustainability reports along with their financial reports in order to capture the full value of the organization. Global standards for sustainability reporting require the disclosure of workforce data that reflect the potential for future performance and profitability. Sustainability reporting has been formalized under guidelines by the Global Reporting Initiative, an international network of business, labor investors and accountants. Schwartz and Murphy (2008) also comment on human capital metrics, suggesting that a class on the subject would benefit all undergraduate management majors. They suggest that primary among those benefits is a change in mind set toward using data and metrics to design and evaluate management policy rather than relying on experience, fad or hype; and suggest that students familiar with HR metrics should be better equipped to prove and enhance the contributions of human resources to their organizations.

Some research has included aspects of HRA in studies examining and comparing reporting practices of a number of countries. A study by Subbarao and Zehgal (1997) gave a macro-level perspective to HRA disclosure in financial statements by analyzing the differences

across countries in the disclosure of human resources information disclosure in annual reports across six countries. The authors found differences in disclosures of HR information across countries and provided accounting and financial professional insights on the HR information areas they need to focus on in their country. In another study, Boedker, Mouritsen and Guthrie (2008) examined contemporary trends from Europe, Australia, and the United States, in “enhanced business reporting” (EBR), which includes aspects of HRA. The authors found a vast diversity in international EBR practice, including measurement and reporting models, and suggested the need for further research about the barriers to and consequences of harmonization. The paper covers contemporary debate on EBR and seeks to inform the US SEC Advisory Committee on Improvements to Financial Statements (Prozen Committee).

Other research has focused more specifically on the authors’ country, but often with implications for the international development of HRA. Examples of this work follows.

Scandinavia

The Scandinavian countries have taken a particularly strong interest in the area of HRA. For example, the Value Driving Talks (VDT) model, developed by Arne Sandervang (2000), and tested in an empirical study in a Norwegian business firm in the electrical sector, calculates financial returns on an organization’s investments in competence development. It focuses on employee training or competence development as its strategic focus, and aligns investment in competency development to the overall business strategy to help organizations with their strategic human resource management goals. VDT, founded on the basic premise of participant’s involvement and motivation in the process of competence development, begins with analyzing the company’s expected economic results and defines the competencies required among the workforce to achieve these results. Once the gaps in competencies have been identified, the aims for the competency development process are set, and then the actual learning process is conducted. On the completion of the learning process, the participants are expected to have gained the competency and changed their behavior, which in turn helps the company achieve its economic results. The participants assess the benefits of the competency program through a benefit description statement that shows a comparison of the potential benefits and experienced improvements. A calculation is then made of the benefits to the company and compared to the costs of training in order to arrive at the Return on Investment of training and development.

Two Swedish studies experimented with reporting HRA measures in financial statements. The Statement of Human Resources, published by Telia, a Swedish National telecommuting Company (Telia, 1996) and the Statement of Human Resources provided by the Swedish Civil Aviation (Swedish Civil Aviation Administration, 1998) provided some insights on the reporting formats. In case of Telia, in addition to a human resources report, the financial statements included a profit and loss account and a balance sheet that included investments in human resources. The statement provided by the Swedish Civil Aviation Administration provided the human resource income statement and a human resources balance sheet showing the change in the percent of value of human capital,

number of employees and the calculated value of human capital, in addition to other key personnel indicators.

Roy (1999) reports on a case study on Skandia Group- one of the first companies known for its work on intellectual capital, and provides an interesting example for organizations desirous of managing their intellectual capital. Included in the case study is the process of development of the Skandia Navigator and the Dolphin Navigator under the guidance of Leif Edvinsson, one of the first persons to be documented as a knowledge manager, The Skandia Navigator successfully introduced new business ratios that emphasized an organization's intangible assets rather than tangible ones. The Dolphin Navigator developed was an IT infrastructure that would help to distribute information regarding Skandia Navigator business planning world wide in a cost effective manner. Roy also discussed the case study from the standpoint of pitfalls and the risks of implementation of such a system and the ways organizations can learn through feedback.

Grojer (1997) gives an interesting perspective on why HRA has taken roots in Scandinavia especially Sweden, as compared to other parts of Europe, by suggesting that human resource accounting measures can be successfully introduced only when it suits the social order in organizations—and Scandinavian management and the Swedish organizational social order suits HRCA. Grojer notes that introduction of new personnel key ratios in financial key ratio pages in organizations may result in the change in the social order between the management elite, and will therefore be a problematic process. A possible conclusion from this perspective is that human resource measures may be introduced smoothly in organizations when these measures would conform to the organizational social order. However Grojer notes that is not an established fact and further research needs to study this area of HRA and social order in organizations in order to help us understand the full implications of this factor.

Olsson (1999) studied measurement of personnel through human resource accounting reports as a procedure for management of learning in the hospital sector of Northwest of Stockholm, and reported that learning in smaller groups is an effective means to make organizational communication regarding intellectual capital within the organization, helping organizations learn better on how to report human resources value. Olsson (2001) provided information on annual reporting practices related to human resources in corporate annual reports of major Swedish companies

Vuontisjarvi (2006) explored by means of content analysis the extent to which the largest Finnish Companies have adapted socially responsible reporting practices in a research study focusing on Human Resource (HR) reporting in corporate annual reports with criteria set on the basis of the analysis of the documents published at the European level in the context of corporate social responsibility with special attention to the European Council appeal on CSR. The results of the content analysis indicate that although social reporting practices are still at an early stage of development in Finland, the most reported theme was training and staff development. A positive sign was that the majority also disclosed themes of participation and staff involvement and employee health and well-being, and nearly one third made references to their work atmosphere or job satisfaction

survey. However disclosures lacked overall consistency and comparability with each other, and quantitative indicators were disclosed by few.

United Kingdom

Morrow (1996 and 1997) investigated the concept of football players in the United Kingdom as human assets and the importance of measurement as the critical factor in asset recognition. In another publication Wagner (2007) suggested that human capital (people and teams) is one of the intangible assets that investors look for in valuing a company, along with structural capital (processes, information systems, patents) and relational capital (links with customers, suppliers, and other stakeholders). However, according to an analysis of more than 600 manufacturing and service companies in research led by Dr. Chris Hendry, Centenary Professor of Organizational Behaviour and Human Resource Management at the Cass Business School, City University of London, Wagner notes that annual reports now overemphasize the role of relationship capital in company performance and minimize the role of human capital, giving a skewed view of companies' future performance. A conclusion was that the long-term value of innovative workers is not getting enough attention from companies preparing annual reports for investors, according to research for Britain's Economic and Social Research Council. Although the annual reports provide glowing accounts of R&D spending and numbers of patents, including those generated by the innovators have left the company, the reports are less likely to focus on the numbers of innovators that have left the company and have thus reduced the company's future prospects for innovation.

Australia and New Zealand

Gusenzow and Tower (2006) note that the Australian Football League (AFL) is Australia's premier spectator sport involving millions of people across a wide range of communities, and that it is not surprising that the most valuable assets as regarded by AFL clubs and the AFL hierarchy are the players, the organization's biggest revenue drivers. However in the authors' survey of 79 AFL-linked individuals and 58 accountants and accounting academics to assess whether key stakeholders considered putting the value of players on a balance sheet a plausible idea, findings showed that the majority of respondents disagreed with the concept of showing the value of AFL players in their clubs' balance sheet. However it is interesting to note that the results from the logistic regression analysis and ANOVA analysis show there is a significant relationship between the concept of valuing AFL players, and both the type of respondent and their knowledge of accounting. Gusenzow and Tower note that although player valuation is a plausible and arguably important idea, a reason for the resistance by AFL respondents could be that AFL has a salary cap to limit amounts paid to players and no transfer fee system. Although the evidence from study did not demonstrate a need to implement player valuations, a move towards financial statement player valuation may be needed if AFL clubs emulate other overseas sporting codes and list on the stock exchange.

Other Australian authors Whiting and Chapman (2003) also investigated the merits of HRA in a professional sport—rugby. The authors comment that the Australia and New

Zealand rugby union is a combination guaranteed to stir patriotic feelings across the Tasman. The authors raise the question that since rugby players are the team's most valuable assets, should their value be placed on the balance sheet, and does doing so make any difference to decisions made by financial statement users. They comment that professional sport has been prevalent in the United Kingdom and the United States for nearly 200 years, but arrived much later in Australia and New Zealand. In the United Kingdom and the United States, professional sports teams' financial accounts often incorporate HRA, in which a value for the employees is placed on the balance sheet and is amortized over a period of time, instead of expensing costs. The authors refer to the big question being whether HRA information is more useful to the decision-maker than the alternate expensing treatment, and that past research has shown that sophisticated users of financial information do make significantly different decisions with the different presentations. The outcome was tested in New Zealand in a survey questionnaire responded to by 64 members of the professional body Institute of Chartered Accountants of New Zealand. On an overall basis, the study shows that generally accountants will make the same investment decisions regardless of whether human resource information is expensed or capitalized. The authors noted, however, that their exercise only explored one type of decision-making process, and that prior studies may have been of a wider nature, thus explaining the differing result. They then suggest that if HRA is to follow the international trends emerging in intangibles reporting, capitalized human resource information may become more prevalent.

India

Interest in measuring human capital has also been apparent in India. Mahalingam (2001, p. 19) notes that "Pundits of today assert that while the other forms of capital, including material, equipment, tools and technology, only represent inert potentialities, it is the human capital that converts this potential and energises the creation of wealth." This author suggests a human resource value approach based on a person's skills and the returns these skills are expected to return over the next five years, with future years discounted to arrive at the current value. Mahalingam notes that each person has a set of competencies and a value is assigned to each, with the sum total of these values making up the value of the employee and the value of all the employees making up the human capital of the organization—which together with the customer and structural capital produces the revenue. In a case study conducted in India, Patra, Khatik and Kolhe (2003) studied a profit making heavy engineering public sector company which used the Lev and Schwartz model to evaluate HRA measures. The authors examined the correlation between the total human resources and personnel expenses for their fitness and impact on production. They found that HRA valuation was important for decision-making in order to achieve the organization's objectives and improve output.

Bhat (2000, p. 1) provides a definition of "HUMAN resources accounting" as depicting the human resources potential in money terms while casting the organization's financial statements. The author refers to several measurement models including the Brummet, Flamholtz and Pyle model (1968a, 1968b, 1969) based on historical cost method with provisions for appropriate depreciation and replacement cost of acquiring, training and

developing the entire human resources, and competitive bidding proposing the capitalizing of the additional earning potential of each human resource in the organization. The author also mentions the Jaggi and Lau (1974) model estimating the human resources worth on a human resource groups basis with the groups accounting for productivity and performance, and Hermanson's (1964, 1986) unpurchased goodwill method in which the marginal higher earning potential of human resources in comparison with similar industries is capitalized. Bhat notes that with global trade and foreign exchange transactions becoming more complex with innovations in derivatives, more uniformity in accounting practices and transparency will emerge. The authors suggests that accounting and financial management issues will soon be integrated in accounting statements facilitating more meaningful use of accounts, as opposed to history and bookkeeping.

China

Tang (2005) focused on a measurement of human resource cost in developing a heuristic frame addressing the link between human resource replacement cost and decision-making, in a human resource replacement cost (HRRC) system. The system measures direct and indirect costs of human resources, which is then applied to a company within the metro industry in China. The author includes a suggested measure of learning cost, cost of lost productivity, and cost of job vacancy and discusses the usefulness of the HRRC model in decision-making in such areas as employee turnover, separation indemnity, duration of labor contracts, and personnel budgets in monetary terms. Tang (p. 2) notes that an increased focus on human resource management and improved information technology has led to a saying "what you cannot measure, you cannot manage." The author adds that since the time when China espoused an open policy of reform there have been many brave attempts to seek new ways for handling organization and management. Tang (p. 14) also suggests that HRA information can aid in budgeting of human resources recruitment and development. The hard costs in human resource replacement cost are the actual investments in human resources which reflect the historical direct costs of recruiting, orientating, and training people. Combining these hard costs with human resource demand can help a company budget its personnel activities more reliably. Tang (p. 15) notes that the system of accounting for replacement cost in people is an attempt to improve the quality of information available for facilitating effective human resource management, providing information necessary for a cost/benefit analysis and decision making in areas such as employee turnover, separation indemnity, duration of labor contract and personnel budgets in monetary terms. Care should be taken to recognize that high human resource costs should not be viewed as negative and low costs as positive in that, for example higher costs could indicate higher-quality training. Although the HRRC system developed was based on a pilot study and still requires refinement and extensions, it does represent a meaningful contribution to the practice of HRA, and an expected result is a new awareness by management of the high costs of turnover.

Ng (2004, p. 26) further comments on the benefits of HRA related information and notes that measuring and managing human capital is not rocket science, but is (p. 26) "simply a defined framework to maximise the only real competitive advantage companies have in the knowledge economy—their human capital assets." Ng notes that to derive and quantify

value from this human asset requires human capital analytics—an entirely new class of systems that aggregates HR data financial, customer and supplier information for exploration, analysis and presentation. According to the author, human capital analytics supports rapid decision backed by quantifiable, accurate information and defensible forecasts, and in addition helps identify essential insights that allow organizations to proactively apply strategic human capital initiatives to meet corporate objective.

Portugal

Bras and Rodrigues (2008) analyzed two competing approaches to accounting for a firm's investment in staff-training activities: the accounting and labour economics approach which argues that no asset should be recognized from training activity and the human resources management approach, espoused by HRA, that advocates recognition of an asset. The authors used document analysis and interviews in their attempt to understand the training phenomenon from the company's point of view. The paper provided a case-based empirical analysis of accounting and human capital and asset recognition arguments, and clarifies the situation in which assets should be recognized as generated by training expenditures.

Germany

Schmidt and Minssen (2007) explored to what extent human resource practitioners value and account for international assignments, and to relate these findings to the human resources cost accounting context. The authors drew on data from a quantitative survey among 415 German chemical companies and expert interviews with human resource managers from eight chemical companies. They found that human resource managers appreciate the positive effect of overseas assignments on personal development, but often underestimate the long-term benefits of an international assignment for the company.

Canada

Jones (2000, p. 9) writes that "Financial reporting systems need to account for people." The author indicates that the issue of providing bottom line worth for training, wellness programs or employee satisfaction surveys remains an ongoing struggle with HR executives in Canada, and laments why one is required to make the business case for something that is intrinsically known to be important to financial importance. The author refers to the International Accounting Standards Committee (IASC) recently published standard on Intangible Assets (IAS 38) and comments on reports that investment and awareness of the importance of intangible assets have increased significantly in the last two decades. Furthermore the author notes that while the standard is expected to have no direct impact on how Canadian chartered accountancy firms report and file (unless the firm is multi-national with offices in countries required to comply with IASC standards) it does give a global definition to intangibles. Jones (p. 2) called for researchers to team up with practitioners to create the knowledge base required for the development of a whole new measurement system for value creation that would operate in parallel with the existing value realization measurement system. The author noted how the Canadian Performance

Reporting Initiative Board is being established to advance knowledge in the intellectual capital management and other areas critical to performance measurement, providing a golden opportunity for HR leader to work together to ensure that people count.

Greece

Andrikopoulos (2005) attempted to bridge the gap between traditional financial theory and intellectual capital (IC) reporting by proposing a model where organizational priorities were set as the solution to a portfolio selection problem. The solution to this problem provides priorities for organizational change. The author notes that the quantitative approach in the paper requires extensive use of data on organizational performance found in IC statements, and that when it comes to human capital IC reporting, works on results from HRA, which have been extensively applied in the academic and business communities. Andrikopoulos found that the model helps discover corporate strengths and uses them to set organizational priorities for IC value creation.

CONCLUSION AND IMPLICATIONS

International contributions made to the field of HRA have resulted in growth of both the field HRA and the wider study of human capital, human resource metrics, intellectual capital, and organizational management. Along with advances in HRA theory, it is encouraging to note that some studies have been based on empirical research, case and field studies. Even studies pointing out bottlenecks and controversies to growth have resulted in opportunities to suggest improvements. Both the process and inclusion of HRA measures in human resource decisions is expected to have implications from the standpoint of providing measures that can compete with other investment proposals for the firm's resources, and demonstrate that the long-term benefits from such investments can be positive. In addition, the very process of measurement can influence management to think in terms of human resources as increasing the value of human capital or human assets that will provide expenditures for the company's future benefits, rather than in terms of expenses. This will promote a longer-term profit perspective compatible with a long-term strategic planning approach for the organization, rather than a strictly short-term profit perspective which may neglect maintenance and jeopardize the long-term security of its most valuable capital investments and assets. Continuing interest in human capital and HRA is compatible with a growing focus on the importance of an organization's intellectual capital in both external investment and internal managerial decisions.

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ELECTED OR APPOINTED SCHOOL BOARDS: IS ONE MORE ACCOUNTABLE THAN THE OTHER?

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ABSTRACT

The election of school boards is relatively new to Virginia citizens. Only within the last 16 years have they been able to determine who will direct the education process of local school districts. Has this “say” made a difference? This study compares the expenditures for elected and appointed school boards in Virginia. After controlling for size, results suggest that the levels of expenditures were similar for both elected and appointed school boards. It does not appear that the presence of elected school boards has made a difference in school spending.

INTRODUCTION

The education of children is a huge responsibility—one that oftentimes leads to considerable debate among parents, educators, politicians and more. While a state government is important in the education process, local school boards serve as the primary policy-makers within a school district. These boards have the power to create local policies, rules and regulations for the daily operations of the school district. Consequently, school boards often are at the center of every education debate that takes place within a locality. This paper analyzes whether the method of school board member selection, appointment or election, makes a difference in a school district’s operations. The first section briefly describes Virginia’s school system and the interrelationship of school districts and localities while the second part describes the proposed research method and results of the preliminary study. The third section discusses future research opportunities.

VIRGINIA’S SCHOOL SYSTEM

According to the Constitution of Virginia, responsibility for the education of elementary and secondary school-age children in the Commonwealth rests with the General Assembly. These responsibilities include determining how local school boards should be chosen. Until 1992, school boards in Virginia were appointed by the governing board of each locality or by a special school board selection commission tasked with these appointments. The General Assembly “resisted efforts to change the method for choosing school board members because of the belief that the schools should be insulated from politics.” [3] However, in 1992, Virginia’s General Assembly passed legislation allowing localities to place a referendum on their ballot. This referendum provided citizens with the opportunity to vote on whether or

not their local school board should be elected or continue to be appointed. In the 16 years since this legislation passed and Virginia voters began to choose, 82 percent of the local school boards now have elected members. Some localities, such as Hanover County and the City of Norfolk, placed the referendum on the ballot; however, the citizens did not approve the change. Those localities continue to utilize appointed school boards.

Why did so many localities choose to elect their local school board members? For many, much of the debate prior to a referendum focused on the need for a school board that was more responsive to the needs of the citizens and more accountable to the public. After the citizens of Charlottesville passed the referendum in November 2005, University of Virginia Professor Jeffrey Rossman, one of the individuals spearheading the city's referendum, commented that the school board should now be able to move "in the direction of greater accountability and greater diversity." [2]

While local school boards are responsible for the daily operations of a school district, it is important to realize that Virginia's school systems are unique in that they are financially dependent upon the local county or city government system. The local county or city governing board must provide funding for school operations since school districts have no taxing power. This "dichotomy of responsibility for budgetary and policy decisions at the local level may provide a balance of power for education while creating an inherent conflict between the local governing bodies and the local school boards in Virginia." [3]

Has the election of local school boards actually resulted in more accountability? Or has it resulted in governing bodies that want to stay in office and are willing to do whatever it takes to do so? The ability to elect school boards has not led to a utopian educational system. New problems have arisen while old problems continue to exist. Citizens of some localities, such as Virginia Beach and Fairfax County, have questioned the success of elected school boards. The purpose of this analysis is to evaluate whether elected school boards are more accountable to the citizen than their counterparts, appointed school boards.

METHOD

Evaluating the hypotheses required several sets of data including the school districts from the Commonwealth of Virginia and an identification of their status as either elected or appointed. Of the 135 school boards in the Commonwealth, 111 are elected and 24 are appointed. The school districts are represented at the town, city, and county levels and of the elected boards, 2 are towns, 23 are cities, and 86 are counties. Of the appointed boards, 1 is a town, 14 are cities, and 9 are counties. The Auditor of Public Accounts for Virginia provided information on the population, enrollment, total local government expenditures, and the expenditures on instruction by school district.

This study examines the expenditures made by the nine county school boards in comparison with a random selection of nine elected boards. The first nine counties represented by elected school boards were selected from an alphabetized listing. Data reported by the Auditor of Public accounts for the State of Virginia included the 2003-2006 reporting years. These annual data included the total local (county) governmental expenditures, the county population, enrollment in grades K-12, and the district's expenditures on instruction.

This study presumes the levels of accountability for both elected and appointed school boards to be equal, therefore the null hypothesis is assumed for all conditions. In particular, no differences are expected when comparing the average total local governmental expenditures across the four years between the two board leadership approaches. Similarly, no difference is expected when comparing appointed versus elected board per-student instructional expenditures. Finally, comparisons of the proportions of instructional expenditures to total local government expenditures is expected to reveal no differences.

RESULTS AND ANALYSIS

Average values for each demographic were calculated across the years 2003-2006 for each school district and conditioned to generate the variable of interest. For example, the average annual total local government expenditure for Accomack County was divided by the average annual total county population to yield its average per capita total local government expenditure. A similar approach was used to generate the average per-student instructional expenditure and the proportion of instruction-to-total local government expenditures. The annual and average amounts for the appointed and elected school boards are shown in Appendices A and B, respectively. No enrollment data were available for 2006, noted as N/A in these tables.

Table I reports t-test results on the three hypotheses evaluating appointed versus elected school boards. Across the sample, there was no difference in the total of local government expenditures on a per capita basis ($t = -0.3978$, $p = 0.6960$). Similarly, there was no difference in the per-student expenditure on instruction ($t = -1.1410$, $p = 0.2707$), noting this covers the lesser period 2003-2005. Finally no difference was detected for the proportion of total local government expenditures spent on instruction ($t = -0.7435$, $p = 0.4679$).

TABLE III: Tests of Differences of Appointed and Elected School Districts

Condition	t-statistic	p-value
Appointed vs. Elected Total Local Government Expenditures, 2003-2006 ($H_0=0$)	-0.3978	0.6960
Appointed vs. Elected Average Per-Student Instructional Expenditures, 2003-2005 ($H_0 = 0$)	-1.1410	0.2707
Appointed vs. Elected Proportions of Average Instructional Expenditures to Total Local Government Expenditures, 2003-2006 ($H_0 = 0$)	-0.7435	0.4679

CONCLUSION

The election of school boards is relatively new to Virginia citizens. Only within the last 16 years have they been able to determine who will direct the education process of local school districts. Has this “say” made a difference? The results of this study suggest that no significant differences exist in spending levels between the elected and appointed school boards. After controlling for size, levels of expenditures were similar for both elected and appointed school boards. It does not appear that the presence of elected school boards has made a difference in school spending.

Since this was a preliminary study, additional research will need to be conducted. In particular, the same statistical tests completed on the population of county school districts should be repeated on the city school districts. It is anticipated that no differences will exist but tests should be performed to confirm this hypothesis. The effects of other variables, such as political party or school board size, should be analyzed also. In addition, the impact of taxing powers should be explored. Since Virginia school districts have no ability to tax its citizens, tests should be conducted that compare them against similar school districts in other states that do have taxing powers. The absence of any significant differences in Virginia elected and appointed school board members may be a function of their inability to control both the revenue and expenditure process. In fact, Feuerstein suggests that “tension between school boards and local governments may one day lead to school boards with the power of taxation.” [1]

APPENDIX A: Appointed School Districts. Total Government Expenditures, Per Student Instruction Expenditures, and Instruction as a Percentage of Total Government Expenditures, 2003-2006.

	School District	Total Local Government Expenditure (per capita)	Per Student Instruction Expenditure	Instruction as % of Total Gov't Expenditure
2006	Accomack	\$ 2,131.10	N/A	43.67%
	Alleghany	\$ 2,601.54	N/A	43.34%
	Amherst	\$ 886.87	N/A	48.14%
	Greensville	\$ 1,776.91	N/A	22.01%
	Hanover	\$ 2,438.99	N/A	47.67%
	Northampton	\$ 2,817.42	N/A	47.08%
	Prince Edward	\$ 1,906.78	N/A	46.66%
	Richmond County	\$ 1,947.54	N/A	41.98%
	Southampton	\$ 2,251.11	N/A	45.34%
2005	Accomack	\$ 1,979.66	\$ 6,563.00	45.91%
	Alleghany	\$ 2,543.44	\$ 6,328.50	42.36%
	Amherst	\$ 1,758.69	\$ 5,989.92	50.77%
	Greensville	\$ 1,552.50	\$ 1,351.28	18.78%
	Hanover	\$ 2,299.55	\$ 5,619.16	47.91%
	Northampton	\$ 2,578.50	\$ 8,020.34	45.83%
	Prince Edward	\$ 1,851.91	\$ 6,472.48	46.96%
	Richmond County	\$ 1,896.63	\$ 6,204.86	42.25%
	Southampton	\$ 2,148.49	\$ 6,069.06	45.00%
2004	Accomack	\$ 1,843.78	\$ 6,249.29	46.30%
	Alleghany	\$ 2,446.30	\$ 5,863.29	42.00%
	Amherst	\$ 1,667.88	\$ 5,596.28	49.71%
	Greensville	\$ 1,494.49	\$ 1,281.03	19.74%
	Hanover	\$ 2,096.42	\$ 5,111.58	47.03%
	Northampton	\$ 2,424.92	\$ 7,245.15	44.90%
	Prince Edward	\$ 1,698.44	\$ 5,662.47	45.73%
	Richmond County	\$ 1,796.92	\$ 5,859.42	43.60%
	Southampton	\$ 2,170.10	\$ 5,760.42	42.34%
2003	Accomack	\$ 1,757.77	\$ 5,018.64	47.24%
	Alleghany	\$ 2,311.49	\$ 5,314.44	44.18%
	Amherst	\$ 1,535.35	\$ 5,421.25	50.16%
	Greensville	\$ 1,705.41	\$ 1,571.04	23.34%
	Hanover	\$ 1,967.90	\$ 4,689.21	47.28%
	Northampton	\$ 2,357.31	\$ 5,820.61	46.70%
	Prince Edward	\$ 1,539.91	\$ 4,761.40	47.00%
	Richmond County	\$ 1,752.59	\$ 4,736.76	42.38%
	Southampton	\$ 1,948.19	\$ 4,790.43	45.50%
Averages	Accomack	\$ 1,928.08	\$ 5,943.64	45.78%
	Alleghany	\$ 2,475.69	\$ 5,835.41	42.97%
	Amherst	\$ 1,462.20	\$ 5,669.15	49.70%
	Greensville	\$ 1,632.33	\$ 1,401.11	20.97%
	Hanover	\$ 2,200.71	\$ 5,139.98	47.47%
	Northampton	\$ 2,544.54	\$ 7,028.70	46.12%
	Prince Edward	\$ 1,749.26	\$ 5,632.12	46.59%
	Richmond County	\$ 1,848.42	\$ 5,600.35	42.55%
	Southampton	\$ 2,129.47	\$ 5,539.97	44.54%

APPENDIX B: Elected School Districts. Total Government Expenditures, Per Student Instruction Expenditures, and Instruction as a Percentage of Total Government Expenditures, 2003-2006.

	School District	Total Local Government Expenditure (per capita)	Per Student Instruction Expenditure	Instruction as % of Total Gov't Expenditure
2006	Albemarle	\$ 312.72	N/A	48%
	Amelia	\$ 1,970.14	N/A	44%
	Appomattox	\$ 2,013.66	N/A	48%
	Arlington	\$ 3,936.28	N/A	33%
	Augusta	\$ 1,947.34	N/A	53%
	Bath	\$ 3,568.16	N/A	40%
	Bedford	\$ 1,947.77	N/A	48%
	Bland	\$ 1,873.47	N/A	40%
	Botetourt	\$ 1,937.33	N/A	52%
2005	Albemarle	\$ 620.63	\$ 2,231.09	51%
	Amelia	\$ 1,881.43	\$ 5,867.44	46%
	Appomattox	\$ 1,895.33	\$ 5,768.14	51%
	Arlington	\$ 3,689.92	\$ 12,913.72	33%
	Augusta	\$ 1,818.29	\$ 6,232.89	55%
	Bath	\$ 3,337.06	\$ 8,501.12	41%
	Bedford	\$ 1,879.47	\$ 5,107.34	47%
	Bland	\$ 2,003.04	\$ 6,207.30	39%
	Botetourt	\$ 1,866.28	\$ 6,170.10	51%
2004	Albemarle	\$ 2,254.49	\$ 7,247.44	45%
	Amelia	\$ 1,785.52	\$ 5,436.80	45%
	Appomattox	\$ 1,689.50	\$ 5,236.43	52%
	Arlington	\$ 3,643.97	\$ 11,883.44	33%
	Augusta	\$ 1,675.68	\$ 5,835.66	55%
	Bath	\$ 3,026.11	\$ 8,116.40	42%
	Bedford	\$ 1,692.15	\$ 4,484.73	46%
	Bland	\$ 1,862.72	\$ 5,762.67	39%
	Botetourt	\$ 1,737.00	\$ 5,895.04	52%
2003	Albemarle	\$ 2,089.97	\$ 5,973.31	45%
	Amelia	\$ 1,686.34	\$ 4,537.64	46%
	Appomattox	\$ 1,679.53	\$ 4,390.82	50%
	Arlington	\$ 3,473.98	\$ 9,738.84	32%
	Augusta	\$ 1,616.40	\$ 5,068.63	56%
	Bath	\$ 2,704.06	\$ 7,516.72	44%
	Bedford	\$ 1,628.60	\$ 4,224.96	47%
	Bland	\$ 1,576.70	\$ 4,994.00	44%
	Botetourt	\$ 1,646.51	\$ 5,459.10	53%
Averages	Albemarle	\$ 1,319.45	\$ 5,150.61	47%
	Amelia	\$ 1,830.86	\$ 5,280.63	45%
	Appomattox	\$ 1,819.50	\$ 5,131.79	50%
	Arlington	\$ 3,686.04	\$ 11,512.00	33%
	Augusta	\$ 1,764.43	\$ 5,712.39	55%
	Bath	\$ 3,158.85	\$ 8,044.75	42%
	Bedford	\$ 1,787.00	\$ 4,605.67	47%
	Bland	\$ 1,828.98	\$ 5,654.66	41%
	Botetourt	\$ 1,796.78	\$ 5,841.41	52%

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Early Adopters of Fair Value Accounting for Stock-Based Compensation: A Case for Signaling

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ABSTRACT

This paper explores signaling as a possible explanation as to why companies voluntarily used the fair value method to account for stock-based compensation prior to it becoming mandatory in 2004. Our sample was divided into two groups, early adopters and non-adopters, to determine whether early adopters were signaling through their adoption decision that they were higher quality firms. A univariate analysis was performed to test the differences between the means of quantifiable attributes of the adopting and non-adopting firms for 2002 and 2003. Our findings are consistent with a signaling explanation that, for some firms, the decision to voluntarily expense options long before there was a requirement to do so signaled that these firms were committed to earnings quality and reporting transparency, and thus were more desirable to investors than were their non-adopting counterparts.

INTRODUCTION

The turn-of-the century accounting scandals, corporate bankruptcies, and the well-publicized Arthur Anderson debacle are stark reminders of the regulatory environment in which corporate misconduct and deceptive accounting practices have occurred, and often with dire consequences to investors. In response to the public outcry for regulatory change, Congress passed the Sarbanes-Oxley Act in 2002. This legislation was seen as an important first step in demanding more corporate accountability, but it also sent a strong message to the accounting profession that accounting rules and standards should promote quality and transparent reporting. During the time Congress was enacting Sarbanes-Oxley, the accounting profession was grappling with one of the most difficult and politically charged issues it had faced in recent years - how to account for stock-based compensation. The issue was further complicated by the fact that, at the time, accounting standards allowed stock-based compensation to be accounted for with either of two vastly different methods: the Intrinsic Value Method (IV) or the Fair Value Method (FV). The Intrinsic Value Method is based on Accounting Principles Board Opinion No. 25: Accounting for Stock Issued to Employees (APB 25), and the Fair Value Method is based on the Statement of Financial Accounting Standard No. 123, Accounting for Stock-based Compensation (SFAS 123).

Under IV, stock-based compensation cost was seldom reflected in earnings because the recognized expense was based on the excess, if any, of the market price of the stock at the grant date over the exercise price of options. Since the option price was routinely set to equal the market price on the grant date, companies avoided recognizing compensation costs from such transactions. In fact, IV only required companies to provide pro forma disclosures of net income and earnings per share as if SFAS 123 had been adopted.

In contrast, stock-based compensation costs were reflected in earnings under the FV because the costs were measured at the grant date based on the expected fair value of the stock award and recognized over the service period. Intuitively, most would have argued that FV promoted more quality and transparent reporting because it more accurately reflected the economic substance of the underlying transactions. Despite this compelling argument, few companies voluntarily adopted FV prior to FAS 123(R) in 2004. Instead, most companies remained steadfast in their opposition to FV, but by March, 2003, 179 companies had adopted or announced their intention to adopt the FV approach. The number had risen to 276 by May, 2003, and had increased to 483 public companies by February, 2004 (McConnell et al, 2004).

In *Take on the Street* (2002), Arthur Levitt, Jr., former chairman of the SEC, points out that Federal Reserve researchers concluded that between 1995 and 2000, the average earnings growth of the companies in the S&P 500 would have been 2.6% less had stock options been expensed. A similar study of companies in the S&P 500 concluded that average earnings may have been overstated by as much as 10 percent because of not recognizing stock-based compensation expense (Kieso et al., 2005). The impact was even greater on companies with broad based stock option plans. For example, if Cisco Systems, which granted stock options to virtually all its employees, had been required to expense its options in 2001, the organization's reported loss would have been \$1.7 billion greater than the figure actually reported.

In October 1995, the FASB issued SFAS 123 which encouraged (but did not require) companies to account for stock-based compensation at the estimated fair value of stock options on the grant date. This standard prompted few additional companies to use FV. Similar to the behavior before this standard was issued, most companies continued to account for stock-based compensation under IV.

One could argue that allowing companies to account for stock-based compensation under IV contributed to an environment where reported earnings and financial position were systematically distorted, thus contributing to a general lack of reporting quality and transparency. Despite the obvious inadequacy and inconsistency in the applicable standards, the Financial Accounting Standards Board (FASB) did not require the FV until 2004. The reluctance of companies to voluntarily use FV suggests a general willingness of companies to sacrifice earnings quality and reporting transparency for short-term earnings objectives. A similar concern was expressed by the Conference Board, a blue-ribbon research committee, that accounting for stock options under IV encouraged a short-term focus rather than on long-term, sustainable growth strategies (Francis, 2003). For example, managers who receive a substantial portion of their compensation from stock options profit from short-term gains in stock price more than from the long-term benefits provided by efficient management.

Although there was a modest increase in the use of FV by companies from 2002 and 2004, such use represented only a small percentage of the more than 9000 public corporations. What factors, if any, distinguished the early adopters of the FV (FASB's recommended approach) from companies that continued to use IV?

BACKGROUND

Signaling Theory

Signaling was first proposed by Michael Spence (1973) to address the problem of information asymmetry in transactions where one party has more or better information than others. Spence suggested that the problem could be resolved by having one party send a signal to reveal relevant information about itself to the other party. The party receiving the signal would interpret it and adjust its behavior accordingly, thus resolving the problem of information asymmetry. The concept was originally studied in the context of prospective employees signaling their skills to prospective employers, but has since been broadened to apply to many other economic decisions.

In general, signals are used to indicate a certain quality that would otherwise not be directly observable. Signaling occurs in competitive environments where it is beneficial to produce an honest signal, but prohibitively costly to produce a deceptive one. The costs include both the cost to produce the signal and the punitive cost for producing a deceptive signal. Signals tend to be honest and reliable when the potential benefits of producing them truthfully exceed the costs. A signal is honest and reliable when it indicates a quality that the signaler, indeed, possesses, and is given when the quality it represents is present.

Information not directly observable that FV companies would want to convey through signaling are earnings quality and more transparent reporting practices. Although some companies produce higher quality earnings and engage in more transparent accounting practices, such qualities can only be confirmed through costly and detailed analysis. Signaling is a cost effective alternative that allows firms to distinguish themselves as higher quality firms because the cost of adopting FV is more than off-set by the perceived quality from signaling. In the current study, we assume that the voluntary adoption of the FV is a cost-effective way to signal quality.

APB 25: Intrinsic Value Method

After debating this issue for decades, accounting regulators and others in the business community finally came to a consensus that stock options represent employee compensation that should be expensed at the fair value of the stock options over the service period. Despite this consensus, most companies still used APB 25 to account for stock-based compensation until SFAS 123 (R) became mandatory.

Issued in 1972 by the Accounting Principle Board (the predecessor to the Financial Accounting Standard Board), APB 25 provides guidance on generally accepted methods of accounting for most types of stock-based compensation awards. It requires companies to use the intrinsic value method where compensation expense is measured as the difference between the market price of the stock and exercise price of the stock option on the measurement date. The measurement date is the first date on which both the number of options and the exercise price are known. For the typical stock option plan, the measurement date is the date options are issued to the employees. This is also referred to as the grant date. Compensation expense is almost never recorded under APB 25 because most companies use a fixed plan whereby the exercise price is routinely set to equal the market price on the grant date. Companies that apply APB 25 and related interpretations to account for stock options must adopt the disclosure provisions of SFAS 123. These provisions are further explained in the next section.

Companies were allowed to use the Intrinsic Value Method despite the concerns expressed by users of the financial statements (primarily through their comment letters) that the intrinsic value method would result in financial statements that would not adequately account for the economic impact of underlying transactions when employees received stock-based compensation in exchange for their services.

SFAS 123: Fair Value Method

The FASB first proposed in June, 1993, that firms account for stock options at fair value on the grant date and expense the fair value over the periods that employees provided service. This proposal was abruptly withdrawn in December, 1994, in response to opposition by a vast majority of comment letters to the exposure draft.

In October, 1995, the FASB issued SFAS 123, effective for fiscal years beginning after December 15, 1996. SFAS 123 recommended (but did not require) that compensation expense from stock options be measured at FV and recognized in the financial statements over the service period. In a political response to companies' overwhelming opposition to the FV method, SFAS 123 was modified to allow the use of the intrinsic value method under rules of APB 25. Companies that elected to use APB 25 were required to disclose in footnotes the pro forma effect on net income and earnings per share as if the preferable fair value method had been used to recognize the stock-based compensation expense.

SFAS 148: Alternative Methods of Transition and Disclosure

SFAS No. 148, Accounting for Stock-Based Compensation- Transition and Disclosure- an amendment of FASB No. 123, provided alternative methods of transition for voluntary change to the FV method. Disclosure requirements in SFAS No. 123 were also amended to require more prominent exposure in both interim and annual financial statements about the method of accounting for stock-based compensation and the effects of the method on reported results. The effective date for SFAS No. 148 was for fiscal years ending after December 15, 2002.

International Accounting Standards

International Accounting Standards Board (IASB) issued IFRS 2, Accounting for Share-based Payment, in February, 2004, which required the recognition of expense for employee stock options using the FV method. This standard went into effect in fiscal years beginning in 2004 for companies using international standards for financial reporting. IASB's standards differ from those of the FASB as to recognition and measurement, but the basic requirement of recognizing expense over the vesting period based on a FV measurement of stock-based employee compensation is the same. Greater convergence with international standards was one of the key reasons given by FASB for proposing amendment to SFAS 123 and 95.

Proposed Amendment to SFAS 123 and 95

In April, 2003, the FASB unanimously voted in favor of expensing stock options at fair value over the service period based on an option pricing model. This was followed in March, 2004, by an exposure draft entitled "Share-Based Payment-an amendment of Statements No. 123 and 95 (Proposed Statement of Financial Accounting Standards)". This proposed statement mandated the use of only the FV method and was designed to improve comparability by eliminating the use of the intrinsic value method. The FV method required the recognition of compensation cost incurred as a result of receiving employee services in exchange for valuable equity instruments issued by the employer. The FASB's position is that recognizing compensation cost in the financial statements, as opposed to footnote disclosures, improves the relevance and reliability of the financial information. Users would benefit from the proposed changes by better understanding the economic transactions affecting an enterprise. In addition, a better understanding of the economic impact of share-based compensation arrangements on a company's financial condition and operations should lead to more efficient resource allocation decisions.

The FASB noted three principal reasons for issuing the proposed statement. The first concern was that financial statements under the intrinsic value method do not faithfully represent the economic transactions affecting the issuer, namely, receipt and consumption of employee services in exchange for value (equity instruments). Secondly, it recognized a need to improve the comparability of reported financial information by eliminating alternative accounting methods. Finally, the FASB wanted to simplify U.S. GAAP with respect to the accounting for stock-based compensation and provide greater convergence with international accounting standards. This proposal was adopted in 2004 as SFAS 123 (R).

Over 4000 comment letters were received in response to the FASB's March 2004, exposure draft. Most investor responses preferred the expensing of options, whereas most corporate responses preferred that options not be expensed. Some of the comment letters questioned the treatment of stock options as an expense.

RESEARCH MOTIVATION AND PURPOSE

We argue that stock options are costs of doing business that should be reflected in earnings like any other measurable cost of doing business. Furthermore, by including these costs in earnings, both the quality of earnings and financial position of a company are improved. Therefore, we hypothesize that these companies are signaling their commitment to earnings quality and transparent reporting by voluntarily adopting FV. Although we recognize that the adoption decision may have been motivated by other factors, signaling is one of the more theoretically compelling possibilities. Given all the recent accounting scandals in which numerous high profile companies were forced to restate their financial statements for various improprieties, signaling to the public that a firm is proactive in adopting accounting standards that promotes earnings quality and transparency seem like a smart strategy. Qualities that FV companies would want to signal are a sound financial position and a commitment to quality, transparent reporting. Such reporting would be highly desirable if these firms were more profitable and/or less risky than the IV firms

What motivated those relatively few companies to adopt FV voluntarily? Were they, in fact, signaling information about their philosophies, future prospects, or earnings quality? This paper

addresses these and other questions by analyzing selected variables for differences between early adopters (FV firms) and non-adopters (IV firms) for explanations consistent with signaling theory. It is our expectation that firms' willingness to voluntarily expense options is related to key financial variables associated with firm size, growth, net profit margin, quality of earnings, and stock market performance. We therefore hypothesize that FV firms are significantly different from IV firms as to those key variables listed above.

It is also possible that some companies may have been responding to the inevitability that the FV method was going to become mandatory in the near future. In fact, at the time of our analysis, the FASB had already released a proposed amendment to SFAS 123 for comment that would require use of the FV approach and disallow the use of the intrinsic value method under APB 25. Another possibility is that companies adopted the FV approach for all options after being required to do so for repriced options.

EMPIRICAL METHODOLOGY

For each of the fiscal years ending in 2002 and 2003, we used the population of S&P 500 companies and divided it into two categories: 1) those that adopted the FV method (SFAS 123) of recognizing stock-based compensation expense in earnings and 2) those that chose the alternative intrinsic value method (APB 25) of providing such information in a footnote disclosure only. The appropriate category was determined by reviewing each company's annual report (or form SEC 10-K) for accounting procedures and related disclosures concerning stock-based compensation. During this review we collected data for net income as reported, FV stock-based compensation expense for the FV companies, and pro forma net income for the IV firms as if FV method had been used to account for stock-based compensation expense. The other variables (Tables 1 and 2) used in the analysis for the S&P 500 companies were obtained from the COMPUSTAT data base.

Univariate tests of the differences between the means of the variables for the fair value and the intrinsic value firms were performed. T-tests of the null hypothesis that the mean values of each variable for the two groups of firms are equal were performed using the SPSS. In 2002, 19 of the 500 S&P firms had adopted the fair value method, and the other 481 used the intrinsic value method. In 2003, the number of fair value firms had risen to 101 while 399 firms continued to use the intrinsic value method.

RESULTS

The evaluation of differences in means revealed statistically significant differences between fair value companies and intrinsic value companies. The key variable of interest for our study was the ratio of stock-based compensation expense to reported income. This ratio was computed for all companies that reported positive net income for the year. In 2002, 400 companies reported positive net income while 100 had losses, and in 2003, 435 firms were profitable while 65 had losses. The amount of stock-based compensation expense is not recorded as an expense by intrinsic value companies, but is shown only as a disclosure item in a firm's "Notes to Consolidated Financial Statements." This amount is reported as an expense by fair value firms, and thus reduces net income or increases a loss. Thus, the higher the ratio of stock-based compensation expense to reported income, the greater the chance a firm would prefer not to use the fair value method. For the FV firms, the ratio was computed by dividing reported stock-based compensation by reported net income; for the IV firms, the ratio was computed by dividing the

amount of stock-based compensation disclosed in the “Notes” by adjusted net income. This ratio was significantly higher (at the .01 level) in both 2002 and 2003 for companies using the intrinsic value method (see Table 1 for the 2002 results and Table 2 for the 2003 results). In 2003, the mean value was 27% for intrinsic value firms and 6% for fair value firms. When this ratio exceeds one, a reported profit becomes a loss. Our review of the firms’ annual reports revealed that eleven profitable intrinsic value companies in both 2002 and 2003 would have reported a loss if they had used the fair value method and recorded their stock option cost as an expense. It is no surprise that none of these companies chose to expense their options.

TABLE 1. Mean Values and Standard Deviations for Selected Variables in 2002 for S&P 500

Variable	Intrinsic Value Firms (n = 481)	Fair Value Firms (n = 19)	t-statistic	Standard Error Difference
EBIT margin	12.99 (26.00)	28.50 (24.46)	-2.704**	5.74
Return on assets	1.97 (24.92)	3.36 (4.44)	-0.913	1.526
Return on equity	11.63 (55.21)	14.63 (12.60)	-0.781	3.83
Total debt to capital	41.03 (342.47)	88.32 (45.94)	-2.51**	18.84
Beta	0.95 (0.66)	0.68 (0.37)	2.968***	0.09
3 year average total asset growth	19.01 (30.59)	14.80 (16.30)	1.055	3.99
3 year average sales growth	15.34 (23.68)	13.03 (16.82)	0.576	4.01
Level of total assets	31,524 (90,444)	135,047 (177,382)	-2.531**	40,903
Level of sales	12,317 (21,346)	22,772 (29,320)	-1.538	6,796
Relative stock price	3.20 (1.53)	3.40 (1.15)	-0.712	0.27
Relative price change	45.89 (123.17)	47.16 (96.23)	-0.054	23.38
Dividend yield	1.45 (1.58)	3.23 (2.35)	-3.279***	0.54
Dividend yield to dividend yield of the S&P 500	96.10 (107.06)	216.27 (129.38)	-3.891***	30.89
1 year total return	0.41 (35.13)	3.49 (28.1)	-0.451	6.82
3 year total return	7.99 (20.32)	-2.12 (9.42)	4.187 ***	2.41
5 year total return	13.84 (16.46)	8.06 (7.90)	2.868***	2.02
Option expense to reported income*	27.16 (104.725)	5.89 (6.20)	3.832***	5.55

Notes. Mean values are presented with standard deviations in parentheses. Total assets and sales are expressed in millions of dollars; means are expressed as percentages.

*Only firms reporting positive net income are included here; 400 of the 500 S&P firms reported positive income in 2002, and all 19 fair value firms were profitable.

**Significant at 5 percent level

***Significant at 1 percent level

TABLE 2. Mean Values and Standard Deviations for Selected Variables in 2003 for S&P 500

Variable	Intrinsic Value Firms (n = 399)	Fair Value Firms (n = 101)	t-statistic	Standard Error Difference
EBIT margin	12.24 (24.47)	21.86 (20.24)	-4.080***	2.36
Return on assets	2.07 (19.54)	3.10 (7.18)	-0.833	1.21
Return on equity	13.48 (57.48)	9.45 (20.77)	1.136	3.54
Total debt to capital	50.48 (51.91)	66.69 (206.71)	-0.782	20.73
Beta	1.03 (0.78)	0.85 (0.52)	2.702***	0.07
3 year average total asset growth	12.58 (19.21)	11.23 (16.43)	0.709	1.90
3 year average sales growth	7.87 (15.99)	9.21 (19.03)	-0.652	2.06
Level of total assets	17,039 (35,178)	118,391 (204,502)	-4.962***	20,425
Level of sales	8,984 (11,459)	25,148 (40,441)	-3.977***	4,065
Relative stock price	3.37 (1.98)	3.83 (1.74)	-2.314**	0.20
Relative price change	30.85 (135.14)	18.69 (104.76)	0.975	12.47
Dividend yield	1.62 (2.24)	2.88 (2.41)	-4.742***	0.27
Dividend yield to dividend yield of the S&P 500	81.17 (116.48)	135.43 (111.96)	-4.314***	12.58
1 year total return	-14.42 (29.70)	-16.53 (22.76)	-0.777	2.72
3 year total return	-3.29 (22.50)	-2.33 (18.70)	0.429	2.24
5 year total return	2.47 (14.10)	-0.29 (9.94)	2.164**	1.28
Option expense to reported income*	21.92 (59.12)	8.47 (15.61)	3.755***	3.58

Notes. Mean values are presented with standard deviations in parentheses. Total assets and sales are expressed in millions of dollars; means are expressed as percentages

*Only firms reporting positive net income are included here; 435 of the 500 S&P firms reported positive income in 2003, and 94 of the 101 fair value firms were profitable.

**Significant at 5 percent level

***Significant at 1 percent level

Our analysis also revealed that in 2002, none of the 19 companies using the FV method reported a loss, whereas 100 (or 21%) of the 481 companies using the intrinsic value method reported a loss (see Table 3).

TABLE 3. Number of firms reporting profits or losses for 2002

	Firms reporting losses	Firms reporting profits	Total
Intrinsic value firms	100	381	481
Fair value firms	0	19	19
Total	100	400	500

For firms reporting losses, none chose to expense options; but firms that were profitable, 5% (19/400) had chosen the fair value approach that expensed options. The results were similar in 2003, where only 7 (7%) of the 101 companies using the FV method reported a loss, but 58 (17%) of the intrinsic value companies reported a loss (see Table 4). For firms reporting losses, 11% (7/65) chose to expense options; but firms that were profitable, 22% (94/435) chose the fair value approach.

TABLE 4. Number of firms reporting profits or losses for 2003

	Firms reporting losses	Firms reporting profits	Total
Intrinsic value firms	58	341	399
Fair value firms	7	94	101
Total	65	435	500

The earning before interest and taxes margin (EBIT) was significantly higher for the fair value firms in both 2002 and 2003, indicating more relative earnings to absorb the option expense. Actually, fair value firms had a lower stock option expense than the intrinsic value firms, as indicated by their significantly lower ratio of option expense to reported income. The higher profitability of these firms may be due in part to their low stock option expense. The decision to expense stock options is relatively easy to make when the amount involved is relatively small. We recognize that firms with low stock option costs may have higher personnel costs since stock options provide an alternate source of executive and employee compensation. The fair value firms in the S&P 500 appear to have managed all of their compensation and other expenses in such a manner that resulted in a higher EBIT margin.

Firms with higher EBIT margin may reflect higher quality of earnings. EBIT is calculated before adjustments for nonrecurring items, value changes in investment securities, write-down of assets, gains or losses from discontinued operations, other income, and other extraordinary items. It is in these areas that there are significant opportunities to “manage” reported net income. Although the components of EBIT (and EBIT margin) can also be “managed” to some extent, it is likely that EBIT is a “purer” figure than net income. Firms with higher EBIT margin would be less likely to try to manufacture profits, and thus these firms could be said to have a higher quality of earnings.

Our analysis also suggests that the lower stock option cost and higher EBIT margin may have contributed to the fair value firms paying higher dividends, given the significantly higher

dividend yield and the higher relative dividend yield for these firms. Higher dividend yield may also be a signal of greater earnings quality. Firms that pay out a large portion of their reported profits in dividends may have real earnings that have not been doctored; other firms, with large reported earnings but minimal dividend payments, may have reported earnings that have been disguised, falsified, or “adjusted”. A firm cannot pay dividends unless sufficient real earnings and cash are available. Farinha and Moreira (2007) tested the relationship between dividend payments and earnings quality for the period 1987 – 2003. Using a sample of approximately 40,000 firm-year observations, they found a positive relationship between dividend payments and several measures of earnings quality. These results are consistent with our findings that the more profitable FV firms share a larger portion of reported earnings with their stockholders than is the case for the IV firms.

Our results also indicate that it was the larger firms that took the lead in adopting the fair value method of accounting for stock option expenses. Although the growth rate was similar for both sets of firms, the level of total assets was significantly higher for fair value firms. Also, growth in sales was similar for both groups of firms, but the level of sales was higher for fair value firms. The difference was statistically significant in 2003 but not in 2002, again indicating that larger firms made the switch to the fair value method.

Risk and return characteristics of firms are of interest to security analysts and investors. A common measure of a firm’s risk, the beta coefficient, was significantly lower for fair value firms. It is expected that lower market risk would be accompanied by lower market return, and indeed this is the case. The 5 year total return, which consists of price appreciation, dividend reinvestment and dividends earned on reinvested dividends, was significantly lower for the fair value companies in both 2002 and 2003. The 3 year total return was also lower for these firms in 2003, but the difference was not significant in 2002; nor were there significant differences for the 1 year total return in either year. Although the low risk, low return characteristics of the fair value firms have an appeal to some investors, it should be noted that the intrinsic value firms cannot be considered “risky.” With a beta of 0.95 in 2002 and 1.03 in 2003, these firms exhibit average market risk, while fair value firms are less risky. Two other market variables, relative stock price and relative price change were similar for both sets of firms.

The low risk, low return characteristics of the FV firms is a signal of their greater transparent financial statements and higher earnings quality. This relationship has been verified by several researchers who have evaluated the relationship between earnings quality and the cost of capital. In an exhaustive review of over 35 articles on this issue, Habib (2006) found that higher earnings quality was associated with lower cost of capital in virtually all cases. Since risk is positively related to the cost of capital, lower risk firms can be expected to have a higher quality of earnings.

CONCLUSIONS

The decision to use the fair value method or the intrinsic value method in accounting for stock options is a choice that corporations have freely made. Since the proposed amendment to FASB 123 and 95 has become effective, however, firms no longer have that choice; they are required to use the fair value method. The results of this paper suggest that there are significant differences between firms that expensed their stock options and those that had chosen not to. Clearly, the impact on the bottom line appeared to have been paramount to the decision to expense stock options given that it resulted in a decrease in a net income or an increase in a net loss. Our study reveals that firms reporting a loss were less likely to use the fair value method, presumably, because of the negative impact it had on earnings.

Fair value firms had a significantly higher EBIT margin, indicating that they had relatively more earnings to absorb the option expense. Not surprisingly, the ratio of option expense to reported income was significantly lower for FV firms. The lower stock option cost and higher EBIT margin were also found to be associated with a higher dividend pay out by fair value firms. Both of these results are consistent with FV firms providing a signal to investors that they are committed to reporting transparency and earnings quality.

The rate of growth was also similar for both groups of firms, but size was significantly different. As measured by total assets, fair value firms were significantly larger in 2002 and 2003. The level of sales was also higher for fair value firms, although the difference was not significant in 2002.

Our results also confirmed the expected risk-return relationships that investors require. The 5-year total return was lower for the fair value firms in both 2002 and 2003, and the 3-year total return was also lower in 2003. Risk, as measured by beta, was also lower in both years, indicating that fair value firms provide a low risk, low reward investment compared with their intrinsic value brothers. Lower risk was also related to signaling higher earnings quality.

One justification for requiring FV expensing of stock options is to improve the transparency of financial reporting. As we observed in this evaluation of IV and FV firms, the FV firms are indeed sending a signal that they are more committed to transparency in financial reporting and earnings quality. The lower beta, higher EBIT margin, and higher dividend yield are components of a signal to investors that the FV firms can be expected to have higher earnings quality and greater transparency in financial reports.

We observed in the annual reports of the S&P 500 companies that many intrinsic value firms question the assertion that the requirement to expense stock options will improve the transparency of financial reporting. No one valuation model is used by all firms or recommended by FASB, each model requires assumptions (on which reasonable people may disagree), and more than one method is available for allocating the expense to various periods. This issue awaits further research.

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ASSESSING CONTROL RISK IN SMALL BUSINESS

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ABSTRACT

This paper describes the components of an assignment that engages students in assessing and computing Control Risk for a small business for the purpose of planning and performing financial audit. The assignment could be used in Auditing and Accounting Information Systems courses.

INTRODUCTION

For planning and performing audit of financial statements of a company, auditors are required to measure "audit risk". Audit risk is the probability of issuing a wrong opinion -- such as unqualified or qualified opinion -- when the audited financial statements contain a material misstatement. Audit risk is defined as follows:

$$\text{Audit Risk} = \text{Inherent Risk} * \text{Control Risk} * \text{Detection Risk}$$

Inherent Risk is the probability of having a misstatement in the financial statements because of the nature of the client, client's industry, or the nature of a particular account in the financial statement. Control risk is the probability that the client's internal control can't prevent or detect a material misstatement on a timely basis. Control risk is largely dependent on the effectiveness of the client's existing internal controls. Detection risk is the probability that the auditor's undertaken procedures will fail to detect a material misstatement in the financial statements.

Assume a CPA firm wants to audit the accounts receivable of a client and there is 60% chance that the account receivable balance is misstated materially (inherent risk) and 40% chance that the misstatement has not been detected by the company's internal controls. Furthermore, assume that the audit procedures utilized by the CPA firm has a 20% percent chance of failing to detect a material misstatement. Under these assumptions, the audit risk is 5% (60% * 40% * 20%). That is, the CPA firm faces a 5 percent audit risk that material misstatement has occurred and evaded both client's controls and the CPA firm's audit procedures.

The auditor has no control on the inherent and control risks -- the auditor merely evaluates those risks as they exist for the purpose of computing audit risk. In contrast, detection risk is controllable by the auditor and largely depends on the auditor's procedures and tests for the audit. For example, by expanding the scope and effectiveness of the audit procedures, the detection risk can be decreased.

OBJECTIVE OF PAPER

This paper describes an assignment that engages students in measuring control risk for small businesses for the computation of audit risk. The assignment could be used in Auditing course and/or Accounting Information Systems course. Students in the course should be divided in groups and each team should be assigned with an audit topic such as cash, accounts receivable, inventory, etc. Subsequently, each team should be asked to complete the following steps:

Step 1. Identifying appropriate internal controls for the subject of audit

The team should research and identify a number of relevant internal controls for the assigned area. For illustration purpose, assume the area of audit is cash disbursements and the team has identified the following internal controls.

Internal Controls for Cash Disbursements

1. Are all disbursements made by check?
2. Are pre-numbered checks used?
3. Does company examine and compare the content of purchase order, receiving report and vendor invoice before issuing a check for payment?
4. Is the owner’s signature required on checks?
5. Does the owner approve and cancel the documentation in support of all disbursements?
6. Are all voided checks retained and accounted for?
7. Does the owner review the bank reconciliation?
8. Does the owner never sign blank checks?
9. Do different people reconcile the bank records and write the checks?

Step 2. Determining the relative importance of the internal controls

The team, through carrying discussions, should determine the relative importance of each of the identified internal controls on a scale of 1 to 10 with 10 to be “very important”. The team should provide justification for the ratings in their report. Assume the team has developed the following ratings for various internal controls.

Internal Controls for Cash Disbursements	Importance Rating
1. Are all disbursements made by check?	5
2. Are pre-numbered checks used?	7
3. Does company examine and compare the content of purchase order, receiving report, and vendor invoice before issuing a check for payment? .	10
4. Is the owner’s signature required on checks?	6
5. Does the owner approve and cancel the documentation in support of all disbursements?	7
6. Are all voided checks retained and accounted for?	3
7. Does the owner review the bank reconciliation?	8
8. Does the owner never sign blank checks?	10
9. Do different people reconcile the bank records and write the checks?	6

Step 3. Visiting the chosen company for the assessment of internal control status

The team should visit the chosen small business site to observe and to determine which of the identified internal controls are in place and working in the company. If the internal control is in place and is working, the relative importance rating should be written under the “Yes” Column; otherwise a zero should be placed.

Internal Controls for Cash Disbursements	Importance Rating	Yes, is in place and is working
1. Are all disbursements made by check?	5	5
2. Are pre-numbered checks used?	7	7
3. Does company examine and compare the content of purchase order, receiving report, and vendor invoice before issuing a check for payment?	10	10
4. Is the owner’s signature required on checks?	6	0
5. Does the owner approve and cancel the documentation in support of all disbursements?	7	0
6. Are all voided checks retained and accounted for?	3	0
7. Does the owner review the bank reconciliation?	8	0
8. Does the owner never sign blank checks?	10	10
9. Do different people reconcile the bank records and write the checks?	6	0
Total	62	32

Step 3. Computing Control Risk

At this point the team should compute the control risk. From total 62 points available, the internal control of the chosen company obtained 32 points -- that result in 52% (32/62). Thus, control risk would be 48% (100% - 52% = 48%). In developing the final control risk figure, other controls that the company has applied for the cash disbursement should be considered and incorporated into the computations.

CONCLUSION

Control risk is one of the elements for the computation of audit risk. Audit risk affects the nature, timing, and the extent of audit procedures and tests to be performed during a financial audit. This paper describes an assignment that engages students in understanding and assessment of internal controls and the computation of control risk. The results should be of interest to educators and students.

On-line Methods for Improving Learning in the First Course of Financial Accounting

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ABSTRACT

This paper is a preliminary assessment of on-line components added to the first undergraduate course in Financial Accounting. The teaching methods used were intended to achieve related objectives: 1) enhance the mastery of accounting, 2) increase student accountability and 3) develop students' ability to become successful learners. The focus on these objectives is linked to the number of students nationally and at the author's university who perform poorly in accounting. The paper compares the student evaluations and overall grades achieved for three courses taught sequentially. Each course added on-line components to those of the prior; the final, third, course was the hybrid.

Introduction

Over the past few years the author has become concerned with the number of students in the first course of Financial Accounting who: 1) come to class unprepared, 2) never practice accounting (homework), and/or 3) do not purchase - or use - the textbook. Alarming, many students seem not to include these critical components in their personal "frame of reference" for the learning of accounting, or at least, for the achievement of a passing grade in accounting. The author believes a trend exists that encompasses even those with a reputation of being "good" students. Students seem to act upon the belief (recognized or not) that presence during class periods and some studying right before a test is all that is necessary. This trend exists notwithstanding professors' conducting discussions of what is necessary for understanding and mastering accounting.

Unfortunately, when "good" students become "not-so-good" students of accounting, they evidence both frustration and unawareness of how their meager result was obtained. It seems to the author that the number of students making unproductive decisions regarding their learning responsibilities has increased dramatically in the last two to three years. The author believes these decisions by students - given the nature of accounting - directly relates to the fact that as many as one-fourth or one-third of students in the first course of Financial Accounting drop out without finishing the course or stay and achieve poor results.

This difficulty in and attainment of poor results in the first course of Financial Accounting is an historic problem. Yet, the author believes that an increase in this problem is dramatic and will continue to grow unless new methods for effective teaching and learning can be discovered. These methods must address the increase in poor achievement that seems to result not so much from lack of awareness but to lack of belief that preparation and practice are essential for mastery of accounting. Related to this problem is what also seems to the author to be a growing trend in students: a failure to recognize or believe that acceptance of responsibility for one's own learning and conduct founded on maturity and independence are essential attainments. Students may not even be aware that they are not demonstrating these

behaviors. Sadly, an increasing number of students graduate from secondary schools and arrive at universities without having achieved an understanding of the need for or how to be accountable for their learning.

There is, however, a positive trend which offers a potential solution. Increasingly students come to the university with advanced technological skills. The trend is for students to be increasingly comfortable with and able to use technology to participate in their own education. Technology offers potential for the design of methods to develop student’s achievement of both accountability and learning. This potential has certainly been illustrated over the past decade but not, perhaps, to the extent that is possible for the discipline of accounting.

BACKGROUND

This paper considers the difference in student achievement and evaluation of learning when methods focused on an on-line environment were added to the first, undergraduate course in financial accounting. The majority of the students in this course were sophomores; this is relevant because the academic experience is designed to foster growth in acceptance of responsibility for and dedication to learning as students progress. The courses used the same text and all included class “face time.” The courses were offered sequentially (Fall 2007, Spring 2008, and Summer 2008). With each new sequence, additional on-line components were added to methods used in the previous sequence. The final course in the sequence was a “hybrid” which, at the author’s institution means that at least fifth-one percent of the class must be online. Thus the hybrid course had half the “face time” of the previous two courses. Also, one hundred percent of the grading in the hybrid was accomplished in on-line components.

The first course in the sequence used on-line components only to provide information including assignments and to administer reading quizzes. The second course added both on-line homework (fifteen percent of the grade) and practice tests. As mentioned above, for the third course, one hundred percent of the grading components were delivered on-line. These components included quizzes, tests, homework, and several essay assignments delivered through a discussion thread. All of the on-line components were administered in a way that required students to assume responsibility for knowing that the component was available and for completion before an expiration date. The dates were chosen to accomplish important criteria for learning accounting: sequential building of learning. Table 1 below compares the three courses which are identified as #1, 2 and 3 rather than by date of offering. This is done because the sequential building of the on-line components is more relevant than the dates the courses were offered.

TABLE 1					
Course Comparison					
<i>Course #</i>	<i>On-line Components Percentage of Grade</i>	<i>Format</i>	<i>Time Period</i>	<i>No. of students completing evaluation</i>	<i>On-line Components</i>
#1	11.6%	Traditional, class meetings twice per week for a semester. Student Evaluation of Learning administered by university.	Fall 2007	55 in 2 sections, total students in all of instructor's classes = 69	On-line Course Management System used for information including assignment due dates, reading quizzes, and discussion thread

#2	14.9%	Same as #1	Spring 2008	52 students over 2 sections - total of classes = 86	Added 1) homework application that is time sensitive and graded, 2) practice tests
#3	100.0%	Hybrid; 4 week time period r/t traditional semester; in class time one half of #1 and 2; at least 51% of class required by university to be on-line. Student evaluation administered via Blackboard, voluntary, 11 students completed survey	Summer 2008	11 students, 1 section, no other classes taught	Added all grading on-line; included individual chapter tests. Online mid-semester and final both administered in computer lab, instructor present
<i>Note: Each successive course had the on-line elements of the previous course plus the identified additions. Same text for all. Number of students is the number completing the student evaluation of learning.</i>					

The number of students taught by the instructor is included in Table 1 because of the author’s belief that – when the instructor is the author – total number of students affects both teaching and student learning. It should also be mentioned that in the course identified as #2 the author was teaching three different subjects. This information is included because the author believes that - for the author’s students - there is an effect on learning when more than two subjects are taught in one semester; particularly when these are delivered in the four class periods that were conducted.

The hybrid course, #3, was a summer course which met for four weeks, rather than the full semester as the other two courses in the comparison. As disclosed in the table, “face time” was included but at half the rate of courses #1 and 2 which were taught during a traditional semester at the author’s institution (August to December and January through April). This hybrid’s design was intended to complement, not replace, the traditional versions of the course as represented by #1 and #2. An intentional focus was placed on methods to enhance the learning of students who are repeating the course because of previous poor performance. In fact, eight of the fourteen students enrolled in the hybrid were retaking the course. This population of “repeaters” was considered a good population for the sequential nature of the on-line methods added in the courses to which this paper refers. It seemed appropriate to strengthen methods used in the previous courses (#1 and #2) particularly those designed to foster acceptance of responsibility for learning.

DESIGN GOALS AND RESULTS

In all three courses on-line components were intended expressly to inform work habits, foster acceptance of responsibility, and enhance understanding of how to approach learning. The goal was to address deficits which, as discussed in the Introduction, the author believes negatively impact performance. As just mentioned, this was strengthened in the third course. Accordingly the purpose of design of delivery

of the on-line components was to require acceptance of responsibility for learning in a manner that (hopefully!) enhances learning.

For all on-line components, in all three courses, a specific open date and a specific expiration date existed. No exceptions were granted if a student missed the expiration date. All information regarding dates was placed on tabs in Blackboard; no reminders were given at any time. In conjunction with the addition of the on-line components of #2 (and then of course #3), this policy was discussed carefully at the beginning of the semester. This included a reminder of the importance for students to develop professional habits which includes accepting responsibility for meeting deadlines, and for intentionally pursuing their own development in regards to knowledge and learning methods.

Due to this emphasis on student learning and student responsibility for learning, a comparison of student evaluations seemed to offer value for an initial assessment of the on-line methods used. Table 2 compares the traditional and hybrid student assessment of learning, as represented by the student evaluations administered at course end. As Table 2 notes, the full evaluation instrument and scoring criteria are located in Figure 1, Appendix.

TABLE 2				
Comparison of Student Evaluations				
		#1	#2	#3
		n=55	n=52	n=11
1	The instructor presented the material in a clear and organized way (1=Hardly ever...5=Almost Always)	3.836	3.327	5.000
2	The instructor's interest in the course motivated students to learn	3.982	3.462	4.909
3	The instructor clearly presented the importance of the subject matter	4.400	3.862	5.000
4	The instructor clearly communicated expectations for student achievement	4.240	3.942	4.909
5	The instructor provided constructive feedback on students' work that helped students improve	3.818	3.308	4.818
6	The instructor was available to assist students	4.400	4.019	4.818
7	The instructor gave assignments appropriate to the class	4.545	4.096	4.900
8	The instructor graded students on what they were expected to learn	4.509	4.135	5.000
9	The instructor encouraged students to ask questions and express their knowledge	4.800	4.058	4.800
10	The instructor expected students to learn challenging or difficult material	4.145	4.040	4.818
11	How much did you learn in this class?	3.564	3.500	4.636
12	On average, how many hours per week did you spend outside of class preparing for this course? (1=none...5=more than 9)	2.745	2.846	4.182
13	What is your current grade in this course? (1=F...5=A))	3.400	3.627	3.727
	Note: Figure 1, Appendix presents the evaluation instrument and scoring criteria			

Rather than abstract selected questions on the student evaluation of learning instrument, the results for all thirteen questions are presented. This is because of the perceived “halo effect.” Students who are very positive about their experience in a course tend to evaluate all aspects highly. This occurred, in the author’s opinion, in the students’ evaluation of the third, hybrid, course. For example, the score for question six is higher for the hybrid. Yet, the instructor was not “more” available than for the other courses. In fact, from the instructor’s perspective, there was less availability. For instance, the hybrid in class sessions met half of time of courses #1 and #2. In addition, office hours were fewer and the instructor was on campus significantly less time than during the regular semesters in which #1 and #2 were taught.

A comparison of student achievement – as represented by class grade average - also seemed to add value. This value is constrained by this initial assessment of the success of the progression in on-line methods used. Of course, there are many reasons other than an increase in learning that may influence an increase grades. This paper, however, is a preliminary consideration of the success of the on-line methods. Table 3 presents student achievement in the three courses as represented by average of grades obtained.

TABLE 3			
Grade Average			
	<i># Students in ACCT 240</i>	<i>Total # Students</i>	<i>Average</i>
#1	55 students, 2 sections	69, 3 classes	71.6%
#2	52 students, 2 sections	86 students, 4 classes	78.2%
#3	14 students	14 students, 1 class	81.3%

As mentioned previously, the author believes that the number of students, both within a specific class, and in total number taught over all classes in one semester affects student learning. Therefore, this information was included in the table. If the author’s belief is correct, the low number of students in the hybrid class acted to raise the evaluations. In addition, the low number of students undoubtedly raised grades. The modifier “undoubtedly” is used because the author had more, substantive interaction with the fourteen students (#3) than with the students in courses #1 and #2. In fact, the author was able to intervene with two of the fourteen students who, at differing points in the course, began to perform poorly. One of these students admitted after the course was over that but for the intervention they would have dropped out.

There is existing research indicating that larger classes (and thus more students) may be more effective for learning. However, some research indicates that class size on either end of the spectrum is more effective (less than about thirty, more than one hundred). In addition, the results reported here may be affected by the demographics of both the authors’ university and students. For example, the classrooms in the author’s College of Business and Economics accommodate either twenty students or forty; one holds forty five and there is one large seating classroom. These sizes were intended to fulfill the university’s promise of small classes and faculty/student interaction. There are other possible influences on both student evaluations and grades achieved that are beyond the scope of this paper.

CONSIDERATIONS

Reliability of these results is compromised and thus not appropriate for statistical purposes. Unfortunately the evaluation instruments were not administered similarly. For courses #1 and #2, the student evaluations were administered by the university administration in the traditional manner: the instructor never touches the instruments nor is present during administration, the instrument is a paper document completed during a class period. Regrettably, the university does not administer student evaluations for summer school classes. A specific request for this policy to be changed with evaluations for the hybrid class administered in the equivalent manner was not granted. Therefore, an on-line (Blackboard) survey with the same questions as the university instrument was created and administered. The university's paper instrument includes the ability to add instructor specific short-answer type questions. These were not added for #1 or #2 but were added to the on-line survey.

Thus this difference in the administration of the evaluations for the hybrid class compromises reliability. Not only was the method of administration different for #3 than for #1 and #2, the administration was unlike anything with which the students are familiar. In addition, students who had taken summer classes previously expected no evaluations to be administered. In the hybrid, #3, the population consisting of a significant majority of "repeaters" could suggest that many of the students have previously taken summer classes at the institution. Although it is beyond the scope of this paper to discuss the correlation of students who perform poorly in the first course of Financial Accounting to doing poorly in other courses, it deserves a cursory mention here. (In fact, there seems to be a consistent menu of courses in which the poor performance occurs.)

Although, the hybrid class was conducted at the end of the semester as were the evaluations in #1 and #2, the location of the survey offers another problem for comparability of results. Unfortunately, the survey was located within the class Blackboard. This undoubtedly compromised students' ability to trust in confidentiality despite specific assurance that all answers would be anonymous. This is relevant because a trend has been perceived over recent years; this is an increase in students' reluctance to trust the instructor. Thus the necessity for students to rely on the instructor's promise of anonymity may have impacted the results in Table 2. Although not all students in a course complete a student evaluation instrument – for many reasons - the manner of administration of the hybrid surveys adds an additional reason not to comply. Perhaps the three students in that class (#3) who did not complete the survey made their decision based concerns regarding privacy of answers.

Yet the survey responses are beneficial in regards to design and use of on-line methods. An example can be found in a student response to a short answer question added, as discussed previously, to the hybrid survey of student learning. Future planning of teaching methods will include reflection on the answer to whether participating in the hybrid was "a good decision for you and your learning style? Would you would recommend that just anyone take the class as a hybrid...or is it just good in certain circumstances?" Following is an interesting, although quite informal, contribution.

Yes, this was a great decision for me to make. I took it in the classroom the first time and got a D and there wasn't (*sic*) a lot of things online to help....When we were in class we learned and took notes on the important things in the chapter. I think the less time in class (in the hybrid) was better because it was up to me to read and do my work instead of relying on 'O. I heard it in class so I will remember how to do it', which isn't true! I needed to figure things out myself and not rely on the fact that we did it in class.

The student's identification of the course in the regular semester as taken "in class," is interesting. Particularly since the hybrid class included "in class" sessions as well. Although the hybrid class sessions

occurred at half the rate of the “regular” classes, the same material was covered in all. Perhaps the statement is revealing of the student’s estimation of where learning occurred. This relates, the author believes, to the above mentioned methods to foster student acceptance of responsibility for learning. Of particular success were the deadlines that were carefully set to enable each component to build on the previous component. Students met the deadlines successfully. The extent of this success had not been anticipated and was satisfying as it fostered the ability to learn in the manner necessary in the discipline of accounting.

These sequences of courses highlighted, for the author, the value of on-line methods for the discipline of accounting. This hybrid course was the first on-line (hybrid or fully on-line) course offered at the author’s institution in the discipline of accounting. For many reasons, the accounting faculty have consistently declined to offer on-line accounting courses; this relates to the characteristics of accounting as well as technology support. The success of this hybrid leads the author to questions personal perceptions and assumptions regarding teaching and learning. When faculty get together, it is not unusual hear lamentations that: students today do not work, do not accept responsibility, and do not really know what hard work “looks like;” hard work is beyond their experience or understanding. The author is guilty of that same lamentation. However, the results reported in this paper and the experience with the hybrid students causes the author to wonder if perhaps teacher perception and style have a greater influence on this problem than realized. Perhaps students today work differently, in a way that is outside the instructor’s experience or understanding.

CONCLUSION

The goal of this project was to address deficits in mastering accounting, related deficits in student accountability, and develop students’ ability to be successful learners. Although the results are not reliable for statistical purposes, the progression of on-line methods appeared to be successful in regards to student learning. Of course, consideration should be given to the many possible influences on the increases – as on-line components were added – reported in Tables 2 and 3. These tables represent an initial assessment; other methods are necessary. In this preliminary study, a critical component was the intentional focus on student acceptance of responsibility for learning. This aspect certainly led to a much more pleasant experience for the instructor while at the same time requiring students to adopt professional work habits.

The author’s experience with the hybrid class and its components was significantly more satisfactory than had been anticipated. The level of satisfaction was such that for all classes, all subjects taught; this progression in on-line components will be continued. At this time, and for reasons mostly beyond the scope of this paper, on-line methods developed will fall within the constraints of class “face time” occurring at some amount. The teaching/learning of current students, or perhaps the students/faculty attracted by the author’s university, seem to benefit from that classroom personal interaction. Yet it is interesting to consider whether the smaller amount of class meetings in the hybrid added value for the students (see the quote above).

Consideration of the trend in student and faculty technology aptitude indicates that the benefit of “face time” will probably decrease over time. And, of course, a semblance of “face time” (in this paper identified as class time) can be achieved with current technology applications; Wimba is an example. Yet, while other reasons for including “face time” are not discussed in this paper, it is worthwhile to note that a change in the level of technology availability and support would be necessary (at the author’s institution) for a fully on-line course in accounting to be contemplated.

The most successful class, from the author's perspective, was the hybrid. As mentioned earlier, this was a surprise. The results displayed in Tables 2 and 3, the author's experience with the class, and student's informal remarks led to a conclusion that value exists for all of the author's courses. While the hybrid course was designed for students repeating the first course of Financial Accounting, the methods employed are applicable to all students. The emphasis on students accepting responsibility for learning and developing skills to learn successfully is critical for academic success whether or not combined with on-line methods. However, the trend in student technology aptitude indicate that combining this emphasis with technology offers value for teaching and learning.

APPENDIX

FIGURE 1						
STUDENT ASSESSMENT OF INSTRUCTION WITH SCORING CRITERIA						
		<i>Hardly ever</i>	<i>Occasion-ally</i>	<i>Often</i>	<i>Usually</i>	<i>Almost Always</i>
	<i>Scoring Criteria</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
1	The instructor presented material in a clear and organized manner.					
2	The instructor's interest in the course motivated students to learn					
3	The instructor clearly presented the importance of the subject matter					
4	The instructor clearly communicated expectations for student achievement					
5	The instructor provided constructive feedback on students' work that helped students improve					
6	The instructor was available to assist students					
7	The instructor gave assignments appropriate to the class					
8	The instructor graded students on what they were expected to learn					
9	The instructor encouraged students to ask questions and express their knowledge					
10	The instructor expected students to learn challenging or difficult material					
		<i>Much less than most classes</i>	<i>Less than most classes</i>	<i>About Average</i>	<i>More than most classes</i>	<i>Much more than most classes</i>
	<i>Scoring Criteria</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
11	How much did you learn in this class?					
		<i>None</i>	<i>1 to 3</i>	<i>4 to 6</i>	<i>7 to 9</i>	<i>More than 9</i>
	<i>Scoring Criteria</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
12	On average, how many hours per week did you spend outside of class preparing for this course?					
		<i>F</i>	<i>D</i>	<i>C</i>	<i>B</i>	<i>A</i>
	<i>Scoring Criteria</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
13	What is your current grade in this course?					
Note: Several short-answer questions were added for the hybrid evaluation administered on Blackboard						

LINKING CLASSROOM-PREPARED FINANCIAL STATEMENTS TO REAL-WORLD EVENTS

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ABSTRACT

This paper focuses both on preparing financial statements in an accounting course, as well as using the statements to solve real world problems, such as determining ending inventory values after a fire, hurricane or other catastrophic loss. By seeing how financial statements not only capture and report day-to-day business operations, but also can be used to ascertain acceptable values (or at least beginning points for negotiable values) for items that are physically no longer there, students should better see the whole picture of both “how” financial statements are prepared, as well as “why” the interconnections of the statements are as they are.

OVERVIEW

Most colleges and universities require the equivalent of two three-semester hour courses in principles of accounting. The first course is usually financial accounting and the second course (either in its entirety or at least the last two-thirds of the course) is managerial accounting. The first topics covered in managerial accounting usually consist of comparing the income statement of a merchandising concern (covered in financial accounting) with the income statement for a manufacturing business, with its focus on direct materials, direct labor and manufacturing overhead. Also covered are the three inventories involved in the manufacturing process: raw materials, work-in-process and finished goods. Other terms such as prime costs (direct materials plus direct labor) and conversion costs (direct labor plus manufacturing overhead) are also covered. Following this, several problems are usually worked whereby the accounts are listed and an income statement for a manufacturing operation (including a schedule or statement of the cost of goods manufactured and sold) is prepared. Taking a listing of manufacturing accounts and generating financial statements is an important part of the financial-to-managerial accounting transition that occurs in principles of accounting. In fact, it is an important step in seeing part of the “financial connection to managerial” accounting. However, the proper alignment of the accounts, while important, does not capture the whole picture. Taking accounts and preparing financial statements demonstrates a student’s knowledge about “how” the accounts are acceptably presented for external reporting, but the equally important determinant of “why” the interconnections are as they are is often not emphasized or demonstrated. To resolve this dilemma, this paper focuses not only on preparing financial statements in an accounting course, but also on using the statements to solve real world problems, such as determining ending inventory values after a fire, hurricane or other catastrophic loss. (Such an inventory loss determination problem is sometimes present in a textbook, but it is not usually a prominent feature of the material presented.) The proposal of this paper is to have two handout problems similar to the ones used in this paper for students to work and check before working the problems in the textbook. (In fact, one option is to hand out the problems along with the answers so students can work the problems and then check their own answers.) By encouraging students to see the linkages of how financial statements not only capture and report day-to-day business operations, but also can be used in situations such as catastrophic losses to ascertain acceptable values (or at least beginning points for negotiable values) for items that are physically no longer there, students should better understand how financial statements communicate important relevant information about the world around them.

PREPARATION OF A SCHEDULE OF THE COST OF GOODS MANUFACTURED AND SOLD FROM A LISTING OF ACCOUNTS

The following problem represents a situation whereby students can take a list of accounts and prepare a Statement of the Cost of Goods Manufactured and Sold. Based on personal use of similar problems, it has been found that it is helpful to show the inventory amounts separately and it is also very helpful for students to show a separate schedule of manufacturing overhead since identifying the overhead items in the listing of accounts is a big step towards accurately presenting a correct Statement of the Cost of Goods Manufactured and Sold. (Also, it is very handy for grading if a question similar to this ends up on an exam since students will list overhead in various, sometimes hard-to-find, places.) Accordingly, students would be asked to use the information from the following accounts to prepare a Schedule of Manufacturing Overhead and a Cost of Goods Manufactured and Sold Statement. Also note that several accounts are extraneous to the problem solution (such as cash and accounts receivable). While such extraneous information is sometimes present in textbook problems, too often textbooks only provide data that is needed to ascertain the solution to the problem presented.

Inventories	
Raw Materials, Beginning	\$ 50
Raw Materials, Ending	65
Work In Process, Beginning	20
Work In Process, Ending	25
Finished Goods, Beginning	85
Finished Goods, Ending	74

Schedule of Manufacturing Overhead

Administrative Expenses	\$ 60
Cash	70
Direct Labor	120
Depreciation - Factory Equipment . . .	30
Depreciation - Office Equipment . . .	4
Indirect Materials	7
Non-factory Office Supplies	6
Factory Utilities	8
Indirect Labor	25
Insurance Expense - Factory	2
Accounts Receivable	12
Net Sales	560
Purchases of Raw Materials	160
Factory Repairs	3
Selling Expenses	75

Cost of Goods Manufactured and Sold Statement

Solution:

Inventories	
Raw Materials, Beginning	\$ 50
Raw Materials, Ending	65
Work In Process, Beginning	20
Work In Process, Ending	25
Finished Goods, Beginning	85
Finished Goods, Ending	74

Administrative Expenses	\$ 60
Cash	70
Direct Labor	120
Depreciation - Factory Equipment	30
Depreciation - Office Equipment	4
Indirect Materials	7
Non-factory Office Supplies	6
Factory Utilities	8
Indirect Labor	25
Insurance Expense - Factory	2
Accounts Receivable	12
Net Sales	560
Purchases of Raw Materials	160
Factory Repairs	3
Selling Expenses	75

Schedule of Manufacturing Overhead	
Depreciation - Factory Equipment	\$ 30
Indirect Materials	7
Factory Utilities	8
Indirect Labor	25
Insurance Expense - Factory	2
Factory Repairs	<u>3</u>
Total	<u>\$ 75</u>

Cost of Goods Manufactured and Sold Statement	
Beginning Inventory Raw Materials	\$ 50,000
+ Purchases of Raw Materials	+ 160,000
Raw Materials Available	\$ 210,000
- Ending Inventory Raw Materials	- 65,000
Raw Materials (or Direct Materials) Used	\$ 145,000
+ Direct Labor	+ 120,000
+ Manufacturing Overhead:	
(See Schedule Above)	+ 75,000
Total Manufacturing Costs	\$ 340,000
+ Beginning Inventory Work-In-Process	+ 20,000
- Ending Inventory Work-In-Process	- 25,000
Cost of Goods Manufactured	\$ 335,000
+ Beginning Inventory Finished Goods	+ 85,000
- Ending Inventory Finished Goods	- 74,000
Cost of Goods Sold	<u>\$ 346,000</u>

USING THE SCHEDULE OF THE COST OF GOODS MANUFACTURED AND SOLD TO DETERMINE INVENTORY VALUES AFTER A CATASTROPHIC LOSS

On Wednesday evening, October 1, 2008, a factory was destroyed by Hurricane Hank. Sadly, the entire factory is totally destroyed and the inventory is nowhere to be found. Fortunately, certain accounting records were kept in electronic form and were saved at the home office (several states away) and were not affected by the hurricane. These records reveal the following for the period December 31, 2007 – October 1, 2008 (the date of the hurricane):

Direct Materials purchased, \$155,000
 Total Prime Costs, \$440,000
 Work-In-Process, 12/31/07, \$85,000
 Cost of Goods Manufactured, \$800,000
 Direct Materials, 12/31/07, \$25,000
 Direct Labor, \$300,000
 Factory Overhead equals 125 percent of direct labor
 Finished Goods, 12/31/07, \$18,000
 Gross Profit (or Gross Margin), \$150,000
 Net sales, \$900,000

The loss was fully covered by insurance. The insurance company wants to know the approximate cost of the inventories as a basis for negotiating a settlement, which is really to be based on replacement cost, not historical cost. Calculate the cost of:

- (1) Direct Materials Inventory, October 1, 2008 _____
- (2) Work-In-Process Inventory, October 1, 2008 _____
- (3) Finished Goods Inventory, October 1, 2008 _____

Solution:

BI Direct Material	\$ 25,000	
+ <u>Direct Material Purchases</u>	+155,000	
Direct Material Available	\$180,000	
- <u>EI Direct Material</u>	- 40,000 (Answer 1)	
Direct Material Used	\$140,000	} = \$440,000 Prime Costs
+ Direct Labor	+300,000	
+ <u>Overhead</u>	+375,000 = 125% of \$300,000 = \$375,000	
Cost of Manufacturing	\$815,000	
+ BI Work-In-Process	+ 85,000	
- <u>EI Work-In-Process</u>	- 100,000 (Answer 2)	
Cost of Goods Manufactured	\$800,000	
+ BI Finished Goods	+ 18,000	
- <u>EI Finished Goods</u>	- 68,000 (Answer 3)	
Cost of Goods Sold	\$750,000	

	Sales	\$ 900,000
	- <u>Cost of Goods Sold</u>	- 750,000
	Gross Profit	\$ 150,000

←

SUMMARY AND CONCLUSIONS

Two types of problems were presented in this paper. The first problem focused on students being asked to prepare a financial statement from a listing of accounts. This is a very important type of problem since the preparation of financial statements is often the final step in presenting financial data to external users. However, the preparation of these types of financial statements focuses only on “how” to prepare the statements. Students need to not only know “how” to do things, but also “why” they are being done. The second problem focused on using the information to resolve a dilemma that might arise in the real world. The second assignment demonstrates that accounting is, indeed, about providing information. Accounting, however, is not only about providing information for external users such as shareholders, creditors, and governmental agencies such as the Internal Revenue Service, it is also useful in resolving day-to-day situations such as calculating at least a starting point for insurance negotiations for ending inventory values of manufacturing inventories when they are destroyed by a catastrophic event such as a fire or hurricane. By using two problems such as the ones shown in this paper, and preferably using them as soon as possible (even as the first two efforts by students to assimilate the material), students should find the material more relevant (and hopefully easier to retain) since it is linked to familiar examples that the students identify with day-to-day events in the real world.

TEACHING TO THE AICPA'S MODEL TAX CURRICULUM

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Abstract

The American Institute of Certified Public Accountants (AICPA) has created a Model Tax Curriculum outlining tax topics that tax educators should cover in their undergraduate tax classes. The AICPA's goal is to ensure that "all accounting students obtain the fundamental tax knowledge they need to begin careers in accounting or tax regardless of the path that a student might take to obtain a degree." The Model Tax Curriculum furthers that goal by breaking the study of taxation into core components that include: 1) the role of taxation in economic decision making and financial reporting; 2) the fundamental tax laws and essential tax-planning concepts; and 3) the breadth of existing tax issues and their impact on a variety of taxpaying entities.

This paper reviews the AICPA's Model Tax Curriculum and concludes that it provides a comprehensive overview of tax subjects that students need to enter the accounting profession. Consequently, tax educators – particularly those who are teaching income tax at the university undergraduate level – should incorporate the AICPA's Model Tax Curriculum into their teaching plans. The Model Tax Curriculum recommends teaching students more information than can be covered in a single semester, however. Thus, tax educators and universities also should compel students to take multiple tax courses to ensure that the students are exposed to the full breadth of information that they will need to pursue careers in taxation.

Finding the Path: The AICPA's Model Tax Curriculum

Income tax accounting is statutory-based and highly regulated. In theory, this rigidity compels uniform treatment of similar taxation issues in all cases. In practice, however, multiple tax professionals addressing the same questions may reach varying answers about proper tax treatment, or may reach identical conclusions, but for different reasons. Even a single tax professional may advise multiple clients to treat similar tax questions differently, depending on considerations unique to each client. Indeed, the hallmark of a successful tax professional is the ability to employ critical-thinking skills to handle tax issues in a manner that is simultaneously consistent with the tax code and the client's business or personal objectives.

Just as tax professionals may follow multiple paths to resolve outstanding tax questions, so too tax educators may choose from numerous methods to teach income tax theory and practice to their students. Well-established teaching methods include a forms-based approach, a research and code-based approach, a strict problem-based approach, and a life-cycle approach. Each method has its strengths and weaknesses, but they share a common goal: to develop students with a substantive knowledge of and approach to the practice of income tax.

Without a doubt, the teaching method that a tax educator chooses will influence how his or her students evaluate and manage the tax issues they face. Regardless of which method we employ, however, our task as tax educators is to provide our students with a broad-based understanding of the tax code and the skills to implement it in our global economy.

The American Institute of Certified Public Accountants (AICPA), which governs accounting professionals, has created a Model Tax Curriculum outlining tax topics that tax educators should cover in their undergraduate tax classes. The AICPA seeks to ensure that "all accounting students obtain the fundamental tax knowledge they need to begin careers in accounting or tax regardless of the path that a student might take to obtain a degree." The Model Tax Curriculum pursues that goal by breaking the study of taxation into a string of components from the basic, such as "comprehend the rationale for tax laws," to the complex, such as the ability to "communicate tax conclusions and recommendations in a clear and concise manner." In between, the curriculum asks educators to expose their students to a broad range of tax issues and their impact on a variety of taxpaying entities. It further contemplates educators developing their students' ethical, interpersonal, and technological skills.

Tax educators who wish to prepare their students to succeed as tax and accounting professionals would be well served to follow the Model Tax Curriculum. Regrettably, while the AICPA has invested substantial resources into developing the Model Tax Curriculum to develop future CPA's core competencies, it has not widely publicized it. Thus, tax educators who want to prepare their students for professional accounting careers according to the AICPA's guidelines must seek out the Model Tax Curriculum on

their own. The materials are available on the Accounting Education Center page of the AICPA's website.

Defining the Course: The AICPA Weighs In

The AICPA is the national professional organization for all American Certified Public Accountants. Among its many activities, the AICPA supports the development of outstanding academic programs to help students begin careers in tax and accounting. Specifically, the AICPA recognizes that a student's positive exposure to tax and accounting concepts "has a key role in attracting students toward careers as tax professionals."

The AICPA has created a Model Tax Curriculum to help tax educators instruct future CPAs in a manner befitting the profession. The AICPA Mission Statement describes the value that CPAs deliver to their clients as having multiple parts:

- Communicating the total picture with clarity and objectivity,
- Translating complex information into critical knowledge,
- Anticipating and creating opportunities, and
- Designing pathways that transform vision into reality.

The AICPA further recognizes that fulfilling this vision in the future requires tax educators to impart a solid tax foundation to their students:

Because taxation is pervasive, complex and critical to decision-making, we recommend that accounting faculty carefully examine the tax component of their curricula to ensure that all accounting students obtain the fundamental tax knowledge they need to begin careers in accounting or tax regardless of the path that a student might take to obtain a degree.

Consequently, the Model Tax Curriculum offers tax educators recommendations about the content of their tax programs "so that the AICPA's vision and its tax section's mission can be maximized."

The Model Tax Curriculum breaks down the study of taxes into three main pieces: 1) the role of taxation in economic decision making and financial reporting; 2) the fundamental tax laws and essential tax-planning concepts; and 3) the breadth of existing tax issues and their impact on a variety of taxpaying entities. These three components, in turn, include subparts that each might comprise a series of lectures, and that suggest analytical and problem-solving discussions. Moreover, the Model Tax Curriculum identifies tangential skill sets, including technological skills, interpersonal skills, and communication skills that future CPAs should hone as part of their tax education. Finally, the Model Tax Curriculum sets forth additional teaching materials such as sample case studies and simulations.

Notably, the Model Tax Curriculum does not provide specific lesson plans or substitute for an individual educator's class preparation. By way of example, the Model Tax

Curriculum endorses teaching students to “apply analytical reasoning tools to assess how taxes affect economic decisions for all taxpaying entities,” but leaves to the educator’s discretion the most efficient means to prepare and present that information. As such, the Model Tax Curriculum articulates what savvy tax educators already know: that the key tax concepts that they present to their students link to the functional and analytical “core competencies” that the students need to pursue tax and accounting careers. Indeed, perhaps the most useful part of the Model Tax Curriculum is its extensive matrix that correlates broad-based tax subjects with the students’ personal and professional development competencies and with the technical tax skills crucial to tax and accounting professionals.

Consistent with the AICPA’s “big picture” approach, the Model Tax Curriculum does not promote any single tax-teaching method over another. Thus, tax educators can and should adopt the Model Tax Curriculum whether they follow a forms-based approach, a research and code-based approach, a strict problem-based approach, and a life-cycle approach. The Model Tax Curriculum does, however, encourage tax educators to “use an approach that integrates planning, research, and financial accounting concepts from a decision-making perspective.” This edict lends itself to tax educators following a hybrid teaching approach that parallels the variety of methods available for evaluating and resolving tax problems.

Challenging Tax Educators: Teach Your Students to Think

At its core, the Model Tax Curriculum recognizes that successful tax educators do more than teach their students rules for rote tax preparation. Given the ever-changing tax rules, and the need to evaluate even small tax issues in the context of a client’s overall financial objectives, successful tax educators provide their students with a framework in which to review a tax problem, identify the underlying tax issue, research the tax law, and then apply the facts to the law in a manner that best satisfies both the tax code and the client’s individual needs. Teaching students to think critically is, of course, more difficult than asking them to memorize various sections of the tax code. But our tax students and future accountants will benefit far beyond their grade in a single tax course if they learn the framework for dealing with potentially complex and unique issues, rather than just memorizing the rules. Absent such a framework, the students will lack the flexibility to recognize that sometimes they have to set aside “the way we’ve always done it” in the face of a more advantageous approach.

The Model Tax Curriculum’s goal of helping students “understand the fundamental tax law” and apply the law to essential tax planning concepts illustrates the need for tax educators to teach their students critical-thinking skills. The Federal Tax Law – Title 26 of the United States Code – is a long, convoluted set of laws that covers thousands of pages. And it is subject to change at the whim of legislators, regulators and courts. Tax educators who say that their students, after only a few weeks of study, understand the fundamental tax law are simply wrong. Students may grasp certain concepts of the law,

such as the basic definition of income, but they do not understand the fundamental tax law. To help them obtain that understanding, thus, tax educators must give their students the background to identify tax issues and research existing resources for answers. They must help them to recognize when existing resources do not have the answer to the specific pending question. This guided research will aid students in the future when a question does not fit neatly into a tax form box.

Indeed, once the students have critical-thinking skills in place, they can use those skills to become effective tax planners. No one wants to pay more taxes than necessary. Clients seeking an accountant today are looking for someone who can help them with tax planning to minimize taxes in their business and personal lives. Although every client's situation is different, an accountant armed with critical-thinking skills can work with an array of clients to answer an array of questions and be an effective tax planner.

Along these same lines, the Model Tax Curriculum asks tax educators to focus their students' attention on the fact that all business decisions are in some form or fashion related to taxes. Thus, for example, tax educators cannot be content with teaching their students how to calculate depreciation on equipment; they must also give the students a framework for advising a client on the long-range financial ramifications of the proposed equipment purchase. A company that is considering a new line of products needs professional assistance to evaluate not only if the product fits its "brand" or if the new product would sell in the marketplace, but also, what tax consequences will the company incur by purchasing the equipment needed to produce the new product? How will the sales of this new product affect the company's bottom line and thus the company's income taxes? Will the company need to hire new employees? What will this mean to the company's payroll and income taxes? Clearly, each of these economic decisions must be studied from a tax standpoint as well as from a business standpoint before the decision is finalized. Teaching our students the calculation of taxes is not enough; educators should strive to also teach the relationship between taxes and the economic decisions business leaders face every day.

Advancing Universities: Two Heads Are Better Than One

The Model Tax Curriculum proposes a vast amount of information for tax educators to present to their students. It is far too extensive to give due consideration in a single undergraduate semester course. One semester of class amounts to 43 hours of class and test time. Any tax educator who purports to present a complete tax overview in that time frame necessarily gives short shrift to at least some of the suggested topics. This is particularly true of large lecture courses. Indeed, the Model Tax Curriculum recognizes that full tax-oriented development "cannot be accomplished via a single individual income tax-oriented course which is exclusively lecture-based." A single semester is simply not enough to even introduce the federal tax code as it applies to individuals, much less business entities.

Consequently, the AICPA contemplates compelling students to take more than one semester of taxation courses, and also identifies alternative opportunities for students to develop their tax knowledge. These suggestions are forward-thinking. Most colleges and universities divide the study of income tax into Income Tax I, which covers individual income tax, and Income Tax II, which covers the study of corporations, partnerships, trusts, payroll taxes, and other entity tax issues. But the institutions typically require that students take only the first semester course. Thus, students who pursue the mandated course load will forego the opportunity to learn how taxation affects the business and economic decisions of entities, as opposed to individuals.

A mandatory second tax class, focusing on the interpretation and application of tax issues to entities, would help ensure that future accountants have the skills and knowledge necessary to become effective business leaders. This conclusion is clear with regard to students who wish to pursue a career in accounting or taxation. But it applies even more broadly. Colleges should compel all business students to take a second tax course to reinforce the notion that tax issues have a day-to-day impact on the financial and economic decisions of every business entity.

While each of the major public universities in South Carolina offers its accounting students a course covering taxation of business entities, none of the universities requires the students to take the second course to graduate. Therefore, many students may graduate without a comprehensive knowledge of taxation of business entities, only learning the basics of individual taxation. The table below synthesizes some South Carolina undergraduate accounting program requirements:

University Name	Accounting Program Offered	Individual and Business Income Tax Classes Offered Separately?	Are Both Required?
Lander University	Yes	Yes	No
University of South Carolina	Yes	Yes	No
Clemson University	Yes	Yes	No
Francis Marion University	Yes	Yes	No
Winthrop University	Yes	Yes	No
College of Charleston	Yes	Yes	No

Although it may be a large undertaking to change a university's internal curriculum to require a student to take two semester of income tax to graduate with a degree in accounting, we as professors should encourage our students to enroll in both semesters of income tax to make sure the students are introduced, as the objective states, to "a broad range of tax issues and their impact on a variety of taxpaying entities."

Conclusion

The Model Tax Curriculum encourages tax educators to “enhance students’ tax knowledge while developing their communication, intellectual, and interpersonal skills.” Although not all classes will fit neatly into the Model Tax Curriculum, it is a starting point to prepare students who will become practicing accountants with a uniform tax-knowledge base and the skills needed to succeed in their profession.

References:

[1] American Institute of Certified Public Accountant’s Model Tax Curriculum,

found at:

<http://ceae.aicpa.org/Resources/Education+and+Curriculum+Development/Model+Tax+Curriculum>

[2] Federal Tax Code, Title 26, United States Code (26 U.S.C.).

[3] Accounting program information found at:

1. www.lander.edu
2. www.sc.edu
3. www.clemson.edu
4. www.fmarion.edu
5. www.winthrop.edu
6. www.cofc.edu

CHINA'S FOREIGN DIRECT INVESTMENT (FDI) ACCOUNTING – FLUFFED UP STORIES OR TRUE FINANCIAL REPORTING?

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ABSTRACT

China's foreign direct investment (FDI) has always played an important role in China's economic development since China's open-door policy in late 1980's, and China will continue to attract FDI in the future.

One critical issue regarding China's FDI has been its accounting. In general, researchers and investors alike have always been skeptical of China's FDI reporting practices. The motivation of this paper is to analyze China's FDI accounting practices. Specifically, I provide anecdotal evidence from literature research to show major problems in China's FDI reporting, including "double counting," "round-tripping," and "off-shore financing." Results from this research may provide additional insight for researchers and decision makers in establishing a more rigorous FDI accounting reporting for China in the future.

INTRODUCTION – CHINA'S ECONOMIC GROWTH

Since the initiation of economic reforms in 1979, China has become one of the world's fastest-growing economies. For nearly three decades – from 1979 to the present, China's gross domestic product (GDP) grew at an average annual rate of 9.7%. For the most recent report, it grew by 11.1% during the first quarter of 2007, and it is expected to continue to grow over the next several years. (See Table 1.)

1990	3.8
1991	9.3
1992	14.2
1993	14.0
1994	13.1
1995	10.9
1996	10.0
1997	9.3
1998	7.8
1999	7.6
2000	8.4
2001	8.3
2002	9.1
2003	10.0
2004	10.1
2005	9.9
2006	11.1
First Quarter 2007*	11.1

Table 1. China's Average Annual Real GDP Growth: 1990-2007 [13, p. 4]

Trade and foreign investment continues to play a major role in China's booming economy. Most recent record showed that its exports reached \$969 billion and imports to \$792 billion in 2006, which generated

a trade surplus of \$177 billion [13]. It is projected that, if the trend continued, then China could surpass the United States to become the second largest (only after European Union) merchandise exporter soon.

Amid the rapid economic growth and improved GDP, lately Chinese officials have expressed concern over a number of areas that they perceive as threats to its future growth. To minimize some of those threats, the government has indicated its goal over the coming years to create a “harmonious society” that would promote more economic balanced growth and address a number of economic and social issues. This report provides an overview of China’s economic development in foreign direct investment (FDI), one of the key aspects of China’s recent economic growth.

CHINA’S FOREIGN DIRECT INVESTMENT – AN OUTLOOK

Most recent research has attributed China’s economic success to its ability to attract foreign direct investments (FDI) that generates sufficient capital to sustain its blooming business activities [5]. In 2006, China attracted US\$70 billion FDI inflow. It is projected that, from 2006-2010, China will continue to attract FDI in major ways – It is projected to account for 30% of the \$250 billion of FDI inflow to all developing countries.

Despite its great success in attracting FDI, there has been growing concerns about whether China can sustain its FDI and economic growth in the future. Signs of trouble concerning China’s FDI include the following:

1. China has been the largest growing economy for the past decade, and the trend appears to be continuing, but it has begun to show signs of saturation. A recent report in *Business Week*, for example, projects that China’s overheated stock market could mean a serious market backslide in the near future [2].
2. China is by far the largest recipient of inward FDI in the world. Unfortunately, it is widely believed that low wages but not other factors may be the major driver of all those prosperous trades and FDI flows [3]. It is likely that China’s FDI may have negatively affected its environment.
3. Currently, foreign invested enterprises account for nearly 50% of China’s exports, but they only account for about 3% of its overall employment [19]. There is an urgent need to study factors that contributed to this unfavorable trend.
4. Even though China has started its convergence with International Financial Reporting Standards (IFRS), there are still major discrepancies on the reliability and accuracy of Chinese financial reporting [7]. Issues such as “double-tripping,” off-shore financing, and corporate governance continue to be major barriers to sound financial reporting and business practices in China’s FDI accounting.

My objectives in this research is to study various issues related to China’s FDI accounting, specifically, I will suggest that the following three issues to be of utmost importance in figuring out China’s proper FDI accounting and reporting:

1. China’s inclusion of extra items to boost its FDI figures,
2. China’s round-tripping in its FDI accounting, and
3. China’s use of off-shore financing that twists the proper FDI accounting.

CHINA’S FDI ACCOUNTING – SOME POTENTIAL PROBLEM AREAS

There have always been doubts about China's economic and financial statistics ranging from GDP growth

to FDI inflows [10], particularly after the publication of business reports such as [6, 11]. China's FDI accounting has always been not as straight-forward and exaggerated as some researchers have claimed [10]. For example, many researchers pointed out that China's FDI figures are likely to be exaggerated by "round-tripping" - domestic capital disguised as foreign investment (passed through Hong Kong, Taiwan, or Macaw) to qualify for special investment incentives reserved for foreigners [11, 14]. This paper will add additional information in the following areas:

China's FDI Accounting Practice – What to Include in FDI?

Relative to China's continuous economic growth, India has always been mentioned as the other growing economy that can compete equally well as China in international trade. Just a quick glance would reveal that, in terms of resources, population, stages of economic growth, and trade policies, China and India are quite similar thus should show similar economic growth and attract FDI in similar ways. In some aspect, India may have even higher potential to lead in economic progress. For example, economic reports show that India has the world's largest youth population hence the largest potential market. However, in 2006, while China reported a USD \$69 billion FDI inflow, India only showed \$17 billion [8]. How do we account for the big gap in China's FDI accounting versus that of India? According to International Monetary Fund [12]¹ definition, FDI includes the following twelve categories (see Table 2):

1. equity capital
2. reinvested earnings of foreign companies
3. inter-company debt transactions
4. short-term and long-term loans
5. financial leasing
6. trade credits
7. grants
8. bonds
9. non-cash acquisition of equity
10. investment made by foreign venture capital investors
11. earnings data of indirectly-held FDI enterprises
12. control premium and non-competition fee

Table 2: International Monetary Fund's Definition of Foreign Direct Investments [12]

In its FDI accounting, China included all categories above while India only reports Category 1 Equity Capital, which would generate huge reporting gap. In addition, China also includes imported equipment as FDI, which is always listed as import data on India's FDI accounting.

China also includes domestic investments that are routed through Hong Kong, Taiwan, Macau back to China ("round-tripping") as "foreign" investments [1]. The inclusion of all the items above plus imported equipment in FDI accounting, as well as the investments primarily coming from domestic sources but yet counted as FDI both overstated the true FDI accounting in China. There are estimates that such overstatement of FDI could amount to about one third of China's overall FDI inflow. Some even estimated that such FDI accounting could overstate China's real FDI figure by thirty to fifty percent [10].

Another area of concern to China's FDI accounting regards the inclusion of reinvested earnings by foreign affiliates in China. Some believe that such inclusion is misleading, in that, by default, these FDI are nothing but funds reinvested back to MNC's China affiliates, therefore they should not be counted as

¹ Organization for Economic Co-operation and Development (OCED) has just revised its benchmark definition of foreign direct investment in April 2008 [15], which is consistent of the categories listed in Table 2.

new FDI inflow to China. Information from year 2002 showed that such reinvestment accounted for about one-third of China's 2001-2002 FDI inflows, about twenty percent of China's industrial production, about eighteen percent of China's tax income, and about half of China's total exports [10]. All the statistics indeed pointed out the key roles that MNC's reinvestments played in China's FDI accounting thus causing some doubts about China's FDI accounting practices. However, IMF standards [12] as well as the Benchmark Definition of FDI published by the OECD [15] both do not rule out the inclusion of such reinvestments to be included in FDI accounting. Therefore, despite the apparent high volumes in all these FDI indicators, China does not violate the general FDI accounting rules imposed by IMF and OECD.

Round Tripping and China's FDI Accounting

Unique to China's FDI inflow, round-tripping probably represented the largest FDI accounting problem in China. As early as 1993, World Bank [9] estimated that round-tripping accounted for 25% of China's FDI in 1992. A more recent report in Pfeffermann [16], round-tripping is estimated to be about half of the total China's FDI inflow from 1999 to 2000 – it is estimated to be about USD 20 billion out of the total of USD 40 billion.

Favorable tax treatments and other incentives for foreign investors attracted many MNC's to invest in China, which is mutually beneficial to foreign investors as well China's FDI. However, these special tax treatments and incentives have motivated many domestic investment funds to disguise as foreign capital. Exactly how much or what percentage of China's capital flight is from domestic sources is hard to estimate. Economists usually use the Net Error and Omission under China's Balance of Payments account as a reference to the size of the flight. One report showed that, from 1997 to 2000, the amounts were more than USD 10 billion each year for four consecutive years [10].

How is round-tripping done? First, companies in China intentionally overstate the value of exports and understate that of imports, thus creating extra capital from international trade. This can be done with a simple procedure of transfer pricing. These companies in turn would then get the money out of China. Despite Chinese government's tight control on foreign exchanges, there are nonetheless many established channels to allow these companies to get the money out to places such as Hong Kong, Taiwan or Macaw. And, finally, these funds are transferred back to China, disguised as foreign investments to special economic zones, which adds value to China's FDI inflow.

Xiao [20, p. 2] describes China's FDI round-tripping as:

“The evidences suggest that a large part of the capital originally created in PRC has managed to go abroad and has stayed aboard waiting for opportunities to return back to PRC. On average the round tripping FDI, e.g. the returning Chinese capital, is about 20% to 30% of the capital flight of various estimations. ”

Due to their geographical closeness to China, also due to their cultural backgrounds, Hong Kong, Taiwan, and Macaw are always listed as major destinations where the double-tripping of China's FDI inflow take place. Hong Kong, in particular, has always been the major source and destination for these FDI double-tripping. Table 3 shows the key role Hong Kong played in China's FDI inflows from 1985 to 2001.

	1985	1990	1992	1993	1993	1994	1995	1996	1997	1998	1999	2000	2001
Share	49%	54%	55%	68%	63%	58%	53%	49%	46%	41%	41%	38%	36%

Table 3: Hong Kong's Role in China's FDI (1985-2001) [10]

If we add about 6% or so from Taiwan, and 2% or so from Macaw, these cross border FDI inflow could easily accounted for forty to sixty of overall China's FDI inflows for the past two decades [20].

Even though Hong Kong, Taiwan, and Macaw's role in China's FDI can be easily identified from China's FDI data, double-tripping does create a loophole in China's FDI accounting, though. Xiao [20] asserts that, from China's FDI inflow, Hong Kong plays an important role in each of all three stages of capital's journey: (1) the original creation of new capital in China, (2) the capital flight out of China, and (3) the round tripping FDI back to China.

However, about half of Hong Kong's FDI to China as reported by China sources cannot be verified or confirmed from the related statistics collected in Hong Kong.

Chinese governments have realized the severity of the FDI round-tripping problem, and have drafted a bill to abolish the preferential tax rate for FDI. It is expected to come into law in 2008 [4]. Once the amendment is passed, there will be a uniform twenty-five percent rate, instead of the traditional fifteen percentage rate for FDI and thirty-three percent for domestic firms, which will almost certain to curb some of the round-tripping loopholes in China's FDI accounting [18].

Off-Shore Financing and China's FDI Accounting

In recent years, FDI from tax havens such as British Virgin Islands (BVI), Cayman Islands and Bermuda's share in China's FDI inflow continues to increase. In 1997, FDI flows from of BVI, Cayman Islands and Bermuda accounted for 4.36% of China's total FDI, such figure increased to 17.8% in 2001 [6]. Such trend continued in 2005 -2006. As Table 4 indicates, BVI continued to be accounted for significant part of China's FDI inflow. Tax havens such as BVI, Cayman Islands and Western Samoa are ranked among top ten origins of China's FDI inflow.

<u>Country/Region of Origin</u>	<u>Amount Invested 2005 (\$ billion)</u>	<u>Amount Invested 2006 (\$ billion)</u>	<u>Year-on-Year Growth (%)</u>
Hong Kong	\$17.95	\$20.23	13
British Virgin Islands	\$9.02	\$11.25	25
Japan	\$6.53	\$4.60	-30
South Korea	\$5.17	\$3.89	-25
United States	\$3.06	\$2.87	-6
Taiwan	\$2.15	\$2.14	-1
Singapore	\$2.20	\$2.26	3
Cayman Islands	\$1.95	\$2.1	8
Germany	\$1.53	\$1.98	29
Western Samoa	\$1.36	\$1.54	13

Table 4: Top 10 Origins of China's FDI [18]

Like Hong Kong, these tax havens provide tax exemptions on dividends and offshore earnings, confidentiality, fast and easy procedures for setting up a company and an established legal system. In some sense, these tax havens are even more favored by MNC's that will likely to invest in China, because they are perceived to be politically more independent than Hong Kong [10]. Apparently Chinese companies listed in these tax havens do not have any major manufacturing or production activities, they are nothing but shell companies that allow Chinese companies to gain access to flexibilities in financial arrangements.

Offshore tax havens have always been favorite locations for special-purpose vehicles used for investing in China. Major reason for using an offshore shell to hold a China investment is to bypass the mainland's maze of regulations and restrictions on foreign investment.

Chinese government has strict regulations prohibiting foreign companies from investing in certain telecom segments, such as internet content providers (ICPs). Therefore, a web of offshore companies could be set up to help foreign companies to invest indirectly but legally in such mainland-based concerns. For a similar reason, for high-tech start-up companies that China has tight control, Chinese venture capitalists go offshore to circumvent China's unclear and restrictive laws on exiting a short-term investment. Such type of off-shore arrangements would provide necessary financial flexibility for transfer of venture capitals while at the same time bypass complicated process that will typically involve layers of governmental approvals.

For Chinese private firms that have problems getting listed in the domestic stock market due to biases against Chinese companies in favor of foreign MNCs, an easier way to gain access to financial capital is for them to set up an offshore company to control their mainland assets and then list the shell abroad company as foreign-owned one. The funds they raise are then sent back to China as "foreign capital" subject to preferential treatment, which, in turn, boosts China's FDI inflow figures without any major economic contribution to China.

CONCLUSION

I have briefly reported the following three major problems in China's FDI accounting: 1. the inclusion of additional items to boost its FDI inflow figure, 2. Round tripping that have exaggerated China's FDI inflow amount by at least 25% for the past decade, and 3. The use of off-shore financing in tax havens that have severely twists the true FDI accounting numbers. Each of these three problems have twisted China's FDI accounting and bears dire consequences. I believe that it is necessary for the Chinese government to change regulations to fix these misleading financial reporting practices to allow true FDI accounting. The identified FDI accounting problems can also provide guidance for future China's policy making in its economic developments.

Further research into China's FDI accounting is still needed, as some of the data in this report is outdated. In addition, additional analysis is needed in order to identify other factors that may have caused China's FDI accounting.

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**A COMPARATIVE STUDY OF CORPORATE ACCOUNTING MALFEASANCE AND
RESTATEMENTS FOR 100 COMPANIES WITH FINANCIAL AND MARKET IMPACT AND
ANALYSIS OF MONITORING CHARACTERISTICS**

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A Comparative Study of Corporate Accounting Malfeasance and Restatements for 100 Companies with financial and market impact and analysis of monitoring characteristics

ABSTRACT

This study examines corporate accounting malfeasance from an exploratory and empirical perspective for 100 companies to determine if there is an association between the Jenkins recommendations SOX requirements. The exploratory perspective discusses the types of corporate malfeasance and gives the dollar impact for the financials and the market dollar impact (\$140 and \$857 billion respectively) of 100 companies with publicly announced malfeasance. In addition to the dollar impact, the results of the exploratory study supports previous studies which found that revenue was the most common area of corporate malfeasance and actual theft was the least. The exploratory study was followed with an empirical examination of corporate malfeasance using internal (corporate governance) and external (auditor and financial analysis) monitoring characteristics by matching the malfeasance companies with non-malfeasance companies. The results of the empirical study did not find any significant differences in the monitoring characteristics of malfeasance as compared to non-malfeasance companies even though these characteristics were chosen based on an examination of recommendations/requirements for business reporting for SOX and several accounting committees over the years.

The research contributes to the body of contemporary accounting literature by providing a review of current business reporting drivers, a dollar measurement of the accounting and related market impact for malfeasance companies and a systematic investigation indicating that the difference tested, in corporate governance characteristics between malfeasance and non-malfeasance companies may not be as significant as deemed in previous studies due to the changing board of director and committee requirements by the SEC and other bodies.

I. INTRODUCTION

Announced corporate malfeasance has increased significantly since the mid-1990s resulting in a significant increase in the number of previously issued financial statements having to be restated. This has also resulted in increased dissatisfaction with the current financial reporting process by regulators and investors. Arthur Levitt's speech, The "Numbers Game" in 1998 highlighted the Securities and Exchange Commission's (SEC) discontentment with the volume of corporate malfeasance, emphasized the need for reform in the financial reporting arena and called on the accounting profession to help in the reformation process. Levitt was the Chairman of the SEC in 1998. The Enron and WorldCom accounting scandals in late 2001 and 2002, refueled the reform issue compelling regulatory and political intervention to change the financial/business reporting process with an implied objective that the reforms would reduce or eliminate corporate malfeasance.

Congress' passage of the Sarbanes-Oxley Act of 2002 (SOX) was a direct response to the accounting scandals and an attempt to reform the financial/business reporting process. But there have been several other efforts during the 20th century to reform or improve the financial reporting process due to misleading or fraudulent financial reporting: the Special Committee on Co-operation with Stock Exchanges of the American Institute of Accountants during the early 1930s (Storey 1964) in response to the stock market crash of 1929; the National Commission on Fraudulent Financial Reporting formed in 1985, chaired by James C. Treadway (the Treadway Commission), (Minter 2002); etc. In 1991 the American Institute of Certified Public Accountants (AICPA) formed the Special Committee on Financial Reporting as part of the AICPA's broad initiative to improve the value of business information and the public's confidence in it. This committee was deemed the Jenkins' Committee since it was chaired by Edmund Jenkins, then a partner in Arthur Andersen.

The Jenkins' Committee report, *Improving Business Reporting-A Customer Focus; Meeting the*

Information Needs of Investors and Creditors (AICPA 1994), was published in 1994. The 200 page report, and the underlying 1600 page database is considered the most comprehensive study on user needs for business reporting information and continues to be utilized today. While none of the Jenkins' Committee recommendations have been fully implemented, these recommendations have been extremely influential in providing user information relative to financial standard setting and reporting since publication of the report as evidenced by the inclusion of several of the recommendations in the Enhanced Business Reporting Consortium's (EBRC) proposed business reporting framework (ERBC 2005) and the SOX legislation (SOX 2002). For a better perspective on the history of accounting please see Previs (1997) and Zeff (2003). The Jenkins Committee and EBRC recommendations and SOX requirements all include, in addition to other items, more transparency in business reporting, more board of director independence and less related party transactions between board members, corporate officers and the corporation (Arnold, 2006). This research seeks to examine corporate malfeasance and the historical value of these recommendation/requirements' impact on corporate malfeasance.

1.1 Corporate Malfeasance & Business Reporting

Since SOX and EBRC requirements/proposal resulted from the recent accounting scandals (corporate malfeasance) and mirror several of the Jenkins Committee recommendations, this research project includes an initial exploratory study of 100 selected accounting malfeasance companies to determine if the accounting malfeasance announced by several companies could be identified to a Jenkins' Committee recommendation and a follow-up empirical study of some of the internal and external monitoring characteristics of these companies and a matched non-malfeasance company. Overall, these studies seek to examine corporate malfeasance and some of the business reporting elements as recommended Jenkins' or required by SOX and the level of the corporate accounting malfeasance experienced in today's society. It is acknowledged that this is difficult, if not impossible to determine, therefore this study identifies and quantifies accounting malfeasance activity (\$140 billion) and the resulting marketing impact (\$857 billion) and associates the activity with the Jenkins' recommendations/SOX requirement where possible.

For purposes of these studies, we are defining corporate accounting malfeasance as the use of false or misleading accounting information or omission of these entries in the financial reporting process (announcements, filings, etc.) that later requires a restatement. This approach to restatements includes accounting errors, accounting misstatements and/or any other accounting irregularity similar to the approach utilized by the United States General Accounting Office (GAO) in their restatement study (GAO 2002). The primary difference between this and other studies is the association of the dollar impact of the accounting irregularity with the market impact and the cataloging of the malfeasance items according to Jenkins' recommendations.

Results of the study indicated that there were 180 accounting malfeasance observations for the 100 companies with an accounting impact (table 5) of over \$140 billion (overlapping) and a market impact (table 7) of over \$857 billion using the 6 months window for 96 of the 100 firms. Appendix D and tables 5, 6 and 7 summarizes the dollar impact of the observation association with Jenkins' recommendations and the accounting and market outcomes.

From the selected sample, each malfeasance companies (from the initial study) was matched with a comparable non-malfeasance company based on their standard industry classification (SIC) code and size (total assets). One of the malfeasance companies was dropped due to its closely held corporation status and the lack of publicly available data. The 4 digit SIC code was used where possible, the 3 digit, and so on until all included companies were matched. For the final phase, financial and corporate governance data for the sampled and matched companies were extracted and tested to determine if there was a statistical difference in the characteristics between malfeasance and non-malfeasance companies as the changes in business reporting recommendations and SOX requirements implied. Financial and auditor data, for these companies, was retrieved from COMPUSTAT and the corporate governance data were

extracted from the proxy statement or 10-K for each company.

The characteristics tested for internal monitoring consisted of the size of each company's board of director; the number of independent directors on the board; whether or not the audit committee was independent; the terms (staggered or same) for the board of directors; and the existence of more than one related party transactions (directors or officers). The characteristics tested for external monitoring were the brand of auditor (Big 4 or other) and auditor change in the last five years. The company's financial position was examined by carefully scrutinizing the firms leverage – total liabilities to total assets. It was hypothesized that accounting malfeasance would be positively associated with board size, classified (staggered) board terms, related party transactions and auditor change; and, accounting malfeasance would be negatively associated with board independence, independent audit committees, auditor brand and leverage.

While other studies (Farber 2005, Frankel et al 2005, etc.) examined the association between fraud and various components of corporate governance addressing board independence, audit committee make-up and the auditor type (Big 4 or other). Frankel (2005) found that in the year prior to the announced fraud, consistent with prior research, that the fraud firms had poor governance relative to his control sample. Frankel et al (2005) also found that board independence shapes the quality of earnings. Findings during this research revealed no correlation between board independence, auditor type and corporate malfeasance. The test of the control variables (not shown) showed no statistical difference between malfeasance and non-malfeasance firms (R-square of .065, adjusted R-square of .02). Although the results differ, this may be due to the years included in our studies. Farber (2005) examined companies from 1982-2000 and Frankel et al (2005) examined companies from 1988-2002, while our study examined companies from 1996-2002. The recommendation of the Blue Ribbon Committee (1999) influenced the make-up of the board of directors and board committees. The results did not reflect any statistical difference except for auditor change during this study. Several of the auditor changes were from Arthur Andersen LLP to another audit firm in 2002. Consequently, this will be examined through a future study.

While the passage of SOX (2002) and the formation of the EBRC (2005) are the most recent broad attempts at mitigating corporate malfeasance and empowering the users of public company reported information, the question is - will this help curb the volume or magnitude of corporate malfeasance? While the question appears rhetorical, what will be used to measure the success or failure of either SOX or SCEBR? Section 2.0 of this research provides an overview of corporate malfeasance and restatements and related studies on these topics; section 3.0 of this article discusses corporate malfeasance and the Jenkins Committee and SOX recommendations/requirements; section 4.0 presents the exploratory study of 100 malfeasance companies and the resulting financial and market impact; section 5.0 presents the empirical study and its results when comparing the malfeasance and non-malfeasance companies. Section 6.0 presents the summary, conclusions and areas of future research.

2.0 Corporate Malfeasance Overview & Literature Review

Identification of corporate malfeasance in this study was obtained through analysis of accounting irregularities or other announced inappropriate financial activity for a company, i.e. bribes. Fraud and accounting errors are included in this operationalization of corporate malfeasance. While it is difficult to interpret whether accounting errors and or misstatements are intentional or unintentional, they exist under managements jurisdiction and as such are management's responsibility. Therefore, these and other accounting irregularities are included as corporate malfeasance for purposes of this discussion. Other studies have addressed this in a similar manner. Dechow and Skinner (2000) made a distinction between fraud and earnings' management. They defined earnings' management as within-GAAP choices that are used to obscure or mask true economic performance (management intent). Whereas, they defined fraud as a clear intent to *deceive* using accounting practices that violate GAAP. Palmrose et al (2002) agreed

with their definition of fraud. But, they also maintained that "it is difficult for researchers, regulators and courts to distinguish empirically between unintentional errors, aggressive accounting (resulting in non-GAAP reporting) and fraud." While Dechow and Skinner (2000) define all non-GAAP reporting as fraud, they discussed in their article the difficulty expressed by Palmrose et al. (2002) of distinguishing intent. Hence, corporate malfeasance in this study contains all accounting irregularities including fraud. This studies approach to examining corporate accounting malfeasance includes accounting errors, accounting misstatements and/or any other accounting irregularity similar to the approach utilized by the GAO (2002) in their study. Here the focus is placed on corporate malfeasance and not fraud to address business reporting concerns.

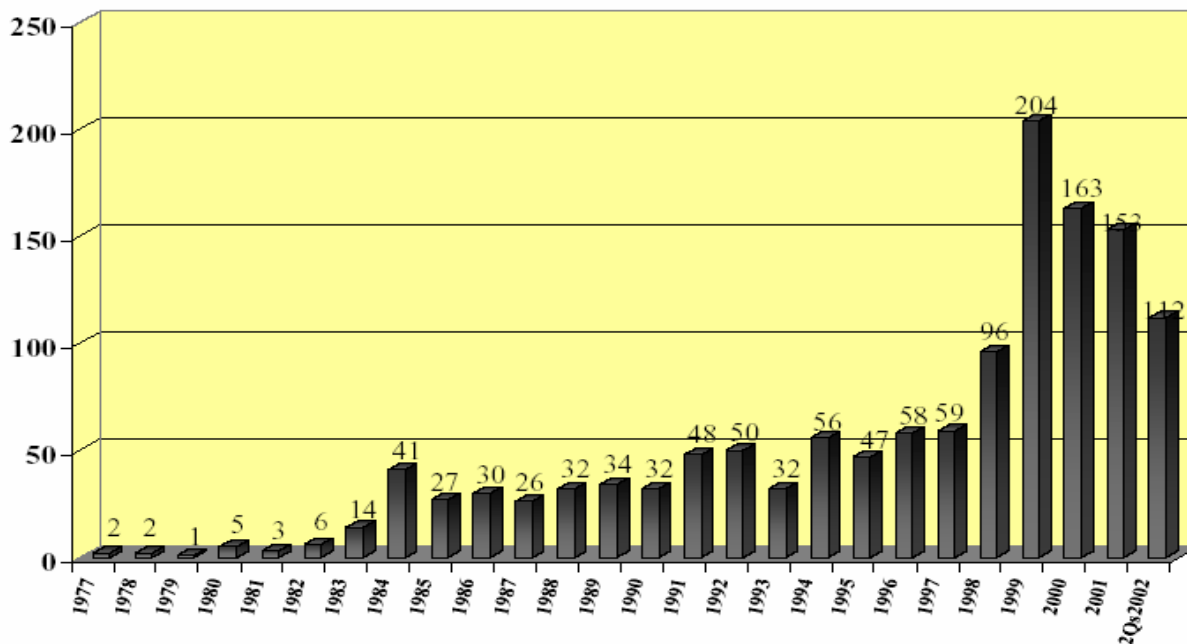
Other interesting work on this topic includes Lynch and Gomaa's (2002) discussion on technology and fraud using Ajzen's theory of planned behavior (1985) and Kohlberg's theory of moral reasoning (1981). The behavior for this type of fraud may or may not involve financial reporting, but it is the type of analysis used to determine if separation of duties, job rotation, and/or time off from job etc. will be useful as a control to prevent or detect fraud in this area. However, this paper addresses whether or not business reporting, as suggested by Jenkins, would have reduced the opportunity or exposed the malfeasance. Gillett and Uddin's (2005) study of CFO intent found CFOs of large companies were more likely to commit fraud than CFOs of smaller companies.

2.1 Increases in Corporate Malfeasance

The number of restatement companies and the magnitude of restatement dollars have been increasing significantly since the mid 1990s, whether examining the number of restatements filed or the number of restatements announced. However, the number of SEC public registrants has been decreasing. Wu's (2002) examination indicated that announced restatements increased from 56 in 1994 to 153 in 2001 – a 273% increase. The GAO study (2002) also reflected a similar growth in announced restatements with 92 announced restatements in 1997 and the volume increasing to 225 in 2001. Huron Consulting (2003) provided data that indicated restatements filed in 2002 (330) increased 285% over the number filed in 1997 (116). Results of these studies and the 1998 Levitt speech denote that the increase in corporate malfeasance reached significance even before the Enron and WorldCom scandals in late 2001. The graph below highlights this effect as it shows the number of restatements filed, between 1977 and 1997, were small relative to the number of public companies registered with the SEC.

Exhibit 3

Restatements by Year 1977-2Q2002



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 Note: Year 2001 and 2002 numbers are preliminary.

The GAO (2002) noted that the average number of companies listed on NYSE, NASDAQ, and AMEX decreased annually from 9,275 in 1997 to 7,446 in 2002. Huron (2003) also noted this decrease in the number of public registrants. Their results indicate that the number of public registrants decreased by 14% from 1997 to 2001 while the number of restatements rose by 53%. The CPA Journal further reiterated that the total number of registered companies decreased from over 10,500 in 1999 to around 9000 in 2002 (includes all US public trading companies). Some of the decrease is attributed to delisting and bankruptcy due to corporate malfeasance. Yet, there is also some decrease in the number of public registrants due to the increase in the number of public companies going private (Grant Thornton, 2003).

In past studies (Kinney and McDaniel 1989, Feroz et al 1991, Gerety and Lehn 1997), results indicated that restatement companies (1976-1984) were smaller, less profitable and slower growing than their industry or control counterparts etc. The COSO study (1999) also described restatement companies as having the same characteristics. However, recent studies (Huron 2003, Wu 2002, Palmrose et al. 2002, etc.) found that trend had changed. As the Huron report (2003) indicated, there had been a shift from small company (less than \$100M) to large companies requiring more restatements. Their study revealed that 58% of the companies filing restatements in 2002, have revenue over \$100M and 22% have revenue over \$1B.

While there have been several studies examining restatements and accounting irregularities the volume of restatements can differ significantly for the same time period. I.e. the 1997 restatement volume for GAO (2002) is 92, for Huron (2003) the volume is 116 and for Wu (2002) the volume is 59. The difference is based primarily on the type of restatement (announced or filed) and/or the type

of accounting irregularities contained in the restatements selected. For example, Huron (2003) restatement volume contains filed restatements by company in the year the restatement was filed. Both quarterly and annual restatements, with accounting errors (problems applying accounting rules, human and system errors, and fraudulent behavior), were counted. Huron (2003) source was the SEC Electronic Data Gathering and Retrieval System (EDGAR). GAO (2002) and Wu (2002) examined announced restatements in the year the restatement was initially announced. GAO (2002) included both annual and quarterly restatements while Wu (2002) only included annual restatements. Their announced restatement volume was based on accounting misrepresentation, irregularities, fraud and/or other errors. Sources for the announcements were from business news media and/or other public sources such as the SEC.

Although most restatements are announced before they are filed, as noted by Wu (2002) the time difference between when a restatement is announced and when it is actually filed can result in a lag of one to eighteen months or longer. However, the volume difference between announced and filed restatements is not just a timing difference as not all announced restatements result in filed restatements. Some companies become delisted or go bankrupt and no filing is required or can be made.

As restatements have increased, the SEC Auditing and Accounting Enforcement Releases (AAER) have also risen. Although the increase in the number of AAERs is not proportional to restatements, it is related since an announced or filed restatement can be the result of an AAER or can trigger an SEC investigation that may result in an AAER. But all restatements for accounting irregularities do not have a corresponding AAER. AAERs are issued by the SEC only after an investigation. SEC investigations are conducted to see if registered companies or persons associated with registered companies have complied with SEC regulations for accounting principles, auditing standards and/or fiduciary responsibilities. Violations of these regulations or other forms of corporate malfeasance result in AAERs. While a company or an individual may receive multiple AAERs as the SEC uncovers different violations, a company may announce or file only one restatement that contains correction of several irregularities (Callen et al 2002).

From 1982 to 1995 the SEC had issued 675 AAERs to companies and individuals (Bonner et al 1998). As of July 30, 2001, they had issued over 1480 AAERs (SEC 2003). The corresponding number of announced restatements issued during those time periods was 475 and 1208 respectively. However, this includes multiple AAERs for the same restatements and those for individuals associated with other SEC violations. For example, Dechow et al. (1996) noted that 165 of 436 AAERs from 1982-1992 were issued for actions against auditors for violations of auditing standards. In examining AAERs, we found as did Bonner et al. (1998) and COSO (1999) that AAERs corresponding to the restatement provided a more detailed description of the corporate malfeasance than can be detected from other sources. Note: From July 30, 2001 to January 30, 2006, the number of AAERs issued increased by almost 1000 to over 2300 (SEC, 2006).

As malfeasance increased, so has the impact on market value of the related companies. Buckster (1999) pointed out that \$31B in market value was lost from January 1997 to January 1998 due to corporate malfeasance. Preliminary study indicated almost a trillion dollar impact for 100 companies. This research and other studies (Wu 2002, and Palmrose et al 2002) found that while the market reacts when there is some measure of materiality, the market reacts more when there is no dollar impact stated in the initial announcement of malfeasance.

3.0 Corporate Malfeasance and Jenkins' Recommendations/SOX Requirements

Since SOX and EBRC requirements/proposal resulted from the recent accounting scandals (corporate malfeasance) and mirror several of the Jenkins Committee recommendations, we will focus on the Jenkins Committee recommendations as they relate to corporate malfeasance. While the intent of the

Jenkins' recommendations was not to address fraud directly, the underlying concept of accounting is relevant, reliable, and timely business reporting. If the information is not reliable, it is not useful. The analysis of the preliminary study and the Jenkins' recommendations indicated that there are some areas of corporate malfeasance events that were specifically addressed in the Jenkins' Committee recommendations. This would include recommendations related to the comprehensive business reporting model; specifically, those recommendations related to off-balance sheet and other innovative financial arrangement (Rec. 2 & 3 under improving the financial statements; director and management information element #7); business segment reporting and unconsolidated entities.

The two major categories of Jenkins' recommendations, 1) Improving the type of information in business reporting (comprehensive model) and 2) Improving the financial statements and related disclosure, focused on making the company more transparent through disclosures. For example, the recommendation for changing the financial reporting model to the comprehensive business reporting model included providing more detailed information and disclosure. Further analysis of the detailed requirement of the comprehensive business reporting model indicated that significant disclosure is also required in this recommendation. This study examined the detail of the accounting malfeasance for the selected companies and correlated it with Jenkins' recommendation where possible. Although not able to directly link each malfeasance event with a Jenkins recommendation (26 of 180 events/activity or 14% were directly linked), there was an indirect link with each item. This resulted in the total accounting dollars related to malfeasance events and activities being allocated between the two major recommendation categories with 87% to the first category, "Improving the Type of Information in Business Reporting (comprehensive model) and 13% to the second category, Improving the Financial Statements and Related Disclosure. However, there is overlapping of the dollars and the recommendations since both of these recommendations focus on making the company more transparent through disclosures.

A more specific and direct connection of the accounting malfeasance event(s) of the 100 companies selected to the Jenkins' recommendations indicated that: 15 had malfeasance involving off-balance sheet financing and innovative financial instruments; 10 had malfeasance involving executive management and director information; and, 1 company's malfeasance activity included a one-time gain on the sale of real-estate as continuing operating income. Other malfeasance activity did not readily lend itself to association with a specific recommendation from the Jenkins' Committee. Therefore, attention was focused on the corporate malfeasance events that related to recommendations included in the Jenkins' Comprehensive Business Reporting Model and other information such as, corporate governance, auditor information, and the overall financial condition of the company later comparing malfeasance and non-malfeasance companies.

4.0 Exploratory Malfeasance Study of 100 Companies

In order to assess whether or not the recommendations would have an impact on corporate malfeasance, this study focused on 100 companies to 1) validate previous conclusions, 2) determine what additional conclusions could be made, and 3) evaluate the relationship of the Jenkins' recommendations to the accounting irregularity. A small sample of 100 companies was selected to address Dechow and Skinner's (2000) concern that academics' samples are usually too large and too general to show an impact on investors.

In addition the announcement date of the corporate malfeasance activity for each company was used to obtain stock price information to determine the market impact of the stock price change for each company where possible. The primary difference, between this and other studies, is the association of the dollar impact of the accounting irregularity with the market impact and the cataloging of the malfeasance items according to Jenkins' recommendations. The objective was to see it were possible to associate a dollar value of corporate malfeasance with specific Jenkins' recommendations for business reporting. Since a direct connection to the malfeasance activity and the recommendations were not made, the Jenkins

recommendations were summarized in two major categories as noted in the study results. The rest of this section discusses preliminary study methodology and results which includes the assertions/conclusions derived for the accounting impact, marketing impact, Jenkins' recommendations and other areas. The results of this study are covered in section 4.4.

4.1 Sample Selection

The 100 malfeasance companies were selected based on publicized malfeasance over the late 2001 to early 2003 time period, and prior related companies discussed in the announcement articles for the selected companies. Forty-nine of the companies were selected from Rutgers University's "Cooking The Books" seminar. In addition, the 16 companies with detailed history were selected from the GAO report (2002), and the balance of the companies was then selected from the SEC AAERs (2002-2003). These companies were selected from these sources without regard to size, auditor, malfeasance activity or other criteria other than an announced accounting malfeasance event as discussed above to ensure the group would be diverse. Sources, of the accounting irregularity and for the details of the accounting irregularity, were taken from various business news articles and regulatory filings. These media were examined to obtain as much detail as possible regarding the malfeasance, the dollar impact of the malfeasance, the financial statement account(s) impacted and the earliest announced date of the irregularity. In some cases, multiple accounting irregularities were described for a company.

Detailed standard industry classification and summary classification for these companies are included in table 1 and table 2. Descriptive financial information and malfeasance information is included in tables 3 and 4 for these companies. As included in table 4, there were 180 observations of malfeasance activity for the 100 companies selected. Fifty one of the malfeasance companies were listed as fortune 500 companies at the time of the malfeasance activity according to COMPUSTAT. Fifty-three of the 100 companies include in this study were also included in the GAO study (GAO 2002). In addition, 61 of the companies had been issued at least one Accounting and Auditing Enforcement Release by the SEC (SEC 2005) with 43 of the malfeasance companies being included in both the GAO study and the SEC AAER database. There were 20 companies included in this study that were not in the GAO study nor at the time of this dissertation, had been issued an AAER.

4.2 Methodology:

The details of the accounting irregularity was further reviewed and categorized according to a detailed accounting taxonomy (Appendix A). This taxonomy was based on the taxonomies from other studies (Bonner et al 1998, Wu 2002 and Huron 2003), but modified for this study. The accounting taxonomy classified the malfeasance activity of the 100 companies into 5 major categories as they related to the company's financial statements and/or type of fraud: 1) Revenue; 2) Expense; 3) Income Inflation (including asset and liabilities impacts); 4) Theft-misappropriations (endogenous); and, 5) Exogenous (bribes, insider trading, etc.). Each of the major categories further segregated the malfeasance activity according to type. These categories were used to group the accounting and marketing dollar impacts (results of this analysis are summarized in table 5). Two coders were used to categorize the details of the accounting malfeasance and in cases where there were differences, a third coder was used to determine the applicable taxonomy category.

Classification of the malfeasance activity of the 100 companies resulted in a total of 180 accounting items for the 100 companies. The reported malfeasance was further categorized in this study according to the Jenkins' recommendations referring to the reporting model and the recommendation referring to disclosures (Jenkins' chapter 5 & 6 – AICPA 1994). The earliest located public announcement date of the malfeasance was used to assess market reaction by getting the stock price for each company 3 months before the event and 3 months after the event. In most cases, the earliest announcement date was taken from the business article. For two companies, the announcement date was taken from the GAO report and for one company from the SEC AAER.

Most market studies use a 1 to 3 day window for market reaction (Wu 2002, Palmrose et al 2002, etc.). GAO analyzed a market impact using a 1 day window and a 30 day window before and after the announcement date (GAO 2002). As noted by Wu (2002) the market starts to exhibit the decline ahead of the announcements'. Possible explanations provided are that early warnings, missing analysis forecast, or SEC formal or informal investigation, could precede restatement announcement. To ensure the decline for the market reaction was captured in this study, the announcement date was used as day zero and retrieved the common stock price for the announcement date, 3 months prior to the announcement date and 3 months subsequent to the announcement date for each company. (If the calculated date was on Saturday, the previous Friday's stock price was used and if it was on Sunday, the following Monday's stock price was used.) The S&P 500 price for each day was also obtained and each company's stock price was indexed using the S&P 500 price. The company stock price was taken from yahoo finance (<http://finance.yahoo.com>) and the S&P Daily Stock Price Record for each stock exchange for the appropriate time period. The volume for common stock outstanding, for each company, was taken from the SEC form 10K or Daily Stock Price Record for the stock price announcement window chosen.

4.3 Malfeasance Study Results – Assertions/Conclusions

The summarized results of this study indicate that the accounting impact was \$140 billion (overlapping), but the market impact using a 6 month window for 96 of the 100 firms was over \$857 billion (table 5). This study found, similar to other studies, that the majority of the restatements due to accounting irregularities (over 95%) reduced earnings for the restating company. Callen et al. (2002) examined filed restatements to see if there was any good news in restatements and found that about 15% of the filed restatements, due to accounting errors, increased the company's earnings. Results also found that restatements, particularly those related to the "Big Bath" concept, will result in an increase in earnings if restated for the current period in some cases. For example, correction of misstatements that previously created "reserve" earnings for a future period ("cookie jar" reserves) will increase earnings in the current period. Results also indicated that several of the malfeasance companies had undisclosed liabilities, special purpose entities or other off-balance sheet arrangements that should have been included on the face of the balance sheet as a liability. It was noted that 15% of the companies had violations in this area with the bulk of the problem relating to special purpose entities (SPEs) cited the most often.

Results of this study of the 100 companies with corporate malfeasance are discussed below in the next three sections (results summary Appendix D and tables 5, 6 and 7): Accounting Assertions/Conclusions; Market Assertions/Conclusions; and, Malfeasance Study and Jenkins Recommendations. Results were similar to other studies and also revealed some differences during examination of the Jenkins recommendations categorization. The similarities included that revenue recognition was the most common form of corporate malfeasance; loss of market value is significantly greater than the magnitude of the accounting dollar loss; actual theft or physical loss is the least of corporate malfeasance items; and the growth in the dollar magnitude of the loss/restatement from initial announcement to final restatement increased significantly. Listed below are conclusions from this research and related prior studies, and/or ongoing work on the assertions.

4.3.1 Accounting Assertions/Conclusions

Accounting assertions/conclusions summarize the malfeasance events and activities into the specific financial statement account or footnote requirement category according to GAAP. This categorization was determined based on details from announcement articles on the company. Again, the announced dollars related to the accounting category were included, when available. However, in some cases, only high level information (i.e. net income, assets) was provided in the announcement and therefore accounting specifics (revenue or expense) could not be ascertained. Accordingly, the high level information was included based on the taxonomy category. Table 5 provides the malfeasance activity based on taxonomy classification.

Assertion #1: Most of the malfeasance occurred in the revenue and revenue recognition area (49 of the 100 companies had revenue as an impacted account).

GAO (2002) results indicate that 39% of the restatements included revenue recognition. Palmrose and Bonner's (1998) findings also showed that revenue was the most common variety of fraud. Palmrose and Scholz (2002) also found that revenue misstatements are the most frequent reason for restatement (37%) and their evidence indicated that revenue restatements are associated with significantly higher payments by defendants.

The SEC issued Staff Accounting Bulletin 101 in 1999 to provide further guidance on Revenue Recognition. Both the FASB and the ISB have revenue recognition projects underway (FASB 2002). But as the Jenkins' Committee (1994) and others have reiterated, more information, beyond GAAP revenue, is needed to help project future earnings and cash flows.

Assertion #2: Actual dollar adjustments for malfeasance restatements are often significantly larger than initially announced.

The dollar magnitude, of the final restatement actually filed, is usually larger than the initial or other (sometimes several announcements before restatement) prior announced restatement dollars for accounting irregularity. (i.e. WorldCom accounting dollar concerns grew from the initially announced \$2.9B to a possible net income overstatement of over \$11B in improper bookings). Once a restatement is required, companies often use this opportunity to more closely examine their accounting records and processes. Swieringa (1984) and Levitt (1998) considered this phenomenon as "accounting magic" and "big bath" respectively. The dollar amount of a restatement grows larger as more items are revealed that will require restatement. Again, it is difficult to determine what is accounting malfeasance and/or what was an unintentional mistake. Most of the accounting entries included in a "Big Bath" can be done in accordance with GAAP since GAAP requires that estimated costs (current and future) associated with restructuring be charged against income in the year in which the decision to restructure is made (Swieringa (1984). This was also seen in several studies even during profitable years as companies smoothed earnings. Other examples of increasing the final restatement include:

- a. Although the initially announced restatement may have been due to revenue overstatement, the final restatement may include increases in expenses for the restatement period thereby further reducing income.
- b. Large expenses are sometimes set aside into 'restructuring' reserves reducing income. Later these reserves are deemed excessive and returned to the income statement thereby increasing income for the then current period.
- c. Asset write-downs or write off (asset cumulative impairment) are also common during this time.

Assertion #3: Theft is the least likely malfeasance item for restatements in most large public companies.

Out of the estimated \$131.5B accounting dollars related to the malfeasance for the 100 companies studied, only \$0.4B (less than .5%) was attributable to direct theft. The evidence indicates that it's not about stealing; it's about manipulating the books or creating opportunity for manipulation of the market price. The preponderance of this type of white-collar fraud occurs in the manipulation of accounting dollars to obtain market reaction/value. Additional fraud occurs through the misappropriation of assets (e.g. purchase art for CEO) or incurrence of liabilities (e.g. guarantee loan) on behalf of officers or directors of the company.

The CFE Report (2002) noted that over 80% of occupational fraud involved asset misappropriation, 13% were corruption schemes, and 5% were fraudulent statements. The results of this study showed

that the smaller the company, the greater the median loss. This concurs with this study's results that actual theft is usually not material relative to the size of most public companies and therefore not usually cited as the reason for restatement.

4.3.2 Market Assertions/Conclusions

The market assertions/conclusions are based on the results of subtracting the 3 months window before the announcement date from the 3 months window after the announcement date for each company and determining the price difference. The 3 months (before and after) window was also used to index the stock price using the S&P 500 for each company as described above. Results (Table 6) indicate that there was an overall market impact of \$858B (\$598B indexed to S&P 500). It was also found, as did other studies (Palmrose et al 2003, GAO 2002 and Wu 2002), that there was a more negative market reaction to restatements involving revenue recognition than any other type.

Assertion #4: The loss of market value of a company due to malfeasance allegations is significantly higher than the accounting value of the direct effects on the financial statements. Adjusted market value change is about 20 times larger than net income effect.

While the approximately 20 multiplier mirrors the P/E ratio, the results are more direct and broadly reflective than the PE ratio. Although the accounting dollar amounts may not have been provided in the initial announcement of restatement/malfeasance, the news itself, that the dollars would have to be restated and/or an investigation (internally or SEC), was enough to cause a reaction in the market. The market reaction is more pronounced if the announcement mentions an effect on revenue or net income.

Studies (Wu 2002; Palmrose et al 2002; and Dechow et al 1996) found that the most significant decline of value is during the initial announcement windows. Dechow et al. (1996) found that the average stock price dropped approximately 9% at the initial announcement of alleged earnings manipulation. Although Palmrose et al. (2002) used a 2 day window to test market reaction and sample of announced restatement companies from 1994-1999, and Wu (2002) used a 3 day window for companies that announced restatements from 1977-2Q2002, similar results were observed. Both studies found that the market reacts to some measure of materiality, and there is a penalty or punishment for the company when no dollar amounts are given with the announcement.

Market reaction noted by Palmrose et al (2002), commented that "substantial portion" of the restatements examined (1995-1999) were due to in process research and development (IPR&D), but there was only mild market reaction to these restatements. While IPR&D was a major restatement item for companies 1999 and prior Palmrose 2003), Huron (2003) found that only 3 of 833 restatements filed from 2000 through 2002 reflected IPR&D as an explanation for restatements. (Additional guidance on IPR&D was provided in 2000 by the AICPA in the form of a practice aid.)

Assertion #5: The market reacts more to changes in values that are presented/disclosed in the financial statements than to missing items/events that should have been included or disclosed. While there has been much discussion about disclosure, the malfeasant sample seems to indicate much larger effects in account over/under statement than the known absence of disclosure (information that should have been included in the financial statements).

Dollars related to actual accounting errors, erroneous accounting activity, or questionable use of GAAP which impacted the accuracy and/or reliability of the financial statements were more common in the 100 malfeasance companies selected for this study. Items requiring disclosure had fewer dollars which could be indicative of the lack of information available to determine a more accurate impact. However additional disclosure on inaccurate accounting information for malfeasance companies would also be inaccurate and therefore not useful for decision making.

5.0 Empirical Study: Corporate Malfeasance & Monitoring Characteristics

From the historical analysis of Jenkins and the exploratory study above, identification was made although indirectly, of the Jenkins' recommendations that addressed the types of accounting malfeasance in this study's selected sample. The identified Jenkins' recommendations include: events related to off-balance sheet and other innovative financial arrangement; director and management information; business segment reporting and unconsolidated entities. These items were also included in either SOX or EBRC. Since the Jenkins' recommendations were not implemented, this study continued by testing characteristics of the malfeasance companies that related to a Jenkins' recommendation, SOX requirement, or EBRC proposed framework: more disclosure, more board independence, and less related party transactions between board members, officers and the corporation. Secondly, corporate governance, auditor characteristics and a financial condition proxy were examined comparing each malfeasance company selected for our initial study to a matched non-malfeasance company and tested using a logistic regression. This follow-up study examined corporate governance as an internal monitoring tool; and, the financial analysis and auditor characteristics as an external monitor tool.

5.1 Corporate Governance – Internal Monitoring Tool

With the accounting scandals of the late 20th and early 21st centuries, public interrogations continue - where was the board? Where were the auditors? In some cases of malfeasance, the answer resonates: they (the board and the auditors) were there, but they were part of the problem (SEC AAER 1996-2003). From the initial study, 10% of the malfeasance companies had accounting irregularities that included related party transactions and compensation issues involving management and directors. Since management and director malfeasance were found to be a problem in the initial study, an examination was conducted of whether or not there is a significant difference between malfeasance companies and non-malfeasance companies in the make-up of the board of directors, their relationship with management, major shareholders, etc. and the type of information included about directors. Beasley (1996) and Abbott et al. (2000) had conflicting results regarding characteristics of the board of directors and their relationship to financial misstatements. Characteristics examined included independence, director tenure, shareholdings, etc. Beasley found these characteristics were related to financial misstatements and Abbott et al. (2000) found that they were not. Gordon and Henry (2004) found a negative relationship between industry-adjusted returns and related party transactions, which supports the perceived conflict of interest between the management board/ and the shareholders.

The Jenkins' Committee determined, from user comments, that users were concerned about the relationship between management, shareholders and directors. Users wanted identity and background checks of members of executive management and the board of directors to be provided in the business reporting package inclusive of any criminal convictions. This would also include publicizing the compensation, and compensating policies for these individuals as well as who decided on the compensation (with interlock and insider participation being the concern). Other information users wanted disclosed included any transactions or relationship issues among major shareholders, directors, management, suppliers, customers, competitors and the company. Since the Jenkins' report was published, there have been some actions taken to strengthen the board of directors from the shareholder's perspective, such as the requirements from the Blue Ribbon Committee.

Interestingly, Jonas and Blanchet (2000) were concerned about the Jenkins' Committee and recommendations from other committees. Their concern was that recommendations were either user needs motivated (the focus of the Jenkins' recommendations, the FASB Conceptual Model and the Earnings persistence Model) or shareholder/investor protection motivated (the focus of the Kirk recommendations, SEC, Blue Ribbon recommendation #8 and SAS 61.) They maintained that quality financial reporting should encompass both user needs and investor protection. According to Jonas and Blanchet (2000), user needs tend to focus on valuation related issues, while investor protection tends to focus more on corporate governance and stewardship issues. The following 5 hypotheses were utilized

during this follow-up study: H1: Company malfeasance is positively associated with board size (the number of directors on the board). H2: Company malfeasance is negatively associated with the number of independent directors on the board. H3: Company malfeasance is negatively associated with the number of independent directors on the audit committee. H4: Company malfeasance is positively associated with staggered terms of the directors on the board. And, H5: Company malfeasance is positively associated with the number of officer/director related party transactions.

5.2 Auditor Brand and Change/Tenure

One of the Jenkins' model element requests that "information about management and shareholders," include the disclosure of the nature of any disagreements between management and directors, independent auditors, bankers, and lead council that are no longer affiliated with the company. This would reveal information to users that would have a contrasting or conflicting position of that provided or presented by the company. Disagreements could also point out additional items that the company did not disclose, that the disagreeing party thought should have been disclosed. Regardless of the resolution of the disagreement, information regarding the disagreement would make the company more transparent to users. Auditor disagreements should be documented in the auditor's work papers and resolved to the auditor's satisfaction before the audit report is issued. If not, the disagreement may impact the type of audit report issued by the auditors, depending on the nature and extent of the disagreement. In some cases, auditor disagreements will cause management to change auditors. In these cases, where disagreements result in management firing the auditor or the auditor resigning, the reason for the auditor change has to be provided to the SEC.

Changing auditors is not something that is done lightly since it must be reported. While there are many good reasons for changing auditors (upgrading to a bigger audit firm, changing to an industry specialty firm, etc.) changing due to disagreement over accounting practices or reporting requirements is not that common since most disagreements are resolved between auditor and management or directors. Changing auditors is an expensive process for the company and for the audit firm. There are significant start-up costs on both sides when new auditors are engaged. While it has been discussed that usually the initial fee for audit engagements may be low to get the audit client, ("low balling") that is not the focus of this paper. Here the focus is on whether or not an auditor change occurred for a malfeasance company during the 5 years prior to the announced malfeasance. Then, the reason for the change will be determined, if the information is accessible.

The Jenkins' Committee discussed user concern about auditor independence, but only to reiterate the importance of auditor independence. The Committee's recommendations and primary focus in this area addressed the topic of flexible auditor association. Flexible auditor association specifies that the auditors should be associated with the business reporting records of the company at all levels as agreed to by the user and the company. The Committee did not address other services or specific issues relating to the auditor's association with the company as does SOX. However, Kinney et al. (2003) found that there did not appear to be evidence to support that audits were less independent due to performance of other services. Kinney et al. (2003) they did find some positive association between "other services and restatements. As in previous studies, the quality of the audit was also an issue. Therefore, Big 4 or non-big 4 auditor differences were tested. For this study two hypotheses on auditor brand and auditor change are set forth: H6: Company malfeasance is negatively associated with the brand of the auditor (Big 5 or non-big 5) and H7: Company malfeasance is positively associated with auditor change in the five years prior to the announced malfeasance.

5.3 Malfeasance and Debt

Malfeasance companies were not expected to be highly leverage due to utilization of the appearance of a "healthy" financial position to continue to obtain cash from investors through the market. The market benefit, in several instances for malfeasance companies, is for the benefit of a few individuals

(management, directors and other insiders) and not for the benefit of the company. Therefore, there is usually no reason other than fraud to take creditor money and not use it for the purpose intended. Several studies have been done to indicate that debt covenant restrictions may be one reason for earnings management. These restrictions are not being considered in this study on corporate accounting malfeasance. While earnings management usually implies using the accounting rules (GAAP) to your advantage to manage earnings, corporate malfeasance for this study's purpose is the intentional or unintentional use of an accounting irregularity in published or announced financial results for a company. It is contended that malfeasance companies, are not any more leveraged than other companies, but may not have as much cash or cash equivalent assets as non-malfeasance companies. For that reason, hypotheses # 8 is: Company malfeasance is negatively associated with firm leverage.

5.4 Data Selection for Empirical Study

The actual announcement date, for the selected malfeasance sample, was used as the focal point not only for the initial study, but also for the follow-up study data retrieval for the testing of malfeasance characteristics. The company's annual financial data in the year prior to the announcement was utilized for analysis in this study. For example, if the malfeasance announcement was made in 2002, then data for the year 2001 was used. Financial statement data for each malfeasance company (the sample) was taken from COMPUSTAT data using the Wharton Research Database System (WRDS) based for the year prior to the announcement date. However for 3 of the sample companies, no data was available in the year prior to the announcement, so data for the previous prior year prior was used, i.e., announcement year minus two. This approach (announcement year minus one) was also applied to the selection of the non-malfeasance firms for hypotheses testing.

5.5 Matching Methodology

Since one of the companies was a closely held corporation, it was excluded from the sample. For the remaining 99 malfeasance companies, an attempt was made to match each with a non-malfeasance company based on the malfeasance company's 4-digit SIC and size (total assets). COMPUSTAT Research Insight was used to gather this historical data. Initially, the 4-digit SIC was used for the sample companies to retrieve the total assets for all companies with the specified SIC. In most cases the number of companies retrieved for a specified SIC was too large to easily isolate a match, therefore, a range based on the sample company's size (total assets) was used to narrow the company volume for that 4-digit SIC. If no comparable size company was found in the 4-digit group, then the SIC code was narrowed to 3 digits, then 2 digits, then 1 digit or finally for 3 companies; they were matched simply on size as the remaining non-malfeasance companies in their SIC (even one digit) were too small.

After a comparable match was determined, the matched companies were each checked for malfeasance using the same sources used for the sampled companies, news media, professional/business journals and publications, google.com and yahoo.com as well as the GAO study and SEC AAERs. After the initial match, 15 of the 98 non-malfeasance companies were eliminated (due to malfeasance) and the matching process repeated to select another non-malfeasance company. After the date of the initial matching process, several other companies (5) deemed to be non-malfeasance companies committed some type of accounting malfeasance and were replaced by repeating the matching process. Therefore, the matching non-malfeasance sample had a cut-off of no known malfeasance as of May 2005.

5.6 Proxy Statements for Sample and Matching Companies

Proxy statements were examined to ensure they included director information. When the proxy statements were not available, the 10K director information was used. For foreign companies listed in the U.S., the 20-F required by the SEC was used. In cases where the data from a wholly owned subsidiary was used, the proxy for the parent company was employed to capture the director information.

No SEC filings or information could be located for three matched companies' board of directors. These

were foreign companies who apparently did not file any reports with the SEC. There were no indications that a 20-F, 10K, or even a Williams Report had been filed in the last 10 years. COMPUSTAT did however have financial data for these companies. To keep the matching as similar as possible, these companies were replaced in both the financial analysis and corporate governance section with 3 other companies using the matching process described above. In addition, 2 other matching companies were replaced during the proxy search due to malfeasance activity by their parent company and in one instance, the company had recently changed its name, seemingly due to an accounting malfeasance issue under its previous name.

5.7 Malfeasance Characteristics Hypotheses

The characteristics tested for internal monitoring were the size of each company's board of director; the number of independent directors on the board; whether or not the audit committee was independent; the terms (staggered or same) for the board of directors; and the existence of more than one related party transaction (directors or officers). The characteristics tested for external monitoring were the brand of auditor (Big 4 or other) and auditor change in the last five years. An examination was conducted of the company's financial position by examining the firms leverage – total liabilities to total assets. It was hypothesized that malfeasance would be positively associated with board size, classified (staggered) board terms, related party transactions and auditor change and negatively associated with board independence, independent audit committees, auditor brand and leverage.

5.8 Malfeasance Characteristics Study Results

The dependent variable in this study is a dichotomous variable: either the company has malfeasance or it does not. Therefore, logistic regression was used for the testing. But, the resulting regression only had an adjusted R-square of .02. The only significant variable in the correlation matrix was company size as expected since this was one of the parameters for matching.

Farber (2005) also examined the association between fraud and various components of corporate governance addressing board independence, audit committee make-up and the auditor type (Big 4 or other). He found that in the year prior to the announced fraud, consistent with prior research, that the fraud firms had poor governance relative to his control sample. Dunn (2004) also had similar results. Frankel et al. (2005) also found that board independence did shape the quality of earnings. No correlation was found in this study between board independence, auditor type and corporate malfeasance. The test of the control variables (not shown) shows no statistical difference between malfeasance and non-malfeasance firms (R-square of .065, adjusted R-square of .02). Although results differ for this research, it may be due to the years included in these studies. Farber (2005) examined companies from 1982-2000, Dunn (2004) examined companies from 1992-1996, and Frankel et al (2005) examined companies from 1988-2002, whereas this study examined companies from 1996-2002. The recommendation of the Blue Ribbon Committee (1999) influenced the make-up of the board of directors and board committees. Results of this research did not show any statistical difference except for auditor change. Since several of the auditor changes were from Arthur Andersen LLP to another audit firm in 2002, this pinpoints further examination in a future study.

6.0 SUMMARY, CONCLUSIONS AND FUTURE RESEARCH

6.1 Summary –Corporate Malfeasance

Summarization of this study of the 100 companies, with accounting malfeasance, was divided into three sections (Appendix D - results summary): accounting assertions/conclusions; market assertions/conclusions; and, malfeasance study and Jenkins' recommendations. Accounting and market results indicated that the accounting impact was \$140 billion (table 5), and the market impact (using the 6 month window for 96 of the 100 companies) was over \$857 billion (table 6). Table 7 provides the market to accounting relationships using the malfeasance taxonomy classifications. Results, for this study, were similar to other studies and also revealed some differences during examination of the Jenkins

recommendations categorization. The similarities included that revenue recognition was the most common form of corporate malfeasance; loss of market value is significantly greater than the magnitude of the accounting dollar loss; actual theft or physical loss is the least of corporate malfeasance items; and, the growth in the dollar magnitude of the restatement from initial announcement to final restatement (“Big Bath” or “Cookie Jar”). The initial exploratory study also validated findings from other studies. Listed below are the conclusions from this initial study and/or ongoing work on the assertion:

1. Most of the malfeasance occurred in the revenue and revenue recognition area (49 of the 100 companies had revenue as an impacted account).
2. Actual dollar adjustments for malfeasance restatements are often significantly larger than initially announced.
3. Theft is the least likely malfeasance item for restatements in most large public companies.
4. The loss of market value of a company due to malfeasance allegations is significantly higher than the value of the direct effects on the financial statements.
5. The market reacts more to changes in values that are presented/disclosed in the financial statements than to missing items/events that should have been included or disclosed.

The follow-up study, after analysis of the categorized accounting malfeasance companies, matched the malfeasance companies with a non-malfeasance company to examine the difference, if any, in corporate governance issues (i.e., board size, board independence, audit committee independence, staggered term board, and related party transactions), auditor, auditor change and company leverage. Results did not show any statistical difference except for auditor change. Since several of the auditor changes were from Arthur Andersen LLP to another audit firm in 2002, therefore, further examination of the 2002 auditor changes is warranted for future study.

6.2 Study Limitation

The primary limitation of this study was that the initial 100 accounting malfeasance companies were not selected in a random manner from one population. However, there was also no bias in their selection. Although this limitation and other occurred, they did not hinder the contribution of this research to the contemporary accounting literature.

Conclusions and Future Research

There is definitely more disclosures in business reporting than there were during the early 1990s due to the SEC and FASB requirements issued since that time. However, those requirements did not prevent the accounting scandal (Enron, WorldCom, etc.) culminating in 2002. Will the SOX requirements or a new business reporting model reduce corporate malfeasance in the future as currently, corporate malfeasance continues to flourish (DHB 2007, AIG 2006, etc)? Although malfeasance is a behavioral issue, enhanced business reporting and penalties for non-adherence to reporting requirements are attempts to reduce and change that behavior. Will it work? As the SEC now has more staff and, therefore, will be conducting more investigations and reviews of public companies’ financial filing, future opportunities will enable study of the SEC’s results and assess what’s working and what’s not working.

This study contributed to the current accounting literature by providing a dollar measurement of the accounting and market impact for malfeasance companies, supported findings in previous studies in some areas, provided more detail on the areas of malfeasance and utilized a 6-month window as opposed to a 6 day window generally used in market assessment studies. In addition, the study provided brief historical information regarding business reporting drivers.

6.4 Future Research

A follow-up study of the status of the 100 selected malfeasance companies and their matches for a period of time to assess survivors, merger, bankruptcies, etc. would be an opportunity for future research. Future accounting issues on corporate malfeasance could include an assessment of whether malfeasance firms indicate more book value than market value of non-malfeasance companies. Future work, pertaining to

corporate governance, could include whether firms with malfeasance are more likely to have a higher percentage of interlock directors than non-malfeasance firms. It could also compare the number of other directorships held by directors of malfeasance firms as compared to a control group of firms with no announced malfeasance.

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APPENDIX A - MALFEASANCE TAXONOMY

1) Revenue

1-1: Fictitious Revenue – Revenue created through fictitious sales transactions or revenue created through cooperation/collusion with another company to increase both company's financial profile.

- a. *Round-tripping*; sale of contract from company A to company B and then from company B back to company A (at least one round-trip, but can be more) to increase revenues for each company.
- b. *Back-to-back*; sale of assets from company A to company B at a gain and then from company B back to company A at a gain to increase income for each company. Round tripping is a form of back-to-back but usually with no gain.
- c. *Fraudulent sales*; Revenue created from fictitious sales transactions with or without sales' orders and/or shipping documents (customer names can be legitimate or fictitious).

1-2: Revenue Timing – A valid sales transaction recognized as complete in a different accounting period than when the actual transaction was completed. This overstates revenue in one period and understates it in another.

- a. *Premature revenue recognition*; recognizing revenue on a valid sales transaction before the sales transaction is completed.
- b. *Backdating sales or software invoices/contracts*; a form of premature revenue recognition in which the date for a completed sales or software contract transaction is changed to an earlier accounting period than when the actual transaction was completed.

1-3: Revenue Misclassification & Other Improprieties – Recognition or misclassification of sales transactions that are not valid sales transaction due to terms being incomplete and/or other contingent information.

- a. *Improper classification/recognition of revenue*; recognition of revenue from sales that are not completed sales transactions – i.e. goods on consignment, overselling goods to distributorships, and/or other buy-back/return agreements.
- b. *Improperly revenue disclosures*; Recognition of sales transaction (one-time revenue gain) without disclosing in footnotes that this was a one-time gain/transaction.
- c. *Reduction of inflated reserves*; revenues created by reversing previously created expense reserves (cookie jar reserves – put away reserves in good times to be used in bad times to increase income).
- d. *Revenue reduction*; Skimming revenue for regulatory rate increases.

2) Expense

2-1: Expense/Cost Classification – Misclassification, non-recognition or unauthorized expenses of the period.

- a. *Compensation Abuses*; Unauthorized pay and bonuses, excess/unauthorized use of company assets and backdating of stock options.
- b. *Fraudulent capitalization of current expenses*; capitalizing expenses as assets to be written-off over a period of time that should be included as costs of the current period.
- c. *Expense or Cost Misclassifications/Manipulation*; recording expense(s) in a later period than incurred or changing the amount of an expense in the current period.
- d. *Non-recognition of losses*; Disregarding or erasing expenses of the period.
- e. *Fictitious or inflated expenses to boost regulatory rates*.

2-2: Big Bang Theory – The process of recordings more costs and expense during an accounting period than normal when 1) a restatement resulting in lower income is required to be filed or 2) a significant loss has occurred for the reported period.

- a. *Restructuring Costs (Fraudulent or Misclassified)*; using a loss/restatement situation to create a reserve (asset) for future restructuring/reorganization of the business by expensing the dollars in the current period (required by GAAP). As the restructuring occurs in the future, the charges will

be written off against the reserve account. However if it is determined that the reserve is not needed or that the reserve is overstated, then the unneeded dollars are added to income in the period for which it was determined the reserves were not needed.

- b. *Erroneous or Inaccurate reserves recorded*; recording expenses in periods of high income to build “cookie-jar” reserves and/or to reduce income.
- c. *Write-downs*; using a loss/restatement situation to write-down or write-off assets that were later be used or sold. This will reduce the asset cost when sold in a later period thereby increasing income.

3) Income Inflation-Assets-Liabilities

3A: Inflated Income – Income inaccurate but the specific revenue or expense impact or detail was not available. Only income impact is provided.

- a. *Earnings inflation to meet analyst expectation*; inappropriate use of reserves, false financial statements, etc.)
- b. *Improper accounting to inflate income*; bundling leases, insufficient disclosures, etc.
- c. *Fraudulent accounting schemes*; Use of shell companies, erroneous reserves, etc.
- d. *Accounting errors*; overstatement of perishable inventory, premature revenue recognition, etc.
- e. *Improper internal controls*; internal controls did not detect errors.

3B1: Assets overstated – Any situation where the specific revenue or expense detail was not available, but the resulting asset(s) detail or impact was provided:

- a. *Mark-to-market abuse*; recognize gross revenues as profits resulting in receivables overstated.
- b. *Assets not properly written down*; inventory overstated, goodwill overstated, etc.
- c. *Overstating reserves through restructuring*; Creating excess reserves based on big-bang theory (see expenses above) or cookie-jar reserves (see revenue above).

3B2: Disclosures & Understated Liabilities – Any situation where the specific revenue or expense detail was not available, but the resulting liability detail or impact was provided.

- a. *Non-Disclosure or inadequate disclosure of liabilities*; debt and guaranteed loans not disclosed, liability not included in financial statement in the appropriate manner, etc.
- b. *Improper off-balance-sheet financing of assets*; inappropriate synthetic leases, etc.
- c. *Fraudulent use of SPEs and inadequate disclosure of SPE accounting issues*; inappropriate reclassification of debt related to SPE, SPEs listed that did not meet SPE criteria, unauthorized SPEs; transfer of bad debt and other items to SPE inappropriately.
- d. *Non-recognition of liability*; liability not disclosed that should have been disclosed or presented in financial statements.

4) Theft - Misappropriation

4A: *Inappropriate purchases/payments to/for employees/officers*; Misuse of company assets by employees and officers.

4B: *Compensation and/or stock abuse by officers*; granting of options or other stock payments to officers that is not included in the contract or that does not meet company requirements for such action.

4C: *Inadequate or no repayment of loan by officers/directors*; loans repayment dismissed resulting in a decrease in assets or earnings of the company.

5) Exogenous

5-1 *Insider trading*; trading by an employee of his company’s stock based on knowledge of an impending downturn or upturn in the company’s financial position thereby increasing the employee’s financial position. Also sharing this information with others (family or friends) and they then act upon the employee’s privileged information.

5-2 *Bribery/Influence Peddling*; illegal payment by a company to a public official or private individual to

gain favorable treatment for that company or the company's goods or services.

5-3 *Conflicts of interest*; Taking a fiduciary position in a situation or making a fiduciary decision on an issue where you are not independent (personal or business relationship, stock owner, etc.).

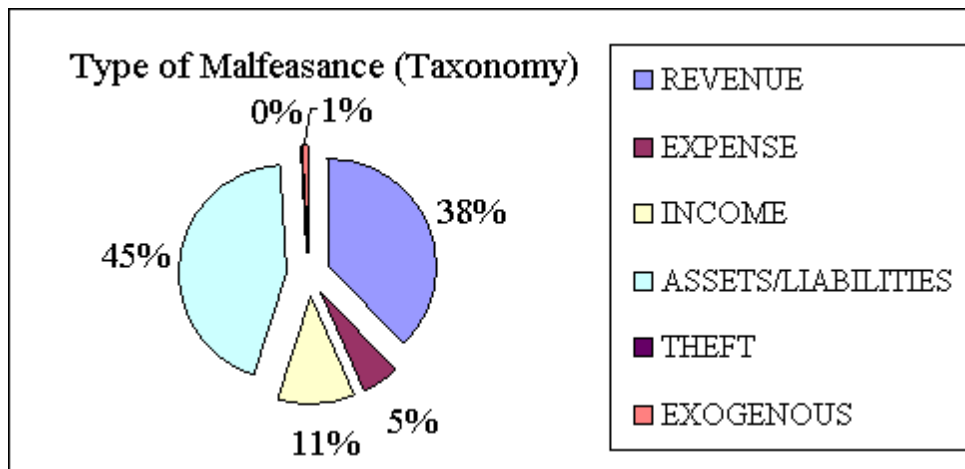
5-4 *Abetment/Accessory to malfeasance of others*; assisting others in misrepresenting financial information.

5-5 *Loan guarantees for executive*; Excessive or inappropriate loan guarantees for employees or board members.

5-6 *Related party transactions*; Transactions occurring with approval being made or sanctioned by persons with a personal or business relationship with the person, organization or company requiring the approval.

APPENDIX D SUMMARY RESULTS OF INITIAL MALFEASANCE STUDY

<u>TAXONOMY ACCOUNTING EFFECT</u>			
1-	REVENUE	53174	37.88%
2-	EXPENSE	7468	5.32%
3-A	INCOME	16109	11.48%
3-B	ASSETS/LIABILITIES	62571	44.58%
4-	THEFT	42	0.03%
5-	EXOGENOUS	1008	0.72%
		140372	100.00%



<u>ACCOUNTING: JENKINS' RECOMMENDATIONS IMPACT</u>		
Improving Information - Comprehensive Model	122073	86.96%
Improving Information - Related Disclosures	18299	13.04%
	140372	

<u>MARKET IMPACT</u>	<u>Gross</u>	<u>Indexed</u>
Gross Market Impact	857415.00	655418.00
Market Mean	8931.41	6827.27
Market/Accounting	<u>Gross</u>	<u>Indexed</u>
Mkt/Rev	16.1	12.3
Mkt/Exp	114.8	87.8
Mkt/Inc	53.2	40.7
Mkt/A&L	13.7	10.5
Mkt/Theft	20414.6	15605.2
Mkt/Exogenous	850.6	650.2

Table 1-Panel A: Detailed Standard Industry Classification

SIC	Industry Title	Number* firms	Percent
01	Agriculture Production - Crops	1	1.01%
13	Oil and Gas Extraction	2	2.02%
20	Food and Kindred Products	1	1.01%
23	Apparel and Other Textile Products	1	1.01%
26	Paper and Allied Products	2	2.02%
27	Printing and Publishing	1	1.01%
28	Chemical and Allied Products	6	6.06%
32	Stone, Clay, Glass and Concrete Products	1	1.01%
34	Fabricated Metal Products	1	1.01%
35	Computer Equipment	5	5.05%
36	Electrical Equipment	6	6.06%
37	Transportation Equipment	3	3.03%
38	Measurement Analyzing, Control, etc.	2	2.02%
48	Communications	6	6.06%
49	Electric, Gas & Sanitary Products	8	8.08%
50	Durable Goods	1	1.01%
51	Non-Durable Goods	4	4.04%
53	General Merchandise Stores	3	3.03%
54	Food Stores	3	3.03%
57	Home Furniture, Furnishings Stores	1	1.01%
58	Eating and Drinking Places	2	2.02%
59	Miscellaneous Retail	3	3.03%
60	Depository Institutions	2	2.02%
61	Non-Depository Institutions	3	3.03%
62	Security & Commodity Brokers, etc.	1	1.01%
63	Insurance Carriers	2	2.02%
64	Insurance Agents, Brokers & Service	1	1.01%
67	Holding & Other Investment Offices	2	2.02%
73	Business Services	19	19.19%
78	Motion Pictures	2	2.02%
79	Amusement and Recreation Services	2	2.02%
80	Health Services	1	1.01%
82	Educational Services	1	1.01%
	Total	99	100.00%

*One company was a closely held corporation and no SIC was available.

Table 2: Summary Standard Industry Classification Code

SIC	Industry Title	Number firms	Percent
01-09	Agriculture	1	1.01%
10-14	Mining	2	2.02%
20-39	Manufacturing	29	29.29%
40-49	Transportation & Public Utilities	14	14.14%
50-51	Wholesale Trade	5	5.05%
52-59	Retail Trade	12	12.12%
60-67	Finance, Insurance, Real Estate	11	11.11%
70-89	Services	25	25.25%
	Total	99	100.00%

Table 3: Financial Summary Description of Malfeasance Companies (\$ in millions)

	N	Minimum	Maximum	Mean	Std. Deviation
TotAsst	99	16	902210	29988.87	100627.533
Sales	99	1	111826	13470.54	22090.580
NetInc	99	-13356	13519	170.19	2955.804
Valid N (listwise)	99				

Table 4: Malfeasance by Announcement Year for Firms (\$ in millions)

	Number Firms	Number Observations	Dollars Amount	Observation Mean	Dollar Mean
1997	6	14	1159	2.33	193.17
1998	8	23	2954	2.88	369.25
1999	11	17	4190	1.55	380.91
2000	8	19	4692	2.38	586.50
2001	18	32	6388	1.78	354.89
2002	45	70	119757	1.56	2661.27
2003	4	5	1232	1.25	308.00
Total	100	180	140372	1.80	1403.72

Table 5: Malfeasance Taxonomy Classification (\$ in millions)

	Number Firms	Number Observations	Dollars Amount	Observation Mean	Dollar Mean
1- Revenue	48	67	53174	116	1108.98
2 - Expense/Cost	27	27	7468	58	132.04
3-A Income	33	39	16109	69	694.12
3-B Asset	12	15	54438	25	4290.58
3-C Liabilities	12	14	8133	26	677.75
4 - Theft	4	4	42	8	10.50
5 - Exogenous	13	14	1008	27	77.54
Total	100	180	140372	280	1403.72

Table 6: Stock Price Change and Market Impact (\$ in millions)

	^a N	Minimum	Maximum	Sum	Mean	Std. Deviation
prminus3	96	1.09	169.50	3038.91	31.66	24.64
AnnPrice	96	.11	102.89	2181.55	22.72	19.93
prplus3	96	.10	84.50	1622.73	16.90	15.98
gainloss	96	-128.50	4.49	-1416.18	-14.75	17.57
gnlspcr	96	-.99	2.48	-42.64	-.44	.45
sp500chg	96	-.29	3.03	-1.79	-.02	.34
InX% chg	96	-72.66	19.83	-138.46	-1.44	7.69
InXPrChg	96	-135.42	8.32	-1241.12	-12.93	18.08
^b numshrs	96	5.95	7324.00	58606.06	610.48	1105.29
^b Mktgnlos	96	-80845.44	7354.07	-601149.01	-6261.97	13635.66
^b absMktgl	96	2.74	80845.44	655417.70	6827.27	13358.67
^b GrossMkt	96	-104224.14	3582.52	-857414.50	-8931.40	17775.90

^a Stock prices for 4 of the 100 companies in the original study were not available due to 2 of the companies being closely held corporation and the other two companies stock prices not listed in daily stock records for the time period needed.

prminus3 = Stock price minus 3 months
 AnnPrice = Stock price announcement date
 prplus3 = Stock price minus 3 months S&P500 market change (index)
 gainloss = Price gain or loss \$ from -3 months to +3 months
 gnlspcr = Price gain or loss percent
 sp500chg = S&P500 market \$ change (index)
 InX% chg = S&P500 market % change (index)
 InXPrChg = Price change indexed using S&P market change
 Numshrs = Number of shares (in millions)
 Mktgnlos = Market gain or loss - in millions (InXPrChg times Numshrs)
 absMktgl = Absolute value of market gain or loss -in millions

Table 7: Accounting/Marketing Dollar Relationships (\$ in millions)

	<u>Gross</u>	<u>Indexed</u>
Market/Revenue	16.1	12.3
Market/Expense	114.8	87.8
Market/Income	53.2	40.7
Market/Asset & Liabilities	13.7	10.5
Market/Theft	20414.6	15605.2
Market/Exogenous	850.6	650.2

ENERGIZE YOUR CLASSROOM: SERVICE LEARNING

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ABSTRACT

The purpose of this article is to discuss the importance of service learning projects as a pedagogical tool and justify their use in accounting courses. The paper describes a service learning project that provided opportunities for students to develop the personal competencies of teamwork and communication. The project involves developing and presenting financial management seminars for local non-profit organizations, high schools and groups on the college campus. A detailed description of the learning goals, planning and implementation issues and project assessment is presented in the article that follows.

INTRODUCTION

The accounting profession has changed dramatically in recent years. Technological advances, globalization and investor power in the capital markets has changed the role of the stereotypical accountant that sits in the back cubicle calculating profits and losses (Albrecht and Sack, 2001). Today's accountants are actively involved in operations allowing them to determine firsthand the organization's informational needs. As a result, effective interpersonal skills in interacting with clients and co-workers are crucial for success. As noted in Albrecht and Sack's report on the future of accounting education, "accounting leaders and practicing accountants believe that accounting education, as currently structured, is outdated, broken, and in need of significant modification" (Albrecht and Sack, 2001).

In addition, to remain competitive in the global market, employer's expectations of students have increased; therefore, students need opportunities to develop real-world skills such as teamwork and communication. It is no longer advantageous for students to sit passively in the classroom listening to lectures. Students need to be actively involved in their educational experience by applying the firsthand knowledge they

learn in the classroom. Research supports active learning strategies and is based on two key assumptions, that learning is an active endeavor and that different people learn in different ways (Meyers and Jones, 1993). General characteristics of active learning include involving students in more than just listening, increasing emphasis on skills development versus transmitting information and engaging students in activities that require the application of knowledge (Bonwell and Eison, 1991). "We have found that by engaging the students in activities during the learning process, they communicate their problems better, retain the material more fully and make more frequent connections between the current material being taught and other information previously learned" (Gibbs and Hagadorn, 2006). There are various active learning strategies that can be used to enhance student learning that range from simple techniques such as small group activities to more complex strategies such as service learning. This paper will focus on the use of service learning as an active learning strategy.

WHAT IS SERVICE LEARNING AND WHY IS IT IMPORTANT?

According to Rama, "service learning is a form of active learning that involves service to one's community" (Rama, 2000). Waterman expands on this definition of service learning to include:

- "A method under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that can be coordinated in collaboration with the school and community;
- That is integrated into the student's academic curriculum or provides structured time for the student to think, talk, or write about what the student did and saw during the actual service activity;
- That provides students with opportunities to use newly acquired skills and knowledge in real-life situations in their own communities; and
- That enhances what is taught in school by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others" (Waterman, 1997).

An additional component of service learning suggested by Zlotkowski is the planned reciprocity of learning by the students and the benefits received by the agencies served (Zlotkowski, 1996). This added requirement of a service learning project eliminates the idea that service learning is just "do-gooding" and highlights the fact that the agencies participating in the process with the students "are not desperate and thrilled to be rescued by college students" (Still, 2004). The benefits provided to the organization have to be balanced with the learning experience of the students.

Several external reports support the use of service learning as a valid teaching pedagogy. The Accounting Education Change Commission (AECC) Position Statement

Number One suggests that service learning should be considered in accounting education due to the fit between expected outcomes of service learning projects and the competencies desired in accounting graduates. "Students must be active participants in the learning process, not passive recipients of information. They should identify and solve unstructured problems that require the use of multiple information sources. Learning by doing should be emphasized. Working in groups should be encouraged" (AECC, 1990). Albrecht and Sack's report also recommended that student "gain practical business experience through more active teaching methods such as internships, field studies and service learning assignments" (Albrecht and Sack, 2001).

In addition, the American Institute of Certified Public Accountants education executive committee charged a special task force in 1999 with developing a competency-based framework that would prepare students for entry into the profession. The competency based framework was part of the AICPA vision of the future of the accounting profession which recognizes that new skills will be necessary to succeed in the future. CPAs will acquire some of these skills through experience and continuing education; however, the foundation of such skills must be developed through higher education in college and universities. The competency-based framework was developed around three broad areas: functional competencies, personal competencies and broad business competencies. Historically, accounting education has focused on the functional competencies which include the technical knowledge necessary to function in the accounting profession. "The personal competencies relate to the attitudes and behaviors of individuals preparing to enter the accounting profession" (AICPA Core Competency Framework, 2008). Seven specific personal competencies were listed in the framework which include: professional demeanor, problem solving and decision making, interaction, leadership, communication, project management and leveraging technology. The service learning project that will be described in the remainder of the paper clearly addressed several of the AICPA personal competencies like leadership, communication and interaction. Exhibit 1 includes the mission statement and goals for the project.

PROJECT OVERVIEW

The service learning project utilized in an introductory and upper level accounting course focuses on the development of personal skills through service in the community. Teams of students were created from one Principles of Accounting II course and one Intermediate Accounting II course to develop and implement money management seminars at local nonprofit organizations and high schools throughout the semester. The project provided an opportunity for students to work together as a group to gather information, create presentations and communicate in a professional manner. The

team concept of the project created an atmosphere conducive to learning and growth. Each team had at least one student from Intermediate Accounting to provide each group with, in most cases, a junior level student that has a broader background of accounting coursework. The topics of the seminars were certainly at a level appropriate for the second semester of a principles course. The intention was to provide a role-model for the group and to ensure the teams felt confident in their knowledge.

The primary goal of the project was for the students to gain valuable experience in developing their interpersonal skills through working in teams and communicating the subject matter to individuals outside the college. In addition, as noted by Still and Clayton, "accountants do play important roles in community organizations and are often sought out to fill board positions with local organizations" (Still and Clayton, 2004). Thus we hoped the students would recognize the need for business educated community members to be active in local service organizations as a result of participating in the project. Exhibit 1 includes a complete list of the project's goals and learning objectives.

This project was implemented at Roanoke College, a small liberal arts college, in Salem, Virginia and was supported by a learning community funded by the college. The goal of the learning community was to aid in the development and implementation of projects that connect curricular and co-curricular activities. The internal grant provided monetary funds to help compensate for the additional faculty time involved in the project, fund student associates to assist with the planning and implementation of the project and travel funds for relevant conferences.

PLANNING

Planning for this service learning project was a joint effort between two faculty and two student associates. The detailed work of the project began about three months prior to implementation. At this time, the student associates began calling area service organizations to target participants for the workshop. These interviews helped identify organizations that would work best within the time commitments of our course and the potential number of participants at each site. Once the local organizations were identified, the instructors made follow-up calls to more fully explain the goals of the project and to work out the details related to the specific dates and times for the meetings. In working with service organizations, the instructors found that initiating contact early was very important since it was often difficult to speak with the contact at the service organization. Frequent communication with the organizations closer to the actual presentation dates was crucial to confirm times and receive a more accurate number of participants. In the last two years, the project has been very

successful at several local organizations, such as, the Rescue Mission, Bethany Hall (a home for women with addiction issues) and the local YWCA. Each of these organizations already had monthly meetings in place and the money management workshop was the featured topic of the meetings for three consecutive months.

As the project planning was finalized, the next step was to assign students to the various service organizations. Through research on the organizations websites and information gathered in earlier phone interviews, the student associates created a PowerPoint presentation on the mission of the various service organizations and their primary purpose in the community. The student associates presented this information during a class session and distributed the workshop dates and times for each organization. The students were given a few days to submit their top three choices for their project site. If a student's schedule hindered participation in the service learning project, an optional research paper could be written.

IMPLEMENTATION – TEAM BUILDING

During the implementation of the project, one of the more difficult project issues was combining the two different accounting classes. The two classes did not meet at the same time so a teambuilding luncheon for both classes was held during a free block for all students. The teambuilding meeting was an opportunity for students from each class to meet and start working on their project. The teambuilding luncheon began with a group dynamic skit which portrayed various team member personalities that a student may encounter in a group. The four roles portrayed in the skit were the silent team member (the one who never speaks at the meetings), the wanderer (the individual who lacks focus on the project and is usually late), the arguer (the individual that argues about everything) and the leader of the team that tries to pull these various and exaggerated roles together to conduct a team meeting. The students enjoyed the interactive approach to identifying and discussing group dynamic issues.

Also the initial teambuilding meeting allowed groups to become better acquainted and begin planning for their first workshop session. Following the skit each group participated in an icebreaker activity and then analyzed the outcome of the activity focusing on the roles that certain team members assumed and the effectiveness of their overall planning and communication. This helped the groups identify two key roles the instructors required for each team: a facilitator and a note taker. The facilitator for the group moderated all team discussions, kept the group on task for each assignment and ensured that everyone assumed their share of the work. In addition, the facilitator communicated lesson plans for each workshop session with the assigned instructor. The note taker was responsible for taking notes during meetings, reminding the group of the next meeting and items requiring further work. Also the note taker followed up after

every meeting with the team through e-mail regarding meeting dates, summary of key decisions and next steps.

IMPLEMENTATION – ON-SITE SESSIONS

The goals of the money management workshop were to educate the participants on budgeting and how to make informed decisions regarding their money. Each workshop focused on a specific topic and had at least one interactive assignment that allowed the participants to apply the information to their own personal situation. Generally three sessions were provided at each site. The topic of the first session at each organization was usually consistent from group to group; however, the approach and activities were often different based on the creativity and expertise of each groups' team members. The first session provided an overview of budgeting including the importance of goals and how to develop a budget. Some groups walked the participants through a budget scenario while others had the workshop participants create a bank for saving money utilizing a soft drink can or a water bottle. The “bank” activity helped the students feel more comfortable and provided a chance to get to know the participants individually, which also helped breakdown any barriers between the students and the participants. The next two sessions included topics on roadblocks to financial success, such as, the differences between credit cards and debit cards, the advantages and disadvantages of payday loans and/or rent to own options and spending pitfalls. Exhibit 2 is a sample of one of the activities created to practice budgeting with the participants.

In the weeks leading up to the first workshop session, time was spent during class preparing the students for the service learning project. The student associates developed a PowerPoint presentation entitled “Service Learning – What is it?” and spent a part of one class period talking about the project's goals and the difference between volunteering and service learning. The instructors' goals for the project were explained early in the process which seemed to help create student buy-in and engagement with the project. The student associates also lead the class in an exercise to discuss stereotypes. The students were asked to name various types of music and three characteristics or stereotypes of each one of the music types. Ultimately, the students were asked to stand up if they listen to a type of music. The conclusion was made that most of the students did not have the characteristics or stereotypes for the music that they listed. The activity emphasized that each student needed to keep an open mind about who they might meet along the way during the project. During previous service learning projects, students have found that people at the transitional living centers were from all walks of life and there is no specific stereotype. Lastly, the students prepared and discussed a personal monthly budget. This activity is similar to the activity the students will be asking the participants from the service organizations to

complete. There were several benefits to completing the personal budgeting activity during a class. First the students had an example to follow by watching the instructors model the appropriate way to explain and complete the activity. In addition, the students gained a better understanding of how difficult or uncomfortable it might be for some people to share personal financial information with others.

EXPECTATIONS AND ASSESSMENT OF STUDENTS

In order to provide a valuable learning experience for the students and the participants at the sessions, clarifying and communicating key expectations was very important. The first set of expectations was related to the work that occurred during the team meetings which were held prior to each site visit. The course instructor provided the teams with general topics for each session and was available for questions; however, each team was expected to develop and implement activities relevant to each site to aid in the discussion of the topic. In addition during the team meetings, the team members determined who would present each section of the workshop. Prior to each on-site presentation the facilitator from each team was expected to arrange a time to discuss the workshop session agenda with the instructor. The second set of expectations was related to the on-site visits. Teams were expected to present three times a semester with each session lasting one hour. A faculty representative or a student associate accompanied each group to the on-site visits and provided informal feedback after each workshop session.

The service learning project was weighted at ten percent of the overall course grade. During the semester, each student was required to write a brief reflection paper about each site visit. Secondly, attendance at team meetings and on-site visits was critical to the learning aspect of the project and was a significant part of the project grade. In addition attitude and professional appearance at the on-site sessions was evaluated. Each student was allowed the opportunity to evaluate their other team members. Refer to exhibit 3 for the peer evaluation tool used in the project. The last component of the grading rubric was a two-page summary reflection paper upon the completion of the project. The students were provided with a list of questions to help them reflect on their experience while developing their paper; however, use of the questions was optional. The components of the project previously described were assigned a total of 100 points and the following grading rubric was used: 30 points for attendance at on-site sessions and three short reflection papers, 15 points for attitude and appearance at on-site sessions, 45 points for the summary two page reflection paper and 10 points for the peer evaluation.

PROJECT ASSESSMENT

Both qualitative and quantitative methodologies were utilized in assessing the project. In part one, significance tests were run on the collected data to test the different hypotheses on the relatively homogeneous group of students. Part two has descriptive statistics that were provided for non-testable responses, and for part three, qualitative student impressions were taken regarding the student experience.

Demographics

Fifty-seven students participated in this study. These participants included members of three different accounting courses. Two of the courses participated in the service learning project, and one course acted as a control group without project participation. Of the participants, fifty-six percent were male, and forty-four percent were female with ninety-one percent being between the ages of 18 and 21 years old. All but one student had chosen "Business Administration" or "Economics" as their declared majors.

Tests of Significance

Each statistical test run on the data tested the mean scores of student responses to leadership questions provided in survey form before the service learning project with those scores from the same survey after the completion of the service learning project (with the exception of the control group). The full survey may be seen in Exhibit 4 of this document. For each question, paired samples T-tests were run on the Likert-scaled responses (1-5) since efforts were made to provide an identifying number to each student. Not all students were able to recall their identifying number; therefore, the sample size for the study was reduced from the original sample to $n = 23$.

In addition to the paired comparison, a control group was utilized who did not complete the service learning project. An independent sample test was run on the post-program means of the two groups (control group and participating group) to determine if there was a significant difference between the two groups.

Paired Samples Test

It was decided before the statistics were run that $p = 0.05$ for all tests would be appropriate to test all hypotheses. For the paired comparison test, the following hypothesis was developed:

$H_0: \mu_{1ni} = \mu_{2ni}$

$H_1: \mu_{1ni} \neq \mu_{2ni}$

Where μ_{1ni} equals the mean response found for each "pre-program" question n (1-13) and μ_{2ni} equals the mean response found for each "post-program" question n (1-13).

Independent Samples Test

For the independent samples comparison test between the control group (who did not complete the service learning project) and the test group (who did complete the service learning project), the following hypothesis was developed:

$H_0: \mu_{1ni} = \mu_{2ni}$

$H_1: \mu_{1ni} \neq \mu_{2ni}$

Where μ_{1ni} equals the mean response found for the control group for each "post-program" question n (1-13) and μ_{2ni} equals the mean response found for the test group for each "post-program" question n (1-13).

Findings (Part I - Tests of Significance)

The first test run was a paired sample T-test of the pre-program and post-program responses of the students who completed the service learning program. Each sample tests the results of the thirteen questions administered in the survey. The tests were run utilizing SPSS for Windows. The results are as follows:

Chart 1 - Paired Samples Descriptive

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Q1PRE	4.17	23	.834	.174
	Q1POST	4.26	23	.689	.144
Pair 2	Q2PRE	4.09	23	1.041	.217
	Q2POST	4.09	23	.848	.177
Pair 3	Q3PRE	4.17	23	.491	.102
	Q3POST	3.87	23	.815	.170
Pair 4	Q4PRE	3.61	23	1.033	.215
	Q4POST	3.70	23	1.063	.222
Pair 5	Q5PRE	4.00	23	.853	.178
	Q5POST	3.96	23	1.022	.213
Pair 6	Q6PRE	4.04	23	.825	.172
	Q6POST	4.00	23	.853	.178
Pair 7	Q7PRE	4.26	23	.810	.169
	Q7POST	4.48	23	.511	.106
Pair 8	Q8PRE	4.57	23	.507	.106
	Q8POST	4.35	23	.714	.149
Pair 9	Q9PRE	4.43	23	.590	.123
	Q9POST	4.39	23	.583	.122
Pair 10	Q10PRE	4.52	23	.511	.106
	Q10POST	4.35	23	.714	.149
Pair 11	Q11PRE	4.09	23	.900	.188
	Q11POST	4.09	23	.900	.188
Pair 12	Q12PRE	4.04	23	1.107	.231
	Q12POST	4.04	23	.928	.194
Pair 13	Q13PRE	4.17	23	.650	.136
	Q13POST	4.26	23	.752	.157

Statistics

Chart 2 – Paired Samples Correlations

Paired Samples Correlations

	N	Correlation	Sig.
Pair 1 Q1PRE & Q1POST	23	.788	.000
Pair 2 Q2PRE & Q2POST	23	.558	.006
Pair 3 Q3PRE & Q3POST	23	.400	.059
Pair 4 Q4PRE & Q4POST	23	.632	.001
Pair 5 Q5PRE & Q5POST	23	.522	.011
Pair 6 Q6PRE & Q6POST	23	.711	.000
Pair 7 Q7PRE & Q7POST	23	.344	.108
Pair 8 Q8PRE & Q8POST	23	.562	.005
Pair 9 Q9PRE & Q9POST	23	.540	.008
Pair 10 Q10PRE & Q10POST	23	.601	.002
Pair 11 Q11PRE & Q11POST	23	.888	.000
Pair 12 Q12PRE & Q12POST	23	.485	.019
Pair 13 Q13PRE & Q13POST	23	.740	.000

Chart 3 – Paired Samples Significance Tests

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Q1PRE - Q1POST	-.09	.515	.107	-.31	.14	-.810	22	.426
Pair 2 Q2PRE - Q2POST	.00	.905	.189	-.39	.39	.000	22	1.000
Pair 3 Q3PRE - Q3POST	.30	.765	.159	-.03	.64	1.908	22	.069
Pair 4 Q4PRE - Q4POST	-.09	.900	.188	-.48	.30	-.463	22	.648
Pair 5 Q5PRE - Q5POST	.04	.928	.194	-.36	.44	.225	22	.824
Pair 6 Q6PRE - Q6POST	.04	.638	.133	-.23	.32	.327	22	.747
Pair 7 Q7PRE - Q7POST	-.22	.795	.166	-.56	.13	-1.311	22	.203
Pair 8 Q8PRE - Q8POST	.22	.600	.125	-.04	.48	1.738	22	.096
Pair 9 Q9PRE - Q9POST	.04	.562	.117	-.20	.29	.371	22	.714
Pair 10 Q10PRE - Q10POST	.17	.576	.120	-.08	.42	1.447	22	.162
Pair 11 Q11PRE - Q11POST	.00	.426	.089	-.18	.18	.000	22	1.000
Pair 12 Q12PRE - Q12POST	.00	1.044	.218	-.45	.45	.000	22	1.000
Pair 13 Q13PRE - Q13POST	-.09	.515	.107	-.31	.14	-.810	22	.426

As can be seen from the significance findings, utilizing a p-value of .05, the students did not provide significantly higher scores on the post-program survey for any of the leadership questions provided on the survey, and we fail to reject the null hypothesis ($\mu_{1ni} = \mu_{2ni}$).

Chart 4 - Independent Samples Descriptive Statistics

Group Statistics

GROUP		N	Mean	Std. Deviation	Std. Error Mean
Q1LEAD	Control Group	15	3.73	.594	.153
	Test Group	42	4.14	.718	.111
Q2OTHERS	Control Group	15	4.20	.941	.243
	Test Group	42	4.29	.742	.114
Q3TOLER	Control Group	15	4.20	.862	.223
	Test Group	42	4.17	.824	.127
Q4ENERGY	Control Group	15	3.80	.862	.223
	Test Group	42	3.95	.909	.140
Q5HELP	Control Group	15	4.00	.845	.218
	Test Group	42	4.19	.862	.133
Q6PATIEN	Control Group	15	3.60	.986	.254
	Test Group	42	4.14	.814	.126
Q7JOBDON	Control Group	15	4.20	.676	.175
	Test Group	42	4.55	.550	.085
Q8THTFUL	Control Group	15	4.20	.561	.145
	Test Group	42	4.52	.634	.098
Q9COOP	Control Group	15	4.40	.507	.131
	Test Group	42	4.60	.544	.084
Q10RESON	Control Group	15	4.00	.655	.169
	Test Group	42	4.45	.670	.103
Q11ROLE	Control Group	15	3.93	1.163	.300
	Test Group	42	4.10	.906	.140
Q12INIT	Control Group	15	3.73	1.100	.284
	Test Group	42	4.10	.878	.136
Q13PLAN	Control Group	15	3.67	1.234	.319
	Test Group	42	4.21	.682	.105

Chart 5 – Independent Samples Significance Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Q1LEAD	Equal variances assumed	.570	.453	-1.977	55	.053	-.41	.207	-.825	.006
	Equal variances not assumed			-2.165	29.689	.039	-.41	.189	-.796	-.023
Q2OTHERS	Equal variances assumed	1.011	.319	-.357	55	.722	-.09	.240	-.566	.395
	Equal variances not assumed			-.319	20.560	.753	-.09	.269	-.645	.474
Q3TOLER	Equal variances assumed	.001	.974	.133	55	.895	.03	.251	-.469	.536
	Equal variances not assumed			.130	23.765	.898	.03	.256	-.496	.563
Q4ENERGY	Equal variances assumed	.019	.892	-.564	55	.575	-.15	.270	-.693	.389
	Equal variances not assumed			-.579	25.945	.567	-.15	.263	-.693	.388
Q5HELP	Equal variances assumed	.209	.649	-.738	55	.464	-.19	.258	-.708	.327
	Equal variances not assumed			-.745	25.154	.463	-.19	.256	-.717	.336
Q6PATIEN	Equal variances assumed	1.456	.233	-2.097	55	.041	-.54	.259	-1.062	-.024
	Equal variances not assumed			-1.913	21.215	.069	-.54	.284	-1.133	.047
Q7JOBDON	Equal variances assumed	.049	.826	-1.976	55	.053	-.35	.176	-.700	.005
	Equal variances not assumed			-1.791	21.000	.088	-.35	.194	-.751	.056
Q8THTFUL	Equal variances assumed	2.572	.115	-1.747	55	.086	-.32	.185	-.695	.048
	Equal variances not assumed			-1.854	27.731	.074	-.32	.175	-.682	.034
Q9COOP	Equal variances assumed	.158	.692	-1.214	55	.230	-.20	.161	-.517	.127
	Equal variances not assumed			-1.256	26.339	.220	-.20	.156	-.515	.124
Q10RESON	Equal variances assumed	3.518	.066	-2.258	55	.028	-.45	.200	-.854	-.051
	Equal variances not assumed			-2.283	25.228	.031	-.45	.198	-.860	-.044
Q11ROLE	Equal variances assumed	.819	.369	-.551	55	.584	-.16	.294	-.751	.427
	Equal variances not assumed			-.489	20.393	.630	-.16	.331	-.852	.528
Q12INIT	Equal variances assumed	.328	.569	-1.281	55	.206	-.36	.283	-.928	.204
	Equal variances not assumed			-1.150	20.735	.263	-.36	.315	-1.017	.293
Q13PLAN	Equal variances assumed	11.232	.001	-2.124	55	.038	-.55	.258	-1.064	-.031
	Equal variances not assumed			-1.632	17.149	.121	-.55	.336	-1.255	.160

From the test of the means, there is a significant p-value for question thirteen (the question on “being a good planner and organizer of group work” of $p = .001$). The mean score from the control group = 3.67 and the participating group's mean = 4.21. Therefore, we can reject the null hypothesis and conclude that the mean responses of

the control group do not equal the mean responses of the test group. It appears that the service learning project correlates with a student's self-efficacy when it comes to planning and organizing group work.

Findings (Part II – Descriptive Statistics)

The survey also questioned students on their ability to recognize the need to be active in service organizations. Each student, who completed the service learning project, was asked several questions about his or her experience. The full survey may be seen in Exhibit 4; however, the questions asked in this section of the survey are below:

1. The community participation aspect of this course helped me to see how the subject matter I learned can be used in everyday life.
2. The community participation aspect of this course showed me how I can become more involved in my community.
3. I feel the community work I did through this course benefited the community.
4. The community work involved in this course helped me to become more aware of the needs in my community.
5. The work I performed in this course helped me learn how to plan and complete a project.
6. Participating in the community helped me enhance my leadership skills.
7. The work I performed in the community enhanced my ability to communicate my ideas in a real world context.
8. The service learning project increased my interest in accounting (future courses or career opportunities).

Descriptive statistics were analyzed to provide insight into the impact of the service learning project on students where:

- 5 = Strongly Agree
- 4 = Somewhat Agree
- 3 = Neither Agree nor Disagree
- 2 = Somewhat Disagree
- 1 = Strongly Disagree

Chart 6 – Community Involvement Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Q1	27	4	5	4.56	.506
Q2	27	2	5	4.26	.859
Q3	27	1	5	4.00	1.000
Q4	27	2	5	3.93	1.107
Q5	27	3	5	4.37	.688
Q6	27	3	5	4.33	.734
Q7	27	2	5	4.26	.813
Q8	27	2	5	3.78	.974
Valid N (listwise)	27				

As detailed by the chart, the mean scores for questions 1, 2, 3, 5, 6, and 7 were all “somewhat agree” or higher. Therefore, the mean scores of the students, who completed the service learning program, indicate that they agreed that the subject matter they learned would be useful in everyday life, and they learned how they could become more involved with their community. It also indicates that the students felt that the work they did in the project truly benefited the community. Lastly, the student’s high mean scores indicate that they learned: how to plan and complete a project, leadership skills, and communication skills.

Findings (Part III – Personal Interviews)

In addition to the quantitative data collection methods utilizing the survey, personal interviews were also conducted with the student participants. The qualitative student feedback provides insight into the impact of the project, and reinforces the need for additional experimentation and research in this area. Some of the students comments were:

“The entire volunteer experience impressed me. I am so thankful that our community or town has places like Bethany Hall. I feel that every university or college should somehow incorporate this type of project into the academic curriculum for every student.” – Mary Lou

“I have learned a great deal about myself through this experience because I developed skills I never thought I had. I was able to develop great oral communication skills. As a student in college, I am always nervous to give presentations in class, but through this experience I was able to overcome most of my fear of public speaking and produce a great presentation on most of the activities we did at the Rescue Mission.” – Michael

"I have always enjoyed working with groups, or at least groups that work together. It was sometimes hard to find a time that fit a meeting in with all five of our busy schedules, but we managed to do it. The other members of the group were involved and came up with really good ideas, which made me feel better about the whole experience. Going into this project I thought that Heath and I would be doing the majority of the work, but the Accounting II students really surprised us. They came up with some good topics to discuss and were always present at the group meeting we had before each session. I think because our group did work together to come up with good ideas, it had a positive impact on the project as a whole. We were able to plan out what we wanted to do and say, making everyone more prepared for each session that we went to." - Jessica

Summary of Findings

Twenty-six hypothesis tests were run on the testable data. In one case, there was a significant difference between the mean scores of participants of a control group, and participants who completed the project when it came to planning and organization. There are several possibilities that explain the low-level of significant statistical findings for the survey. The design of the survey instrument had not been previously tested, and may have low validity and reliability. Efforts to improve the instrument's design may increase the level of significant findings. In addition, the sample size for this study was low, especially given the fact that many students could not retain their identifying number, which would allow for the paired comparison. Therefore, an increased sample size may also increase the level of significant findings.

Qualitative feedback from student participants was exceptionally positive, which was reinforced with high mean scores on the survey. Based on this, it may be beneficial to continue experimentation and research on the positive impact of the project.

Challenges

In preparing to implement this project or one of a similar nature, there are a few challenges to highlight. One of the most frustrating challenges is that the instructors often have to "sell the project" to service organizations. There will be many hours spent brainstorming area service organizations that meet the needs of the project and then many more hours spent contacting and discussing the project with the organizations to find a few organizations that are appropriate for the project. Instructors and students will spend more time outside the classroom preparing for the money management workshop and actually going to the site for the presentation. In addition, two courses

working together on a project to create teams of students is difficult logistically. This challenge would not have been as significant if the courses were taught at the same time. Regardless of when the courses are taught, constant communication between the instructors is crucial to ensure the classes are on schedule to implement the project.

Within the classroom, there are other challenges. The instructor will have to allocate classroom time to prepare for the project development. The paper discusses a few of the activities that are utilized in the classroom to prepare the students for service. Each activity takes approximately fifteen or twenty minutes of classroom time that the instructor will need to plan for during the semester. Often allocating time to the service learning project means the instructor will have to give up a little depth in the coverage of certain topics in the classroom.

Rewards

Despite the challenges, there are many rewards for the time and energy spent. This project cultivates an atmosphere of teamwork and communication. Whether students are communicating with each other in their team meetings or communicating with the participants at the service organizations, they are learning and practicing how to communicate their ideas clearly and concisely. In addition, students in the classroom are engaged in the learning process. It is difficult to pinpoint the reasons for the increased level of engagement. Possibly the instructors' excitement and passion for the project is carried over to the students' attitudes as they prepare for the project. The project also allows students and faculty the opportunity to work together in a nontraditional format to brainstorm and develop strategies for the workshops sessions. Finally the projects usually takes place outside the typical classroom hours so the fact that the instructors are giving of their personal time to help in the success of implementing the project may also be a reason for better student engagement. If your course could use a jump start, a project similar to the one discussed in this paper will energize your class!

Limitations and Future Research

Lastly, the survey questions and findings of the project have limitations. As mentioned previously, it is difficult to have significance in our findings due to the small sample size (23 in the paired sample). However, the qualitative data and the comments from the students during class reflect the quality of the project and the growth the students have in their communication skills and teamwork skills. The results are also limited by the survey since many of the questions appear to be "leading questions" and a student may not want to score themselves low on any of the questions. Further research needs

to be done in validating the survey instrument and determining the most appropriate way to measure change in our students' teamwork and communication skills.

Exhibit 1 – Project Mission Statement and Goals

Service Learning in Accounting

Mission Statement

The use of service learning in the selected introductory and upper level accounting courses provides opportunities for the students to develop professional skills. Students will actively participate in their learning experience by applying course material through oral and written communication while working in teams.

Learning Goals and Objectives

1. Students in Accounting II and Intermediate Accounting II gain valuable experience in developing teamwork skills.
 - a. Students have opportunities to work in a formal small group over the course of the semester.
 - b. Students learn more about the skills necessary to work together as an effective team.
 - c. Students believe that the service learning project assists in developing connections with their group members.

2. Students in Accounting II and Intermediate Accounting II gain valuable experience in developing communication skills.
 - a. Students have opportunities to communicate both internally within their group and externally with people at the service organizations.
 - b. Students gain confidence in their communication with others.

3. Students in Accounting II and Intermediate Accounting II begin to recognize the need in the community for their skills.
 - a. Students recognize that their efforts are valued and appreciated by the service organizations.
 - b. Students recognize that their service learning activities during the semester are worthwhile.
 - c. Students recognize the importance of the money management topic by participating in the service learning project.
 - d. Students in Accounting II discover an interest in the accounting profession.

Exhibit 3 – Peer Evaluation Form

SERVICE LEARNING PEER EVALUATION - SPRING 2008

Project Site: _____

The ratings you provide on this form will be used in assigning grades to group members.
 The instructor will evaluate the overall project.
 Group members will provide information on the relative contributions made by all members of the project group, including themselves.

List the names of the group members, including yourself in the spaces provided.
 Rate each group member including yourself using the criteria listed below.
 Assign points to each member (**including yourself**) using a scale between 1 and 5.

- 1 = Did not participate in criteria (poor participant).
- 2 = Occasionally participated in this criteria.
- 3 = Participated most of the time in this criteria (average participant).
- 4 = Always participated in the criteria.
- 5 = Went above and beyond to make the team work (excellent participant).

Team Members

1. Frequency of attendance at group meetings.	_____	_____	_____	_____	_____
2. Group member made efforts in terms of defining/clarifying the group task.	_____	_____	_____	_____	_____
3. Group member helped to ensure that the final product(s) was(were) done well.	_____	_____	_____	_____	_____
4. Group member prepared his/ her share of the final product(s).	_____	_____	_____	_____	_____
5. Group member contributed ideas.	_____	_____	_____	_____	_____
6. Group member contributed time.	_____	_____	_____	_____	_____
7. Group member contributed leadership.	_____	_____	_____	_____	_____
8. Group member supported and provided constructive feedback to one another's ideas.	_____	_____	_____	_____	_____
9. Group member understood and was committed to group goals.	_____	_____	_____	_____	_____
10. Group member accepted dissenting views and discussed the ideas.	_____	_____	_____	_____	_____
	_____	_____	_____	_____	_____

Exhibit 4 – Assessment Survey

Demographic Information: Please write your answer or circle your response

1 What is your gender?	<input type="text" value="Male"/>	<input type="text" value="Female"/>	
2 What is your age?	<input style="width: 100%;" type="text"/>		
3 How many times have you participated in a service learning project over the past year?	<input style="width: 100%;" type="text"/>		
4 What is your academic status?	<input type="text" value="Freshman"/>	<input type="text" value="Sophomore"/>	<input type="text" value="Junior"/> <input type="text" value="Senior"/>
5 How many courses are you taking this semester?	<input style="width: 100%;" type="text"/>		
6 Do you work (part-time or full-time) during the semester?	<input type="text" value="Yes"/>	<input type="text" value="No"/>	
7 What is your major (or the major you are thinking of declaring)?	<input style="width: 100%;" type="text"/>		
8a Are you considering a minor or concentration?	<input type="text" value="Yes"/>	<input type="text" value="No"/>	
8b If yes, what is your minor or concentration?	<input style="width: 100%;" type="text"/>		

Part II

Survey: Please check the box to state if you agree or disagree with the following statements.

	<input type="text" value="Strongly Agree"/>	<input type="text" value="Somewhat Agree"/>	<input type="text" value="Neither Agree or Disagree"/>	<input type="text" value="Somewhat Disagree"/>	<input type="text" value="Strongly Disagree"/>
1 In relation to my peers, I am a strong leader.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2 I enjoy working with others and get along well in a group.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
3 I am very tolerant of other members in groups and teams.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
4 I have a high energy level when it comes to group work.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
5 I frequently help fellow group members with their work.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
6 I am patient with group members who work slower than me.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
7 My fellow group members trust me to get the job done.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
8 I am thoughtful of fellow member's feelings and other commitments.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
9 I get along well in teams and cooperate with the other members.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
10 I am very reasonable in my expectations of fellow group members.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
11 I am comfortable taking the "leadership role" in groups.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
12 I usually take the initiative and get things started in group work.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
13 I am a good planner and organizer of group work.	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

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A WORKSHOP ON CLASSROOM EXPERIMENTS IN ECONOMOCS

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ABSTRACT

In this workshop we explain how classroom experiments could be used to enhance teaching effectiveness. We will review the available resources for economics instructors. We will discuss the procedures, expected results, and the lessons we learn from some of these experiments. Participants will learn how to start using the introduced resources in their own classrooms.

INTRODUCTION

Experimental Economics has experienced a steadily growing interest by economists during the last decade. This is not surprising since laboratory and field experiments obviously provide a further valuable source of empirical evidence of economic behavior besides statistics, econometrics, polls, interviews and simulations. Experimental economics uses experimental designs and laboratory methods to check and test whether the forecasts made by economic models are plausible. Experimental economists use a controlled laboratory setting to test underlying behavioral assumptions in economic theory. Experimental approach has been also used in other social science fields like psychology, business, finance, and marketing. Roughly speaking, experimental economics is a method of research used to explore economics models by collecting data and testing the hypothesis. On the other hand, the focus of classroom experiments is completely different. Classroom experiments incorporate a simplified setting -which usually involves simple decision making process and participation in markets or simple games- to allow the students see the theory of economics “in action”. Using experiments, instructors can explain a lot of complex concepts, and show the students how they, themselves, will actually act if they were confronted with that situation. Given the controlled nature of experiments, the isolation of specific variables and focus on them is possible, which facilitates teaching economic concepts that heavily rely on “all else equal¹”. This can not be achieved in the daily real world decision making situations.

In this workshop, we introduce classroom experiment methods for teaching the basic concepts and models in economics, as well as available resources for instructors. Two of the workshop presenters have been trained in an NSF funded workshop on classroom experiments, at College of William and Mary, in May 2002. The next section lists the available commonly used economic experiments.

¹ This is the assumption of “Ceteris Paribus” that is used in economic theories extensively. This assumption can be easily implemented in experimental settings.

LIST OF COMMON CLASSROOM EXPERIMENTS

Below is a list of some economic classroom experiments available to all instructors. We will introduce some of these experiments at this workshop and review some of the available online resources, too. We will review how to run successful classroom exercises and discuss the efficient methods to collect data and analyze the results based on our experience.

The following experiments are available in the Yandell's book [5]:

1. Ultimatum Bargaining: The Division Experiment
2. Market Equilibrium: Dual Oral Auction
3. Constrained Equilibrium: Double Oral Auction with Price control
4. Tax Incidence: Double Oral Auction with Taxes
5. Diminishing Marginal Returns: Folded paper Factory
6. Monopoly: Price searching Experiment
7. International Trade: A Comparative Advantage Experiment
8. Adverse Selection and Market Failure: A Lemons Experiment
9. Public Goods and Market Failure: Voluntary Contribution Experiment
10. Pollution Rights Trading Experiment
11. A Common Property Experiment
12. Oligopolistic Decision Making: A prisoner's Dilemma Experiment
13. Inflation Uncertainty Experiment
14. Unemployment and Job Search Experiment
15. A Macroeconomic Equilibrium Experiment

This is a list of possible web based experiments on Veconlab [6], University of Virginia (UVA) as of May 26, 2008:

1. Auctions: Buyer's Curse, Common Value, Private Value, Irrigation Reduction
2. Bargaining/Fairness: Ultimatum Game, Reciprocity Game, Room Allocation Game, Trust Game
3. Decisions: Lottery Choice, Probability Matching, Sequential Search
4. Games: Coordination Game, Guessing Game, Matrix Games, Traveler's Dilemma
5. Asymmetric Information: Information Cascades, Signaling Game, Statistical Discrimination
6. Markets: Bertrand, Call Market, Cournot, Double Auction, Market Entry, Posted Offer
7. Public Choice: Common Pool Resource Game, Linear Public Goods, Rent Seeking, Volunteer's Dilemma
8. Guide to Experimenters: Obtaining a Password, Hints on Using the Software, Sample Data Displays, etc.

This is a list of possible web based experiments on Aplia [1], as of May 26, 2008:

1. Supply and Demand
2. Interest Rates
3. Tragedy of the Commons
4. Unemployment Compensation
5. Labor Market
6. Fixed Prices
7. Flexible Prices

In the next section we review our plan for the proposed workshop.

PROPOSED PROCEDURE FOR THIS WORKSHOP

In this workshop we discuss a few widely used classroom experiments (for example market, ultimatum/dictator); and discuss the procedures, expected results, and the lessons we learn from them. We also talk about how to motivate students to be actively involved in these experiments. We share some experience based rules for running those experiments within the class time period. Furthermore, there will be a discussion about the economic models underlying these experiments and some sample emerged outcomes in comparison with model predictions. In the literature, to increase the incentives of students to participate in experiments, there should be some cash or non cash prizes for the subjects (students). We talk about how to set an incentive scheme for active participation of students. We present methods to collect and analyze the data for future usage in the classroom. We specify the minimum technology needed to run these classroom exercises, collect data, analyze student responses, and compare it with the prediction from the theoretical model. We also guide the participants to where they can find further resources on classroom experiments. Our goal is that participants will be able to conduct classroom exercises successfully in their own classrooms after attending this workshop.

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ETHICS IN BUSINESS EDUCATION: PROGRESS REPORT

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ABSTRACT

Many business schools now are taking steps to ensure that their graduates have been taught to adhere to high ethical standards and behavior. Much controversy has been created over the past decade due to unethical “white collar” conduct. The outcry of the public has put more pressure than ever on business schools to incorporate more and more ethics in their curriculum. A question that many researchers have asked is whether or not business schools can change the ethical behavior of students once they reach the college age. Many believe that most college-aged students have already developed their code of ethics, and no matter how hard schools try, they cannot change what has already been deeply embedded. However, some suggest that it is not too late to make a difference in the ethical views of students enrolled in business programs, and schools should do everything in their power to make sure that students are aware of the choices they will have to face once they graduate and enter the business world. The purpose of this paper is to present a progress evaluation report on the study of the ethical responses of business students from a small college located in the southeastern United States. Using an ethics quiz from the Wall Street Journal (WSJ, 1999) as a base questionnaire, business students shared their perceptions on ethical issues in business. Accredited business schools are assessing student learning to demonstrate that they are adding value to the business education of their students. Ethics must be assessed, as well, to ensure that future business leaders place a high value on ethical behavior.

INTRODUCTION AND LITERATURE REVIEW

The word “ethics” is derived from the Greek word, ethos, meaning “customs”, “conduct”, or “character” (Northouse, 2007). The modern day meaning is concerned with what leaders do and who they are—their conduct and character. Numerous theories exist as to how followers are motivated to follow their leader/employer. Teleological theories are those that stress the consequences of a leader’s conduct. Teleological theories come from the Greek word “telos” meaning ends or purposes. When looking at consequences, two types of theories occur. The first type is Ethical Egoism and deals with an individual choosing an outcome that produces the greatest good for themselves, perhaps receiving a promotion if their division excels. The second

type of teleological theory is Utilitarianism, which states that a leader will behave in a manner to create the greatest good for the greatest number of people. An example is when a part of a federal budget is allocated to preventing an illness through immunizations rather than all to a catastrophic illness that already exists. Close to Utilitarianism is Altruism, which is almost a total concern for others, such as was the case with Mother Teresa (Northouse, 2007).

Virtue Based Theories are those that stress a person's character. These are elements of who a person is and his/her disposition. Based on the writing of Aristotle, these virtues are courage, temperance, generosity, self-control, sociability, modesty, fairness, and justice (Velasquez, 1992). At one time it was believed that these characteristics were innate; however, it is now believed that they can be learned (Kullberg, 1988).

Several perspectives of ethical leadership developed throughout the years. One theory was by Heifetz (1994) which advocates that a person must use authority to influence their people through conflicts and rapid change. It is part of ethical theory because of the emphasis that is placed on the values of the worker. James Macgregor Burns (1978) in his theory of Transformational Leadership attempts to motivate leaders to strive for higher standards of moral responsibility by emphasizing a follower's needs, values, and morals. Burns' theory is closely associated with Servant Leadership Theory by Robert Greenleaf (1970), which stresses even more emphasis on the needs of followers. Leaders under the Servant Leadership Theory should nurture and empathize with followers. The followers would then be motivated by viewing the leader as a role model through his/her becoming a servant (Northouse, 2007). According to Stanley (2008) leaders who have ethical values which are irreproachable will motivate followers in a more positive way. They then will tend to try to emulate their leader. An example of this type of ethical value is when a leader chooses not to take unfair advantage of another. If an individual is seeking promotion, doing so at all costs would be considered unethical behavior (Stanley, 2008). Robert Greenleaf chose the more ethical "route" to advancement, and after serving as a lineman for AT&T for many years, he moved into organizational management at the company (Sendjaya & Sarros, 2002). Greenleaf also put into practice what he believed and was the founder of the Greenleaf Center for Servant Leadership, which currently carries on his Servant Leadership Theory and practices (Smith, 2004).

With these theories established, the question arises as to how much influence leaders in education have upon students? Obviously the "leaders" within an educational environment are the teachers and administration. Are these "leaders" influencing students in a positive way? How can this be measured? Since ethics was incorporated as one of the five major objectives within the Department of Business in this small southeastern university, the authors wanted to compare the results from a 2006 study with those of the same survey collected in 2008 to evaluate whether or not a positive ethical effect has taken place from the teacher/student interaction during that period of time.

METHODOLOGY

To evaluate if any kind of positive progress in the students' ethical perceptions has occurred between 2006 and 2008 due to teacher/student interaction, a 16 question ethics quiz from *The Wall Street Journal* served as the basis for the questionnaire. The questions ranged from personal

use of company e-mail on the job, to whether or not the individuals had lied about sick days or had taken credit for one another's work. Business students represented the population of interest. From a small public university in a southeastern state, a convenience sample of ten business courses was selected. From a captive population of 174 students, 138 responses were collected. One questionnaire was rejected for lack of completeness, providing an effective rate of return of 78.7%. From the students surveyed in 2006, two changes had to be implemented. First, the participating students from another institution were removed to account only for those within the same university, and second the demographics were limited to gender, class, and concentration as major factors. Students were informed about the purpose of study, and the voluntary nature of their participation. Proper research procedures were applied to assure the students' anonymity, to maintain the privacy of the information, and to avoid duplications in participation. Classificatory questions were used to be able to evaluate potential differences between the participants.

FINDINGS OF THE STUDY

Table I shows the sample characteristics from the data collected in 2006, and reflects the characteristics of the students surveyed in 2008. The mix of students was very similar in comparing the two samples. The 2008 survey included a few students who were not business majors.

Table I						
Sample characteristics						
Description	Gender		Classification		Concentration	
	2006	2008	2006	2008	2006	2008
Male	54%	53%				
Female	46%	47%				
Freshman			1%	4%		
Sophomore			18%	26%		
Junior			30%	15%		
Senior			51%	55%		
Accounting					16%	14%
Economics/Finance					5%	7%
Health Care Management					15%	17%
Management/Marketing					64%	52%
Other						10%

In comparing the results of 2006 with 2008, emphasis was placed on the fact that many of the freshman and sophomore students from 2006 have become junior and senior students in 2008. Therefore, it is the assumption of the authors that of those freshman and sophomore students who continued their education at the surveyed university were exposed to the ethical values of their teachers and ethical issues emphasized in their business courses.

Table II shows the responses of the students with regard to their answers to the ethics quiz. There is no significant difference between the students surveyed in 2006 versus 2008 regarding items

pertaining to internet usage and technology, with the exception of question number five regarding blaming an error on a technological glitch. The answer to this question favored the students who took the survey in 2006. This was the only question that favored those students. However, there were six questions that had a significant difference in ethical responses regarding vendor, client, and employer relationships, which are items that are strenuously taught within the courses of the Department of Business. The students surveyed in 2008 showed a significant difference in questions 8-13. There was a significant difference in both receiving and giving gifts to a boss, and receiving gifts from vendors. Those students surveyed in 2008 had higher ethical standards regarding giving a fifty dollar gift to their boss, as well as receiving a fifty dollar gift from their boss. Also, the 2008 students received significantly higher responses regarding receiving various gifts from vendors such as football tickets, theater tickets, holiday food baskets, and gift certificates. However, in question 14, "Can you accept a \$75 prize won at a raffle at a supplier's conference?" the percentage is still high for both groups, 93% for 2006 and 95% for 2008, indicating that the majority of the students believe this type of prize is acceptable.

Table II		
Student Responses		
Questions	2006	2008
	Answered Yes	
1. Is it wrong to use company e-mail for personal reasons?	53%	58%
2. Is it wrong to use office equipment to help your children or spouse to do schoolwork?	53%	61%
3. Is it wrong to play computer games on office equipment during the workday?	81%	85%
4. Is it wrong to use office equipment to do internet shopping?	81%	82%
5. Is it unethical to blame an error you made on a technological glitch?	83%	74% *
6. Is it unethical to visit pornographic web sites using office equipment?	98%	97%
7. What's the value at which a gift from a supplier or client becomes troubling?		
	\$25,00	20%
	\$50,00	33%
	\$100.00	47%
8. Is a \$50.00 gift to a boss unacceptable?	33%	43% *
9. Is a \$50.00 gift from the boss unacceptable?	23%	34% *
10. Of gifts from suppliers: Is it OK to take a \$200 pair of football tickets?	59%	44% *
11. Is it OK to take a \$120 pair of theater tickets?	59%	47% *
12. Is it OK to take a \$100 holiday food basket?	68%	55% *
13. Is it OK to take a \$25 gift certificate?	83%	72% *
14. Can you accept a \$75 prize won at a raffle at a supplier's conference?	95%	93%
15. Due to on-the-job pressure, have you ever abused or lied about sick days?	45%	38%
16. Due to on-the-job pressure, have you ever taken credit for someone else's work or idea?	6%	7%
*significance .05 alpha		

The comparison of these two data sets indicates that the 2008 students are more aware of certain ethical issues, especially those associated with vendor, client, and employer relationships, and the assumption is made by the authors, that this awareness has been a result of emphasizing ethics in business classes and the interaction that these students may have with their teachers (leaders).

IMPLEMENTING ETHICS IN HIGHER EDUCATION

Implementing ethics within business schools appears to be a trend that cycles back with time depending on the events occurring within the corporate world. After various incidences in the 1970s involving bribery of foreign officials, illegal campaign contributions and numerous business frauds, the Foreign Corrupt Practices Act was passed whereby companies that trade their stock publicly are required to keep appropriate records detailing transactions in an accurate and fair manner (Albrecht, et.al, 2008). Then in the 1980s the corporate world was confronted with the insider trading scandals regarding Michael Milken and Ivan Boesky (Stewart, 1991).

Corporations began to again address ethics, and Abend (1988), indicated ways corporations stressed ethical values to their employees. Electronic Data Systems software developers and Eli Lilly, pharmaceutical manufacturer, both used ethic's standards and programs in their employee training. Hallmark Cards also had standards and statements of ethics and reinforced these statements by having employees sign the statements, thereby acknowledging receipt and understanding of their policies. General Dynamics, aeronautical manufacturer employed nine full-time directors and had 29 ethics hotlines to answer questions that employees had pertaining to their ethical standards (Abend, 1988).

Ironically, Arthur Andersen accounting firm had implemented a program in 1988 to teach ethics in the university setting through the use of five case studies. This program was called Partnership for Applied Curriculum on Ethics (PACE). It was estimated that by 1992, approximately 300 universities would be using the program (Kullberg, 1988). Most disappointing is the fact that this leader in ethic's education was the accounting firm that audited and approved the financial statement of both Enron and WorldCom in 2000 when both companies were involved in the largest accounting scandals in recent history. Consequently, Arthur Anderson was forced to close their doors on August 31, 2002, and the Sarbanes-Oxley Act was a result of these accounting improprieties (Albrecht, et.al, 2008). Enron, the oil and gas conglomerate actually had an "image of being an excellent corporate citizen, with all the corporate social responsibility....and business ethics tools and status symbols in place" (Sims & Brinkmann 2003). They even had a code of ethics and a commitment to integrity and excellence (Moore, 2006). The example that both companies set was definitely not one of "walking the talk". Stanley (2008) emphasizes that "Leading by example is the finest way to demonstrate ethical behavior.....managers must adhere to a code of conduct themselves".

While implementing a code of ethics is a common procedure within business organizations, it is not typically done within higher education. As indicated by Moore (2006), "This raises the question whether the commonplace corporate practice of implementing a code of ethics, with all its attendant issues, is appropriately transferable to the higher education sphere". Moore further notes that all universities have standards deemed appropriate for research but need to address

those ethical issues that deal with the “commercial activity” they are in, i.e. recruiting and retaining students. His article explores a code of ethics referred to as the “Guide” that was developed in the United Kingdom by a Council for Industry and Higher Education (CIHE) event in 2004 and Brunel University. In conducting research on the subject prior to implementation of the “Guide”, it was determined that there was not often an institution-wide agreement on ethical standards but often a fragmented series of documents from department to department, and as aforementioned, ethical standards in research are deemed most important. The “Guide” that was implemented was 36 pages in length, consisting of two parts. Part I contained four chapters covering the articulation of ethics, thinking about ethics, developing a framework for ethics, and putting the policy into practice. Part II then goes further into the illustration of the framework with “warnings” that it is not intended to be a template to follow but merely an approach that universities may want to consider. As a result of all of the exhaustive effort, as well as the helpful examples and illustration, it may be widely adopted. The code of ethics that was developed in the “Guide” is definitely transferable between institutions and is accepted via ‘signature statements’ (Moore, 2006). As of the writing of Moore’s paper in 2006, five universities received support to try the “Guide”. Further research needs to be conducted to determine their success in implementation of this standardized code of ethics for higher education.

In view of the fact that the “Guide” has not been universally accepted, some alternatives for managing ethics within higher education have been suggested by Moore. In condensed form, they are:

- 1) Encourage integrity by staff and students.
- 2) Reinforce the institution’s mission and values among staff and students.
- 3) Issue a statement that it is known that moral issues will arise in the course of the daily activities of both staff and students, particularly in committee settings, and that these issues are to be acknowledged and openly discussed by both colleagues and managers when deemed appropriate.
- 4) Senior and middle managers should “walk the talk”.
- 5) Written guidance on ethical policies should be in place, especially in regard to research and ‘questionable practices’.
- 6) Monitor work by auditing current documentation.
- 7) Appoint an ethics advisory committee to monitor and advise on specific issues.
- 8) Do not expect all moral issues to be mutually resolved as constrained conflict is fundamental to the nature of universities (Moore, 2006).

Moore concludes his article by indicating that an interesting research project would be a comparison of those institutions that adopted the “Guide” as their formal code of ethics, compared to those that used the above alternative approaches.

CONCLUSION AND RECOMENDATIONS

The results of this study indicate that student ethical perceptions can be positively influenced by business schools. Through proper leadership, and the integration of standardized codes of ethics within the university and the curriculum, business schools can have a major impact on the ethical behavior of their graduates, which in turn could positively influence the corporate business environment. However, business schools must establish a more formalized assessment effort that compares the student's ethical views both before and after they complete the upper level business curriculum in order to determine the amount of value added. Additional research is needed to determine the most effective methods for influencing business students. Business schools must be proactive in preparing their graduates not only in becoming professional business leaders, but also in becoming ethical decision makers who lead by example.

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FIGHTING PLAGIARISM IN THE BUSINESS COMMUNICATIONS CLASSROOM: ONE PROFESSOR'S ARSENAL

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ABSTRACT

Unfortunately, plagiarism in the classroom is a problem. There are many reasons for this problem. One is that electronic information sources makes it very easy to do and students succumb to this temptation for a variety of reasons. Plagiarism can be a real challenge in any course that requires writing reports. This paper describes specific assignments designed to help students understand what plagiarism is and how to avoid it.

INTRODUCTION

Plagiarism, a common form of cheating, is a problem we often face in the classroom. According to Plagiarism.org, a website dedicated to the topic, "54% of students admitted to plagiarizing from the Internet"[1]. A study of cheating at Canadian colleges found that "more than half the undergraduates and 35 percent of the graduate students surveyed admitted to some form of cheating on written course work, such as failing to footnote, turning in someone else's work, or falsifying a bibliography" [2].

In addition to being widespread, the problem is not restricted to the classroom. A quick search on any online information database will reveal articles discussing reports and instances of plagiarism in professions such as journalism, advertising, cartooning, and medicine. Even politicians and academics are not above plagiarism.

The use of the Internet and other electronic information sources for researching college reports has made plagiarism in the university classroom particularly easy. All a student needs to do is cut and paste sections of information from the electronic source into his paper. Their reasons for doing this are many – from running out of time to properly research and write their papers, to being lazy and unethical. It is an easy temptation and one that many students fall into.

I teach a Business Communications course to undergraduates of a business college and the culmination of the writing part of that course entails researching and writing a business report. In the fall of 2007, I was shocked and dismayed to find that approximately 25% of my students had taken the easy approach and had cut and paste entire sections from the Internet and other electronic information sources directly into their papers with no citations.

Determined not to let this happen the next semester, I developed a series of assignments designed to help students understand what plagiarism is and how to avoid it. In this paper, I describe these assignments.

TEACHING STUDENTS HOW NOT TO PLAGIARIZE

Part One: Understanding What Plagiarism Is Assignment

The first assignment in the series is also the first writing assignment in the class. Students are asked to complete the first two steps of a three-step writing process and plan and draft memos that define plagiarism and provide information on how our Honor Code deals with cases of plagiarism.

Since students are learning about the importance of analyzing their audience and adapting their message to each audience, they are asked to plan and draft two memos, one each to two different audiences -- new freshmen students and new university professors. This also allows them to think about plagiarism from two perspectives, that of a student and that of a professor.

Students are instructed to use the web pages for the University's Office of Judicial and Honors Programs for the necessary information for their memos. This provides them with information that is specific to our university and ensures that they know how their own university defines plagiarism, what they should do to avoid plagiarism, and what will happen should they be charged with plagiarism.

Students complete a planning document for each memo and compose the first draft of each memo. They are instructed to make each memo no longer than two pages.

Written instructions for this assignment are presented in Appendix A. A copy of the planning document that they complete is presented in Appendix B. The draft memos are graded using a rubric that focuses on assessing the memo's planning. A copy of that rubric is presented in Appendix C.

Part Two: Understanding and Planning Reports Lectures

During the section of the course on report writing, students research and write an informational business report. To start this section, I present a lecture on understanding and planning reports. This lecture includes discussing the work plan and its importance, and gathering information and supporting your message with reliable information.

My lecture on this includes discussions about academic honesty, including documenting sources, paraphrasing, and using quotations. In addition to covering how to do these things and their correct formatting, my discussions with students focus on why it is important. The purpose of this lecture is to make sure that students understand what they need to do to avoid plagiarism. Our discussions build on the foundation of knowledge acquired from their research on plagiarism in the first assignment.

A second lecture on conducting secondary research is presented by the head research librarian at our university. In addition to helping students locate and use the many electronic databases and information sources, she stresses the importance of evaluating and using appropriate sources. Working with my report assignment guidelines, she focuses on helping students understand that they must find information that is authoritative and current.

As a result of her lecture, students have a better understanding of what type of information they need to find and how to find it. However, just as important a benefit is that students feel less overwhelmed when they start to conduct their research. They also are more apt to approach the librarian for help, because they feel that they have a relationship with her from their classroom experience. Because of these factors,

students are less likely to base their reports on one major information source. They are more likely to gather a variety of appropriate resources and apply them to their work.

Part Three: Basing Analysis on Multiple Resources Activity

Once students understand what type of information is needed and how to find it, they need to learn how to apply multiple resources to their analysis. To help them with this, I developed an in-class activity that requires them to answer several questions about a topic using information from multiple sources that I supply.

In my spring 2008 class, students were given three articles from the business press about Starbucks Corp. They were then given three questions to answer and were instructed to answer each question using information from at least two of the three sources. They were required to include in-text citations in their answers to show me where they got the information used in their answers.

This activity gave students the opportunity to practice applying information from multiple sources to answer research questions. By completing this activity, they were able to see first hand how using multiple sources resulted in richer, more complete answers. Hopefully, understanding this will result in less copying of information from one major source into their reports.

They also practiced using in-text citations and applying them appropriately to their work.

A copy of this activity is presented in Appendix D.

Part Four: Researching and Writing a Business Report Assignment

The fourth part of teaching students how not to plagiarize brings all the above work together in an assignment to research and write a business report. The topic of this report is not important. What are important are the requirements and steps of the assignment. The report requirements designed to help fight plagiarism are detailed below:

- **Multiple Resources** – Depending on the topic, students are required to base their reports on at least eight – ten different information resources, of which only one – two may be a .com website (usually the topic company’s website). In addition to requiring that a certain number of resources be used, resources must be current (no older than two years), and must include at least one major article (feature or cover story) from a major business publication. This requires students to pull together information from a variety of sources and merge this information together, limiting their ability to write entirely from one resource and removing the temptation to cut and paste information from an electronic source into their reports. By requiring current resources and at least one major business press article, students also are less likely to be able to purchase a report from an online research service.
- **Annotated Bibliography** – For at least half of their resources, students must annotate their bibliography citation with information about why they selected that resource. This includes reporting how/where the resource was found, why the student considers it to be current, and why the student considers it to be authoritative, including how the author’s credibility is established. The research librarian presents this requirement to the students during her lecture and she also grades this part of the report. Providing this information requires the students to think about why they are using the sources they do and results in better quality information used in the reports.
- **Copy of Major Article(s)** – Students are asked to attach a full-text copy of their major business press article to their reports as an appendix. This helps me evaluate the quality of their research, but it also enables me to see very quickly if the article was plagiarized.

There are also several steps to this report assignment that help deter plagiarism. These steps are described below:

- **Work Plan** – By the first class after the research report assignment is given, students are asked to submit a work plan for their report. In addition to describing the problem statement and purpose for the report, the work plan includes descriptions of the report's scope, the sources and methods of data collection, a preliminary outline, and a timeline detailing the necessary tasks and schedule for completing the report. Preparing this work plan helps students realize the time needed for this assignment and gets them started on the report sooner. And, hopefully, that means that they are less likely to be rushed at the end and less likely to look for “easy” solutions such as plagiarism to their time-management problems.
- **Progress Report** – About one week into the assignment, a progress report is due. Students prepare a short, written progress reporting detailing what's been done and what needs to be done, as well as their plans for completing their reports. These short reports are given to me during a brief, one-on-one progress report session. This gives me with an opportunity to assess whether students are on track or not and to provide any necessary guidance. As with the work plan, the progress report helps ensure that students are working on their reports and not leaving them to the last minute.
- **First Draft** – About one week before the final report is due, students are required to submit a copy of their first draft. This also works to keep them on task, but it also provides me with an opportunity to review their work and provide feedback. If students are not using quotations properly or providing correct in-text citations, I can bring it to their attention and get them to fix their problems. This gives me an opportunity to help them correctly apply what we earlier discussed in class regarding documentation, quotations, and paraphrasing.

Once the final report is submitted, it is graded with a grading rubric that includes evaluating that appropriate, current resources were used and that the report correctly incorporated in-text citations and a bibliography.

A copy of the report guidelines is included in Appendix E. The grading rubric for the report is presented in Appendix F.

RESULTS

Since my experience with plagiarism in the fall of 2007, I've had only one semester to use these anti-plagiarism assignments. But, based on that one semester, these assignments seem to be accomplishing what I wanted. Students' reports in the spring 2008 semester were better and I found no instances of plagiarism. I observed the following differences:

- Students better managed their time. They started their business reports earlier and worked more consistently on them so that they were not as rushed at the end. As a result, they were less likely to look for shortcuts such as cutting and pasting material from resources into their reports.
- The quality of references used was higher. Information provided in their annotated bibliographies indicated that they evaluated and selected more appropriate resources to base their reports upon. In the past, they've often just grabbed the first eight – ten articles from their online searches and not had all the information they really needed for their research. This then led them to copying from the company's website or some other comprehensive source rather than incorporating information from multiple sources.
- Students were more careful about how they used in-text citations and quotations and, on the whole, these were done correctly. In the past, many students had either not cited information that should

have been cited or they had cited entire paragraphs and sections that were paraphrased or quoted from their resources.

I've been very pleased with these results. While I expect that combating plagiarism will be an ongoing battle, it is one that I intend to continue to fight. These assignments and others will continue to be part of my arsenal.

APPENDIX A

Understanding What Plagiarism Is Assignment

We have a problem. New freshmen do not understand what plagiarism is, nor do they understand how our university and its honor system handle cases of plagiarism. In addition, new professors need some of this same information.

Your job is to draft two memos to provide information to these two audiences to help them understand plagiarism. Your memos should provide answers to the following questions:

- What is plagiarism? How does our honor code define it?
- How does our honor system deal with cases of plagiarism?

Also include any other important information that you feel each audience should know. You should be able to find all the information you need on the university website on the pages for the Office of Judicial and Honor Programs.

You will present this information in a memo that is no longer than 2 pages. The memo should follow proper memo formatting (see Appendix A and/or Ch. 6 of your text for information about memo format). Please use a 12-point Times New Roman font, single line spacing, and block paragraphs. You may address them to the “Freshman Class of 2012” and “New Professors.”

In order to develop your memos, you will need to follow the three-step writing process. For this assignment, I want you to follow steps one and two.

- **Step One: Planning** – Complete the attached planning document for each of your 2 memos. This is where you will define your purpose, profile your audience, define the information you’ll gather, organize your communication, and determine how you’ll need to adapt your writing to your different audiences.
- **Step Two: Writing** – Compose your first draft of each memo. Following what you included in your planning document, write the first draft of each memo.

I will be looking for careful and well thought out planning. I will be looking for drafts that follow your plans.

APPENDIX B

Understanding What Plagiarism Is Planning Document

The 3-Step Writing Process: Planning and Writing

Name _____

Audience _____
(indicate whether this worksheet is for your freshmen or new professor memo)

Purpose: *What is the purpose of this communication – both the general purpose and the specific purpose?*

Audience: *Provide an analysis of your audience. (See fig. 3.2 on page 55 for an example of what to include.)*

Information: *What information do you need to include? (list your sources and the key facts that you'll include in your memo.)*

Organization: *Define your main idea, discuss the scope necessary for this memo, determine whether you'll use the direct or indirect approach – and why – and outline your memo.*

Adapting to Your Audience: *How will you adapt your writing to your audience so it will be most effective?*

APPENDIX C

Understanding What Plagiarism Is Grading Rubric

Name _____

Scale: 0 = not done; 1 = not acceptable; 2 = OK, but needs work; 3 = good; 4 = excellent

Purpose – Memo’s purpose is clear, both the general and specific purpose.	0	1	2	3	4
Audience – Memo is adapted to audience as evidenced by organization, word choice, writing style, tone, etc.	0	1	2	3	4
Information – Information included is complete and targeted to audience’s needs. Information is accurate, ethical, and pertinent.	0	1	2	3	4
Organization – Main idea is evident. Overall organizational approach is appropriate for audience and purpose. Memo is easy to follow and understand. Paragraphs cover only one topic each and do not ramble. Transitions are used effectively so the memo flows from topic to topic.	0	1	2	3	4
Tone – Memo is business-like in its tone. Writing is conversational, but displays the appropriate level of formality given the audience and purpose.	0	1	2	3	4
Writing -- Memo is clear and concise, not wordy. It uses effective sentences and paragraphs. Words used are appropriate and convey the intended meaning. Parallel construction is used where necessary.	0	1	2	3	4
Length – Memo is no longer than 2 pages.	0	1	2	3	4
Format – Correct memo format is used.	0	1	2	3	4

APPENDIX D

Basing Analysis on Multiple Resources Activity

Your job as a researcher is to help management solve problems and answer questions by gathering information, analyzing or making sense of it, and presenting it to management in a report. To be sure that your report is balanced and complete, it should be based on multiple sources.

Attached are three articles about Starbucks Corp. Each article presents information about how Starbucks has slipped recently and how it hopes to recover. I want you to use these three articles to answer the following questions:

1. What problems have caused Starbucks to slip?
2. How does Howard Schultz's plan for Starbucks to recover? What does he suggest that Starbucks do?
3. Starbucks faces competition from McDonald's and Dunkin Donuts. Explain the threat that this competition poses to Starbucks.

Be sure that your answers are thorough and complete. Each answer should be based on information in at least two of the three sources.

A few pointers on preparing your answers:

- Use only the information in these articles to answer the questions.
- Weave information from multiple sources together to make a complete answer for each question.
- You may write on the articles and you may make notes from them as you prepare your answers.
- Please include in-text citations (article title and page number) to show me where you got the information used in your answers.

This activity is to help you understand how to use multiple sources of information in your reports. I am not grading your writing in this assignment, but you should still strive for well organized, concise, and clear writing.

APPENDIX E

Researching and Writing a Business Report Assignment

There is a major push in the world today to be environmentally friendly, to protect and sustain our world for future generations. Not only is our university focused on this topic, many businesses are developing new products and changing their processes so that they too help protect and sustain our world.

So what are companies actually doing? Which companies are “greener” than others? As consumers, it’s important to understand the answers to these questions. For this assignment, you’ll answer these questions in a written business report. To do this, you will select two competing companies (two companies operating in the same industry), research both companies, and write a report that presents information and compares each company’s efforts to be “green.” Based on this information, you will conclude which company is “greener.”

Your report should include the following types of information:

- An overview of each company – including where it is located, what it does, and how big it is (in terms of annual revenue).
- A “green” audit of each company – what is it doing to sustain the environment? What is it not doing, or does it do anything that is not environmentally friendly?
- Conclusion – which company is “greener?”

You will present your findings in a memo report to me. This means that your report will follow the format for a business memo; however, it will include headings and subheadings and be longer than a usual business memo. I expect these reports should be about six - eight pages long. Your report should include an introduction, body, conclusion, appendix, and “works cited” bibliography.

Good business reports are based on authoritative, balanced, and current research. You will need to use multiple sources to prepare this report. Primarily you should use appropriate library databases and collect authoritative information. Please keep the following guidelines in mind as you gather your resources:

- You must use at least eight different resources.
- You may only use two .com websites – each company’s website. These will be two of your eight resources.
- You may not use any resource that is older than two years.
- You must include at least one major article per company from the business press – Business Week, Forbes, Fortune, The Economist, The New York Times, The Wall Street Journal, etc.

You should be able to find all the information you need through the university Library.

Please document your sources using the MLA citation format. MLA format includes in-text citations and a “Works Cited” bibliography. In addition, you will annotate four of your resources in your bibliography with information about why you selected that resource for this report. Our librarian will provide information about what that includes when we meet with her in class.

I would also like a copy of the two major articles you used attached as an appendix to your report.

The various deadlines for this report are detailed below:

- Your work plan is due by our next class. It should include your report's problem statement and purpose. It should also describe your report's scope, your sources and methods of data collection, a preliminary outline, and a timeline detailing the necessary tasks and schedule for completing your report. I will review your work plans and provide feedback to ensure that your report and how you plan to accomplish this work are on track.
- Your progress report is due by May 28th. We will meet in my office to discuss your progress to date and your plan for completing your report. This is also your opportunity to discuss any issues or problems you are encountering.
- The first draft of your report is due on June 5th. You should submit your first draft to me via the assignment link for this project (in the June 2nd folder).
- Your final report is due on the last day of class, June 12th. You will print out your report, staple it and your appendices together, and hand it in at the beginning of class. You will also make an oral presentation of your report in class that day.

My grading rubric for your written report is attached to these guidelines.

Your written report is worth 100 points; the oral presentation of this information is also worth 100 points. These two assignments comprise your final exam for this class.

Separate instructions for the oral presentation of this report are posted on BlackBoard in the June 12th folder.

APPENDIX F

Researching and Writing a Business Report Grading Rubric

Name _____ Date _____

Scale: 0 = not done; 1 = not acceptable; 2 = OK, but needs work; 3 = good; 4 = excellent

Introduction – explains the problem motivating the report, describes the problem’s background and significance, clarifies report scope and limitations, describes the research methodology, previews report’s organization.	0	1	2	3	4
Body – discusses, analyzes, interprets, and evaluates the research findings. Presents evidence that justifies the conclusions. Opinions are supported by facts. Information is balanced.	0	1	2	3	4
Conclusions – tells what the findings mean in terms of solving the problem. No new information is presented.	0	1	2	3	4
Works Cited – citations applied appropriately in-text using the MLA format. Appropriate, current business resources used. Correct Works Cited list.	0	1	2	3	4
Organization – report is well organized, easy to follow, and understand. Similar ideas are grouped together so it’s easy to see relationships and follow arguments.	0	1	2	3	4
Tone – report is business-like in its tone. Tone appropriate for purpose and audience.	0	1	2	3	4
Fluency/Written Expression – information is presented clearly and concisely. Sentence unity and structure, parallelism, word choice, etc. are correct. Paragraphs are limited to one topic only.	0	1	2	3	4
Mechanics – grammar, spelling, punctuation, word use, etc. are all correct.	0	1	2	3	4
Format – consistently applied memo format, 12-pt Times New Roman font, single-spaced, block paragraphs, appropriate headings and sub-headings.	0	1	2	3	4
Graphics – used appropriately to highlight and clarify information. No orphan tables or charts.	0	1	2	3	4

Comments:

REFERENCES

- [1] Plagiarism.org. (2008). *Facts About Plagiarism*. Retrieved May 24, 2008, from <http://www.plagiarism.org/facts.html>

- [2] Birchard, K. (Oct 13, 2006). Cheating Is Rampant at Canadian Colleges. *The Chronicle of Higher Education*, 53, 8. p.NA. Retrieved May 24, 2008, from Academic OneFile via Gale: <http://find.galegroup.com.proxy.longwood.edu/itx/start.do?prodId=AONE>

BRIDGING THE GAP BETWEEN TRADITIONAL AND ONLINE EDUCATION WITH TECHNOLOGY AND CREATIVITY

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ABSTRACT

Enrollments of online programs have had strong growth recent years. As a residential professor who also has developed and managed online courses, the author illustrates how technology and creativity have been employed, and continuous efforts are required to help bridge the gap between traditional and online education.

INTRODUCTION

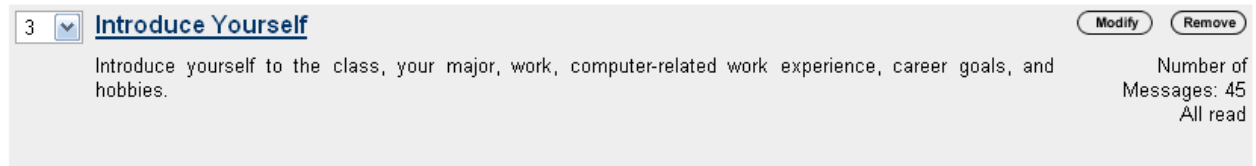
More students have embraced online learning. The flexible and convenient format of online study allows students to earn degrees without leaving jobs, and study at their own pace from home or the office. However the rapid growth of online instruction has caused concerns. In traditional education, instructors can physically monitor students taking exams, communicate with students directly. Online education, on the other hand, lacks face-to-face classroom interactions, and no best way of monitoring students taking exams. Through answering the following five questions, this paper illustrates how technology and creativity can help bridge the gap between traditional and online education.

1. How can one enhance interactions among students and with the instructor in online education?

Research done by the National Education Association showed that the most important and difficult aspect of teaching online is not using technology. Instead, it's creating a community among the students. "Otherwise, you're going to get student disengagement and higher dropout rates," says Rachel Hendrickson, the association's higher-education coordinator. (Carnevale, 2003)

Be creative in instructing the students to introduce themselves (Fig. 1). The author found that, in an online computer programming course, asking students to share their computer-related work experience proved valuable. In the class, there were always students who had worked in the information technology (IT) industry for years and some were even IT department managers. They were serious about learning and valued the degree they were working toward highly. Their sharing always encouraged other students and reinforced that learning is building knowledge and skills for one's career.

Fig. 1 Ask students to introduce themselves especially on subjects related with the major



Although what constitutes productive and generative conversations in online discussions and how such interactions can be orchestrated to nurture epistemic practices still remain open questions (Uzuner, 2007) and more research need to be done on that, interactivity is the heart and soul of effective asynchronous learning (Pelz, 2004).

Many distance educators believe that more teaching and learning often occurs when the instructional process is mediated by technology. “When I went to school,” Mr. Fluge recalls, “one person got to go to the board. That was great for that one person, but the rest of us had to think about what that experience was like”. “With online education, everyone goes to the board.” (Carnevale, 2003) With discussion board, students know that they are on display; the whole class will read and comment the postings. That can motivate students to work harder and think more before posting anything in the discussion board.

2. How can academic dishonesty be curbed on online education?

- a. The first step is making students know the expectations and required effort, for example: give a quiz on syllabus, course policies and keys for success. At the beginning, clearly state the expectations, learning outcomes, required time commitment, and keys for success, and give a quiz on those. That will make students take the time to read the syllabus, know the required effort and plan their schedule accordingly. Having a quiz on course policies and tips for success helps to reinforce them again periodically in discussion board.
- b. Some institutions use proctored testing centers. But that distracts from the convenience that draw students to online education in the first place.
- c. Ask each student to work on a unique project is effective. For example, in a programming course, the author gave a list of tasks that students were required to find a company, club, or an organization that has software need. Each student ended up with a unique application, even the core required tasks are the same. The possibilities of cheating were minimized. Also, students found such assignments exciting, fulfilling, and helpful in putting all the pieces together.
- d. Limit the test time short enough to make looking up the answers difficult, and that can be done easily in Blackboard with not only the multiple-choice questions, but also the essay or programming test. After opening the test file, students were given two hours to finish and submit the test. For computer programming classes, given that there are companies offer coding services for a fee on Internet, without the time limit, students can pay a fee and get a well-written program in just a few days.
- e. For the multiple-choice questions, use a big pool of questions; each quiz is designed to pull a certain number of questions randomly from the pool. Therefore, if two students want to share answers, first of all, it's likely that their questions are different; secondly, even if some questions are the same, they are of different sequence, so given the time limit, it's harder to cheat.
- f. Design discussion board questions creatively and keep helping students on time management. Time plus energy equals learning. There is no substitute for time on a task. Learning to use one's time well is critical for students and professionals alike. Students need help in learning effective time management. Chickering and Zelda emphasized that allocating realistic amounts of time means effective learning for students (1987). Online students often face the challenge of managing their time among the responsibilities of a full-time job, family and their studies. In a

Java class, the author asked students to participate in the following discussion and interact with each other. Note that one of the questions is on time management where student were able to learn better time management skills from their peers.

Fig. 2 Students were asked to answer questions designed by the instructor

The screenshot shows a Blackboard discussion board interface. At the top left, there is a dropdown menu showing '12' and the title 'Module 1 Discussion'. To the right are 'Modify' and 'Remove' buttons. Below the title, there is a text area with the following content:

Read the "Discussion Board Expectations" document before you do any postings.

Post at least one response to the following questions:

1. How to set up the path so that you may compile and run Java programs from any folder?
2. What features make Java popular? You may need to Google search for more information.
3. How to zip the module 1 homework folder?
4. Share your computer-related work experience.
5. Share how you plan to use your time wisely through the week. Share study strategies that have worked for you.

Respond to at least two other students' postings.

On the right side, there is a summary: 'Number of Messages: 54' and 'All read'.

- g. To prevent students from printing the test and showing to others, in Blackboard, have the following Java Script in the “HTML” box of the instructions textbox of the test, then if the student hit “File”, and “Print” from the browser, it will just print blank pages.

Fig. 3 JavaScript that can preventing students from printing the tests

The screenshot shows the 'Test Information' configuration page in Blackboard. The 'Name' field contains 'Ch18 Qz' and the 'Description' field contains 'Quiz on Ch18 Building your own classes and objects.'. Below these fields are radio buttons for 'Smart Text', 'Plain Text', and 'HTML', with 'HTML' selected. A toolbar with icons for 'Preview' and other functions is visible. The 'Instructions' field contains the following JavaScript code:

```
<STYLE type=text/css>@media print {BODY
{display:none} !important}</STYLE>
<SCRIPT language=Javascript
src="http://www.blackboard.niu.edu/blackboard/javascript/r
<STYLE type=text/css>@media print {BODY
{display:none}}</STYLE>
```

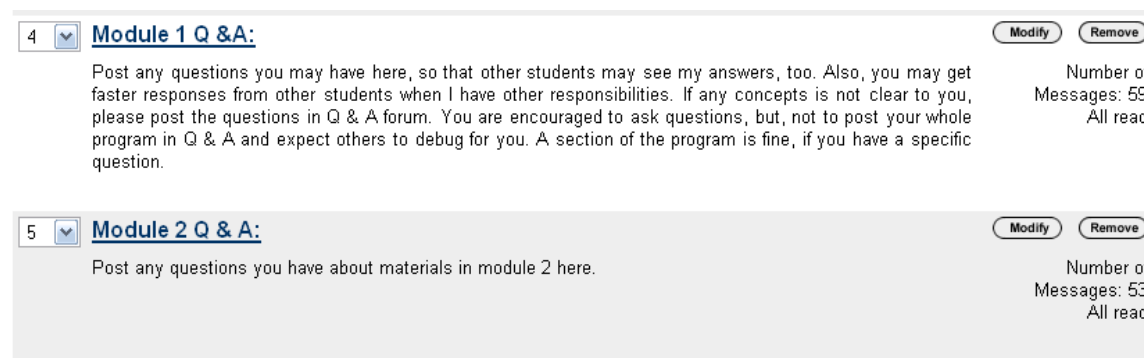
At the bottom of the page, there is a 'Submit' button.

3. **How can technology be used so that an online instructor can answer the same question just once and the whole class can hear or see the answer like in traditional classroom?**

In the traditional classrooms, the professor's answer to one student's question can be heard by all students in the class; therefore, on the professor's side there is no need to answer the same questions twice, and on the students' side, there is no need to ask the same questions.

Interaction among participants is critical in learning and cognitive development. (Richardson & Swan, 2003). How can the instructor have productive interaction with the learners? The instructors, often times, have to answer the same questions more than once if email or Instant Messenger (IM) is used. At the beginning of the term, students were instructed to post any question, other than personal issues, in Q & A forums. If one student has a question, chances are that others may have the same question. Posting the professor's response to the first student's question in Q & A forum will allow other students in the class to see the question and the instructor's response. Thus much time can be saved for both the instructor and students, compared with using email or IM. Students were instructed to use email for communicating personal issues only. The following is a screen shot of Q&A forums instruction and the statistics of students' participation in a class of 19 students.

Fig. 4 Students are instructed to post questions in Q & A Forums



Every student in the class could see the instructors' answers. The author designed one Q & A Forum for each learning module so that students could easily find the specific questions and answers.

4. Given the higher faculty turnaround rate in online education, how can previous instructors' learned experiences be passed on to the next instructor to maintain the quality of the course?

There is a higher faculty turnaround rate in online education than in traditional education. The author learned that frequently asked questions (FAQ) are valuable assets. Based on questions asked in Q & A forums, instructors can build FAQ pools and organize the questions by topics, instead of by chapters, so that if there is a new edition of the textbook or the instructor decides to change the textbook, part of the pool may still be used. Treat the frequently asked questions as valuable assets that should be saved and passed on. With the FAQ organized by topics, not only future students do not need to go to Q& A forum as much, but the instructor can also save time in posting answers because there will be less questions, thus, they may afford to spend more time on activities such as creatively building online community.

Another good use of a FAQ is to list cases of academic dishonesty and explain why each one is considered as cheating. For example, copying something from Internet without listing the source is wrong. List cases in the FAQ, give clear definitions of cheating, and require students to read them at the beginning of the term. Each semester, accumulate different cases in FAQ. Again, organize FAQs by topics. Gradually, many assets will be accumulated. Passing the accumulated FAQs on to next semester helps the course instructors tremendously, especially new adjuncts.

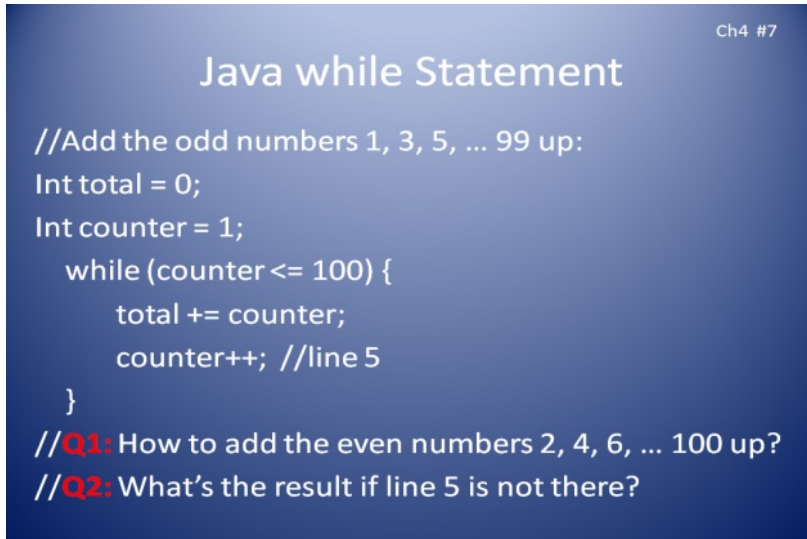
5. Is using more advanced technology always better for online education?

Not always. Not everyone is ready for the new technology. In a traditional classroom, students can interact closely with the professors. Technology is available for online learners to interact with the instructors to a certain degree. Many students still prefer learning from reading texts. Now, some textbook publishers offer web-based video instructions to go with the textbook, for example, Prentice Hall offers Cyber Classroom with their “Java How to Program” textbook. There is a code that comes with each textbook that gives access to a cyber classroom; in it, students can choose the chapter and topic to hear the explanation and watch the demonstration on programming. It’s like having a teacher in the front to explain any topic any time. Surprisingly, only 15% of the class chose to use the cyber classroom. Part of the reason is that some students are not ready for the technology. Although the publisher does provide technical services, but every computer has different configurations and some students are not willing to take the time to go through the trouble-shooting procedure that the publisher provides, some won’t even bother to install the software since it’s not required. Some just prefer reading the book at own pace rather than watching the video at the pace set by others.

Sidman & Jones (2007) did a case study regarding the impact of elected use of interactive skeletal PowerPoint slides on exam scores to combine technology with learning style theory and demonstrate a unique teaching and learning process. They reported that exam scores for the students who elected to use the interactive skeletal (partial) slides were significantly better in a higher-level (non-introductory) course than those students who did not use the interactive slides.

In addition to text explanations, charts, arrows, and bubbles in PowerPoint, embedding questions in the slides can make students think more. In traditional classes, students learn the concepts in classroom first before applying them to assignment, whereas some online students jump to assignment first, and then go back to find answers. To make sure online students learn concepts before attempting assignments, the author embedded questions in the Power Point slides. The embedded questions were designed in such a way that as long as the student read the slides or the books, they could figure out the answers. Have the same questions that were embedded in the Power Point file also listed as part of the homework assignment so that students may choose to either read the book or the Power Point first. The following figure shows questions embedded in the slide to engage students, like in a traditional classroom, students face questions asked by the teacher.

Fig. 5 Engaging Students in the PowerPoint with Embedded Questions



```
Ch4 #7

Java while Statement

//Add the odd numbers 1, 3, 5, ... 99 up:
Int total = 0;
Int counter = 1;
  while (counter <= 100) {
    total += counter;
    counter++; //line 5
  }
//Q1: How to add the even numbers 2, 4, 6, ... 100 up?
//Q2: What's the result if line 5 is not there?
```

Not every student is ready for newest technology. Technology such as interactive PowerPoint presentation can enhance learning, although some students still prefer reading the paper textbook.

CONCLUSION

Given various differences between traditional and online educations such as test monitoring and interaction opportunities, this paper addressed concerns caused by rapid growth of online education by answering five frequently questions about online education. Adopting the technology that the public is ready for and using it creatively can help bridge the gap between traditional and online educations.

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**BLENDED LEARNING IN ACADEMIA:
SUGGESTIONS FOR KEY STAKEHOLDERS**

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ABSTRACT

With the emergence of a new information society, blended learning is enjoying renewed interest. Within academia, faculty, students, and administrators each face their own issues with respect to blended learning. Based on our experiences, we offer suggestions for each of these key stakeholders.

INTRODUCTION

Within the popular press, blended learning is widely portrayed to be the most effective approach to education and training across very diverse organizational settings [12]. Indeed, researchers have reported the success of blended learning in such varied contexts as prison systems [3], firefighting organizations [1], and automotive manufacturers [5]. Undeniably, many organizations are experiencing lower costs, more flexible and consistent delivery, and more timely instruction as result of the blended approach [9]. And, indications are that the blended approach to learning will continue to increase in popularity within the foreseeable future [6].

Blended learning typically refers to the combination of e-learning (i.e., distance training using the Internet) with some other form of learning such as classroom instruction [6]. Yet, the concept of blending learning remains somewhat vague because the degree to which distance vs. classroom learning is incorporated within a course varies greatly. Some studies have concluded that about two virtual modules out of twelve is about right [7], while others have found success offering only 20 percent of a course in instructor-led classroom study [2]. In our own experience, we have observed that some instructors rely totally on on-line modules, while others conduct only one or two classes each semester using Internet-based tools.

Additionally, while blended learning is gaining popularity at many universities, not everyone should be expected to warmly embrace this approach to education. Research suggests that only about two-thirds of individuals prefer a blended learning approach [2]. However, as we evolve into more of an information society and we have more computer-savvy students entering our educational institutions, it is clear that technology will play a larger role. Educators who have relied on traditional classroom methodology for decades, and who may not feel comfortable with emerging technologies, will likely begin to notice they are not meeting student expectations in the classroom.

Universities are already experiencing increasing demands by both students and governing authorities to offer more flexible, on-line programs. However, it is critical that movement toward more blended learning be approached in a systematic, practical manner. Without proper training and planning, it is possible that a more stressful, impersonal learning environment may be created that significantly diminishes the learning experience for all involved.

Based on our experience with blended learning, this paper attempts to capture the unique perspectives of key stakeholders within academia. Specifically, we discuss issues of importance to students, faculty, and administrators.

A HISTORICAL PERSPECTIVE

The blended approach to learning is not new. With the development of video film over 80 years ago, the potential existed to integrate technology with in-class instruction [6]. However, the extent to which technologies such as videos, television, DVDs, and satellite feeds have replaced classroom instruction has been relatively insignificant. While these technologies have served as useful tools to supplement teaching, in-class instruction has remained the dominant means of delivering knowledge and skills in both academia and industry for the past century. Rosenberg [10] suggested that the inability of students to interact with these technologies may have contributed to their inability to replace traditional instruction. But, given the current popularity of blended learning, we must ask, “What has changed?”

Toffler [11] offers one perspective. He suggests that we are experiencing the evolution of a new society – an information society. Toffler argues that for over five centuries we lived in an industrial society. We trained our students to follow well thought-out, proven approaches to problem solving based on relatively static information. However, around 1992, the information society began to emerge. In this new age, technology such as global communications networks, nanotechnology, and robotics dramatically changed the way information was created, revised, and transmitted around the world [8].

In this information society, the World Wide Web and more user-friendly, interactive software has had a dramatic impact on education. Tools now exist that allow students to take an active role in the learning process. And, much of this technology is available at a relatively low cost. Indeed, the idea of blended learning is enjoying renewed interest in today’s information society. However, it is crucial that universities approach blended learning in a organized, rational manner. Given the popularity of blended learning, it is possible to overreact and create negative perceptions among key stakeholders. Based on our experiences, we offer suggestions to faculty, students, and administrators that we believe will make this transition more successful.

FACULTY PARTICIPATION

Reactions among faculty have been mixed with regard to blended learning. Faculty who work with changing technology on a regular basis (e.g. MIS faculty) and younger faculty appear to be much more receptive to incorporating technology into their courses. However, there are many faculty members who are approaching these changes with caution. And, this is understandable.

For faculty who have been in academia for 20 to 30 years, change does not always come easy. The thought of students not attending class in person, of exams being given on-line, and communication taking place in chat rooms seems inappropriate. Some faculty have even expressed a concern that, if they move into more blended learning, their student evaluations and merit increases will be negatively impacted. Showing patience and providing support is important with these faculty members.

At our institution, we have set a goal of having at least one section per year of our core courses on-line within the next two years. We are encouraging faculty who are not familiar with technology tools to slowly begin to introduce them into their courses. And, we are attempting to provide training opportunities, incentives, and support systems to facilitate these changes.

Provide Appropriate Training

Our first attempt to provide comprehensive training within the college of business was very much a learning experience. In our college, we have more than fifty faculty members. Sixteen agreed to participate in an eleven-week certification program designed to expose them to different aspects of blended learning in the classroom. In the end, more than half decided to withdraw after only a few weeks into program. In retrospect, there were several issues in the program that may have led to these rather disappointing results.

First, we found that our faculty were at very different levels in terms of their exposure to blended learning and the tools available to them. Some were interested in only a couple of the modules being offered. Yet they were “encouraged” to take the entire eleven-week course to make certain they had received comprehensive training and because each session would build on the previous week’s work. Thus, many simply chose not to participate because they felt that much of the program would be repetitive. Future training will likely be more effective if faculty can “pick and choose” the modules that they are interested in.

Second, the program was set up on a rigid schedule. The program was designed for modules to be opened up on Sunday night and to be taken off-line in one week. We quickly discovered that this schedule did not meet with the approval of faculty members. Some faculty commented that in some weeks they had sufficient time to complete several modules, but other weeks were so busy they simply did not have time to participate. Flexibility will be crucial if this program is to succeed in the future.

Third, each week assignments were expected to be completed and grades were assigned to participants. Some faculty observed that being “graded” seemed inappropriate for what should be a more professional experience. In fact, some found themselves completing “busy work” to make a certain grade rather than focusing on the aspects of the training that they were more interested in.

The Distance Education staff at our university who conducted the training are very knowledgeable, patient individuals. And, their efforts at putting together this program were very much appreciated by all involved. However, significant changes will likely need to be considered before the program is offered again.

Establish Effective Incentives

The issue of motivating faculty to established blended and on-line courses has been a hot topic. One colleague recently solicited comments from our business faculty on appropriate incentives and received considerable, but wide-spread, perspectives on the appropriate direction.

Some felt strongly that an incentive, such as a course release or additional travel funds, should be offered each time a traditional in-class course is converted. Others argued that we should reward faculty only when they initially complete formal training to acquire the necessary skills to introduce technology into the classroom. These individuals suggested that providing an incentive for every course is simply too much. Then, there was the feeling of a few individuals that moving toward blended learning is simply part of the job. They felt that it is no more demanding to create an in-class course from scratch than to put a class on-line that has already been taught by a faculty member. Couple these diverse options with those who have already created on-line courses, and feel that they should now be rewarded for their prior efforts, and you have a potentially precarious situation.

There are some real concerns about the unintended consequences of establishing an incentive system for blended or on-line course preparation. First, we do not want to discourage faculty from creating new, in-class courses. We frequently need to introduce these courses into our curriculum. And, based on the type of course, some are more suited to in-class delivery. If the “carrot” is only for blended or on-line courses, it may be difficult to get faculty interested in more traditional courses that are still needed. Second, there is a concern that some faculty will take advantage of these programs. For instance, one faculty member commented that he had comprehensive PowerPoint notes for each lecture and that he could quickly convert these to “pdf files” and post them on-line. He figured if he got a release for each course he converted, he could teach a reduced schedule for several years. Third, it is possible that too much emphasis and rewards for blended learning may motivate some faculty to reduce their efforts in research and service. Again, if individuals value the reward, they will aggressively pursue it, often at the expense of other responsibilities.

Even with these concerns, it is recognized that some incentive program is necessary to sufficiently motivate faculty, who may have spent many years teaching in the classroom, to change their delivery methods. Within our college, this issue is currently being reviewed by the Strategic Planning Committee. It is anticipated that a major incentive will be offered to individuals who gain the skills necessary to introduce technology into the classroom and then successfully implement it the first time. Then, we anticipate offering smaller incentives for subsequent course modifications.

Establish Internal Support Systems

At our university, we have a Distance Education staff that is charged with providing support for on-line learning. And, these individuals are very responsive and professional. However, we have found that having someone close by, who may be familiar with a particular discipline, can be a great source of help as well.

It is important to identify individuals within your department who have previous experience with blended learning and solicit their support. In our department, we are fortunate to have several individuals who have extensive experience integrating various technologies into their courses. We are also fortunate that these individuals are willing to give their time to help colleagues understand tools that are available and may be suited to their particular disciplines.

Within the past year, several sessions have been set-up to discuss tools such as Camtasia, Podcasts, and Wikis. In these small, informal settings, personal help is provided by experienced colleagues that our faculty respect and feel comfortable with. And, because individuals conducting these sessions are just down the hall, follow-up questions can be asked quickly.

STUDENT SUCCESS

Increasingly, students are arriving at universities more technologically-savvy than many faculty members. These students have grown up surfing the Internet, participating in chatrooms, and text messaging friends. They have a comfort level with technology and an eagerness to learn more. Many anticipate using technology in the classroom and are somewhat disappointed when this does not occur. And, they will continue to enter our universities with even greater expectations over the next decade.

One colleague recently observed that his seventh-grade son was actively using the same software that we were teaching our sophomores in college. And, he was correct. Many students are becoming proficient with many types of software at a much earlier age. Unfortunately, not all of our students have the same level of expertise. One neighboring institution found that only two percent of students arriving had the necessary skills to exempt their core Microsoft Windows/Office course.

Regardless of a student's knowledge of technology, we must remember that this does not always equate to success in blended learning environments. Specifically, we have found that it is important to provide students with appropriate on-line skills, to ensure that opportunities are available to meet with instructors, and to make alternative in-class opportunities available for students who feel more comfortable in this environment.

Preparation is Key

While our students are demonstrating higher comfort levels with technology, they are not necessarily prepared for the demands of blended (or on-line) learning. This assumption, however, is made by many key stakeholders. But, we must remember that most of these students come from high schools that used standardized methods of instruction, in a classroom setting, to prepare the students to function in an industrial society that was dominant for over 500 years. In fact, we have found that these students often do not possess the skill set that will lead to success in blended learning environments or in an information society.

At our institution, the introductory computer applications course is evolving to help students learn how to manage their time in self-paced courses, to set up their virtual classroom, to take a proactive role in problem-solving, and to use technology effectively. Each student in the college of business is required to take this course as a freshman or sophomore. Thus, we can reach these students early in the curriculum to help ensure that when they face blended learning in higher-level courses, they are prepared.

Face Time Remains Important

Often the pendulum swings too far in one direction before it finally finds its way back to the middle. We experienced this to some extent with one of our junior-level, core courses that used a blended approach. Initially, the course was about 50 percent in-class and 50 percent on-line. However, it gradually "progressed" to a completely on-line course for most of the sections offered each semester. In fact, because graduate students were assigned to lab sessions, there was only minimal contact between the instructor and the students.

While the job market was likely the primary factor in less students selecting the discipline associated with this core course as their major area of study, some faculty suggested that our less "personal" approach may have been a contributing factor as well. And, in fact, we see many of our undecided business students choose a major after exposure to the junior-level introductory courses in each discipline. Thus, while we all had the best of intentions, we may not have established sufficient opportunities for face-to-face interaction. And, the problem may get worse before it gets better.

Many faculty are now requesting that, since their courses are more on-line, their office hours be "on-line." We have started to experiment with allowing faculty to establish virtual office hours. However, skepticism remains about what will be lost when students have limited opportunities to interact on a personal level with faculty. In our own experience, former professors were instrumental in influencing our careers. Whether through classroom instruction, advising sessions, or office hours, it seems vital that we find ways to allow experienced faculty to serve as mentors.

Encourage Students To Find Their Comfort Level

As noted earlier, only two-thirds of individuals reported that they preferred the blended approach to learning [2]. It is likely that factors such as age, personality, marital status, family demands, and learning

preferences greatly impact one's interest in blended learning. For some individuals, the social aspects of being in a classroom are an important part of the college experience.

It is imperative that both students and universities understand that not everyone is going to be a good fit for courses that are predominantly on-line. While it is important to give students the tools they need to be successful in blended learning environments, it is likewise important to encourage students to find the level of blended learning that fits their own preferences.

While we are moving toward more blended learning at our university, we also plan to retain in-class sections for most of our core courses. We designate levels of blended learning in particular courses with key letters after the course section so that students have some idea of the extent to which classes will be on-line before they register. We also use advising sessions to discuss with students their experiences in previous courses and to advise them on appropriate classes for subsequent semesters.

ADMINISTRATIVE APPROACHES

Within our university system, the amount of blended learning has increased significantly. A recent report shows that the number of internet-based courses offered from 2000 to 2005 increased by 479% and that enrollments in eCore courses increased by 2166% [4]. Additionally, the WebMBA program (a joint effort by five universities) has more than doubled in just the past year. There is a demand for blended learning and university administrators are moving to make certain this demand is met.

In a recent State of the System address, the Chancellor of our system left little doubt that we will continue to aggressively integrate technology into the classroom. He noted that the Spellings Report had concluded that academia had not sufficiently invested in technology and that we could not continue to lag behind if we intended to serve our customers and communities.

There is pressure to respond. However, it is important that we not blindly pursue initiatives that may negatively impact the quality of instruction. Based on our experiences with blended learning we believe that administrators should ensure appropriate virtual classroom sizes, find receptive audiences for initial offerings, and focus on recruiting as a way to enhance blended learning.

Virtual Classes Have Limits

About six years ago, one of our introductory courses was converted to a blended course, with most of the course being self-paced and on-line. Enrollments soon grew from about 45-50 students to over 80 students per section. With in-class sections, the number of desks often act to cap these classes. However, in virtual classrooms, there are no limits. It is important that administrators, some of which have no experience with blended learning, understand that the requirements for students and faculty do not decrease with blended learning.

In the face of increasing enrollments and a decrease in faculty (both because of a tight labor market and decreasing budgets for new faculty lines), it is important that administration not view blended learning as a mechanism to increase class sizes. It is possible to free up classroom resources through blended learning. However, there is a real danger of lowering the quality of instruction if class sizes are allowed to grow unimpeded.

Administrators are not only under pressure to increase blended learning, they are also experiencing significant budget cuts and increasing student enrollments. At first glance, the idea of using virtual classrooms to increase class size does appear to solve these issues. However, this may be a risky proposition. As administrators become more involved in blended learning, we are seeing more realistic

expectations. For instance, at our university, over the past several years, the introductory course that once had over 80 students is now back to more manageable levels.

Find a Receptive Audience

Many administrators will be surprised at the extent to which blended learning is already occurring. In certain disciplines, technology is an integral part of the curriculum and instructors have been incorporating it into courses for years. It is with this faculty group that administrators will likely find the most receptive audience. These faculty can serve as champions to promote blended learning, as resources to organize training efforts, and as a great source of expertise.

Within our college, we have two primary disciplines that are experienced with blended learning and proficient with a number of technology tools. And, they have been generous with using their knowledge and skills to help others. It is important that administrators recognize and reward this valuable service.

Recruit Faculty With Blended Learning Skills

We have found that some faculty are simply not interested in blended learning. Despite efforts and incentives designed to encourage the use of more technology, some faculty simply choose to stick to same approaches they have used in the classroom for years. It is unclear exactly what administrators can do with tenured faculty who strongly protest blended learning and who may even use academic freedom as a basis for retaining their in-class methodology. It is, however, very apparent the direction that can be taken in the future.

As part of all job announcements, we now specify that on-line learning experience is desired. And, we actively discuss one's interest in blended learning during their job interview. It is likely that faculty members on the job market will begin realize the competitive advantage that having blended learning experience gives them and continue to hone their skills. It is hoped that faculty reluctant to use technology will begin to see the changes occurring around them and take a more active role in understanding the advantages that can be gained through blended learning.

CONCLUSION

The emergence of the World Wide Web over the past decade has created many opportunities to integrate technology into the traditional classroom environment. And, while a more blended approach has the potential to significantly enhance the learning experience, it is important to understand the perspectives and challenges of all key stakeholders.

Institutions and faculty who have traditionally trained students in a classroom setting to be successful in a largely industrial society must now adjust to more technology-savvy students who will be competing for jobs in a more information-oriented environment. For some stakeholders, this transition will be daunting. However, it is likely that where universities use a systematic approach and devote sufficient resources to blended learning, both students and faculty can be successful.

Blended learning holds the potential to allow educational institutions to prepare students to be effective in an evolving society where information can quickly be obsolete. Using web-based applications, along with appropriate classroom instruction, students can be trained how to efficiently access and process the latest information when making decisions. And, there is increasing evidence that this skill set will be essential to success in the job market. As one author suggests, "The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn [11]. Undoubtedly, blended learning will be a key approach in preparing our students to meet the demands of the 21st century.

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Want a Win, Win, Win? Try Management Internships.

Abstract

Studies have researched the benefits student internships offer students and employers, but limited research, has looked at the benefits internships might lend to educational institutions. Typical research examines student performance after the internship experience and employer satisfaction from internship outcomes. This research looked for evidence that educational institutions benefit. These benefits are financial, academic, community service and economic development. A survey instrument was developed and sent to 619 deans of all U.S. business programs. They were asked to forward the survey to the person with the most knowledge about their institution's internship programs. Twenty Nine percent replied.

Introduction

In 1906 the University of Cincinnati started offering the a program that is the ancestor of today's internships. Now, 91% of colleges of business offer some form of management internship opportunity for their students. Only 17% require participation.

Internships have various definitions, but generally, an intern is someone working in a temporary position with an emphasis on education rather than employment. Other similar programs include: apprenticeship, cooperative education, externships, practicum's, etc. For simplicity, the term internship will be used.

Literature Review

There exists a scarcity of recent research in the area of business internships. Only ten pages were published in academic business outlets in 2007, and 4 of those, are photographs. 2006 was not much better.

A Journal of Marketing Education written in April, 2000 by Gault, Redington, and Schlager is the most recent reported research in business publications. The business research report three groups benefit from internships: students, employers and educational institutions. Student and employer benefits have research measures and statistically analysis, but University benefits are offered anecdotally.

Student benefits include:

- higher starting salaries (Gault, et. al, 2008, Malcolm, 2000, & Taylor, 1988)

- higher job satisfaction (Gault, et. al, 2008, Devine, et. al, 2007& Taylor, 1988)
- sooner job offers (Gault, et. al, 2008, Taylor, 1988, & Thiel and Hartley, 1997)
- more job offers (Devine, et. al, 2007, Malcolm, 2000)
- higher extrinsic success (Gault, et. al, 2008, & Taylor, 1988)
- develop communication skills (Knemeyer and Murphy, 2002)
- better career preparation (Gault, et. al, 2008)
- improve job-related skills (Devine, et. al, 2007, Knemeyer and Murphy, 2002)
- improved creative thinking (Gault, et. al, 2008)
- better job interviewing skills (Gault, et. al, 2008)
- better job networking (Gault, et. al, 2008)
- stronger resume (Devine, et. al, 2007, Malcolm, 2000)
- earn money (Knemeyer and Murphy, 2002)
- earn academic credit (Knemeyer and Murphy, 2002)

Employer benefits are:

- first choice of best students (Gault, et. al, 2008, Malcolm, 2000 & Thiel and Hartley, 1997)
- best selection of future employees (Devine, et. al, 2007, Malcolm, 2000, & Hall, et. al, 1995)
- better hiring decisions (NACE, 2005, Knemeyer and Murphy, 2002, Malcolm, 2000, & Thiel and Hartley, 1997)
- new ideas (Knemeyer and Murphy, 2002, Thiel and Hartley, 1997)
- networked to college (Thiel and Hartley, 1997)
- fulfilling social responsibilities (Thiel and Hartley, 1997)
- part-time help (Devine, et. al, 2007, Knemeyer and Murphy, 2002, & Malcolm, 2000)

Suggested University benefits:

- improved reputation (Devine, et. al, 2007, Thiel and Hartley, 1997)
- improved student recruiting (Devine, et. al, 2007)
- smarter students (Gault, et. al, 2008 & Thiel and Hartley, 1997)
- new scholarships
- other forms of funding (Gault, et. al, 2008 & Thiel and Hartley, 1997)
- networking to the local community (Gault, et. al, 2008 Devine, et. al, 2007, & Thiel and Hartley, 1997)
- external curriculum assessment (Devine, et. al, 2007, Thiel and Hartley, 1997)
- practitioner input (Thiel and Hartley, 1997)

Research Questions

This research focuses on expanding our understanding of how management internships benefit educational institutions in six basic areas: teaching, research, service, economic development, financial support and the general areas of recruiting and reputation.

Teaching Benefits

Teaching is the primary mission for higher educational institutions. Previous research has shown, internships do benefit student learning, but are there other benefits to the institution and what are they?

- Do faculty's general knowledge or experience increased?
- Are classroom discussions richer because of student's experiences as interns?

Research Benefits

A second primary mission for most higher educational institutions is the expansion of human knowledge. In what ways do internships assist or support research?

- Are faculty invited to do research at organizations that have or had interns?
- Do interns bring research ideas or suggestions to faculty?
- Do faculty intern advisors find research opportunities at the organizations with interns?

Service Benefits

Generally, the third mission for higher educational institutions is service to the university and community. How do internships impact on service activities?

- Are faculty members providing service to organizations with interns?
- How is that service performed?
- Does the institution feel a greater connection to the community because of the internships?

Economic Development Benefits

The new mission of economic development is becoming increasingly important as institutions of higher education are looked to in order to take a leading role in this important, but often difficult activity.

- Do internships inspire more students to open new businesses?
- Do internship increase the number of students hired by new or small business?

- Do these placement lead to increased economic development?

Financial Benefits

Since finances are becoming increasingly important in public institutions as state funding is reduced, most educational institutions are looking for outside financial assistance.

- Do internships increase the private financial support received?
- Do scholarships increase?
- Are grants or other research funds made available?
- Are chairs endowed?

Recruiting and Reputation Impact

Enrollments are becoming a major concern at many universities.

- Are more students enrolling in colleges and universities with internship programs, than colleges and universities without such programs?
- Is recruiting of faculty or staff easier because of an internship programs?
- Is an institution's reputation affected by its internship programs?
- Are graduates from colleges and universities with internship programs hired sooner, at higher salaries, by better organizations, into better positions?
- Each of these hypothesis's are stated in the positive as suggested in prior research, benefits in all areas are expected to be found.

Analysis and Discussion

Sampling

There are 653 U. S. schools of business in the AACSB directory of schools of business, but 30 did not list email addresses. This reduced the sample to 623 schools. Nine of these email address were invalid, leaving the used sample of 619.

On March 12 and 26, 2008 these Deans were e-mailed a message requesting their school participation in the on-line survey. The email requested the message be forward to the person most knowledgeable about the benefits your school of business receives by offering internship programs. A total of 180 useable responses were received or a 29% response rate.

42.7% of the respondents were Deans or Associate Deans, 23.8% held the rank of Professor through Instructor, and 33.5% were other.

18.3% had less than 6 years of higher education experience, 15.4% had 6 to 10 years experience and 66.3% had more than 10 years experience.

40% had been at their current institution for less than 6 years, 20% 6 to 10 years and 40% 10 years or long.

Institutional demographic information can be categorized as follows:

- Most responses came from the Southeast 30.4% followed by the Mid East 14% and the center of the country Great Lakes and Plains 12.9% and 10.5%.
- Ninety-eight percent Most responses came from public and private 4 year or above institutions.
- 31.6% were doctoral institutions, 54.9% were master level institutions, 9.9% offer baccalaureate degrees and 8.8% offer other degree programs.
- 30.4% were in or near large cities, 46.7% were in or near mid-size cities and 12.9% were in small towns or rural settings.

Questionnaire

A questionnaire consisting of 45 questions was developed and placed on-line using active server pages. Sixteen questions used a Likert type scale to measure responses. On these questions, respondents replied on a 0 to 5 scale, where 0 is never, 1 is rarely, 2 is sometimes, 3 is usually, 4 is most times and 5 is always. N/K is no knowledge. Six questions were open ended and five ask for an estimation of the ratio between internships and benefits.

Results

Ninety-five percent of the institutions responding to the survey offer some form of internships. Table 1 shows the frequency and percentage of internships broken down for management majors.

Table 1 – Internship Requirements for Management Majors

Major	Major Required		Major Elective		Free Elective		Not Available	
Management	28	17.0%	70	42.4%	20	21.8%	31	18.8%

From table 1 it is clear that very few business schools, around 17% require all management majors to complete an internship to graduate. About 42% offer them as major electives and around 22% offer them as free electives.

Research Questions

The results to the research questions will be reported in the final version of the paper in a format like the following:

Teaching Benefits

Teaching is the primary mission for higher educational institutions. Previous research has shown, internships do benefit student learning, but are there other benefits to the institution and what are they?

- Do faculty's general knowledge or experience increased? __% **yes**, __%**no**
- Are classroom discussions richer because of student's experiences as interns?

Research Benefits

A second primary mission for most higher educational institutions is the expansion of human knowledge. In what ways do internships assist or support research?

- Are faculty invited to do research at organizations that have or had interns?
- Do interns bring research ideas or suggestions to faculty?
- Do faculty intern advisors find research opportunities at the organizations with interns?

Service Benefits

Generally, the third mission for higher educational institutions is service to the university and community. How do internships impact on service activities?

- Are faculty members providing service to organizations with interns?
- How is that service performed?
- Does the institution feel a greater connection to the community because of the internships?

Economic Development Benefits

The new mission of economic development is becoming increasingly important as institutions of higher education are looked to in order to take a leading role in this important, but often difficult activity.

- Do internships inspire more students to open new businesses?

- Do internship increase the number of students hired by new or small business?
- Do these placement lead to increased economic development?

Financial Benefits

Since finances are becoming increasingly important in public institutions as state funding is reduced, most educational institutions are looking for outside financial assistance.

- Do internships increase the private financial support received?
- Do scholarships increase?
- Are grants or other research funds made available?
- Are chairs endowed?

Recruiting and Reputation Impact

Enrollments are becoming a major concern at many universities.

- Are more students enrolling in colleges and universities with internship programs, than colleges and universities without such programs?
- Is recruiting of faculty or staff easier because of an internship programs?
- Is an institution's reputation affected by its internship programs?
- Are graduates from colleges and universities with internship programs hired sooner, at higher salaries, by better organizations, into better positions?
- Each of these hypothesis's are stated in the positive as suggested in prior research, benefits in all areas are expected to be found.

Conclusions and Suggestions for Further Research

Internships are underappreciated for the role they play in Business Schools. While 91% of the institutions offer some form of management internship, it seems only a small percentage are cultivating the rewards that could be available to them. Internships are a source of additional students in these times of shrinking enrollments. They enhance the school reputation. They can be a channel for much need funds for research. Internships can provide faculty with new business experience through service and consulting opportunities.

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EVOLUTION OF THE UNDERGRADUATE MANAGEMENT SCIENCE COURSE

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ABSTRACT

In 2003, AACSB International approved a new set of standards for accreditation of business programs that include a requirement for coverage of statistical data analysis and management science. We discuss trends for OR/MS in undergraduate business curricula since the standards revision, including student and faculty perception of its relevance and increased use of Excel-based tools in other business disciplines.

Background

The Management Science (MS) course has seen a decline in popularity in business schools across the nation. In some cases, it was eliminated from the undergraduate business curriculum after AACSB dropped it as a required course in 1991 [3]. In an attempt to stave off extinction, MS professors incorporated Excel-based solution and analysis into their courses and reduced coverage of mathematical techniques such as the simplex method. This seemed to be a natural extension since Excel is widely used throughout the business world for processing quantitative data and developing analytical solutions. Fortunately, incorporation of spreadsheets into MS increased both the relevance and the popularity of the introductory MS course in business core curricula (see references in [2]).

When we first started using Excel in the undergraduate quantitative analysis course at our institution in the mid-1990s, it was the only course where business students were exposed to spreadsheets and learned basic spreadsheet modeling skills. Since then our business statistics courses has adopted Excel but coverage is restricted primarily to descriptive statistics, chart constructions, and probability calculations. Upstream faculty in finance, economics, and accounting has come to rely on these Excel skills in their students. Over the years, we have routinely heard back from students who used these skills in a variety of class projects and summer internships.

In April of 2003, the AACSB approved a new set of standards for accreditation of business programs. While there are no requirements in the current guidelines for any specific courses in the business core curriculum, “statistical data analysis and management science” was added to the required list of management-specific knowledge and skills areas [1]. This presented MS with a second opportunity to demonstrate its value and impact on organizational decision-making.

Current situation

In the last couple of years, we have noticed an increase of “pockets” of Excel-based analysis in a variety of lower-level business courses such as introductory accounting. In some respects, we are no longer viewed as the primary course where students learn spreadsheet skills. This is despite the fact that we teach a variety of Excel-based tools such as data tables, Solver, random-number generation, and regression. It appears that somewhere along the way we slid back to being the “quant” class again with some question as to whether we are relevant!

Our response is two-pronged: educate faculty from other business disciplines about the undergraduate MS course (and why it should continue to be required of all business majors) and evolve the course naturally

so that we are once again the course where students are learning essential spreadsheet and analytical skills not necessarily taught elsewhere (but used by other business disciplines).

One of our tasks is to update the language describing the learning objectives for the course. It was written in a form that is useful (and understandable) for the faculty teaching the course, detailing specific MS techniques and concepts as well as defining the scope of coverage. We are taking a meta-perspective of the course and restructuring the objectives into two levels – a set of broad objectives in business-friendly language and a second in-depth set of details in terms of topics covered. We have observed the increased popularity of “business analytics” in recent years and our investigation of this subject area has revealed a significant overlap with topics in our MS course. This has contributed to our acknowledgment of the need to frame the learning objectives for the MS course in terms of the business problems being addressed.

Our second task is to investigate where and how exactly the modeling skills taught in the MS course are used in upper-level business courses. It has been about seven years since we originally did this and, at that time, we asked the faculty in the College of Business for their “wish list”. Needless to say, the list was long and it would have taken 2 semester-long courses to accommodate everyone’s requests. In addition, there seems to have been a miscommunication in that we expected upper-level faculty would use the skill level the students received from our class and build on it while, in many cases, the faculty expected a higher-than-realistic skill set from a sophomore-level course. Compounding that was the fact there was potentially several semesters lag between our MS course and subsequent courses where the skills are utilized.

In our presentation, we will report on progress-to-date for these two tasks and discuss general trends for MS in undergraduate business curricula.

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AN INQUIRY-BASED APPROACH FOR TEACHING STUDENTS TO FORMULATE LINEAR PROGRAMMING MODELS

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ABSTRACT

Linear programming (LP) is a standard topic in management science and operations management courses. This paper presents a simple, inquiry-based approach to teaching formulation of linear programming models. The inquiry-based activity is based on a simple LP problem, requires students to use critical thinking skills, and can be used as a foundation for teaching the formulation of more complex LP models. This activity is an important component of an instructional package that has enabled most students to formulate simple LP models.

INTRODUCTION

Linear programming (LP) is a standard topic in management science and operations management courses. In most operations management textbooks, the discussion of LP begins with a definition of optimization and a summary of the uses of LP. Then the concepts of decision variables, objective function, and constraints are introduced. Next, a two-variable LP problem is introduced, set up in standard format, and solved using the graphical method. Finally, at least one other solution method, such as the simplex method or Excel/Excel Solver, is demonstrated.

In the author's experience, this approach often works well for students with strong mathematics skills. However, this method is less effective for students who struggle with math. The major contribution of this paper is to present an inquiry-based approach to teaching LP model formulation. The inquiry-based approach seems to help struggling students learn the topic and gives all students an opportunity to practice critical thinking skills. This approach has been used for the past four semesters. Classroom experience will be discussed. Both theory and assessment data will be used to evaluate the inquiry-based activity. Plans for improving both the activity and student performance will be discussed.

REVIEW OF LITERATURE

One objective of inquiry-based learning is to help students develop critical thinking skills. Bloom's taxonomy, which is often used to classify critical thinking skills, will be presented first. Then inquiry-based learning and its benefits will be described. Finally, literature related to the design of the inquiry-based LP activity will be discussed.

Bloom's Taxonomy

For more than fifty years, educational researchers have recognized that there are different levels of cognitive reasoning. Bloom's taxonomy [3] identified six types of cognitive reasoning: knowledge, comprehension, application, analysis, synthesis, and evaluation. Analysis, synthesis, and evaluation were generally considered to be critical thinking skills.

Anderson and Krathwohl [1] revised Bloom's taxonomy to be more consistent with recent learning research. The six categories in the new taxonomy are described below [1, p. 31].

- *Remembering* is the retrieval of knowledge from long-term memory. Remembering includes recognizing and recalling information.
- *Understanding* occurs when meaning is constructed from oral, written, or graphic information. Examples of understanding include interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining in one's own words.
- *Application* means carrying out a procedure, such as a computational procedure or a set of work instructions.
- *Analysis* involves breaking information into parts and determining how they relate to each other or to some structure or purpose. Examples of analysis include distinguishing between relevant and irrelevant information, organizing information, and determining an author's point of view.
- *Evaluation* is the process of making judgments, based on criteria or standards. This includes both the application of standards and the determination of which standards are appropriate.
- *Creating* is the process of putting elements together to form a coherent or functional whole, or reorganizing elements into a new pattern. Creating involves generating, planning, or producing something; examples include generating a hypothesis about the cause of a quality problem, planning a project, and developing a new human resources manual.

The first four categories in the revised taxonomy are roughly equivalent to the first four categories in the original Bloom [3] taxonomy. The new taxonomy defines *evaluation* more narrowly; evaluation is now the fifth category, rather than the sixth. *Creating*, which is now the sixth category, is similar to the old *synthesis* category. In the revised taxonomy, critical thinking includes analysis, evaluation, and creating.

Inquiry-Based Learning and Its Benefits

Inquiry-based learning is a teaching method that presents students with a real-world challenge, such as a problem to be solved or a business case to be analyzed [12]. Real-world tasks are used because they have a greater ability to motivate students [12]; Oliver [10] found that students dislike tasks that they consider irrelevant. The information needed to meet the inquiry-based challenge has not been explicitly covered in previous class sessions or earlier course work. However, the learning activity is designed so that students can extend their existing knowledge and skills to meet the requirements of the activity. The scope of inquiry-based activities may range from a single class session or a brief assignment, to a project that lasts throughout the semester. Some activities are designed to be completed by individuals, while others require a team effort.

Audet [2] states that some course activities do not qualify as inquiry-based learning:

What distinguishes inquiry from other classroom activities is the attempt to draw meaning out of experience. Without driving, answerable questions and an emphasis on sense making, no classroom experience has a true connection with the process of inquiry [2, p.7].

DeBoer [7] noted that inquiry-based learning requires students to use inductive reasoning, which involves drawing general conclusions from particular instances or situations; consequently, inquiry-based learning is also called inductive learning [12].

Many business faculty are already familiar with some inquiry-based activities, such as case teaching, problem-based learning, project-based learning, and field experience courses. A case problem is also an

inquiry-based activity if it requires "sense-making" activities, such as analysis, recommendations, or developing a new problem-solving strategy. Some case problems only require students to apply a specific or obvious problem-solving strategy that has already been taught; those problems can provide a useful learning experience, but they do not meet Audet's definition of an inquiry-based activity.

Prince and Felder [11, 12] have reviewed a significant body of research that documents the benefits of inquiry-based learning. A number of research studies have found that inquiry-based learning improves students' skills in critical thinking and problem solving [11, 12]. Other benefits depend on the subject matter, the nature of the inquiry-based task, and the extent to which the activity challenges students [11, 12]. The research studies reviewed by Prince and Felder [11, 12] are generally based on an activity, or a sequence of activities, that are done throughout a semester. The benefits of a single inquiry-based activity, as described in this paper, are probably much smaller.

Designing an Inquiry-Based Activity

Researchers have also provided advice about designing inquiry-based activities. Lundeberg and Yadev [9] found that tasks which require high levels of knowledge and critical thinking have the greatest impact on student learning. Colburn [6] suggested that tasks should be challenging but not so difficult that most students cannot do them. Oliver [10] found that students dislike tasks with unclear instructions; this raises the issue of how much structure the faculty member should provide to students. Instructions with too little detail may leave students floundering, but instructions that are too specific may eliminate the need for students to think critically about the assignment. The teacher must also decide what assistance should be available to students as they do the task, and whether that help should come from peers, the teacher, or both. Here again, the goal is to maximize student learning without leaving some students behind [15].

The inquiry-based exercise presented in this paper is based on two techniques taught by Harvey Brightman [5]. The first is a set of principles for presenting a topic in a way that is clear and understandable to students; Brightman calls these the "Big 5". The "Big 5" were developed in response to research by Feldman [8], who found that presentation clarity is one of the most important factors in student learning. The "Big 5" principles are listed below:

1. Why before what: Help students understand why a topic is important before teaching the topic. Remember that the students' "why" may be different from the teacher's "why".
2. Simple to complex: Start with simple ideas, and move toward more complex ideas.
3. Familiar to unfamiliar: Begin with everyday principles or ideas, and move toward new concepts or unfamiliar words.
4. Concrete to abstract: Start by analyzing a situation, dataset, or question. Use the analysis to introduce definitions, concepts, theory, and formulas.
5. Multiple languages: Translate between words, diagrams, and symbols.

The "why before what" principle is a reminder to motivate students by making the material seem important and relevant; this is consistent with the research of Prince and Felder [12] and Oliver [10], which was mentioned earlier. Brightman's [5] technique for implementing the "why before what" principle will be described in the next paragraph. The second, third, and fourth principles are designed to make the presentation clear and understandable, while also presenting complex material. The "concrete to abstract" principle is consistent with inquiry-based learning. Both are based on beginning with a specific example, reasoning inductively, and drawing conclusions. The last principle, multiple languages, recognizes that communicating in words, diagrams, and symbols will make the presentation clear to a larger number of students.

The second Brightman [5] technique that is used in this paper is called a "hook". A hook is an activity that is designed to serve two purposes: (1) to make the topic seem relevant to students, and (2) to serve as a "spine", or organizing device, for the presentation of the topic. The hook can be an exercise, a short quiz, a small case, or a demonstration [4]. Some hooks, like the one presented in this paper, also provide opportunities for students to engage in problem solving and use critical thinking skills. Those hooks are simple inquiry-based activities.

AN INQUIRY-BASED ACTIVITY FOR FORMULATING LP MODELS

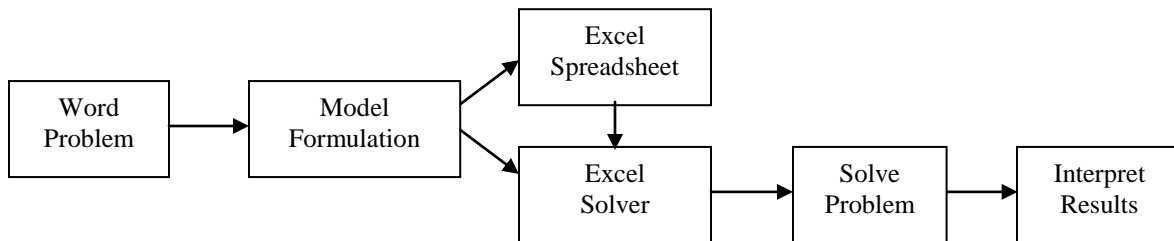
The teaching challenge that prompted the development of the inquiry-based activity will be discussed first. Then the hook will be presented. Finally, a teaching strategy for using the hook will be described.

Analyzing the Teaching Challenge

The author regularly teaches an undergraduate core course in operations management, which all business students must take in their junior or senior year. Since no management science course is offered, linear programming and several other management science topics are taught in the operations management course. Typically, two 75-minute class periods are allocated to linear programming. The objective of linear programming coverage is to teach students to formulate LP problems in standard form, solve them in Excel and Excel Solver, and interpret the results. Since time is so limited, manual methods of solving LP problems are no longer taught.

The process for solving an LP problem is shown in Figure 1. The word problem must be translated into a standard algebraic formulation. Some information from the model formulation is used to set up a spreadsheet, while other information is entered directly into Solver. If all those steps have been done correctly, the problem can be solved quickly. The last step is to interpret the results. The remainder of this paper will focus on the first step: translating the word problem into a standard algebraic formulation

FIGURE 1: PROCESS FOR SOLVING AN LP PROBLEM



Brightman's Big 5 principles [5] were used to analyze the way that LP model formulation had been taught in the past.

- Why before what: Several uses of LP were discussed near the beginning of the first class on LP, but students seldom remembered this information when they were tested on it. This was a case of the teacher's "why", not the students' "why".
- Simple to complex, familiar to unfamiliar, and concrete to abstract: After the uses of LP were discussed, decision variables, objective function, and constraints were introduced. These abstract, unfamiliar concepts were presented before a concrete example was introduced.

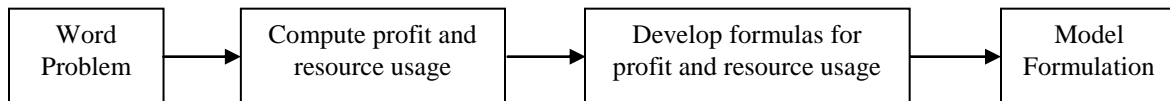
- Multiple languages: Words were translated into algebraic symbols, but some students had difficulty making this translation, and some never mastered the translation.

On the basis of this analysis, a decision was made to test the use of a hook and the "Big 5" principles to teach linear programming. LP was an ideal test case for these methods. It is an important topic in operations management, and it is a difficult topic for many students. Finding a problem to use as a hook would be easy. Business students understand the importance of maximizing profit and minimizing costs; there are a multitude of LP problems that require students to do one of those two things.

The Hook

The inquiry-based learning activity for LP was based on the principle of going from a concrete situation to abstract concepts. The underlying hypothesis was that many students understand calculations better than they understand algebraic functions and constraints. Students who had trouble setting up objective functions and constraints might be able to compute profit and resource usage for a specific combination of bowls and mugs. After they had practiced with those calculations, the model formulation could be taught more easily. The process is shown in Figure 2.

FIGURE 2: THE TRANSLATION PROCESS FOR THE HOOK



The plan was to have students attempt to solve a two-variable product mix problem by trial and error. Students would be instructed to try various combinations of the two products, checking each time to see whether the constraints were met. They would be asked to make the profit as large as possible, without violating any constraints. No formulas would be given for profit or resource usage; students would have to figure out how to compute those quantities. To assist weak students, students would do the exercise in pairs. It was expected that working in pairs would also help students develop better strategies for finding the optimal solution.

The problem below was selected as the basis for the hook:

A craft shop makes and sells pottery bowls and mugs. The shop makes a profit of \$40 per bowl and \$50 per mug. A bowl requires 1 hour of labor and 4 pounds of clay. A mug requires 2 hours of labor and 3 pounds of clay. 40 labor hours are available each day. The shop can obtain only 120 pounds of clay per day. Find the maximum profit per day, and determine how much of each product should be made. (Adapted from [14], pp. 217-218)

Students were given a sheet with the following information: the problem, a table for recording data, and instructions for the activity. Figure 3 is a shortened version of the data table; the table used in class has more rows. The row of calculations is intended to show students what to do; it also gives them a way to check their computational methods before proceeding with the exercise. The instructions are shown in Figure 4.

The problem, instructions, and data table are distributed on one sheet of paper. Students are given 15 to 20 minutes to complete the exercise.

FIGURE 3: DATA TABLE FOR LP LEARNING ACTIVITY

Number of bowls	Number of mugs	Profit	Hours of Labor Used	Labor \leq 40	Pounds of Clay Used	Clay \leq 120
4	6	\$460	16	Yes	34	Yes

FIGURE 4: INSTRUCTIONS FOR LP LEARNING ACTIVITY

Work with a partner on this exercise.

Procedure:

(a) Select a combination of bowls and mugs to make. Enter the number of bowls and mugs in the table. Complete the information in the rest of the row. Both you and your partner should complete the information and compare your answers.

(b) Repeat step (a), with different combinations of bowls and mugs until time is called. Try to get as high a profit as you can.

Using the Hook

This lecture begins with a short discussion of optimization and what is meant by an optimal solution. Students are told that we will study an optimization method called linear programming and that we will begin with a short exercise. When the exercise is distributed, the teacher briefly discusses the instructions and answers any questions about them. During the next few minutes, the teacher's coaching is usually limited to clarifying the instructions. The few students who have trouble with the computations usually get help from their partners; if necessary, the teacher also helps struggling students. About halfway through the exercise, some students begin asking advice on solution strategy or inquiring whether they have the optimal solution. If a student pair asks for advice or has not found the optimal solution, they will be encouraged to try another problem-solving strategy. If the optimal solution has been found, this will be confirmed; the students will be asked not to share their solution, so that other students can discover it on their own.

The first two times this exercise was used, almost all coaching was requested by students. With that procedure, five to ten percent of the student pairs in each class found the optimal solution. Then the teacher began approaching students who were not asking for help and asking to see their work. Students were given feedback on whether they had found the optimal solution, were getting close, or could still do much better. When all student pairs received feedback, forty to fifty percent of the pairs in each class found the optimum. This teacher-initiated coaching also increased the time needed for the exercise from 15 minutes to about 20 minutes. Without teacher-initiated coaching, some students apparently stopped work when they had achieved a significant improvement over the initial example given in the data table or when a particular solution strategy had reached its limits.

While students are working on the exercise, the teacher divides the chalkboard into four vertical sections. The first three are labeled profit, labor, and clay; the fourth section is not labeled. When the students have worked about 20 minutes, the teacher calls time and begins a dialogue with the students about their results. Most of the information required for the model formulation will be developed during this dialogue. At each step, information provided by the students is listed on the chalkboard. The four sections of the chalkboard are filled one row at a time, from left to right. The steps in the dialogue are listed below; the filled-in chalkboard is depicted in Figure 5.

1. Call on a student to give the optimal solution and explain the profit calculation.
2. Call on two other students to give the calculations for labor used and clay used.
3. Set up two variables to represent the amount of each product to make. Ask the student pairs to develop a formula for profit. Call on a student to give the answer. Explain the answer for the benefit of those who did not get it.
4. Ask the student pairs to develop formulas for resource usage. Call on students to give those formulas.
5. Write the right-hand sides of the constraints on the chalkboard, next to the formulas for resource usage. Ask the students whether the signs between the formulas and the right-hand sides should be \leq or \geq . Write the signs on the board.
6. Introduce the terms decision variables, objective function, and constraints. Write them on the chalkboard as shown in Figure 5.

FIGURE 5: FILLED-IN CHALKBOARD FOR THE LP MODEL EXERCISE

Profit	Labor	Clay	
Optimal solution: 24 bowls, 8 mugs			
$24(\$40) + 8(\$50) = \$1,360$	$1(24) + 2(8) = 40$ hrs.	$4(24) + 3(8) = 120$ lbs.	Let x = number of bowls to make Let y = number of mugs to make
$40x + 50y$	$x + 2y \leq 40$	$4x + 3y \leq 120$	
Objective function	Labor constraint	Clay constraint	Decision variables

At this point, most of the model formulation has been developed; only the non-negativity constraints are lacking. It is now time to summarize what has been done, and introduce the standard model formulation. Here are the steps:

7. In a convenient spot on the chalkboard, note that every linear programming problem has three elements.
8. Write the model formulation, except for the non-negativity constraints, on the chalkboard.
9. Explain why the non-negativity constraints are needed, and help the students develop them. Add them to the model.

The final chalkboard is shown in Figure 6.

FIGURE 6: FINAL CHALKBOARD FOR LP MODEL EXERCISE

Profit	Labor	Clay	Model formulation in standard form
Optimal solution: 24 bowls, 8 mugs			Decision variables Let x = number of bowls to make Let y = number of mugs to make
$24(\$40) + 8(\$50) = \$1,360$	$1(24) + 2(8) = 40$ hrs.	$4(24) + 3(8) = 120$ lbs.	Objective function $40x + 50y$
$40x + 50y$	$x + 2y \leq 40$	$4x + 3y \leq 120$	Constraints Labor: $x + 2y \leq 40$ Clay: $4x + 3y \leq 120$ Non-negativity: $x \geq 0$ $y \geq 0$
Objective function	Labor constraint	Clay constraint	

It is now time to summarize what has been done and explain what still needs to be done.

10. Draw the diagram in Figure 2 on the chalkboard, or display it in PowerPoint. Use the diagram to summarize what the class has done.
11. Draw the diagram in Figure 1 on the chalkboard, or display it in PowerPoint. Use the diagram to explain what still needs to be done.

The exercise and steps 1-11 can be done in about 50 minutes. After these activities, the author distributes notes on linear programming. The notes present linear programming in a traditional way, explain how to solve LP problems using Excel and Excel Solver, and discuss the formulation of more complex LP problems. The notes are necessary because the textbook used in this course [13] does not include LP coverage. Information that was previously skipped, such as the uses of LP, is now discussed. An induction approach is used to help students develop Excel formulas for profit and resource usage. The remainder of the LP coverage is handled in a traditional way.

Before a test is given, students have several opportunities to reinforce what they learned in class. First, self-study problems, with answers, are distributed; students have a week to work on these problems and get help from the teacher. Second, a quiz on LP model formulation is given, and students receive written feedback on their errors. Third, students have an out-of-class assignment, which requires formulating an LP model, solving it, and interpreting the results. Students also get written feedback on the assignment. Therefore, classroom instruction is only one of several course activities that influences student performance on the test.

EVALUATING THE INQUIRY-BASED APPROACH

First, the inquiry-based activity will be evaluated from a theoretical point of view. Then assessment data will be presented. Finally, plans for further assessment and improvement will be discussed.

Theoretical Evaluation

The instructor's observation was that the exercise created a sense of excitement in the classroom and seemed to motivate students to learn linear programming, as predicted by Brightman [5], Oliver [10], and Prince and Felder [11]. For most students, the activity appeared to be challenging but not too difficult; this is consistent with the recommendations made by Colburn [6]. In terms of the revised Bloom taxonomy, checking to see that the LP constraints are being met is an evaluation (level 5) task. Some student pairs have mentioned well-developed strategies for finding the optimal solution; those students are using creation (level 6) skills. Even those students who are using only evaluation skills are doing critical thinking.

The exercise conforms to Brightman's (2005) "Big 5" principles:

- Why before what: Business students understand the importance of profit and are motivated to increase profit.
- Simple to complex: The exercise begins with calculations that students already understand. A fair number of students can make the translation from arithmetic to algebra by themselves.
- Familiar to unfamiliar: The exercise proceeds from arithmetic to algebra, and then to the concepts of decision variables, objective function, and constraints.
- Concrete to abstract: The exercise begins with a specific word problem. The class discussion of the exercise is used to introduce the model formulation and new concepts.
- Multiple languages: Students translate from a word problem to calculations, and then to algebra.

Student reactions to the exercise suggest that the "hook" and the "Big 5" principles worked well in this case.

Assessment Data

At the author's university, one of the learning goals for the BSBA program is: "Students will be able to demonstrate rational decision making using quantitative tools, strategies, and data". This goal is assessed in several courses, using both multiple choice tests and quantitative tasks in each course. The authors were asked to develop a task and a rubric for assessing this goal in the undergraduate operations management course. The assessment task is defined as follows:

Assessment will be based on a test question that requires students to formulate a linear programming problem in standard form. The student should be prompted for the decision variables, the objective function, and the constraints. The problem must be a product mix problem with 2 variables, 2 resource constraints, and one additional constraint – such as a contract, booked orders, or a market size limitation. The problem must prompt the student for the decision variables, objective function, and constraints. Students must be required to set up the problem from scratch. Multiple choice questions cannot be used for this assessment.

Faculty teaching an operations management course are required to include this task in one of the tests given in the course. The rubric used to assess student performance on the task is shown in Figure 7.

FIGURE 7: RUBRIC FOR ASSESSING PERFORMANCE ON LP MODEL FORMULATION

Item	Characteristics of Student's Answer	Points
1	Decision variables are defined correctly and used consistently throughout the problem setup.	0 - 1
2	The formula for the objective function is present and correct	0 - 2
3	The student correctly states whether the objective function should be maximized or minimized.	0 - 1
4	Two resource constraints are present. The left-hand sides of the resource constraints are correct. (0 – 3 points for each constraint)	0 - 6
5	Both resource constraints have correct signs	0 - 1
6	Both resource constraints have correct right-hand sides	0 - 1
7	Both non-negativity constraints are present and correct.	0 - 2
8	The additional constraint is present and correct.	0 - 2
	Total points	0-16

For the past two semesters, detailed assessment data has been collected using this rubric. During those semesters, the author taught four sections of undergraduate operations management, with a total of 134 students. Student scores, based on the rubric, are summarized in Figure 8.

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**FIGURE 8
SUMMARY SCORES FOR STUDENT PERFORMANCE ON LP MODEL FORMULATION**

Raw Score	% Score	Number of Students	% of Students
16	100	96	71.6%
15	94	12	9.0%
14	88	7	5.2%
13	81	4	3.0%
12	75	5	3.7%
0 – 11	0 - 74	10	7.5%
TOTAL		134	100%

More than 70% of the students earned a perfect score on the model formulation task; 92.5% earned a score of 75% or more on the task. The remaining 7.5% received raw scores of 11 or less; their percentage scores were less than 70%. As stated earlier, classroom instruction is only one factor that influences student performance on the test. However, there is anecdotal evidence that students who attended class on the day that model formulation was taught generally received higher scores than those who did not.

Student performance on various parts of the LP formulation task was also analyzed. The results are shown in Figure 9. In five of the eight categories, the average score was 95% or more of the maximum score. Students had the greatest difficulty with the signs for the resource constraints; the non-negativity constraints; and the additional (non-resource) constraint. Plans for improving performance in these areas will be discussed in the next section.

FIGURE 9
STUDENT PERFORMANCE ON VARIOUS PARTS OF THE LP FORMULATION TASK

Item	Characteristics of Student's Answer	Maximum Points	Average Points	Average % Score
1	Decision variables are defined correctly and used consistently throughout the problem setup.	1	0.95	95.0%
2	The formula for the objective function is present and correct	2	1.91	95.5%
3	The student correctly states whether the objective function should be maximized or minimized.	1	0.98	98.0%
4	Two resource constraints are present. The left-hand sides of the resource constraints are correct. (0 – 3 points for each constraint)	6	5.75	95.8%
5	Both resource constraints have correct signs	1	0.90	90.0%
6	Both resource constraints have correct right-hand sides	1	0.95	95.0%
7	Both non-negativity constraints are present and correct.	2	1.74	87.0%
8	The additional constraint is present and correct.	2	1.75	87.5%
	Total points	16	14.93	93.34%

Instructional Improvement and Additional Assessment

The assessment results in Figure 9 will be used to improve instruction. The meaning of the \leq and \geq signs will be reviewed in class. Students will also be given more practice with the non-negativity constraints and non-resource constraints. We will continue to use the rubric in Figure 7 to assess student learning.

For research purposes, the effectiveness of the inquiry-based activity will be assessed using quiz performance and the rubric in Figure 7. Quiz performance is a better measure of effectiveness than test performance, which is influenced by quiz questions, feedback on the quiz, the assignment, and feedback on the assignment.

In the theoretical evaluation of the inquiry-based activity, it was suggested that students were excited about the activity; that the activity was sufficiently challenging but not too difficult; and that some students developed strategies for finding the optimal solution. In the future, students will be surveyed about their reactions to the inquiry-based activity and strategies they may have used during the activity. They will also be asked to rate the impact of each LP-related activity on their learning. In addition, attendance records will be compared with student scores on the quiz-based and test-based LP assessments to see whether attendance affected learning. These evaluations will provide additional measures concerning the effectiveness of the inquiry-based activity and other instructional components. Also, this additional research will provide more data for improving instruction.

SUMMARY

An inquiry-based approach to teaching LP model formulation has been presented. This activity is an important component of an instructional package that has enabled most students to formulate simple LP models. Anecdotal evidence suggests that students enjoy the inquiry-based activity. The activity also gives students a chance to practice critical thinking skills. Plans for instructional improvement and further assessment of the activity were discussed.

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IMPROVING PERFORMANCE WITH SKILL CHARTING

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Introduction

This paper offers a tool, skill charting [SC], to assist managers and employees to improve performance quality by systematically examining and improving skills and knowledge, particularly performance that has a behavioral focus. This tool has more than one label, such as performance mapping, or skill roadmap. Skill charting offers supervisors and managers the means to do several important and interrelated things, among which are to improve: the quality and quantity of some performance, the learning of managers and employees; and, importantly, to incorporate some findings regarding human motivation so as to enhance employee job skills, feelings of being "in" on things or connectedness, and feelings of improved competence and positive self-image. Many of these topics are explained in detail in publications by Cardy (2004), Gilbert (1996), and Lyons (2005).

Focus of This Paper

The general plan of this conceptual paper is to define and explain what skill charting is about and how it is used in practice. Also included in the paper is some theory-grounding for the approach as well as how the skill charting tool compares with some other quality learning tools. Finally, the paper includes details of how the tool is applied in an intervention as well as some outcomes and consequences of its use.

We know that business or organizational competitiveness is tied to improving managerial skills as well as improving the training and development of the workforce,

that is, the enhancement of human capital (Worrall & Cooper, 2001). The quality of performance of human resources is usually grounded in the application of skill and knowledge competencies. Skill is the application of some behavior that has some discriminations of mastery, for example, quality and/or quantity. Like competence, skill has relativistic referents and virtually every task or job may be performed more or less skillfully depending on results achieved, time used and resources applied. Both competence and skill are qualitative terms. If we can improve an individual's skills we are also improving their competence and their capacity to more carefully discriminate among alternative approaches to skill application.

Theory Bases

In general, we base skill charting [SC] on what is often referred to as a constructivist approach to employee learning and change. In such an approach the manager or employee is constructing or creating new knowledge over a foundation of prior or previous learning. If what we discover in taking on new learning activities is at variance with what we already "know", we have choices to make about behaving and performing differently. In the context of SC as presented here individuals, working together to improve performance, make meaning socially as they construct their experience together so they can cooperate and communicate and achieve consensus about what is happening. There are multiple representations of reality and managers and employees, together, construct reality and the construction is ongoing and changing as accepted meanings and understandings among or between individuals are negotiated in a social context (Raelin, 2000).

In more specific terms, SC is grounded on Experiential Learning Theory [ELT], and in the steps of the processes of SC it is possible to map the features of ELT directly to the steps of SC. For our purposes, learning is generally defined as a change in performance. Adult learners make use of several forms of educational or training processes. This paper relies on the use and influence of ELT particularly in the training portion of the work. Experiential approaches usually seek to involve learners in new experiences, tend to be somewhat holistic in nature, and often integrate other approaches into a single framework as action, cognition, reflection, and experience (Kayes, 2002).

In general, experiential approaches include action-driven learning approaches that seek to improve task behaviors that contribute to effectiveness in achieving goal-directed outcomes. Also included are cognitive approaches that are concerned with thinking processes (e.g., memories, perceptions, representations) that emphasize intra- and interpersonal transformations that take place within and between employees, and employees and managers. Finally, reflective approaches as part of experiential learning tend to focus on processes of self-discovery and questioning whereby managers and employees learn to reflect critically on their assumptions and beliefs, and then, ultimately, free themselves from assumptions that limit their perspectives.

ELT, as an interdisciplinary field, is grounded in philosophy, anthropology, sociology, psychology, and cognitive science (Carver, 1996). Perhaps the most established and discussed model of experiential learning is that of David Kolb (1984). The skill chart creation and use examined in this paper parallel, in sequence, the behaviors explained in Kolb's model of experiential learning. Kolb's model (1984) is grounded in the humanistic concept that people have a natural capacity to learn.

Experience acts as the catalyst for engaging in the process of a dialectic inquiry - process that is based on and confined to the data of human experience. The process operates whereby knowledge is created through the transformation of experience (Kolb, 1984, p. 41) and the learning activity rests on six assumptions: Learning

- (a) is a process, not an outcome,
- (b) derives from experience,
- (c) requires an individual to resolve dialectically opposed demands,
- (d) is holistic and integrative, it goes beyond cognition to include thinking, feeling, perceiving and behaving;
- (e) requires interplay between a person and environment, that is, we assimilate new experiences into existing concepts and accommodate existing concepts to new experiences; and
- (f) results in knowledge creation.

Moreover, learning involves the interplay between two interdependent dimensions of knowledge: acquisition and transformation (how to get information and what to do with it). Each dimension requires an individual to resolve a dialectic or a set of competing learning tensions. In *acquisition*, the learner resolves the tension between apprehension (concrete experience) and - comprehension (abstract conceptualization). Apprehension is the taking in of information, while comprehension is when the learner breaks down this information into meaningful events and places them within a symbolic system of culture and society (how the information fits with what we know/believe).

This knowledge (acquisition) interacts with the second learning dimension:

knowledge transformation. Here, one resolves the tension between knowledge intention (reflective observation) and knowledge extension (active experimentation). The learner moves inwardly to reflect on previously acquired knowledge. Then, he/she moves beyond the self to interact with an external environment. Taken in concert, these four processes constitute the learning cycle. As employees and managers resolve these dialectical tensions, they orchestrate their way around the cyclical process of learning. Learning, then, is a continuous process of responding to diverse personal and environmental demands that arise from the interaction between experience, conceptualization, reflection, and action in a cyclical, but not necessarily orderly, fashion. The four processes mesh very well, indeed, with the skill charting creation and maintenance activities identified in this paper.

How Skill Charting is Used

Skill charting as a process is frequently used in organizations, on a small or large scale, to identify domains of knowledge, skills, and abilities that represent the individuals of a particular group or unit. Individuals using direction and guidelines map the competencies (Lyons, 2003). The SC is primarily the result of a process of listing critical skill and knowledge elements of a task, job, role, or unit so as to demonstrate or discover, or re-discover, what is needed for successful performance. Identities and listings are followed by activities that seek to create refinements of skilled behavior, create standards for measuring skilled performance, and related activities.

Relationship With Other Quality Learning Tools

The skills charting [SC] approach has characteristics that parallel some of the features of methods used in quality management. There are many valuable sources (such as Evans

and Dean, 2002) that demonstrate the broad array of tools and methods used in quality improvement efforts. An in-depth examination of these tools is beyond the scope of this paper; however, brief attention is owed to those tools that parallel skill charting, namely, the Relations Diagram and the Affinity Diagram. The Relations Diagram attempts to illustrate all of the different relationships or connections between factors or processes. If done skillfully, a Relations Diagram helps us to detect the forces that drive action in a situation; hence it is particularly useful in locating important factors of a situation on which to focus attention in problem solving efforts.

The Affinity Diagram is a widely used tool that shifts results from a brainstorming, listing type of activity into groupings (sets) of items or elements from a field of events, functions, and activities that seem to belong together. Credibility is granted to the groupings as participants in the process establish criteria for groupings membership. Participants have at their disposal organized, classified, and categorized information as the groupings become more clearly segregated and partitioned. Both the Relations Diagram and the Affinity Diagram are tools that help individuals or groups reach greater understanding of situations through the construction of information that may serve as a springboard for analysis, decision-making, and action plans.

Skill charting [SC], similar to Relations and Affinity Diagrams, has brainstorm, graphic, and categorization features, however, skills charting as a comprehensive process moves well beyond classification into the development of skills identities, scripts, and performance assessment. Skill charting is what Applebaum and Reichart (1998) call a facilitating factor within the learning organization.

Effectiveness of Skill Charting and Related Tools

Several training and educational approaches demonstrate the effectiveness of skill charting processes. All of the tools are aimed at script or guide-creation for skill applications. Frankly, we do not know of many unsuccessful attempts in the use of the methods as such efforts do not find their way into the literature. We report here, briefly, upon the research to which we have access. Keleman and others (1993) used a form of skill charting creation and management to demonstrate how group support systems can be made more effective. The primary focus of their research was the implementation and use of group support systems in various arrangements for problem-solving, decision making and so on. They developed an approach that permits a facilitator of a group to enable skill adjustments on-the-fly in real time situations with problem solving groups. The approach enables better use of time and more effective use of information by the group.

Lyons (2003, 2004c) used similar processes extensively in skill development and performance improvement training and education. Skills development was housed within a training design that applied skill charting activities. Performance definition and focus are critical elements in the process and once skill attributes and behaviors are identified, in this example, customer satisfaction pursuant to some types of transactions with employees, the learners go on to create performance standards for each one. The process is somewhat reflexive and self-reinforcing. In one study (Lyons, 2003) team leaders' performance of specific supervisory and leadership skills with team members was improved from using script creation processes in their training. In another study (Lyons, 2004a) a senior management team making use of skill charting processes was able to

positively influence a serious employee turnover problem through the skillful creation of behavioral profiles of ideal work associates.

Finally, in a recent study (Lyons, 2004b) a training model was developed that made use of hypothetical problem situations (cases, incidents) with skill charting activities superimposed on the case analysis work. The resulting approach was named Case-Based Modeling and was used to improve the performance of team members in certain performance areas such as skillfully managing meetings. The approach has broad applicability for training in general supervision, management, and for higher education in business and management. With adaptation, the approach could be used in many different situations and with many different occupational groups.

The Functions of Skill Charting

Commencing with SC relies on the analysis of performance in some general-to-specific areas. The analysis of performance relies on recent data and historical information. For illustrative purposes, we need some target performance domain. Suppose our business has a sales function and we have several individuals primarily involved in direct selling to customers, in-person or by telephone. This sales group we refer to as a team and this team will use the SC processes explained here.

Our performance domain within sales is "assisting the customer to define his/her needs." Further, suppose that a variety of performance indicators such as data from customer satisfaction surveys, random telephone surveys of customers' buying experience, unsolicited communications from customers, team leader observations of associates' performance with customers, and other means have yielded information that indicates that knowledge and skill of associates in dealing with needs of customers is an

area that requires improvement in quality. The analysis should ordinarily result in the identity of performance gaps or problems. Such discovery is central to the overall process of skill charting.

Once performance gaps have been identified, clarified and understood, it is important to establish objectives for the SC effort. Ultimately, we want to be able to specify what performance is desired and how much improvement is needed. We need to address the focus of improvement efforts. For example, is the improvement only at the individual performer level, or, is it at the level of a unit, the team, and so on. Might the improvement be focused on a combination of levels? In the example provided above, assisting the customer define his/her needs, the primary focus of improvement level is the individual performer.

Objectives should be general enough to allow the skill charters enough freedom to find good solutions and specific enough to convey what the change effort ought to accomplish. Changes need to be driven by ends and not means. While the quality of the thinking and effort that goes into the construction is important, it is merely a means to an end, that is, identities of improved performance activities. The small group or individual construction of a skills chart for a particular performance need is a central aspect of this article. The chart starts out as a graphical representation of activities and behavior that *might* be part of an episode where the employee needs to behave in a more skilled manner to be effective. As performance gaps are known, the group commences to chart, on poster sheets, whiteboard, Powerpoint, etc., the bits of information, data, intuition, guesses, expert opinion, and so forth, that may influence improved performance. Then we

commence with a type of brainstorming activity. This activity is similar to the use of the quality improvement tools of Relations Diagram and Affinity Diagram.

The creation of the map is just the beginning. The construction of the map serves as a as a graphic organizer of ideas. Individuals or small groups can brainstorm a number of ideas, behaviors, or performances that may help to define skilled performance in some area. Again, our sample skill area is: assisting the customer to define his/her needs and we are assuming that our individual or small group used this skill area as its stimulus or trigger.

The team lists the major activities, and actions that would need to occur as part of a skillful repertoire of behavior to address the performance gap. This is how the physical map commences. Several significant component areas could be identified, such as these examples:

- Greeting, meeting/encountering the customer

- Creating questions and using questions with the customer

- Active listening to/with the customer

- Reflecting and summarizing customer statements

- Focusing on how product/service choice meets customer needs

Below we explain how the ideas are translated into a set of performance improvement possibilities.

Implementation

The team will identify several important performance activities or behaviors. Each of these activities frequently has subordinate parts. As the charting takes on complexity and details we discover that the participants are creating a form of a script or

repertoire of skilled performance. That is, the participants are constructing the features, activities and language of a skilled performance. The graphical nature of the map helps to illuminate interrelationships among components as well as interdependencies.

This process, in time, will yield a set of performance requirements intended to improve performance, that is - per our example, assisting the customer to define his/her needs. As all requirements are not of equal value, the requirements will need to be placed in priority order according to team-developed criteria, for example, importance, perceived value to customer, and so on. In addition, the requirements must go through some valuation of what performance activities are "musts" and which ones are "wants." This classification and musts-wants testing require careful facilitation.

Selecting Specific Components

Once a somewhat detailed and/or hierarchical set of actions or behaviors has been identified the team may discuss the adequacy of the repertoire as a sufficient improvement to achieve the original goal: assisting the customer to define his/her needs. Each of the actions or behaviors can be examined in terms of skilled performance. The following questions may be helpful. What criteria would define each action as a skilled performance? What criteria make sense in terms of quality or consequences? This is a refinement of the activity explained above. The team has to question where the gaps remain in the repertoire we are referring to as skilled behavior. This reflective dialog is often very useful in aiding understanding. Once all of the possible actions are discussed, adjusted, agreed-to and the like, the details are to be documented.

Prepare the Actual Intervention

The assumptions underlying all of this preparation are: improvement is continuous,

improvement is based on trial and learning, and most likely there is no "silver bullet" or one best way to achieve improvements. The preparation for the actual changes in performance is, fundamentally, a codification of a script for a skilled repertoire of behavior. The team has created a script of behavior to result in improved performance. Not all team members have mastered all of the needed skills (for example, active listening to, and indirect questioning of customers) to confidently and competently enact the script. Additional training may be required for some team members. The team leader or highly skilled associates can assist with this training. Once training is completed, the team members are prepared to interact with customers using the results of the skills charting process and we can anticipate qualitative improvements in performance.

Outcomes and Consequences

The skill charting process may assist managers and supervisors attain a more complete understanding of the transferability of skills from job activity to job activity (Gunner, 2001). A manager or supervisor can use the process as an instructional tool. It can be used in a work session with employees in reference to some activity that needs to be performed with more precision, attention, or care.

The charting strategy tools have implications for many aspects of the human resources and employee learning domains to include: the conduct of job analysis, in-depth task analysis, and skill development over a broad range of potential skill domains, the development of new competencies and standards, training, performance analysis and appraisal, and performance improvement. Virtually all of these matters influence individual learning and organizational performance and have clear implications for the competitiveness of an organization.

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REVISITING RELATIONSHIP BETWEEN MACHIAVELLIANISM AND ACADEMIC ACHIEVEMENT

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ABSTRACT

Previous research on the relationship between Machiavellianism and academic achievement has yielded mixed results. The present study supports the hypothesis of a negative relationship between scores on Mach IV scale and grade point average in a sample of 82 undergraduate students.

The modern concept of Machiavellianism was derived from the ideas of Machiavelli as published in *The Prince* in 1532 (Machiavelli, 1940). Interest in Machiavellianism was revived more recently by conceptualizing it as a personality orientation (Christie & Geis, 1970). A Machiavellian is defined as a person who 'views and manipulates others for his own purpose' (Christie & Geis, 1970, p. 1).

Machiavellianism, theoretically, is a social concept that may apply only to interpersonal relationship. Its relationship with academic achievement has been largely unexplored. Christie and Geis (1970; p. 36-37) believed that Machiavellianism and intellectual abilities were not related to each other. They analyzed data from seven samples and found no evidence of a relationship between intellectual ability and Machiavellianism. This was supported by evidence from other empirical studies. Ames and Kidd (1979) reported a lack of significant relationship between Machiavellianism and grade point. Similarly, Yong (1994) found no evidence of a relationship between grades and Machiavellianism. However, Singer (1964) found that Machiavellianism and grades were positively related to each other with abilities held constant. Kauffmann et al. (1987) found that grade orientation was related to Machiavellianism. Marks and Lindsay (1966), though not measuring academic achievement directly, found that Machiavellianism influenced the relationship between education and occupational attainment. The present study explores this relationship further with an assumption that grade point average (GPA) as an indicator of academic achievement may be influenced to some degree by interpersonal and social skills of a student.

Method

Eighty-two undergraduates students taking Management courses at a medium size university in the Southeastern United States were given the Mach IV scale (Christie and Geis, 1970) and were also asked to indicate their current grade point average (GPA).

Results and Discussion

The results showed a significant negative correlation ($r = -.28, p < .05$) between Machiavellianism and the grade point average (GPA). The Cronbach's Alpha for Mach IV was found to be .68, well within the acceptable range reported in the literature. A plausible explanation for this finding is that those who are high on Machiavellianism may be socially more active and thus easily distracted from the demands of the academic work. Further research may include other possible determinants of academic achievement and

possibly a direct measure of the degree participation of the respondents in social life on campus or outside it.

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UNDERSTANDING BUSINESS STUDENT SUCCESS AND SATISFACTION IN HIGHER EDUCATION – AN EXPLORATORY STUDY

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ABSTRACT

The paper presents preliminary results from an exploratory study measuring business student success and satisfaction at the end of their undergraduate degree. In addition to measuring satisfaction with specific aspects such as students' major, minor and student organization, general satisfaction levels were measured as well. Student success was measured in terms of employment and salary levels or admission to graduate school. The purpose of the study was to explore the relationships between student involvement, student success and satisfaction.

STUDY OF PROGRAM EFFECTIVENESS

More than any time in the history of higher education, colleges and universities are being asked to be accountable to various constituencies for the quality of their educational programs (Kuh, Kinzie, Schuh, & Whitt, 2005). Education Secretary, Margaret Spellings, has threatened federal intervention if the higher education institutions do not help students evaluate their effectiveness (Basken, 2008). In light of escalating college tuitions, especially at private institutions, and the criticality of good higher education in the intensely competitive global world, stakes are high for the American society, students and their loved ones who support and sponsor them (The Spellings Report, 2006). The federal and state agencies as well as accreditation bodies are seeking concrete evidence of program effectiveness. It is hard for any respectable program to ignore the pressures for measuring student satisfaction, achievement and success.

Background Information

The exploratory study was conducted at a business school of a mid-western private comprehensive university.

In order to measure the success of its undergraduate students, the Business College implemented a one credit hour assessment course for the seniors. In this course, the students completed an ETS (Educational Testing Service) major field test, a writing essay, an individual presentation, as well as a portfolio of their accomplishments. It was part of a competency development framework implemented through business core courses in a four year degree program. Prior to the course, it was difficult to find a common time for the students to complete these assignments and there was no incentive for the

students to perform well on the assignments. The course did address the concern about time but it did not provide significant motivation to all students for a better performance. It became evident that at this later stage in their academic careers, the students did not see it very beneficial to document or demonstrate these competencies as an academic exercise. Moreover, the data was neither generating any significant debate nor any action in the College for programmatic improvements. The individual academic departments did not seem to have a stake in these outcomes.

To improve upon the existing status-quo, on an experimental basis, an additional survey was designed and conducted (see Appendix 1). The goal of the survey was to measure student satisfaction and student success in a succinct fashion. Satisfaction with various specific aspects of academic life was measured but two summary questions captured general satisfaction levels. This is not an uncommon practice in social sciences. Success was measured in terms of employment and salary levels or graduate school admission. These are the most commonly stated goals of college students. Also, these success measures resonate with the individual departments more clearly (e.g., statements such as, "We are a great ABC department because X percent of our students find jobs at an average salary of Y dollars," can be used to market programs). In addition, students' GPA was considered a measure of their academic success. Students were asked to identify their involvement in College events, internship programs and the College student organizations to understand the determinants of student success and satisfaction. The determinants could guide corrective actions or future resource allocations. Above all, none of these measures required additional performance tests on the part of students and thus solving the issue of student motivation. Here are the key questions the study explored:

1. Is student satisfaction specific to individual aspects or are various aspects of satisfaction correlated with each other as well as overall satisfaction?
2. Is student satisfaction related to students' success (i.e. GPA, employment status)?
3. Is student satisfaction related to their involvement in college activities, student organizations or internships?

Sample

A total of 62 graduating senior students completed the survey in spring 2008. As per the University registrar, there were a total of 87 total qualified business graduates for the May commencement. Hence, the sample is a significant portion of the entire population. The sample was evenly split between males and females. Fifty percent of the students had secured employment and 3% were going to graduate school. Six students noted receiving a signing bonus ranging from \$1,500-\$5,000. Similarly, 50% of the students noted that they had participated in internships. The mean student GPA was 3.2 (SD .397). Students represented six different majors as noted in the table 1 and descriptive statistics for student satisfaction are provided in table 2.

TABLE 1
Sample by majors (N=62)

Major	count
Accounting	9
Business Management	16
Economics	1
Finance	12
Hospitality Management	3
Marketing	19
Management Information Systems	2

TABLE 2
Mean of student satisfaction variables

Satisfaction with	N	Minimum	Maximum	Mean	Std. Deviation
College Experience	62	3	5	4.44	.590
Major Curricula	62	2	5	4.26	.745
Minor Curricula	56	1	5	4.02	.944
Core curricula	62	1	5	3.85	.846
Student Organizations	62	2	5	3.89	.791
Events/Speakers etc.	62	2	5	3.94	.807
Academic Advising	62	1	5	4.03	.991
Staff/Administration	62	3	5	4.34	.599
Faculty	62	3	5	4.27	.632
Valid N (listwise)	56				

Results

In order to understand the content of student satisfaction, two types of analyses were performed – matrix of correlations (table 2) and factor analysis (table 3).

TABLE 3

Pearson Correlations among satisfaction variables
(n=62)

Satisfaction With	College Exp.	Major Curr.	Minor Curr.	Core Curr.	Event s	Advising	Faculty	Staff	Orgs.
College Experience	1								
Major curricula	.560**	1							
Minor Curricula	.372**	.391**	1						
Core Curricula	.424**	.476**	.491**	1					
Events/speakers	.439**	.192	.374**	.490**	1				
Academic Advising	.256*	.210	.322*	.318*	.249	1			
Faculty	.378**	.230	.113	.290*	.421**	.221	1		
Staff/administration	.364**	.168	.180	.390**	.521**	.313*	.747**	1	
St. Organizations	.528**	.300*	.339*	.391**	.681**	.297*	.260*	.359**	1

**p<.01

*p<.05

Noteworthy trends in this matrix are: (a) as expected, students' overall satisfaction is related to all the key subcomponents of satisfaction in the survey; (b) Student satisfaction with College faculty, however, is not related to student satisfaction with their curricula in major, minor or academic advising; (c) understandably, student satisfaction with their major or minor curricula is not related to their satisfaction with the College staff and administration.

Factor analysis of the student satisfaction with their major, minor and College core curricula, College events and organizations as well advising, faculty and staff provide further insight. Principal Components analysis, using the Varimax rotation results in two factors with Eigenvalues greater than 1. Satisfaction with major curricula, minor curricula and core curricula decisively load on the first factor with values greater than .71. This factor explains 44.7% of the total variance. Satisfaction with guest speakers/lectures/events, staff and faculty decisively load on the second component with values of .68, .90 and .86 respectively. Satisfaction with advising load on the first component with values of .50, but satisfaction with student organizations had very similar loading values on both factors. The second factor explains an additional 16% of the variance.

TABLE 4

Varimax Rotated Component Matrix

Satisfaction with College's	Component 1	Component 2
Major Curricula	.714	.037
Core Curricula	.741	.333
Minor Curricula	.796	.027
Events/speakers/lectures	.439	.682
Staff & Administration	.127	.896
Faculty	.037	.856
Academic Advising	.501	.255
Student Organizations	.534	.507

These analyses suggest that students view curricula and personnel as somewhat distinct and unrelated aspects of their satisfaction. In the future analyses, construction of two satisfaction scales may be in order. In this paper, overall satisfaction with the College of Business is used for other analyses as it is highly correlated with all the other measures of satisfaction.

Student success can be categorized into academic success as measured through their GPA. Their applied success can be measured through employment status (if they already had a job), their salary level and the amount of their bonus. The correlation between student GPA and their satisfaction with the overall College was insignificant ($r=.112$, $n=62$). Actually, their GPA was not significantly related to any of the satisfaction variables. The student means on their overall College experience were very similar regardless if they had job, were still looking for a job or were going to graduate school (see Table 4). Interestingly, the scores of the two students going to graduate school were the highest and the mean of the group that had jobs was higher than the group that did not have jobs. One Way ANOVA showed no statistically significant differences, however, between and within employment groups ($F=.969$, $p=.386$) for satisfaction with the College experience.

TABLE 5

Satisfaction with Overall College Experience and Employment Status

Employment	Mean	N	Std. Deviation
Have a job	4.43	30	.626
Still Looking	4.40	30	.563
Grad School	5.00	2	.000
Total	4.44	62	.590

Similarly, satisfaction levels were not statistically different among the groups with various salary levels (Table 5). As per One Way ANOVA, the differences between and within groups were significant at .07 level ($F=2.457$). It is, however, interesting to note that satisfaction levels increase with the salary levels except for the group with the highest levels of salary.

TABLE 6

Satisfaction with Overall College Experience and Salary Level

Salary Level	N	Mean	Std. Deviation
\$30,000 or less	3	3.67	1.155
\$30,001- 40,000	12	4.33	.492
\$40,001-45,000	6	4.67	.516
\$45,001-49,999	3	5.00	.000
\$50,000 or more	7	4.43	.535
Total	31	4.42	.620

In response to our last question, students' overall satisfaction with College was compared between groups of students who had experienced internship and those who had not. The sample was evenly split between the two groups and their mean was almost identical (4.45 and 4.42 respectively). Only five students out of 62 had participated in a shadowing experience, and comparing the two groups would not have resulted in reliable results. Twenty students noted participating in one or more of the College events, and their mean, while higher, was not statistically significant from those who did not indicate participating in the student organizations (4.50 and 4.40 respectively). Similarly the mean satisfaction of students who participated in student organizations (mean 4.5, n=34) was higher than those who indicated no participation (mean 4.36; n=28) but the differences were not statistically significant.

Summary

At a time when there is great deal of pressure to document the effectiveness of academic programs, this paper has yielded some interesting insights. The students expressed high levels of satisfaction with their overall experience in the College of Business as well as with other specific aspects such as curricula, extra-curricular activities and personnel. Student satisfaction, however, was not significantly correlated with their academic success, their employment status or their salary levels. The directionality of the means was as expected, however. Similarly, it was a surprise that overall satisfaction did not have statistically significant correlation with students' involvement in organizations, College events and even internships. Again, the directionality of the means was in the expected order though the group with the highest salary levels was the exception.

Various explanations are possible for lack of significant results. Students may be happy to be graduating and satisfaction levels are reported at such high levels by most students that there is not sufficient variance in the data. Also, having students complete the survey as a class assignment in the assessment course may have yielded a perfect response, but it might not have captured the range of their sentiments. The study is very exploratory and has its limitations. Follow-up and further analyses are warranted.

APPENDIX

Graduating Seniors Questionnaire

Name _____ Graduation Date _____
Major _____ Minor _____
E-mail after graduation _____ Phone Number _____
Permanent address _____

Employment status (circle one):

- a) Have a job.
Title _____
Employer _____
Address _____

- Did you receive multiple offers? Yes or No If yes, how many? _____
- b) Still looking for a position.
- c) Going for advanced education.
Degree/Education _____
School _____

Starting salary range if you already have accepted a position:

- \$30,000 or less
 \$30,001 – 40,000
 \$40,001 – 45,000
 \$45,001 – 49,999
 \$50,000 or more

Signing bonus (if applicable) \$ _____

Did you participate in any of the following while at AU (check all that apply):

- Internship
 Shadowing experience
 The Magic of Business, Meet the Accountant Night or a Workshop/Event of the Burton D Morgan Center
 SIFE, Delta Mu Delta, Eagle Investment Group, IMA Accounting Club, AMA or any other COBE student organization.

Are you planning on sitting for an accounting certification, investment (series 6, 7 etc.) or insurance licensure (Life, Health etc.) or any other professional certification within the next year? Yes or No

If yes, list which ones _____

Do you plan on continuing with a graduate degree at some point? Yes or No
 If yes, circle which degree

- a. Master in Business Administration – General
- b. Master in Business Administration – Accounting concentration
- c. Master of Accountancy
- d. Other _____

How satisfied are you with the following:		Not at all Satisfied	Neutral			Very Satisfied
	Satisfied					
1)	Overall experience in the Dauch College	1	2	3	4	5
2)	Curricula in your major	1	2	3	4	5
3)	Curricula in your minor	1	2	3	4	5
4)	COBE's core courses	1	2	3	4	5
5)	COBE's student organizations	1	2	3	4	5
6)	COBE's guest speakers, lectures and events	1	2	3	4	5
7)	Academic advising	1	2	3	4	5
8)	COBE staff and administration	1	2	3	4	5
9)	COBE faculty	1	2	3	4	5

Would you recommend Dauch College of Business and Economics to a relative or a friend?

- 5 Most definitely – with enthusiasm
- 4 Yes
- 3 Yes, but with some reservations
- 2 No
- 1 I would recommend against it

Additional comments:

Thank you!

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YOU NEED TO GET A JOB– BUT YOU BETTER KEEP YOUR GRADES UP: CONFLICTING EXPECTATIONS IN TODAY’S ACADEMIC ENVIRONMENT

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ABSTRACT

Over the last decade, American students have seen a dramatic increase in college tuition and expenses (Fethke, 2006). To offset this increase in college expense, many students have taken on part time or even full time work (Gose, 1998; Nonis and Hudson, 2006). In addition to, or because of, the burden of lack of focus and exhaustion, students are reporting a decline in the number of hours spent studying (Higher Education Research Institute, 2003). To compound this problem, many states offer scholarships that are based on a minimum student grade point average (GPA) (GA Student Finance Commission; SC Commission on Higher Education; College Pays- We Can get You There). The pressure to make good grades, while working more hours to pay for tuition has created disconnect between university expectations and student behavior. Universities expect students to focus on academics, while at the same time continue to increase the cost of enrollment. Students understand the necessity to pay the bills, while at the same time succeeding academically. This paper will address the dissonance created by the demands of academic rigor as opposed to the economic demands of obtaining a college education.

This research focused on students’ perception of the relationship between academic endeavor and working. In addition, student perception of the university’s role in this dynamic was also examined. Students responded to a series of questions examining both student and university responsibility in this growing problem. Results indicate that students believe that the university should be more helpful and accommodating of students that must work to pay for college expense. The authors address implications of this dynamic and suggest implications for future research.

INTRODUCTION

The cost of tuition in higher education has gone up drastically in the last 10 years. According to the College Board, the average cost of tuition and fees at a four-year private college rose 5.9% to \$22,218 for 2006-07. Public colleges rose at a rate of 6.3%. Even though the cost of a public college is less for tuition and fees (\$5836) when room and board are added it becomes \$12,796 for public institutions and \$ 30,367 for private schools (How College Savings Plans Ease the Worry, 2007). The College Board estimates that a moderate budget for miscellaneous expenses (excluding transportation) is \$3,700 per school year. In a survey conducted by Zogby International, students and parents agreed that their biggest expense other than tuitions, room and board, and books was car upkeep. The Zogby study also reported that 89% of college students have cell phones. On parent complained that the most shocking cost he encountered was “that darned cell-phone bill” (Elmer, 2006).

With this dramatic increase in college tuition and expenses, many college students now work to either support themselves or to pay for the items that their parents can not provide. Many students today consider cars, cell phones and fashionable clothing a necessity. Many are not willing to give up these items; therefore, they work in order to afford them. Students now choose to live off campus and this creates the necessity for cars and the added expenses associated with a vehicle. As a result of working more hours, many students now report a decline in the number of hours that they spend studying (Higher Education Research Institute, 2003). To compound this problem, many states offer scholarships that are based on a minimum student grade point average (GPA) (GA Student Finance Commission; SC Commission on Higher Education; College Pays- We Can get You There). If a student fails to maintain the required GPA, he or she loses the scholarship. This requires that students either take out loans or work more hours if they want to continue their collegiate experience.

This pressure to make good grades while working more hours has created a disconnect between university expectations and student behavior. Universities expect students to focus on academics and at the same time they continue to increase the cost of enrollment. Students understand the necessity to pay bills, while at the same time to succeed academically. This paper addresses the dissonance created by the demands of academic rigor as opposed to the economic demands of obtaining a college education.

Global changes from an industrial era to a knowledge era have made a college education crucial. We have reached an era of “achieving greater expectations”. These new expectations require shared responsibility, not only among universities and students, but also with the community as a whole. High schools, business leaders, media, and accrediting bodies must help create a society where knowledge is valued and everyone has access to an excellent education (Nellen and Turner, 2007). Success will not come easy when students face the challenge of increasing tuition, working more hours and increasing debt to repay. They will need the support of not only their parents and universities, but also the companies they work for to be able to manage their studies, finances, and time.

Faculty often believe that school should be the only priority and often have little or no patience or sympathy with late or missed assignments because of work. Students often use work as an excuse for being unable to meet deadlines or group meetings for shared assignment responsibilities. Students’ management of time to meet the expectation of their professors, coupled with their work responsibilities, often causes both their educational expectations and work experiences to be less than an ideal situation.

METHODOLOGY

To access the students’ perception of the relationship between academic endeavor and working, 121 students at a small public institution were surveyed. In addition, the survey examined the students’ perception to the university’s role in this dynamic.

The average age of the population was 22.6 with a range of 18-43 and included 52 males and 69 females. There were 42 African-Americans, 71 Caucasians and 7 of other races included in the survey. The study included 27 accounting students, 7 finance, 54 management, 13 marketing, and 19 from other areas. In addition to the demographic questions, students were asked to give specific answers as to their actual GPA, average number of hours per week they worked, average hours per weeks they studied, and their involvement in campus organizations. They were also asked to estimate what their GPA would be if they did not work. Other specific questions covered rearrangement of tests or assignments because of work

and whether they had student loans. In addition they were asked to respond to a series of 11 questions on a scale of 1-5 with 1 being strongly disagree and 5 strongly agree.

RESULTS

Subjects reported they worked an average of 21.5 hours per week. As reported, 16.6% of students did not work at all or worked less than 10 hours per week. However, 36.7% reported working between 10 and 20 hours with 46.7% reporting working more than 20 hours per week. Twenty-five percent of students who work more than 20 hours per week are working 40 – 50 hours per week.

Students reported studying less than half the number of hours they work. The average number of hours per week students studied was 9.4. Fifty-two percent of students reported no involvement in student organizations, 22% were involved with only 1, 16% with 2, and 10% of students were involved in 3 or more organizations.

When students estimated what their GPA would be if they did not work, the average rose from an actual of 2.96 to an estimated GPA of 3.25. This seems to indicate that students admit that working does cause a GPA to be lower, but that the necessity of working overrides that effect. While they are cognizant of the importance of good grades, they also must work enough to provide the necessities or perceived necessities that their parents did not provide.

The chart below provides a list of the other items asked on a scale of 1 to 5 with 1 being Strongly Disagree and 5 Strongly Agree.

Question	Average All 100%	Average 20 Hours or Less 53.3%	Average 20 Hours or More 46.7%
1. It is necessary for me to work to meet living expenses.	3.94	3.48**	4.43**
2. The university should arrange class schedules to help working students have more choices for class schedules.	4.36	4.08**	4.66**
3. Professors should understand if students who work are late for class because of work schedules.	3.40	3.30	3.50
4. Professors should understand if working students miss project deadlines because of work.	2.51	2.48	2.55
5. Professor should understand that working students can not always attend class because work schedules.	2.54	2.51	2.58

Question	Average All 100%	Average 20 Hours or Less 53.3%	Average 20 Hours or More 46.7%
6. After graduation, I will remain with the job I currently have.	1.86	1.72	2.01
7. The university should provide tutors for all classes.	3.98	4.02	3.94
8. Students who work should have first choice for class scheduling	2.58	2.25**	2.93**
9. It is unfair for working students to receive special consideration.	2.92	2.97	2.86
10. My degree will enable me to obtain a job that I want.	4.55	4.54	4.57
11. GPA's are important to employers when selecting new employees.	3.35	3.53*	3.15*

* P < .05 ** P < .01

DISCUSSION

Items 1, 2, 8, and 11 produced significant differences between the two groups – those who work 20 hours or less and those who work more than 20 hours.

Based on the results, it appears that many students who work are working because it is a necessity. Item 1 suggests they are providing their own living expenses in addition to costs for school. Working is not a choice for them but a necessity. As expected, those students who work the most hours must do so to meet living expenses.

Item 2 suggests students also believe that universities should have more choices for class schedules so they can meet their work and school requirements. This is more of a problem at smaller schools because there are fewer sections to choose. At times, there is only one time slot for upper level classes and often there are students who have problems meeting class because of work schedules. The difference in the perception of students who work 20 hours or less and those who work more than 20 hours is significant. Those who work the most feel much more strongly that universities should give them wider choices for class schedules.

Items 3, 4, and 5 are related questions which deal with classroom leniency. There was a significant difference in Items 3 and 4 (1.04E-07) and 3 and 5 (1.02E-07). It seems that students believe professors should be more understanding about their being late for class than students missing project deadlines or not coming to class at all. Being late for class is acceptable to both groups of students, but missing projects and deadlines are not. However, most professors do not know if tardiness or absence is due to work or some other reason unless they ask. Although 83% of the students taking the survey worked more than 10 hours per week, only 17.4% of them reported asking professors to rearrange tests or assignments

because of work. They apparently are aware of the pressures of work and school and are meeting basic requirements even when they work.

Item 7 suggest that both groups of students believe universities should provide them with tutors for classes if they are needed. Students are concerned about costs, but yet they expect universities to provide better scheduling, more classes, and tutors for all classes. These items are understandable, but students do not seem to make the connection between added services and cost.

There is a significant difference in the perception of students concerning first choice for scheduling. As item 8 reports, those who work the most hours believe they should have first choice for schedules. However, neither group was concerned with working students receiving special consideration.

All the students believed strongly that their degree would help them get the job that they desired. However, those that worked more were inclined to think GPA was not as important to employers as those who worked 20 hours or less.

Those students who work the most also believe that GPA's do not matter as much to employers. This belief may be a tradeoff because many of them have GPA's that are less than they would be if they did not work so many hours. Students who work 20 hours or less believe more strongly that GPA's do matter to employers.

Sixty-eight percent of students surveyed reported that they have student loans. If tuition costs continue to rise, this percentage will probably also rise along with the number of students who work more than 20 hours per week.

CONCLUSION

The future suggests that tuition will continue to rise dramatically, far outpacing inflation. This means that more and more students will have to balance the scales between work and higher education. Students believe professors should understand their dilemma and work with them to help them be able to earn money and go to school. Universities and professors must address this issue if many of these students are to continue their education. Universities can address some scheduling issues by providing alternate class times in consecutive semesters. This may mean a student will have to wait a semester for a class to meet his or her schedule, but it will provide them the opportunity for flexibility. A long range plan for class times can be generated so students can plan ahead to get the required courses. This will mean that professors may have to teach in times that are not the most desired. Universities can also provide counseling services, time management seminars, and assistance in finding available financial aid. These services are now provided by many universities, but students need to be aware that they are offered.

Another option for universities and students is now available because of advancements in technology. On-line classes can now be offered for more flexibility in scheduling. However, students need to be aware that an on-line class puts more of the burden for learning on them. Also, some courses are difficult to offer on line because of the nature of the course and not all professors are willing to teach on-line courses.

Most universities are providing help for students that need it with special labs for math and English. The problem is that students do not always know where to find the help and help is not as readily available for

all classes. Universities can provide names of those qualified to tutor in all subjects. Professors and advisors need to be aware of student needs and the resources available so they can direct them to the proper places to receive assistance.

Students also need to be advised that it is not necessary to take a full load if they must work 40 hours or more. They should be encouraged to scale back the number of classes and simply take longer to complete their degree. Universities need to place importance on quality and help students get the education they need to be successful in the work world.

Students must be willing to accept less hours per semester if they need to work in excess of 20 hours per week. They also need to understand the importance of keeping their professors and employers informed when a potential conflict arises. Many times professors and employers will work with a student to solve a conflict if they know in advance.

Employers also have an opportunity to attract quality personnel by providing benefits to their employees who are also furthering their education. They can provide flexible working hours for their student employees, give them tuition assistance, and allow them to take time off when it is really necessary for their school work.

The dilemma that universities and professors are facing is how to help students manage their educational expectations, finances and time without sacrificing the quality of education that is provided. There is no easy solution and universities, faculty, and students and employers must work together on these issues.

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Production and Capacity of US Doctoral Programs

Abstract

A survey was sent to all Universities offering doctoral degrees in business. The population of doctoral universities was created by making a list of all schools that have granted a doctorate in business as reported to the Department of Education. This paper will present the preliminary results of that survey.

Introduction

A shortage of business professor has continually existed for the past 40 years. The primary qualification for the professor is a business doctorate. The source of business doctorate's for business schools offering doctoral programs. This study will examine the current supply of new business doctorates.

Literature Review

This is an abstract. A complete literature review will go here. See the reference list for the type of articles to be included.

Data Collection

Population

All institutions reporting doctoral graduates to the US department of Education between 1992 and 2006 were included in the target population. A total of 136 schools reported business PhD graduates. Five (5) replied to my request, that they do not offer doctoral programs. This is interesting, since they reported some doctoral graduates to the US Department of Education. Two schools refused to respond and as of May 22, 2008 only 18 usable responses have been received. I will continue to request data through the summer. This report will be on the 18 replies received.

Results

Here are some basic results. The annual average number of applications doctoral programs is 197. Only 24 on average are accepted. And only 13.5 on average actually start classes. Interestingly, 15 are reported to complete on average, some school keep an above average number of students. 12.6 of the 15 complete exams and 10.6 graduates. That is about a 200 to 10 or 20 to 1 ratio. So can we state that only 5% of the applicants graduate? No, most students apply to more than one program, so the application number is likely inflated. And it is also likely that the better students are accepted into more than one program. Only if all doctoral programs adopted the use of single application processing system could an accurate figure on applications and acceptances be known. We have to use the starting total as a measure. So if 217 students started of 434 accepted, assuming all accepted student start, most students were accepted into two doctoral programs. See Table 1 for more details.

Table 1

	Total Applications	Total Accepted	Total Starting	Total Completing Courses	Total Completing Exams	Total Graduating
Average	197.2222	24.11111111	13.5625	15.05555556	12.6	10.64063
Count	18	18	16	18	15	16
Sum	3,550	434	217	271	189	170.25
Minimum	32	10	4	3	5	2
Maximum	700	46	20	25	20	18.75

Conclusion, etc.

This is a quick abstract of my research. If you like it. Accept is and read the full paper in the proceedings.

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REMAINING ENERGETIC AND ENGAGED IN THE CLASSROOM: THE SENIOR FACULTY CONSORTIUM

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ABSTRACT

This workshop is designed for senior faculty discussions about how to stay active and engaged in all aspects of a faculty position until retirement. Many of us have heard about or observed ROAD (retired on active duty) employees, but something in our work ethic nags us that we do not want to be around campus, if we do not feel we are contributing our fair share. But what should the contribution be after 20, 30, or more years? There will not be a speaker or panel, but all attendees at the workshop will be expected to be active participants.

WORKSHOP TOPICS

Using the topics proposed for the 2008 DSI New Faculty Development Consortium as a foundation, the following issues will be the starting point for the workshop discussion.

- What does it mean to a faculty member today?
 - How is this different from what it meant to be a faculty member when you started in higher education? How well have you adapted?
 - What does it mean to be a new faculty member versus a senior faculty member?
- What are the rules of the game for post tenure review? Are you using it as a meaningful self assessment or is it just another pain from administration? Both?
- How is your teaching and pedagogy continuing to change? Have you conquered the technologies or have they conquered you?
- How are you staying current in the field and using this to continue as an active researcher? Are you AQ (academically qualified) to help maintain your institutions' AACSB accreditation?
- What does service mean to the faculty member who has served on every major committee at the university, as well as held a variety of offices in their professional organization?
- Do you have an ethical responsibility (the right thing to do) to seek out new faculty and mentor them, either formally or informally?
- Is this the time for a change of scenery? Should you go ahead and move closer to the adult children or aging parent and find a new position there? Is it time to move closer to the beach or closer to the mountains, so that you're already there for retirement?
- What are the future trends in the academy?
 - Do you want to keep up?
 - Can you keep up?

There are some recent encouraging words for senior faculty. The topic in the email distribution from Tomorrow's Professor on April 11, 2008, was "Can Technology Keep an Old Academic in the Game?" In this essay by Michael Rogers, he notes that he sometimes has memory lapses, but confesses that memory has never been his strongest suit. He then discusses ways that he can use technology, such as asking students to email their requests to see him, to help him keep track of the important things in his life. Also, a recent newspaper article discusses research in a forthcoming neurology book which presents the idea that the blips in memory that we call senior moments are a result of the vast amount of information we have acquired, and it is just taking a little longer to sort through all that information to get to a wise answer.

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Student Perceptions of Teaching Evaluations

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ABSTRACT

Most research on student evaluations of teaching have focused on the results and validity of the instrument. Very little exists on student attitudes toward the process. The goal of this study was to assess student's seriousness and perceptions regarding the student evaluation of teaching process and use of results. A vast majority of students stated that they approached the evaluation process seriously. There were no significant differences between students from the two departments in our college. Surprisingly, more students believed that faculty took the evaluation process more seriously than did the administration. We found two significant differences. Females stated that they took the process more seriously than did males. They were also more likely to believe that the evaluations provided good feedback to the administration.

INTRODUCTION

Accountability is increasing in all levels of academia from the accreditation of the institution to student evaluations of their professors; faculty evaluations of their chairs, deans, and the president of the institution. Students are currently being referred to as consumers (Gursoy and Umbreit 2005) and are being given the power that other types of consumers have when dealing with all types of suppliers (Read, Rama and Raghunandan 2001; Haskell 1997). Student evaluations of teaching (SETs) were originally designed to help instructors improve the quality of their instruction and courses, a formative function (Birnbaum 1999; Germain 2005; Haskell 1997; Rifkin 1995). SETs continue to provide formative feedback for instructors (Aultman 2006), but increasingly they are used by administrators for faculty reappointment, tenure, promotion, and pay increase recommendations, a summative function (Cashin and Downey 1992; Jackson et al. 1999; Pike 1998; Seldin 1999; Read, Rama and Raghunandan, 2001; Onwuegbuzie, and et al. 2007). Student evaluation forms may be designed by individual instructors, by departments, by colleges, or by outside agencies. Regardless of the instrument used, research, in the past, has supported the assumption that students make valid and reliable estimates of their learning (Hoyt and Perera 2000; Cashin 1995; Seldin 1993). SETs should be highly influenced by variables demonstrated to be strongly associated with effective teaching. Unfortunately, researchers have reached no consensus on a definition of quality or effective teaching (Onwuegbuzie, et.al. 2007; Germain, and Scandura 2005; Okpala and Ellis 2005; Marsh 2001; Jackson, et al 1999; Clayson and Haley 1990). Researchers have also addressed student perceptions related to characteristics of effective teaching (Onwuegbuzie et al. 2007; Surrant and Desselle 2007; Marsh 2001), dimensions of student perceptions of teaching effectiveness (Jackson et al. 1999), and student perceptions of learning (Gursoy and Umbreit 2005).

Past researchers have shown that SETs are multidimensional and ratings are impacted by a number of external factors, beyond the control of any instructor (Johnson 2002; Read, Rama and Raghunandan 2001; Chasin 1995). There are three dimension clusters that appear consistently in SETs: "(a) instructor presentation of material, (b) facilitation of learning and (c) regulation of learning" (Jackson, et al. 1999). Various other researchers have accepted and used these dimension clusters when developing or testing SETs to assist in producing the multidimensional aspect of the rating system (Onwuegbuzie et al 2007; Marsh 2001). Researchers have identified various additional dimensions that impact SET results. Student mood (Munz and Fallert 1998) was correlated with both instructor and course ratings, as were characteristics of an instructor's personality (Nerger et al. 2007; Onwuegbuzie et al. 2007; Clayson and

Sheffet 2006; Okpapa and Ellis 2005; Clayson 1999; Clayson and Haley 1990). Students value, and thus give higher ratings to positive personality traits they define as caring for students, enthusiasm, fairness related to grading, and accessibility (Surratt and Desselle 2007; Onwuegbuzie et al. 2007; Clayson and Sheffet 2006; Okpapa and Ellis 2005; Gursoy and Umbreit 2005; Jackson et al 1999; Hinkin 1991; Clayson and Haley 1990). However, Cashin (1995), states the instructor's personality "is not related to student ratings".

Researchers have attempted to clarify faculty assumptions regarding the impact on SETs from class size, class time, whether the class was required or an elective, the workload (required assignments and preparation for the class), and grading leniency. The effects of class size have been the focus for Uttley and Carson (2007), Maurer et al. (2006), Shurden et al. (2005), Kwan (1999), and Fernandez, Mateo and Muniz (1998), but have shown mixed results (UCSB 2004). Uttley and Carson (2007), Cashin (1995), and Hinkin (1991) studied the effects of class length, and time of day for the course, again finding mixed results.

Gursoy and Umbreit (2005) and Marsh (2001) explored definitions of good and bad workloads assigned to students. Students define workloads by the amount of time they spend on productive, valuable activities related to the course. The myth is that less workload for students leads to higher student ratings. Gursoy and Umbreit (2005) and Marsh (2001) found that students valued, thus giving positive ratings, for a high good workload and negative ratings for a high bad workload (activities that student's did not believe were productive for learning in the course). Of course, there is a point where too much good workload was just too much, thus lowering the rating. However, this point is never identified within the research, possibly because it varies by student. Cashin (1995) suggests that evaluations based on workloads support the validity of student ratings, but Cashin does not distinguish between "good or bad" workloads. Nor does he address the myth of workloads. Lenient grading and its impact on positive ratings has been the focus for a number of researchers, but results have been mixed (Surratt and Desselle 2007; Marsh 2001; Jackson et al. 1999; Cashin 1995). There is a general positive correlation between grades, either expected or actual, and student evaluations of teaching (Nerger et al. 2007; Millea and Grimes 2002; Johnson 2002; Marsh 2001; Greenwald and Gillmore 1997; Jackson et al. 1990; Cohen 1981), but Marsh and Roche 2000 caution that good grades can come from higher motivation and greater interest in the subject matter and need not constitute bias. In fact, "workload, expected grades, and their relations with SETs were stable over 12 years" (Marsh and Roche 2000). The age, race and gender of both instructor and student have shown mixed results in their impact on SETs (Surratt and Desselle 2007; Davidovitch and Dan Soen 2006; Okpala and Ellis 2005; Millea and Grimes 2002; Cashin 1995).

In our previous research, we have focused on identifying differences in student perceptions of classes taught through distance education (DE) videoconferencing depending on whether students attend at the originating or remote site. As we expected, remote-site students gave lower ratings to their DE classes than did originating-site students, and were less satisfied with the classes in general (Uttley and Carson 2006). The goal of last year's research was to identify external factors that influence SETs among faculty teaching multiple sections of the same class. We concluded that if instructors wanted to maximize their evaluations, they would teach only two sections of a class in one semester. Counterintuitively, they would teach classes that meet early on Monday, Wednesday, and Friday mornings and they would never teach at 10:00 AM or 11:00 AM. They would teach upper level classes that are relatively large, and they would hope for a relatively low response rate on the SETs (Uttley and Carson 2007).

An additional element in the equation of SETs that is beyond the control of an instructor and not yet explored is how seriously students take the evaluations when completing them. Onwuegbuzie et al. (2007) point out that the "... lack of knowledge of the actual process that students use when they respond on TEFs (teaching evaluation forms) makes it difficult to claim that studies have provided sufficient evidence of substantive validity regarding TEF ratings" (p.118). Pharmacy students saw the SETs as an opportunity to express their opinions (Surratt and Desselle 2007). Consistent with our interest is factors

beyond the control of instructors, and due to the lack of research regarding how students approach the teaching evaluation process, we chose to explore two questions: “What are students’ perceptions of teaching evaluations and do they take the evaluations seriously?”

METHODOLOGY

The focus of this paper is to examine student perceptions of the method used for student evaluations of teaching (SETs). In 2004, Lander University adopted the Individual Development and Educational Assessment (IDEA) instrument to collect student perceptions of all of their classes. The College of Business and Public Affairs (COBPA) began using this instrument in the fall of 1998. Unlike the other three colleges at Lander, our college has always used a unique strategy for conducting these student evaluations of teaching. On a particular two days, about 2/3 of the way through the semester, all classes in COBPA are evaluated. A faculty member, other than the class instructor, administers the evaluations at the beginning of class. The vast majority of the students in our college take four to six classes per semester, which means that by the end of the second day, a student has seen the same evaluation instrument for up to six times. As part of our continuing research into the impact of factors that are beyond an instructor’s control on their Student Evaluations of Teaching (SETs), we asked students about their perceptions of the IDEA instrument and the process used by the College of Business and Public Affairs.

The IDEA instrument provides three summary measures for each class. The first measures effective teaching in terms of progress made on particular course objectives, which instructors pick from a list of 12 possible course objectives, designating each as essential, important, or not important to the particular course. Those objectives deemed essential are double weighted in the IDEA assessment calculations. Regardless of the objectives chosen by each instructor, the IDEA instrument is identical. Objectives are organized into six categories: *Basic Cognitive Background*; *Application of Learning*; *Expressiveness*; *Intellectual Development*; *Lifelong Learning*; and *Team Skills* (www.idea.ksu.edu). Most categories include multiple possible objectives, rated by students on a five-point scale from *no apparent progress* (1) to *exceptional progress* (5):

Basic Cognitive Background

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories

Application of Learning

3. Learning to *apply* course material (to improve thinking, problem solving, and decisions)
4. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course

Expressiveness

6. Developing creative capacities (writing, inventing, designing, performing in art, music, drama, etc.)
8. Developing skill in expressing oneself orally or in writing

Intellectual Development

7. Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc.)
10. Developing a clearer understanding of, and commitment to, personal values
11. Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view

Lifelong Learning

9. Learning how to find and use resources for answering questions or solving problems
12. Acquiring an interest in learning more by asking questions and seeking answers

Team Skills

5. Acquiring skills in working with others as a member of a team.

The second measure is based on the single statement, "Overall, I rate this instructor an excellent teacher." Response options range from *definitely false* (1) to *definitely true* (5). The third measure is based on the single statement, "Overall, I rate this course as excellent." The responses are the same as those used for the second measure. For each measure, the IDEA center calculates raw and adjusted average scores, recommending that the adjusted scores be used for comparisons. Scores are adjusted on the basis of students' professed desire to take the course, expressed effort put forth, and perceived amount of work required.

While the literature includes other studies of student perceptions of teaching evaluation instruments and student ideas about what should be included in evaluations of teaching, we designed our study specifically to focus on the evaluation instrument and process used at Lander. Within our college in the spring 2008 semester, faculty taught 84 classes from which to collect data. Since only our college employs the two-day evaluation process, we eliminated lower level general education courses (Anthropology 104, Sociology 101, Economics 101, etc.), which are taken by students from all colleges at Lander. We invited all college faculty to participate and distributed surveys to those who agreed. Approximately one week after the completion of the evaluation instruments, surveys were distributed to students. We asked that each student complete only one survey. Thus, as the distribution time lengthened, an increasing number of students from any specific class had already completed the survey. On the survey forms, we asked students to indicate if they were at least 18 years old and that we had permission to use their data in our analyses. A few students were evidently younger than 18 and a surprising number did not give permission for us to use their data. We eliminated those surveys, which left us with 373 usable surveys from students in 35 classes. Our survey consisted of six perception questions and two demographic questions:

1. I believe the IDEA evaluation form is an accurate way for students to provide feedback to administrators about their professor's teaching objectives for the course.
2. I believe the IDEA evaluation form is an accurate way for students to provide feedback to professors regarding their teaching objectives for the course.
3. I believe the administration takes the IDEA evaluation results seriously for faculty retention, promotion, and salary increases.
4. I believe faculty take the results of the IDEA evaluations seriously.
5. I respond to the first IDEA evaluation on the first day in a serious manner; I read each question and carefully consider each of the responses, selecting the most appropriate.
6. I respond to the last IDEA evaluation form on the last day in the same serious manner as the first IDEA evaluation I respond to.
7. I am Female _____ I am Male _____
8. I am in the department of Business Administration _____
I am in the department of Political and Social Sciences _____
I am not in the College of Business and Public Affairs _____

The responses for each perception question were arranged in a Likert format from strongly disagree (1) to strongly agree (5). The demographic questions were checked or left blank to provide a yes or no format. We used the MicroCase* statistical package to analyze the data. We compared students from the department of Business Administration to those from Political and Social Sciences (PaSS); we compared females to males; we compared perceptions from day one to perceptions from day two. Since our data are nominal and ordinal level, we used contingency tables for our comparisons and rely on X^2 , lambda, Somer's D and percentage differences for our analyses (Fox 2003).

* MicroCase Corporation, acquired in 1999 by Wadsworth, now a division of Thomson Learning, Inc.

DESCRIPTIVE ANALYSES

Due to the lack of literature on student perceptions of the IDEA instrument, we have approached our exploration with a series of questions. Table 1 shows the demographic characteristics of our research population. Our percentage of females and males falls between the percentages for Lander and for COBPA, which is to be expected because Sociology has many more female students, and Business has more male students. Respondents from Business represent 57% of their majors; respondents from PaSS represent 52% of their majors.

Variable	Valid N	%	Variable	Valid N	%
Sex	365		Department Affiliation	348	
Females	207	56.7	Business Administration	228	65.5
Males	158	43.3	Political and Social Sciences	104	29.9
			Neither	16	4.6

Table 2 includes the distribution of responses from our respondents.

Survey Questions	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
Accurate way to provide feedback to administrators about professor's teaching objectives.	6.7	15	7.5	52.5	18.2
Accurate way for students to provide feedback to professors about their teaching objectives.	5.4	15.0	8.0	51.7	19.8
Believe administration takes evaluation results seriously for faculty retention, promotion, and salary increases.	7.5	19.3	20.3	36.5	16.1
Believe faculty takes the results of the IDEA evaluations seriously.	5.8	12.3	19.5	42.5	20.0
Take first IDEA evaluation on the first day in a serious manner.	6.0	6.9	10.2	39.8	37.1
Take last IDEA evaluation on the last day in the same serious manner.	9.0	10.7	10.7	38.1	31.5

Exploration Questions:

Question 1: *Do students differ in how seriously they think about their completion of the IDEA instrument depending on whether it is the first day or the last day of the teaching evaluations process?* For our comparative analyses, we collapsed the variable responses into three categories: disagree, neither disagree nor agree, and agree. It is obvious from figure 1 that over two thirds of all students say that they approach the evaluations in a serious manner. It is also obvious that fewer students take the evaluation seriously on the last day (69.6%) compared to the first day (76.9%). The relationship is significant based on Somer's D_{yx} of 0.696 ($p=0.001$), a proportional reduction in error (PRE) measure, that indicates knowing a student's seriousness on day one reduces the error in predicting their seriousness on day two by nearly 70%. Ten percent of students, who stated that they approached the evaluations seriously on the first day, said that they did not approach them as seriously on the last day, the change we expected to find.

Curiously, 12.8% of students who said that they did not approach the evaluations seriously on the first day, agreed that they approached day two of the evaluations with equal seriousness.

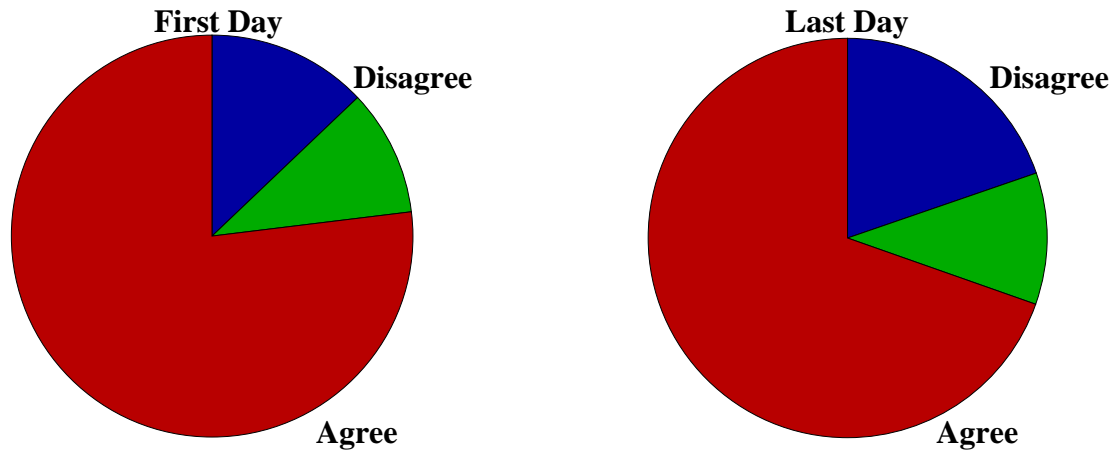


FIGURE 1. Distribution of students showing the seriousness with which they approach teaching evaluations for the first day and last day of the evaluation period.

Question 2: Do students differ in how seriously they think about their completion of the IDEA instrument based on whether they are majors in the department of business administration or political and social sciences (PaSS)? Kwan (1999) and Nerger et al. (2007) found academic discipline to be associated with differences in SETs. Do these differences reflect different perceptions about the teaching evaluation process or instrument as well? Figure 2 shows the comparison of students from business and PaSS. While a higher percentage of PaSS students (81% and 70%) than business students (77% and 69%) state that they approach the teaching evaluation process in a serious manner, neither of the differences is significant. In fact, we found no significant differences between students from the two departments.

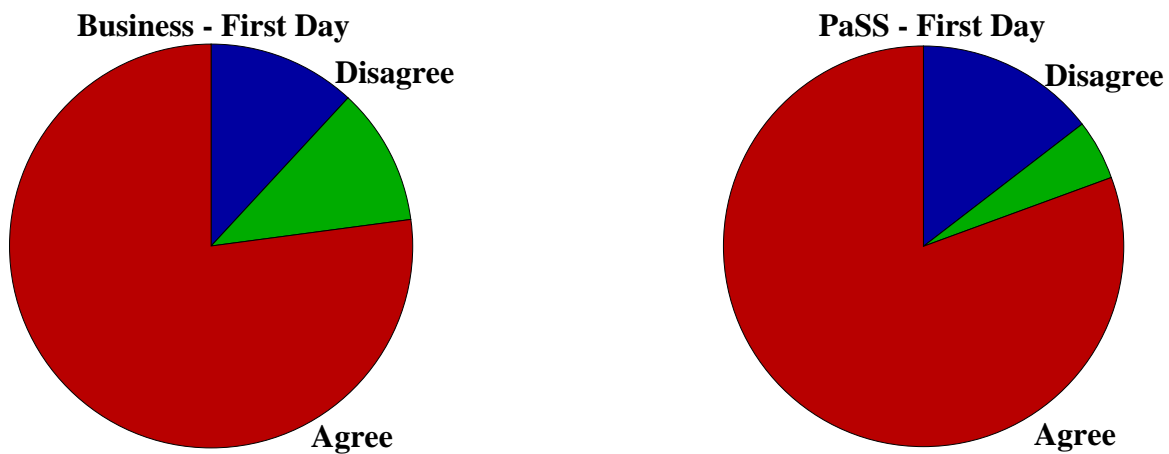


FIGURE 2a. Comparison of students from business and PaSS showing the seriousness with which they approach teaching evaluations for the first day of the evaluation period.

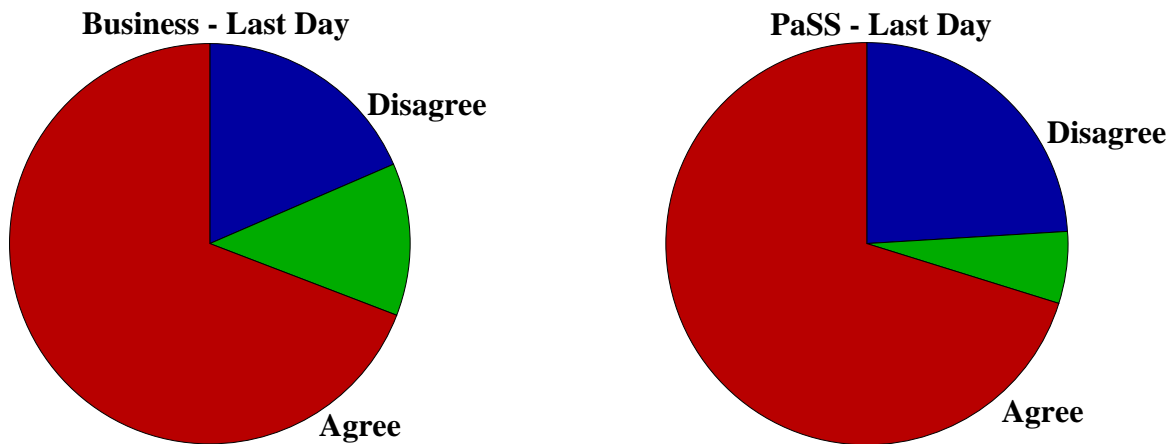


FIGURE 2b. Comparison of students from business and PaSS showing the seriousness with which they approach teaching evaluations the last day of the evaluation period.

Question 3: *Do females differ from males in how seriously they approach their completion of the IDEA instrument?* In general, females tend to evaluate teaching more positively (Millea and Grimes 2002; Davidovitch and Dan Soen 2006). Might this suggest that females also approach the process of completing teaching evaluations more seriously? In figure 3a, it is easy to see that significantly ($p=0.045$) more females (82%) approach the evaluation process seriously than do males (71%) on the first day of evaluations. Figure 3b shows that for the last day of evaluations, the difference between females (75.7%) and males (61.4%) is even more pronounced ($p=0.008$).

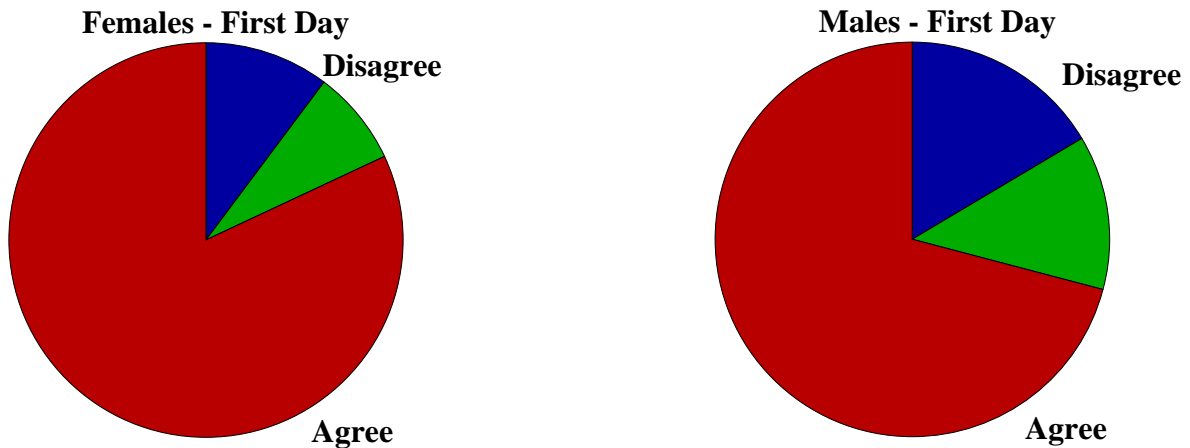


FIGURE 3a. Comparison of females and males showing the seriousness with which they approach teaching evaluations for the first day of the evaluation period.

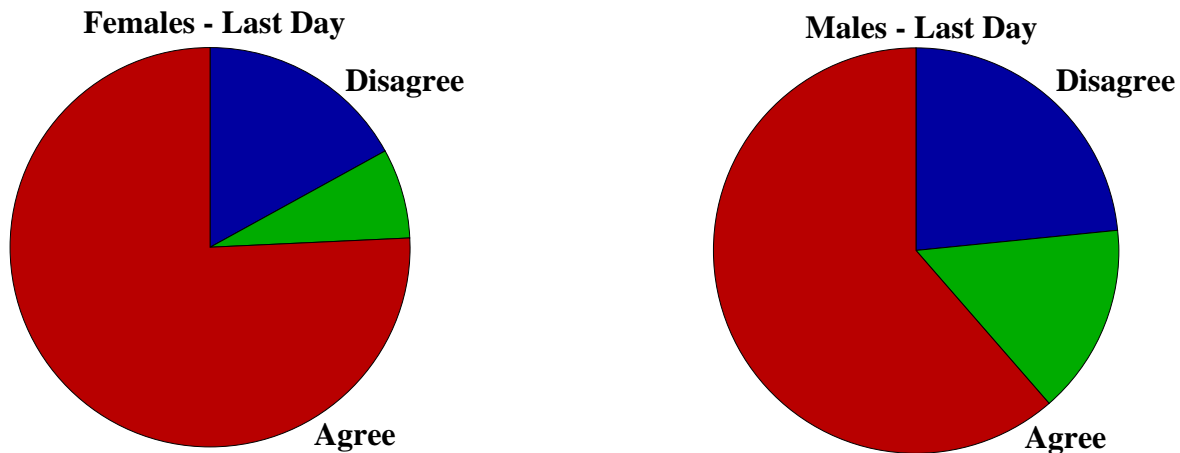


FIGURE 3b. Comparison of females and males showing the seriousness with which they approach teaching evaluations for the last day of the evaluation period.

We found one additional significant difference between females and males. Based on Lambda (0.082), sex explains 8.2% of the variation in students' beliefs about whether the IDEA instrument provides accurate feedback about a professor's teaching objectives to the administration. This comparison is shown in figure 4 ($p=0.001$).

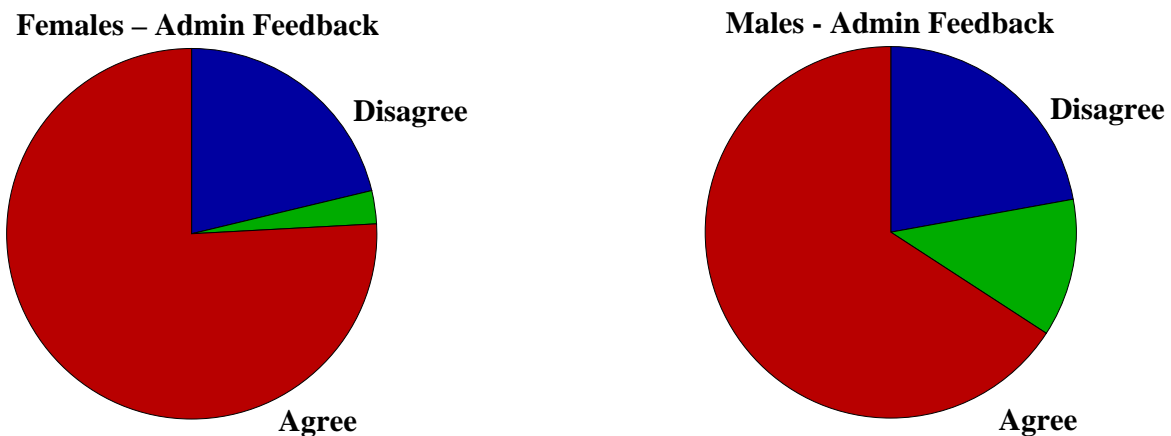


FIGURE 4. Comparison of females and males showing their beliefs that the IDEA instrument is an accurate way to provide feedback to the administration about a professor's teaching objectives.

Additionally, in our exploration, we found no significant differences between the females from the two departments or between the males of the two departments.

DISCUSSION

The goal of this study was to determine what impact, if any, student perceptions have on the evaluation process of the teaching quality. A short survey using Likert-scale questions was developed to assess student's seriousness and perceptions regarding the use of the student evaluation of teaching results. This survey was administered to students approximately one week after they completed the formal student evaluation of teaching.

Our most recent findings indicate that those students who we questioned believe in large measure that the IDEA instrument is an accurate means to provide feedback to the administration as well as to the professor about his or her teaching objectives. In measuring both usefulness to administrator and instructor slightly better than 70% of the students we questioned believed it to be an accurate feedback tool. Conversely, while they perceived it to be useful they did not feel as strongly that the administration took the student evaluations seriously. On this dimension only slightly better than 50% of the students we queried perceived the administration was serious in its use of the instrument when determining retention, promotion and salary increases. On the other hand, and again slightly better than 70% of the queried students believe that the instructors took the results of the IDEA evaluation seriously. Finally, we observe from the data that there a measurable difference, although slight, in perception about the level of seriousness depending on whether or not the evaluations occur on the first or last day of the evaluation period. The difference between these two days is slightly better than 7% indicating that evaluations rendered on the last day of the evaluation period may not be given the same attention as those rendered on the first day.

Our survey instrument had some problems. In addition to the 228 usable surveys from the department of business administration, 18 students (7.3%) failed to check the line giving us permission to use their data. In addition to the 104 usable surveys from the department of political and social sciences, 14 students (12%) also failed to give permission for us to use the data. In addition, 6 students, who were not in our college or did not identify their college, also failed to give us permission to use their data. On the survey instrument, the line under the introductory instructions included two blanks to be checked: the first asked students to indicate that they were at least 18 years of age; the second asked for permission to use the data. The majority of the students, who did not give us permission to use their data, did check the blank indicating their ages. We suspect that this horizontal layout explains the missed blank. On future surveys, we will arrange these two indicators vertically and use check boxes, rather than lines. Hopefully, the modified layout will decrease the likelihood that students will miss these items.

Our second set of identifiers was also problematic. We asked students to indicate their academic affiliation. A few students checked that they were in either the department of business administration or political and social sciences and also checked that they were not in our college. We did not realize that students did not know the name of the college in which their department was housed. It should be easy to avoid this confusion in the future if we asked students to indicate their department, but if not the departments in our college, to indicate their major.

While entering data, we noticed a contradiction in a sequence of answers. About 10% of students, who said that they did not take the evaluations seriously on the first day, stated that they approached the second-day evaluations with equal seriousness. Obviously, their answers mean that they never took the evaluations seriously. This problem occurred because of the wording of our questions. Both of these questions should have asked how seriously students approached the evaluations. The answers could have ranged from very seriously to not at all seriously in a Likert format.

We did not include an open-ended question asking for comments, an oversight. We did, however, receive two useful comments. One student wrote, "Just let us write what we think!" which we assume refers to faculty performance. Another student commented that they did not think the majority of students took the evaluations seriously unless they felt they had been wronged in some way.

Based on the research of Davidovitch and Dan Soen (2006), who found that instructors of mandatory courses received lower evaluations compared to instructors of electives, we should have asked if students took evaluations for required classes more seriously than those for electives.

Several studies, Nerger et al. 2007; Onwuegbuzie et al. 2007; Clayson and Sheffet 2006; Okpapa and Ellis 2005; Clayson 1999; Clayson and Haley 1990, have identified that characteristics of an instructor's

personality are directly correlated to both instructor and course ratings. We should have asked if the professor presented a positive personality in the classroom. In the same area of reference Surratt and Desselle (2007) found that students were more willing to complete the teaching evaluation if they really liked or disliked the professor. We should have asked if students were more likely to complete the questionnaire based on their like or dislike of the professor.

Based on our findings we need to examine what students used as a measurement of seriousness on the part of administration and instructor. This could be addressed in an open ended question, What would you like to see happen with the results of the IDEA evaluations?

Our intent for the future is to continue examining the IDEA evaluation instrument emphasizing student attitudes, sex and academic discipline differences. We believe that this research continues to challenge the received wisdom regarding the validity and reliability of the IDEA evaluation instrument. The need to implement the most valid and reliable instrument to gauge teaching quality is vital in the world of accountability.

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ASSESSMENT OF COURSE LEARNING OUTCOMES USING END-OF-SEMESTER INSTRUCTOR/COURSE EVALUATION PROCESS: BENEFITS AND DRAWBACKS

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ABSTRACT

Some are considering an end-of-the-course instructor/course evaluation system in which, among other traditional questions, students will be asked to rate the extent of their learning in each predetermined course learning outcome based upon their perceptions. This paper through a pilot test, has explored the benefits and drawbacks of such assessment approach. The results from the pilot test are discussed in the paper. The findings from the pilot test are intended to be used for a large scale study.

INTRODUCTION

Since the mid-1980s, public demand for assessing the effectiveness of higher education has grown steadily, due to the increase in the public interest in how tax dollars are being allocated and spent for higher education. In addition to the state requirements, assessment data are required by organizations, which accredit academic institutions such as the Southern Association of Colleges and Schools (SACS) and the Association to Advance Collegiate Schools of Business (AACSB) International. The concept of assessment is inherent in the accreditation process. It plays an important role when the accrediting agency must decide which universities and colleges deserve accreditation and which do not. Because of the mentioned forces, educators have been faced with an unprecedented demand for accountability by higher education. Whether faced with the state and/or accreditation requirements, institutions of higher education are moving to provide assessment data to their constituents and stakeholders through development and implementation of a formal assessment process.

RESEARCH OBJECTIVE

Some are proposing the development and implementation of an end-of-the-course instructor/course evaluation system in which, among other traditional questions, students will be asked to rate the extent of their learning in each predetermined learning outcome set for the course based upon their perceptions. This process, if adopted, will measure the course learning outcome in “indirect approach” from the students’ point of view. The purpose of this study is to investigate the benefits and drawbacks of this type of assessment method.

RESEARCH METHOD AND RESULTS

Pursuant to the goal of the study, the following steps were undertaken:

1. During the last class of an introductory accounting course, through an anonymous survey, students were asked to rate the extent of their learning in each predetermined learning outcome set for the course based upon their perceptions. This constitutes “indirect” method of assessment. The predetermined course learning outcomes were listed in the course syllabus and were discussed on the first day of class. In addition, they were listed in the survey instrument. Table 1 displays the results for this step. For example, 44% of the students who participated in the survey perceived

that the extent of their learning in course learning outcome one was “adequate” and 56% perceived their learning was “good”.

Table 1. Indirect Assessment Results

Course Learning Outcomes for ACCT 2101 – Principles of Financial Accounting	Indirect Assessment		
	Little	Adequate	Good
1. Recognize and explain the purpose of the general purpose financial statements (i.e., Income Statement, Statement of Retained Earnings, Balance Sheet, and Cash Flows Statement), differentiate and compute various elements of the general purpose financial statements	0%	44%	56%
2. Recognize, interpret, and calculate financial ratios pertaining to the analysis of the general purpose financial statements	13%	50%	38%
3. Determine the impact of specific business transactions or errors on the financial statements	0%	44%	56%
4. Recognize, explain, and apply basic accounting principles and accounting practices pertaining to cash, receivables, merchandise inventory, assets, liabilities, and stockholders' equity	6%	25%	69%
5. Know the process by which business transactions are recorded and processed for the preparation of financial statements in service and merchandising companies	6%	44%	50%

- To assess the reliability of the answers provided by the students, 10 of the topics covered in the course were listed in the survey instrument and the students were asked to indicate the course learning outcome to which each topic was related to. Table 2 displays the results. For example, “Current Ratio” is part of course learning outcome two (LO2). Sixty three (63%) of the students identified “Current Ratio” with the correct course learning outcome and 37 % did not identify the correct learning outcome.
- Using a comprehensive final exam, the extent of students’ actual learning in each predetermined course-learning outcome was measured. This constitutes “direct method” of assessment which is recommended by the AACSB International. The final exam contained 80 multiple choice questions. Table 3 displays the results. For example, in average, 68% of the students had correct answers for the 18 questions pertaining to the course learning outcome one (LO1).

CONCLUSION

Based upon the pilot study results, it appears that the “indirect assessment” results, although useful to some extent, but is not highly reliable. For example, based upon indirect assessment results, 94% of the students expressed that the extent of their learning in course learning outcome four was adequate and good. However, per “direct assessment” results only 56% of the class had correct answers for 29

questions pertaining to learning outcome four. Per study results, some of the students had difficulty in identifying the correct learning outcome to which each the 10 listed topics were related to. The results of this study should be of interest to the administrators and educators. In vast majority of universities and colleges, administrators use the student evaluation of instructor/course results for merit, promotion, and tenure decision.

Table 2. Reliability Results

Ten of the Topics Covered in the Course	Course Learning Outcome					Correct Answer
	LO1	LO2	LO3	LO4	LO5	
1. Current Ratio	6%	63%	19%	6%	6%	LO2
2. Journalizing sales transactions	0%	0%	38%	6%	56%	LO5
3. Matching principle	13%	6%	19%	25%	38%	LO4
4. LIFO method	6%	0%	19%	50%	25%	LO4
5. Computation of current assets	38%	13%	13%	38%	0%	LO1
6. Bonds	13%	38%	6%	38%	6%	LO4
7. Impact of overstatement of expense	13%	7%	53%	13%	13%	LO3
8. Posting	0%	6%	25%	13%	56%	LO5
9. Multiple Income Statement	69%	6%	6%	13%	6%	LO1
10. Measuring solvency of a company	19%	56%	19%	6%	0%	LO2

Table 3. Direct Assessment Results

Course Learning Outcomes for ACCT 2101 – Principles of Financial Accounting	Number of Questions on the Test	Direct Assessment
1. Recognize and explain the purpose of the general purpose financial statements (i.e., Income Statement, Statement of Retained Earnings, Balance Sheet, and Cash Flows Statement), differentiate and compute various elements of the general purpose financial statements	18	68%
2. Recognize, interpret, and calculate financial ratios pertaining to the analysis of the general purpose financial statements	12	68%
3. Determine the impact of specific business transactions or errors on the financial statements	11	72%
4. Recognize, explain, and apply basic accounting principles and accounting practices pertaining to cash, receivables, merchandise inventory, assets, liabilities, and stockholders' equity	29	57%
5. Know the process by which business transactions are recorded and processed for the preparation of financial statements in service and merchandising companies	10	82%

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A STUDY OF TROY'S E-CAMPUS TEST STRATEGIES: COMPARISON OF PROCTORED AND NON PROCTORED EXAMS

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ABSTRACT

The authors studied the testing pattern grades in four e-campus courses at Troy University with 76 students. In their research, the authors found significant differences in average test grade scores between tests taken electronically without a proctor as compared to those administered using a live or a remote proctor overall. To control for differences among courses, a statistical test was solely conducted on the courses which had the same instructor, same text, and similar tests with comparable results; students scored significantly lower on proctored exams versus non-proctored exams. To enhance the quality of courses in the online environment, the researchers recommend several pedagogical strategies based on their findings and an extensive literature review.

INTRODUCTION

Fueled by intense competition in higher education as well as the increasing popularity and the widespread availability of the Internet, distance learning is becoming the mode of choice for many university courses and programs. It is getting difficult to find a major American university or college which does not offer distance learning to their students. In 2003, Lawrence [25] found that enrollments topped 1.3 million "in over 50,000 distance-learning course offerings". The *Chronicle of Higher Education* estimates that nearly 1 in 2 university or college students in the U.S. has taken a course online and nearly 1 in 10 take their entire program online [54].

As online education increases in use, faculty and administrators alike are questioning whether the quality of the education experience in the online setting is equivalent to the quality of in-class courses. This study hopes to address the issue of quality in the online education environment and add empirical proof that proctored tests could add more rigor to the distance learning arena.

In addition, this research project aims to increase the evidence and hopefully in a small way tackle Phipps & Meisotis' [35, p. 25] criticism that "there is a relative paucity of true, original research explaining or predicting phenomena related to distance learning."

LITERATURE REVIEW

Use of Technology

The use of technology seems to be of little question in the classroom. Online education is booming. The benefits are numerous. Online or distance education feedback from students on

assignments can be gathered in real time and the professor can improve on the class while it is going on (Abraham, 1995, 145). Lawrence and Singhanian (2004, 333) suggest that the boom in online education is directly linked to the use of technology since distance courses and programs can “reach a broader student audience and have the potential to address student needs better at significantly lower costs.” Many universities are “transitioning their developmental education courses onto the Web to provide greater access for students and to reduce teaching loads [47, p. 6).

As the technology becomes more sophisticated, faculty can use the technology to eliminate some of the problems associated with distance learning, for example, cheating and questionable identity of the student. Professors can catch cheaters and stop identity fraud through many different techniques tied to new technologies: cameras, remote proctors (which also have fingerprint and id checking mechanisms), proctored exams, by calling them on the telephone unexpectedly to assess progress, discuss a point further or to ask how the student found a piece of information (i.e. checking for plagiarism), and by checking paper content through an internet search engine or Turnitin software.

Benefits and Drawbacks to Online Education

Although online education is expanding and being embraced by more institutions of higher education than ever before, moving courses from the traditional classroom to an online setting fundamentally shifts human interaction, communication, and learning paradigms (Robles & Braathen, 2002). There are a number of benefits that are part of distance learning’s allure. In online courses, because of the nature of the environment, all communication is in writing and that increases the “academic rigor” in the assessment of writing and thinking skills since professors would probably see more writing and discussion samples. The professor can really get to know each student’s work better than in an on-site class especially for the more reserved or quiet student who does not participate much. In the online environment, everyone is participating more equally. Some professors ask students to write essays early in the class and that way they can compare writing styles on a paper to the beginning essays to assess plagiarism [10, p. A 47].

The delivery platforms such as Blackboard, Vista and Web-CT have narrowed the variety of approaches in the online environment since they have similar basic functions of discussion board, chat rooms, group work (chat and discussion board), schedule/calendar of work, posting of website links, articles, powerpoint, video clips, electronic gradebook, assignment grading with feedback notes, and digital dropboxes where papers can be reviewed and uploaded with comments. Many publishers now have downloadable e- textbooks and learning packets with many student learning tools such as online quizzes, online libraries/articles, online powerpoints, chapter summaries, and faculty resources.

Although hybrid and online classes are on the upswing, drawbacks to distance learning include: potential for breakdowns - “web servers crash, FTP programs stop transferring files and some browsers may not support certain features”; technological barriers - “some students are still uncomfortable with computers and may not have easy access to the Internet” and people are too busy/distracted - “it is very time consuming for faculty and students” alike to teach and learn in the online environment [1, p.147].

Another con to online courses as viewed by faculty is that “students can cheat” by finding sources on the internet or using their books during the exams, having someone else take their exams for them or plagiarizing other people’s work [10, p. A47]

. Often online students are working adults who have spent time in the work world and typically are older and believed to be “far less prone to cheat than the younger audience” [29, p. 4]. As online courses and programs increase, there will be greater potential for abuse since younger students are far more inclined to cheat and have more technological savvy to find creative ways, who become online students, ‘beat the system’ in the future. Kerka & Wonacoot [23] agree that it is becoming more difficult to identify online cheating and impersonation is perceived as a greater risk.

Benefits and Drawbacks of Online Testing

Benefits of online testing are numerous: immediate results to faculty and students, and no loss of exams or compromising security by mailing or faxing [28, p. 5]. Advantages of online testing also include the convenience of taking a test whenever and wherever a student wants, getting immediate feedback, and adaptive testing (where the computer gives progressively harder questions in quizzes) [43].

In the traditional class setting, testing with a professor provides face to face contact between faculty and students, clearer test instructions, direct supervision of students, and fast feedback on performance (depending on the professor). However the cons to the traditional classroom are that some professors may take too long to grade tests and give back results [28, p. 5]. This is in direct contrast to the online testing environment which results in nearly immediate test results for multiple choice questions (automated systems) and fairly quick and more detailed feedback to students on other types of questions such as short answer or essays.

Concerns about online testing from faculty are widely voiced and include the following: 1) ensuring the student’s identity (is student taking the test him/herself or getting outside help), 2) discomfort of faculty with technology; 3) can online tests evaluate difficult concepts, 4) how does online testing limit student’s options, 5) how can qualitative results be determined online, 6) will wording on online test affect students’ responses, 7) ease of technology for student use; 8) ease and timeliness of data collection, and 9) difficulty of administering an online test [29, p. 2].

Student Characteristics Needed for Online Success

Students in distance education need to be self starters and have good study skills. This can be viewed as a plus or a minus. For the independent learner who is often self-motivated, the course can be done more at the student’s pace and workload can be arranged to fit the student’s work schedule (such as job related travel) more easily in the online environment. Chang (2005) found in his research that students in a Web-based course have more positive motivational orientations and are more self-directed if they have specific instructions on learning strategies in their orientations to online education.

In addition, students currently who take on-line courses have been seen to have “unique characteristics” such as being older, having more work experience, enrolled in more non-traditional degree programs, have longer commutes, “have more childcare responsibilities”, and greater computer experience in general, according to Dutton et al. [16, p. 1].

On the other hand, for students who struggle with reading, writing, and comprehending concepts, distance education can be very demanding since students need stronger written communication skills, a higher comfort level with technology, to be well organized about due dates and must

balance their time wisely to get all the online tasks completed. There is a tendency for some students to put off their assignments to the last minute as attested by the statistics in a tool like Blackboard; typically 30-50% of students wait until the last afternoon before the due date to submit an assignment online.

Face-to-face Versus Written Communication

In most communication courses, experts agree that face-to-face communications are a 'richer medium', meaning they are more appropriate for complex communications and for relaying messages that have high importance in people's lives, such as promotions, performance evaluations, bad news and criticism. This is primarily because in face-to-face communications, the listener can check to hear the words and also see the facial and non-verbal signals which communicate a bigger picture to the listener.

This is probably why many faculty still enjoy teaching in the classroom. However, there are times that written communications (which is the most relied upon communication in distance education) actually enhances learning and greater participation. For example, values are easier to discuss in writing than orally since "inadvertent or arranged nonverbal signals are not so dominant" in the online environment [12, p. 5]. Also, students may enjoy the anonymity of the online environment since their race/ethnicity, their physical deficits (i.e. obesity, disabilities, dwarfism) and their lifestyle differences (i.e. attire, economic status, piercings, tattoos, hair colorings/cuts) will not be issues in the online environment nor will they play a role in the faculty's bias regarding their performance. In addition, students who must travel for their jobs, have different shifts or who have children are able to access the online courses anytime that is convenient to their individual schedules. A mother with 5 children said about her experience at Brenau University (i.e. located in Gainesville, Georgia): "It would have been impossible for me to dream of completing an MBA before Brenau went online with its program." [55].

Assessment Methods

As online education is becoming more mainstream, the need to assess teaching in the online environment increases. There are a number of "best practice" recommendations for teaching methodologies in the online environment as researched by Chickering & Ehrmann [12]:

Good practice #1 – Encouraging contacts between faculty and students. The online environment can "strengthen interactions with all students, but especially with shy students who are reluctant to ask questions or challenge the professor directly." [12, p. 4].

Good practice #2 – Structure more interactions with other students; study groups, and group discussions in an online course; this can be a source of collaborative learning and group problem solving. A "clear advantage of email for today's busy commuting students is that it opens up communications with classmates even when they are not physically together [12, p. 5]

Good practice #3 – Use active learning; having students do research on the internet gives practical hands-on experience to students right in the online environment and taking online courses increases the student's facility with technology [12, p. 5]

Good practice #4 – Give prompt feedback; professors using online testing allows nearly immediate feedback for students on objective tests and usually much faster feedback on qualitative tests such as essays or case analysis; tracking changes on papers can provide learning opportunities for students in improving their papers; email can be used for more private and customized feedback to individual students or the discussion board can be used to give more general comments for all students to learn from; computers can be used for portfolio evaluations so faculty and students can see how students have gained in knowledge or improved their performance [12, p. 6].

Since students vary in their readiness for the online environment, universities may want to assess the specific study skills of each student and screen those who do not have the needed skills to perform well in the online environment [47, p. 13]. Developing the skills needed for self-study and online learning as well as an overall orientation to the online course materials/content management system is recommended as a “best practice”, which has some empirical research confirming its effectiveness. In their study, Wadsworth et al. [47] found that students in a developmental online math course scored significantly higher in their final grade for the course if they had higher motivation, concentration, information processing and self-testing strategies. “Providing real examples and practice to students on how to transfer strategies from a traditional to an online classroom can give students tools to ensure success in the online classroom” [47, p. 12].

Another ‘best practice’ is for professors in online courses to use a variety of measures to assess learning outcomes to compensate for a lack of face to face interaction. Dr. Iyengar [21, p. 5] uses the following techniques: weekly online quizzes, discussion postings, optional chat comments on the learning experience (like a journal), proctored tests and test analysis.

For instance, in test analysis, Iyengar [21] gives students the breakdown of the percentages of students who incorrectly answered certain questions and asks why students think they got the question wrong. This helps him to explain the concepts in further detail to those who may have not clearly understood it in that class and to improve his teaching for the next group. This interchange also encourages students to “take responsibility for their learning” Iyengar [21, p. 5] believes.

An additional way to offset one of the biggest drawbacks to distance education (i.e. the lack of face-to-face feedback, both verbal and non-verbal) is to enrich the online environment [21, p. 5]. For example, encouraging each student to bring examples from the real world that collaborate what they have read or what points were made in a Powerpoint, or doing research via the internet and providing links to the rest of the class on a particular concept or way to solve a problem, can add value to online delivery of courses.

As online instructors can no longer monitor and react to student questions, comments, asides, body language, and facial expressions, they must employ other techniques to acquire the same information [3]. The absence of low level social cues and emotions may minimize the richness of communication, limit and impede a more interactive cyber learning community [38]. Instead of using narrowly defined learning outcomes tested by examinations, technology offers a rich environment where skills such as written communication, collaboration, team work, and reflective thinking can be assessed by giving learners multiple channels, group/general discussion boards/tolls and unlimited space of expression. Technology can be used to create environments for assessment of learning.

However, despite these opportunities in distance education, there are still some differences between online versus traditional course delivery and professors continue to grapple with the recommendations for ‘best practices’ in their individual disciplines. One area that administrators struggle with is what elements of distance education should be controlled by the structure and policies of the university or departmental unit and which parts of course development should be the academic freedom of the professor.

For example, do administrators limit the enrollments of online classes – experts believe that to successfully gain a rapport in the online environment, it is recommended that “no more than 15-20 students be in an online class” [29, p. 3]. In an attempt to increase the quality and consistency of online learning, some schools, like Troy University, have created policies that all online professors must return e-mails within 24 hours during the week and 48 hours on the weekend, have employed full time administrators and staff just for online students, and have a required template for all online syllabi which spells out details such as how many external links must be on Blackboard, where students get a proctor, required online course evaluations and what responsibilities the students/faculty have in online courses (www.troy.edu).

Experts also suggest several ‘best practice’ methodologies to increase the effectiveness of often criticized online assessments including: 1) explain what is meant by cheating or plagiarism and encourage honesty through honor codes or signed integrity policies; 2) “maintain assessment security” through difficult to guess instructor passwords and make frequent copies of grades (from the electronic gradebook) to guard against changes not made by the instructor; 3) use proctored tests for all important assessments and proctors who are “not personally related” to the students; 4) draw randomly generated questions from a large question pool and if possible, reorder the multiple choice answers as well; and 5) control the assessment situation by prohibiting all electronic devices from being in the testing room and disabling printers, internet access, and both hardwired and wireless networks [39, p. 6].

Academic Rigor

Often faculty question whether an online course has the same academic rigor of a traditional class in terms of testing and learning outcomes. Faculty are suspicious of online testing since un-proctored tests (often used in the online environment) are considered to be easier or less rigorous than proctored tests and students may be getting assistance on tests or cheating by getting the answers/questions from friends, or having friends take the exams for them (identity issues) (Mallory & Laury, 2001,3). In other words, students may earn a high mark on an online test but not really learn the material.

Suskie [45, p. 4] recommends that learning outcomes need to be clearly stated and assessments should be tied directly to what you teach, and that faculty should build rapport with students through engaging and frequent assessments (i.e. use “many different measures and many different kinds of measures”) of skills/concepts throughout the course.

In two sections of his introductory Management Information Systems (MIS) class, Dr. Abraham [2, p. 12] found that the students in his online section “performed slightly better than students from another section taught in a conventional classroom setting”. In addition, “students are more enthusiastic about the course, make better presentations, and occasionally make helpful suggestions that improve the class” [2, p. 16]. Dr. Abraham’s experience supports the contention that the online environment can be a highly interactive and engaging learning experience for students, if structured successfully.

The online environment can also be more conducive to offering students extra study quizzes, self testing and study guides. The student generally has more responsibility to take the initiative for their own learning in this venue. To test this assumption of more self discipline and its relationship to performance, Kibble found that “students who used formative assessment generally performed better on summative examinations” and “providing incentives for online quizzes increased student participation.” Formative assessment, in this case, means that un-proctored quizzes were taken repeatedly to prepare for the proctored midterm and final exams [24, p. 258].

Wellman [48, p. 25] discovered in his research on 120 college students in a Doctor of Pharmacy program at Ferris State University that on-line delivery paired with proctored testing was more effective in promoting learning than un-proctored testing as measured by “improvement from medical terminology pre-test to post-test”.

Contrary to Abraham’s study which used MIS classes to compare online and on-ground students, Lawrence and Singhanian [26, p. 336] discovered strong evidence that traditional students outperformed the distance learning students on tests (multiple choice and written) and overall grade (by .259 margin in 11 classes) ($p=.0036$). Also there was a “moderate difference in the percentage of students” who did not finish the class and those who received a D or F, or withdrew (W or WF) was greater in the distance-learning courses than the traditional ones ($p = .0339$) [26, p. 336]. There is one caveat, from 2001 to 2003, students have been getting better in test scores and grades over time in the distance education sections.

Unlike the “typical” online student who is older and non-traditional, most of the students were traditional aged (in their early 20s) in their sample. As students took more online courses, they found that students become better at taking online classes [26, p. 337]. What happened in the Lawrence and Singhanian research is that students who could not get into the traditional on-ground class, were given the option to take a second section of the course which was totally online. If they didn’t take the course online, they would have to wait another semester to get the course. So, in essence, by the structuring of their scheduling of courses, administrators/faculty were ‘forcing’ students to elect ‘online’ course formats when they may not have been ready for them and/or they actually preferred the traditional classroom format.

Proctored Versus Un-proctored Tests

When comparing an un-proctored to an on-ground or online proctored test, faculty in general feel that students do not get the same level of testing. Overall, the concern of faculty is that “un-proctored, on-line, asynchronous testing would be compromised by students collaborating without consent of the instructor” [31, p. 219]. Students themselves admit that the “absence of supervision” is a factor which has influenced them to cheat [50, p. 235]. Even with proctored tests, students may find a way to cheat. Their friends may take the test early and share their results so that late testers do better on the tests than early test takers. One way to address this problem is for faculty to create assessment questions which are “drawn from a large pool and each student is given a randomly generated selection” of questions on an individual test, which currently is possible on management software such as Blackboard and WebCT [34].

To decide on the efficacy of proctored versus un-proctored tests, academe would do well to benchmark what the corporate world has deemed as ‘essential’ in testing. “Because vendors such as Cisco and Microsoft want to ensure the validity of certifications bearing their names, they

insist that exams be taken in brick-and-mortar facilities run by companies such as Sylvan Learning and Prometric. Test takers must show up with two forms of ID and proctors must watch them take exams [37, p. 44]. Proctors are charged with checking the student's identity [28, p. 5]. "Proctored tests also help satisfy accrediting agencies that colleges are offering sound programs" since many accreditation groups have questioned the effectiveness of unproctored testing [52, p. A43].

Test centers also monitor screen content by using software (such as Blackboard) that prevents students from browsing the internet during the test, times the test, and verifies the student's identity (eg. Remote proctoring uses fingerprints and photo id scanners while live proctors visually check photo ids). Tests may be protected by a password which only the proctor or test center receives as an added precaution [28, p. 6].

METHODOLOGY

Participants

The sample size consisted of 76 students in Troy University, including the Georgia and Virginia campuses, who attended four business graduate level courses online. Three faculty members in Finance, Marketing and Management gave both proctored and non-proctored tests in their respective online courses: MGT 6600 in Terms 1 and 2, 2007; HSA 6682 in Term 5 2007; and MBA 6631 in Term 3, 2008. These students' scores were compared in the first phase of a general comparison between proctored and non-proctored tests, despite course and instructor differences. Two of the graduate courses, the MGMT 6600 courses, were taught by the same faculty member, who used similar proctored and non-proctored tests, the same textbook, and the same course materials. As a second phase of the research, this group of students were also statistically analyzed for differences based on the type of testing conducted (N=47).

Statistical Methods

One-tailed t-tests were performed on the four classes as a whole to see if the average test scores for students who took proctored exams were different from the scores for the non-proctored tests. The four classes were in 3 different disciplines, namely Advanced Theory and Concepts of Management (offered for two different semesters in 2007), Health Care Management and Financial Management courses. All students were taking classes online at Troy University from Term 1, 2007 to Term 3 in 2008.

In addition, t-test statistical tests (one-tailed) were conducted on the two classes which were the same with the same instructor using tests that were randomly generated from the same test bank pool. The means, standard deviation and standard error of the mean as well as t test results are given. The researchers also filed and were approved to present the findings internally in March, 2008 and to publish the findings through academic conferences and journals in April, 2008 by the Institutional Review Board (IRB) of Troy University.

RESULTS AND DISCUSSION

Results

In the first comparison (using all the students in all four classes), the authors found the means of the proctored tests were 79% whereas the non-proctored test average was 87% with standard deviation of 14.422 and 9.750 respectively. Standard Error of the Mean was 1.654 for proctored tests and 1.118 for non-proctored tests (Please see Table 1 for the results).

Table 2 summarizes the one-tailed t- test results showing highly significant ($p < .000$) differences in average test scores for proctored versus non-proctored tests.

Table 1. Mean, Standard Deviation, and Standard Error of the Mean of Proctored Vs. Non-Proctored Average Test Scores For Graduate Business Courses at Troy University

	N	Mean	Std. Deviation	Std. Error Mean
Proctored Tests	76	79.18	14.422	1.654
NonProctored	76	87.30	9.750	1.118

Table 2. T-Test Results of Proctored Vs. Non-Proctored Average Test Scores For Graduate Business Courses at Troy University

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Proctored Tests	47.865	75	.000	79.184	75.89	82.48
NonProctored	78.058	75	.000	87.303	85.07	89.53

In order to control for the variance due to differences in instructors and courses, the two classes (of the same course), which were taught by the same instructor, using the same text, similar Blackboard formats online, and similar tests drawn from a random test bank pool, were analyzed. The results were comparable to the general results (for all 4 courses). The average test score for proctored exams was 74% and 86% for non-proctored. Again the proctored test scores on average were significantly lower than the non-proctored scores ($p < .000$). Please see Table 4 for the complete results of the t-test of the MGMT 6600 (Advanced Theory and Concepts in Management) course only.

Table 3. Mean, Standard Deviation and Standard Error of the Mean of Proctored Vs. Non-Proctored Average Test Scores For Graduate Course MGMT 6600 Advanced Concepts in Management at Troy University

	N	Mean	Std. Deviation	Std. Error Mean
Proctored Tests	47	74.17	13.620	1.987
NonProctored	47	86.09	9.987	1.457

Table 4. T-Test Results of Proctored Vs. Non-Proctored Average Test Scores For Graduate Course MGMT 6600 Advanced Concepts and Theories in Management at Troy University

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Proctored Tests	37.335	46	.000	74.170	70.17	78.17
NonProctored	59.096	46	.000	86.085	83.15	89.02

Discussion

The present research gives credence to the assumption that online course rigor can be enhanced by requiring proctored exams. The evidence in this study shows significant differences in test results (ranging from 8-12 percentage point differences in test scores depending on the course). Based upon the findings of this research and the literature review, the authors make the following recommendations for future testing in the online environment:

1. Use more proctored tests in online courses
2. Use qualitative or subjective assignments such as written essays and papers with a rubric for assessment as well as enriching activities such as internet exercises.
3. Have protocol for proctors in taking 2 forms of id.
4. Have stricter guidelines for who can be proctors (i.e. students should not use their friends, relatives, or immediate supervisors as proctors)

5. Use non-proctored tests on a more limited basis, preferably for quizzes or study reviews, or tests which are not a significant percent of the grade. Incentives to use non-proctored tests to prepare for proctored tests can be given as extra credit points or bonus points to encourage this type of self study.

Limitations and Conclusions

Issues which limit the present study include: 1) use of test scores only; 2) limited usage of different types of proctoring (i.e. live vs. remote proctoring); 3) comparison across courses and professors; 4) small sample and cell size and 5) generalizability.

The authors used only test scores in their current research but could investigate if course grades were actually lower when professors used proctored exams. Ideally, the number of proctored tests (or the percentage of the total grade) could be examined to see if there is a threshold for impacting a student's course grade.

Originally the researchers became interested in the impact of a new policy implemented in Term 1, 2007 (August): All professors who taught online graduate business courses at Troy were required to give one (1) proctored exam per term. In Term 1, 2008, Troy University also initiated a pilot study of a remote proctor system called 'Secureexam Remote Proctor System'. Three professors implemented the remote proctor system at that time but only one professor participated in the current study. Since there were only 8 students who used the remote proctoring system, the authors were unable to compare remote versus live proctored test results, which would be a worthwhile follow-up study.

The one drawback to using remote proctoring as gleaned from the professor who was in the pilot study and participated in this research, is the amount of time it takes the professor to get the system up and running, time to review the videotapes of the test (the remote system does give the professor hints as to what behavior, such as noises and motions, is suspicious and which frames on the videotape to watch), and the cleverness of students to deceive the remote proctoring system. The benefits of the remote proctoring system are: 1) low cost of approximately \$150; 2) increased security using fingerprint and student id scanning; and 3) ease of use in any location (particularly useful for military personnel who may be deployed in the middle of a course and distant from any test center/proctoring sites).

Although the overall study was conducted across courses and professors, the subset study of the test scores from one professor who controlled for the text, test questions and teaching methods, shows comparability. However, these results could be suspect due to the small sample size. There were only 76 students in the larger sample and 47 students in the one professor, one course sample. To increase the reliability of the results, the authors suggest using a larger sample size. If possible, it would be best to compare professors who are teaching the same course using the same textbook and again to increase this database so that both sample and cell size are not issues.

Lastly, the research was only conducted in one university. It is highly recommended to increase the generalizability of the study by gathering data from a number of different universities employing distance education. It would be interesting to check on differences between universities based on size, location and missions. Another factor to control for would be the extent of the distance education: Is the student taking one course via distance education or is their entire program online?

In conclusion, the authors found that in different courses with different professors, there were consistent results that demonstrated the effectiveness of proctored exams. By having a proctor, professors will experience a more rigorous assessment which would be more comparable to the traditional classroom test environment. To increase the academic rigor of online classes and to enhance the comparability of online education to traditional teaching, the researchers have convincingly brought evidence to show that students who take proctored tests will perform statistically lower on their tests as compared to students who are given non-proctored tests.

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TEACHING THE CONCEPT OF FREE CASH FLOW TO NON-BUSINESS STUDENTS

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ABSTRACT

The evaluation of financial performance has been extended to include an analysis of free cash flow in finance courses. Understanding this concept is important since it is less subject to accounting manipulations than the more familiar concept of “profits.” Students in disciplines other than business are often encouraged to take one or two business courses as electives. The course often selected is Introduction to Business, a course where profits are discussed, but free cash flow is not. In this paper, we discuss why teaching free cash flow is important, and present an example of the calculation of free cash flow.

INTRODUCTION

Business is widely regarded as a desirable area of study in universities today. The School of Business is one of the largest units in many universities. Students in other disciplines are often encouraged to gain some familiarity with business by taking one or two business courses as electives. It is felt that these courses will improve their overall educational background and increase their opportunities for finding employment following graduation. The courses generally selected are Introduction to Business, accounting, and economics. The Introduction to Business course is required in some programs.

Introduction to Business courses generally include a section on finance and accounting, and there is some discussion of a company’s income statement and the bottom line figure, profits after taxes. The concept of profits is also discussed in micro-economics, and the calculation of corporate profits is thoroughly covered in accounting. Introduction to Business and introductory accounting courses also discuss the statement of cash flows, which public companies are required to prepare and publish. This statement presents information about a firm’s cash receipts and cash payments, where the sum of cash flows from operating activities, investing activities, and financing activities is equal to the change in cash and cash equivalents during the accounting period. The measurement of free cash flow, however, is not generally discussed in these courses. The income statement, along with its profit figure, and the statement of cash flows are important to creditors, but a firm’s free cash flow may be more useful to security analysts and investors because it indicates the cash flow that is actually available for distribution to the firm’s investors. Since many nonbusiness students taking these courses will not take any other business courses during their undergraduate years, they will have no other opportunity to be exposed to the free cash flow

concept in a classroom setting. Because of the many ways that reported profits can be manipulated, it is important that students become familiar with another method of evaluating company performance.

We begin by discussing reported profits and the difficulties that may arise when a reliance on profits is the sole measure of company performance. Second, the free cash flow concept is discussed, along with an example of the calculation of free cash flow. Finally, some problems in applying the free cash flow concept are discussed.

THE UNCERTAINTY OF REPORTED PROFITS

Accounting scandals, inflated earnings reports, earnings restatements, and analysts who consistently give bullish investment advice have led many investors to question the integrity of reported earnings figures.

When presented to students in the Introduction to Business course, net income is a fairly simple concept. Expenses of the business are subtracted from sales to determine taxable income; taxes are calculated and subtracted, and the resulting figure is net income. However, there are a variety of rules that govern the recognition and timing of sales and expenses, and some of these rules are open to interpretation by corporate management. As a result, some “profitable” firms may be in a very poor financial condition. For example, in 2000, WR Grace & Company continued to report quarterly profits as it headed towards bankruptcy (Chang 2002).

Rather than simply reporting earnings, firms can use a variety of assumptions and accounting irregularities that enable them to “manage earnings” and obfuscate financial results (Rappaport 2002). Some firms recognize sales prematurely by recording sales in the current period of customers who have shipping dates of later periods. In other cases, fictitious sales are recorded, or credit sales are made to companies with meager prospects of paying. A change in cash flow that lags significantly behind a change in sales, or a rise in receivables that is significantly greater than a rise in sales, might be indicative of these practices (Magrath 2002).

Gains from pension fund investments can be counted as earnings, although they are not related to the profitability of the firm’s operations and provide no inherent benefit to the firm’s investors. And pension income is calculated based on an expected long-term rate of return, not on actual earnings. Verizon Communications, for example, was profitable in 2001 only because of \$2.7 billion in pension gains (Gibbs 2002).

Reported earnings can also be boosted by accounting rules that allow a firm tremendous flexibility in estimating the fair market value of securities, certain contracts, and other assets that it holds at the end of each quarter. Any resulting increases in value can be recorded as earnings. It has been estimated that more than half of Enron’s originally reported pretax profits in 2000 resulted from this type of subjective valuation estimates (Gibbs 2002).

Subjectivity may also arise in the recording of some costs. A firm that had been expensing research and development expenditures may capitalize them, resulting in lower reported expenses and thus higher reported profits, but less actual available cash, because of the tax effect. Other costs, such as commissions, may be capitalized and then charged to future time periods, resulting in higher reported profits for the current period. Similarly, current reported profits may be increased when contributions to underfunded pension plans are decreased or discontinued for a period of time. On the other hand, firms that are experiencing sizable losses may prepay some costs and write them off to boost later earnings.

Congressional hearings that preceded the passage of the Sarbanes-Oxley Act of 2002 highlighted some of the ways corporate accountants have engaged in manipulations to report favorable profits growth, to meet projected numbers, or to meet analysts' expectations. To correct these erroneous earnings reports, there were 156 restatements of income in 2000 according to the Securities and Exchange Commission, costing investors an estimated \$31.2 billion in market value (Henry 2001).

FREE CASH FLOW: MEASUREMENT AND EVALUATION

A performance measure that may be a more accurate indicator of firm success than traditional earnings based measures is free cash flow. For some analysts, free cash flow has replaced earnings as the preferred method of analyzing financial performance.

In recent years corporate finance textbooks have included free cash flow analysis as a component of the evaluation of financial performance. Each year as more business school graduates with an understanding of free cash flow enter the workforce, free cash flow will grow in importance and application. Calculation of free cash flow is an attempt to avoid the subjectivity and potential manipulation in reported earnings.

For this paper, free cash flow is defined as the cash flow that is available for distribution to investors after the firm has made all of the investments in fixed assets and working capital necessary to sustain its ongoing operations. Since all cash flow generated by a firm must go somewhere, free cash flow can be calculated from two equivalent perspectives: an operating perspective and a financing perspective. To calculate free cash flow, one needs an income statement, a balance sheet for the beginning of the income period, and a balance sheet for the end of the period. Following the general approach suggested by Keown et al (2008) and Brigham and Daves (2007), free cash flow is calculated as follows:

$$\text{Free Cash Flow from an Operating Perspective: } FCF = CFO - OWC - FA$$

FCF = free cash flow

CFO = after-tax cash flows from operations

OWC = investment in operating working capital

FA = investment in fixed assets and other long-term assets

CFO = operating income + depreciation – (tax expense – change in income tax payable)

OWC = operating working capital at the end of the period – operating working capital at the beginning of the period

$$\begin{aligned} \text{Operating working capital} &= \text{operating current assets} - \text{operating current liabilities} \\ &= \text{current assets that do not pay interest} - \\ &\quad \text{current liabilities that do not earn interest} \\ &= (\text{cash} + \text{accounts receivable} + \text{inventory} + \\ &\quad \text{prepaid expenses}) - (\text{accounts payable} + \\ &\quad \text{accruals other than accrued taxes and} \\ &\quad \text{accrued interest}) \end{aligned}$$

FA = gross fixed assets and other long-term assets at the end of the period – gross fixed assets and other long-term assets at the beginning of the period

Free Cash Flow from a Financing Perspective:

$$\text{FCF} = \text{Interest} + \text{Debt} + \text{Dividends} + \text{Equity} + \text{Other}$$

FCF = free cash flow

Interest = interest due creditors and investors – change in interest payable (a negative cash flow)

Debt = repayment of short-term debt – acquisition of new short-term debt + repayment of long-term debt – issuance of new long-term debt (negative for repayment of debt and positive for acquisition of new debt)

Dividends = dividends paid to stockholders (a negative cash flow)

Equity = repurchase of common and/or preferred stock – issuance of common and/or preferred stock (negative for repurchases and positive for new issuance)

Other = purchase of marketable securities – sale of marketable securities

Free cash flow from an operating perspective must equal the absolute value of free cash flow from a financing perspective; they will be the same amount but different signs. The equivalence of these measures can best be demonstrated by an actual example. The financial statements of practically any publicly-held company can be used to demonstrate the free cash flow calculations. Consider the financial statements of the McDonald's Corporation, as presented in Keown (2003); the income statement for calendar year 2000 is shown in Table 1 and balance sheets for December 31, 1999 and

Table 1. The McDonald's Corporation Income Statement for the Year Ended December 31, 2000
(\$ millions)

Sales		\$14,244
Cost of goods sold		<u>8,622</u>
Gross profits		5,622
Marketing, general, and Administrative expenses	\$1,898	
Depreciation expense	<u>395</u>	
Total operating expenses		<u>2,293</u>
Operating profits		3,329
Interest expenses		<u>446</u>
Earnings before taxes		2,883
Income taxes		<u>905</u>
Profit after taxes		1,978
Common stock dividends		664
Change in retained earnings		1,314

2000 are shown in Table 2. The figures shown in these statements have been simplified to enhance the explanation of the free cash flow concept; the complexity found in the actual statements is not necessary for an understanding of the concept.

Table 2. The McDonald's Corporation Balance Sheet for December 31, 1999 and 2000 (\$ millions)

<i>Assets</i>			
	1999	2000	Net changes
Cash	\$ 420	\$ 422	\$ 2
Accounts receivable	708	797	89
Inventory	83	99	16
Prepaid expenses	<u>362</u>	<u>345</u>	<u>(17)</u>
Total current assets	\$ 1,573	\$ 1,623	\$ 90
Gross fixed assets	22,451	23,569	1,118
Accumulated depreciation	(6,126)	(6,521)	(395)
Net fixed assets	16,325	17,048	723
Other assets	<u>3,086</u>	<u>2,973</u>	<u>(113)</u>
Total assets	\$20,948	\$21,684	\$ 700
<i>Liabilities and Equity</i>			
Short-term notes payable	\$ 1,620	\$ 630	\$ (990)
Accounts payable	586	685	99
Accrued expenses	<u>1,069</u>	<u>1,046</u>	<u>(23)</u>
Total current liabilities	3,275	2,361	(914)
Long-term debt	<u>7,344</u>	<u>9,418</u>	<u>2,074</u>
Total liabilities	\$10,619	\$11,779	\$ 1,160
Equity:			
Par value and paid in capital	2,031	2,159	128
Treasury stock	(6,209)	(8,111)	(1,902)
Retained earnings	<u>14,543</u>	<u>15,857</u>	<u>1,314</u>
Total common equity	<u>10,365</u>	<u>9,905</u>	<u>(460)</u>
Total liabilities and equity	\$20,948	\$21,684	\$ 700

From these statements, we can calculate free cash flow.

Free Cash Flow from an Operating Perspective = CFO – OWC – FA

CFO = operating income + depreciation – (tax expense – change in income tax payable) = 3,329 + 395 – 905 = 2,819

$$\begin{aligned}\text{Operating working capital (2000)} &= (422 + 797 + 99 + 345) - (685 + 1,046) \\ &= 1,663 - 1731 = (68)\end{aligned}$$

$$\begin{aligned}\text{Operating working capital (1999)} &= (420 + 708 + 83 + 362) - (586 + 1,069) \\ &= 1,573 - 1655 = (82)\end{aligned}$$

$$\text{OWC} = (68) - (82) = 15$$

$$\text{Gross fixed assets and other assets (2000)} = 23,569 + 2,972 = 26,541$$

$$\text{Gross fixed assets and other assets (1999)} = 22,451 + 3,086 = 25,537$$

$$\text{FA} = 26,541 - 25,537 = 1,004$$

$$\text{Thus, FCF (operating perspective)} = \text{CFO} - \text{OWC} - \text{FA} = 2,819 - 15 - 1,004 = 1,800$$

From a financing perspective, $\text{FCF} = \text{Interest} + \text{Debt} + \text{Dividends} + \text{Equity} + \text{Other}$

$$\text{Interest} = - 446$$

$$\text{Debt} = (-990 + 2,074) = 1,084$$

$$\text{Dividends} = - 664$$

$$\text{Equity} = 128 - 1902 = - 1774$$

$$\text{Other} = 0$$

$$\begin{aligned}\text{Thus, FCF (financing perspective)} &= \text{Interest} + \text{Debt} + \text{Dividends} + \text{Equity} + \text{Other} \\ &= - 446 + 1,084 - 664 - 1774 + 0 = - 1,800\end{aligned}$$

In 2000, McDonald's had after-tax cash flows of \$2,819 million. After investing in operating working capital and fixed assets, \$1,800 million was available for distribution to investors. The investment in assets is obviously necessary if McDonald's is to remain viable in the extremely competitive fast foods business. The \$1,800 million free cash flow was distributed to stockholders in the form of dividends and stock repurchases, and to creditors in the form of interest payment and the repayment of short-term debt. Since the total amount distributed was greater than the \$1,800, the firm issued some additional long-term debt and common stock.

Healthy free cash flow permits a firm to increase dividends, pay interest on time, and reduce debt. Negative free cash flow over long periods of time may lead to declining dividend payments, unsustainable debt levels, and attempts to manufacture profits and hide debt. Understanding free cash flow is important because it is a measure that cannot be as easily manipulated as can reported profits to meet a predetermined management goal.

The measurement of free cash flow is also crucial to firm valuation. In spite of the attention given to reported earnings, earnings per share, and EBITDA by analysts and investors, it is free cash flow that is the basis for valuing a company, where the value of a company is equal to the present value of the free cash flow expected to be generated over the life of the business, discounted at the firm's weighted average cost of capital. Valuation based on economic value added gives equivalent results, but the massive body of academic research demonstrates that accounting profits are only coincidentally related to firm value (Stewart 1991; Copeland, Koller, and Murrin 1992; and Damodaran 1996).

CAUTIONS IN THE USE OF FREE CASH FLOW

A firm with high profits is generally preferred by investors to a firm with low profits. Can the same conclusion be drawn with regard to free cash flow? Jensen (1986) suggested that firms with substantial free cash flow may have low growth prospects and little or no potential projects with positive net present values. Firms with low growth prospects and large free cash flow may become targets of hostile takeover attempts. An agency conflict arises in that managers may be tempted to invest these funds at below the cost of capital or misuse it on organizational inefficiencies. Jensen advanced the hypothesis that a major source of stockholder gain when publicly held companies go private is the mitigation of agency problems associated with free cash flow. Thus, having high free cash flow is not necessarily a desirable condition.

Research results on Jensen's free cash flow hypotheses have been mixed. Lehn and Poulsen (1989) supported the hypothesis: they found a significant relationship between undistributed cash flow and a firm's decision to go private, and that premiums paid to stockholders in going private transactions were significantly related to undistributed cash flow. In contrast, Kieschnick (1998) did not find that the prior level of a firm's free cash flow was a significant determinant of the odds of it going private. Nor was there a significant relationship between free cash flow and premiums paid when firms go private. If free cash flow is high because of inadequate investment opportunities, there may be a need to consider an acquisition or an expansion into another line of business.

A company may also be able to attain high levels of free cash flow by stretching accounts payables, collecting receivables more diligently, depleting inventory, or deferring taxes. Gains in free cash flow from these means, however, are only temporary. Accounts payable and deferred taxes must eventually be paid, inventory must be restocked, and collection policies must be brought in line with the competition.

On the other hand, low or negative free cash flow is not necessarily a reason for concern. Free cash flow may be depressed for several years because of a high level of investment demands. And a low level of free cash flow in any one year may reflect significant investment requirements in that year. Those investments may help the firm sustain a higher rate of sales growth in the future. Of course, negative free cash flow that arises because of negative operating earnings is not desirable and creates a need for prompt corrective action by the company.

Finally, there is the problem of consistency and comparability among companies reporting free cash flow in their financial statements. There are many ways to define free cash flow, and companies provide their own definitions and calculations in their annual reports. When a firm changes its free cash flow definition, the change in reported free cash flow can be astonishing. Coca-Cola, for example, changed its definition of free cash flow in 1999 with the result that its reported free cash flow increased in 1998 by over \$500 million and by almost \$2 billion in 1999 (Mills, Bible, and Mason 2002). Twelve different definitions of free cash flow from corporations, financial reporting services, and finance textbooks are reviewed by Mills, Bible, and Mason (2002). They point out although free cash flow is an important measure of a firm's financial strength, there is a need for a consensus of what it actually represents. Thus if one wishes to compare the free cash flow of various companies, it is necessary to select a definition and then compute each firm's free cash flow according to that definition. One cannot simply use the free cash flow figures reported in the annual reports of the individual firms because of the variety of definitions used.

CONCLUSION

Reported profits can be manipulated by a variety of accounting gimmicks, but it is far more difficult to manipulate free cash flow and the working capital accounts. Thus, it is possible for a company to report positive profits as it heads to bankruptcy. Free cash flow, however, would generally begin to decline much earlier, and investors who focus on this variable may become aware of an approaching problem. Free cash flow indicates the amount of cash flow actually available for distribution to all investors; it is a more reliable variable than reported profits - either you have the cash or you don't - and thus it may be a better measure of a firm's performance. Positive free cash flow is generally preferred by investors, but there are cases where negative free cash flow is acceptable.

In recent years corporate finance textbooks have included free cash flow analysis as a component of the evaluation of financial performance, and business students, most of whom are required to take at least one finance course, have the opportunity to learn about this concept. It is important that a wider number of individuals become familiar with this concept because many of them will become investors and it is important that they understand performance measures beyond reported profits. Inclusion of a discussion of free cash flow in the Introduction to Business course would be a step in the right direction

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CREATING A PROBLEM FORMAT THAT CAPTURES THE INTERCONNECTIONS OF MANAGERIAL ACCOUNTING TERMINOLOGY

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ABSTRACT

This paper focuses on developing a comprehensive problem to help managerial accounting students better understand the interconnections of basic new terms in managerial accounting and how these terms relate to the financial statements. These terms include direct materials, direct labor, manufacturing overhead, product costs, period costs, prime costs, and conversion costs. Also presented are the three inventories of raw materials, work-in-process and finished goods. Using one set of numbers to see the broader picture of how the introductory managerial accounting material interconnects should better prepare students to then take these cost items and first journalize them and then later break them into their variable and fixed components for cost-volume-profit analysis.

INTRODUCTION

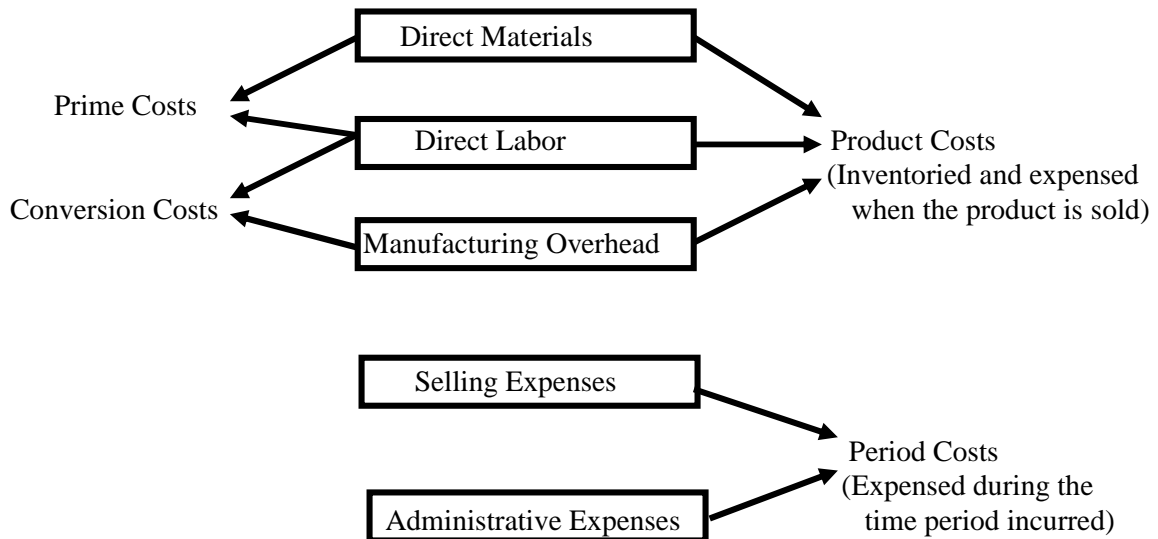
Managerial accounting is usually the second course in a two-course sequence for principles of accounting required for college of business graduates at most major colleges and universities. (If managerial accounting is not the entire second course, it is usually at least two-thirds of the second course.) The first chapter in managerial accounting textbooks defines and discusses the basic managerial accounting terminology. This usually includes a discussion of direct materials, direct labor, manufacturing overhead, product costs, period costs, prime costs, and conversion costs. Also presented are the three inventories of raw materials, work-in-process and finished goods. The chapter usually concludes by first presenting an income statement for a merchandising concern (from the principles I course), followed by the new income statement for a manufacturing concern with its cost of goods manufactured and sold statement (or schedule). The problems for the chapters usually provide many opportunities to calculate various subtotals and schedules and statements. However, there is rarely a comprehensive or capstone problem for identifying all the new terms and seeing how they interrelate with other topics in the chapter. This paper develops such a comprehensive problem which should help managerial accounting students better understand the interconnections of basic new terms in managerial accounting and how these terms relate to the financial statements. Using one set of numbers to see the broader picture of how the introductory managerial accounting material interconnects should better prepare students to then take these cost items and first journalize them and then later break them into their variable and fixed components for cost-volume-profit analysis.

DEFINING THE TERMS

The first step is to define the terms and to show that there is flexibility in managerial accounting definitions and procedures. For example, the first item often defined is direct materials – or raw materials – with the names being interchangeable and either name being equally acceptable. Direct materials are defined as materials that are conveniently and economically traceable to the finished product and that become a part of the finished product. Accordingly, in making wooden tables, the wood would be considered direct materials. The nails and glue, however, might be considered direct materials at one company (where they are conveniently and economically traceable) but not at another company.

Direct labor is similarly defined as labor that is conveniently and economically traceable to the finished product. Manufacturing overhead is defined as everything else in the factory besides direct materials and direct labor. This would include such things as indirect materials (the nails and glue if not considered direct materials), indirect labor (supervisors or other non-“hands-on” factory labor), factory depreciation, factory utilities, factory property taxes, factory security, and many other factory (or manufacturing or plant) costs. The combination of direct materials and direct labor is called “prime costs,” and the combination of direct labor and manufacturing overhead is called “conversion costs.” All three costs combined – direct materials, direct labor and manufacturing overhead – are called “product costs.”

At this point, it is important to remind students that since a company is now making its own products, it has new manufacturing costs – but it still has the non-manufacturing costs of selling and administrative expenses as well. The selling and administrative expenses are called “period costs” since they are not inventoried, but are expensed in the time period that the costs are incurred. The following illustration shows the interrelationships:



TERMINOLOGY PROBLEM

This problem has two parts. First a list of total costs is broken down into the subcategories identified by the new cost terminology. Next, these same cost items are used to prepare the Income Statement (with a Cost of Goods Manufactured and Sold Schedule) for the company.

Part I: Seaside Company accumulated the following costs for October and wants to determine the amount of (a) Prime Costs, (b) Factory Overhead, (c) Conversion Costs, (d) Product Costs, and (e) period costs.

Company President's Salary.....	\$ 150,000
Security Costs for Sales and Administrative Offices..	20,000
Factory Security Costs.....	80,000
Sales Salaries.....	120,000
Direct Labor.....	200,000
Raw Materials Used.....	345,000
Indirect Labor.....	37,000

Depreciation on Delivery Trucks.....	15,000
Other Selling Expenses.....	70,000
Property Taxes on Factory.....	11,000
Factory Supplies Used.....	18,000
Plant Utilities.....	12,000
Other Factory Overhead.....	25,000
Depreciation on Factory Building.....	30,000
Depreciation on Office Equipment.....	14,000
Property Taxes on Administrative and Sales Offices...	1,000
Advertising.....	45,000
Non-Plant Utilities.....	22,000
Depreciation on Factory Equipment.....	35,000
Other Administrative Expenses.....	50,000

Solution:

(a) Prime Costs

Raw Materials Used.....	\$ 345,000
Direct Labor.....	200,000
	<u>\$ 545,000</u>

(b) Factory Overhead

Indirect Labor.....	\$ 37,000
Factory Security Costs.....	80,000
Property Taxes on Factory.....	11,000
Factory Supplies Used.....	18,000
Plant Utilities.....	12,000
Depreciation on Factory Building.....	30,000
Depreciation on Factory Equipment.....	35,000
Other Factory Overhead.....	25,000
	<u>\$ 248,000</u>

(c) Conversion Costs

Direct Labor.....	\$ 200,000
Factory Overhead (from B).....	248,000
	<u>\$ 448,000</u>

(d) Product Costs

Raw Materials Used.....	345,000
Direct Labor.....	\$ 200,000
Factory Overhead (from B).....	248,000
	<u>\$ 793,000</u>

(e) Period Costs

Company President's Salary.....	\$ 150,000
Security Costs for Sales and Administrative Offices..	20,000
Sales Salaries.....	120,000
Depreciation on Delivery Trucks.....	15,000
Depreciation on Office Equipment.....	14,000
Property Taxes on Administrative and Sales Offices...	1,000
Advertising.....	45,000
Non-Plant Utilities.....	22,000
Other Selling Expenses.....	70,000
Other Administrative Expenses.....	50,000
	<u>\$ 507,000</u>

Part II: Using the information from Part I and the following additional information for Seaside Company for the month of October, prepare an Income Statement (with a Cost of Goods Manufactured and Sold Schedule under the periodic inventory system) for October. Also identify where the Product Costs and Period Costs show up in the statements.

Sales.....	\$1,590,000
Beginning Inventory Raw Materials.....	40,000
Beginning Inventory Work-In-Process.....	60,000
Beginning Inventory Finished Goods.....	90,000
Ending Inventory Raw Materials.....	75,000
Ending Inventory Work-In-Process.....	10,000
Ending Inventory Finished Goods.....	110,000
Raw Materials Purchased.....	380,000

Solution:

Seaside Company
Income Statement
For the Month Ended October 31

Sales	\$1,590,000	
- Cost of Goods (see below) -	823,000	
<u>Gross Profit</u>	<u>\$ 767,000</u>	
- Selling and Administrative Expenses	507,000	→ (Period Costs)
<u>Net Income</u>	<u>\$ 260,000</u>	

Seaside Company
Schedule of the Cost of Goods Manufactured and Sold
For the Month Ended October 31

Beginning Inventory Raw Materials	\$ 40,000	
+ Purchases of Raw Materials	+ 380,000	
<u>Raw Materials Available</u>	<u>\$ 420,000</u>	
- Ending Inventory Raw Materials	- 75,000	
<u>Raw Materials (or Direct Materials) Used</u>	<u>\$ 345,000</u>	
+ Direct Labor	+ 200,000	
+ Manufacturing Overhead: (With Each Item Listed Separately)	+ 248,000	
<u>Total Manufacturing Costs</u>	<u>\$ 793,000</u>	→ (Product Costs) for Goods Produced in October
+ Beginning Inventory Work-In-Process	+ 60,000	
- Ending Inventory Work-In-Process	- 10,000	
<u>Cost of Goods Manufactured</u>	<u>\$ 843,000</u>	
+ Beginning Inventory Finished Goods	+ 90,000	
- Ending Inventory Finished Goods	- 110,000	
<u>Cost of Goods Sold</u>	<u>\$ 823,000</u>	→ (Product Costs) for Goods Sold in October

SUMMARY AND CONCLUSIONS

Managerial accounting textbooks usually have a rather disjointed approach of first presenting the new terms of direct materials, direct labor, manufacturing overhead, product costs, period costs, prime costs, and conversion costs followed by an expansion of the merchandising single-inventory system to capture the manufacturing system with its three inventories of raw materials, work-in-process and finished goods. Later, with a set of unrelated numbers and with no real connectivity to the previous topics, the chapter concludes by presenting the manufacturing income statement, including the calculation of cost of goods manufactured and sold. Even among the exercises and problems at the end of the chapter, there is rarely a capstone problem that includes all the new terminology and then interweaves it into the preparation of the new financial statements. Such a problem has been presented in this paper. Solving such a problem should help managerial accounting students see the broader picture of how all of the pieces fit into one puzzle and thus help clarify the linkages and interconnections of the introductory material in the managerial accounting course.

PROGRAM MERCHANT

Merchants and businessmen often make money by buying a commodity cheaply in one location and selling at a higher price in another location. According to Adam Smith, author of *The Wealth of Nations*, this practice serves to help bring prices closer to their “true value.” Assuming that the market price of goods is known everywhere and that the cost of transport from one region to another is able to be calculated, it should be possible to see if a commodity could be bought, moved and sold profitably in advance. The formula is based on the price of the commodity in the target location minus the price of the goods in the source location minus the cost of transport. If necessary parameters are known, it would be simple enough to compute automatically where goods should be bought and sold for the highest profit. That is what we attempted to do.

The first task was to acquire the prices for several different physical goods in regionally separate locations. That was done via using the ACCRA city Cost of Living Index for one year. It provided 38 suitable goods for analysis in 310 different cities.

The next task was to find shipping costs for bulk goods from one city to another. This was accomplished by using the online less-than-truckload freight calculator provided by UPS (with the rate estimated using shipments of 10,000 lbs). Rates were retrieved from the site using the iMacros program.

The last step was to compute the potential profits for each good using the formula above via Open Office and analyze the results.

The program succeeded in its primary goal of finding profitable city pairs. All of the items studied yielded at least one profitable city pair. In some cases the profits were negligible, but in others the potential profit proved considerable. The single most profitable pair was buying Lipitor for \$102.95 in Hays, Kansas and shipping it to Providence, Rhode Island selling it for \$142.09.

The study showed that while the concept has promise, it is not without considerable practical problems. It was difficult to find proper regional price data that the Merchant program needs to run. It was also a major problem to find proper shipping information, as most freight companies hold their shipping calculation algorithm to be a business secret. Lastly, the final computations took over four days running on three computers simultaneously (handling over three million entries). The first two problems could prove formidable, but it may be possible that the latter could be reduced using a compiled coding language rather than Open Office Macros.

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PRIVACY IN A GENETIC AGE

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ABSTRACT

Privacy has become one of the most enduring issues people have to deal with, and this is increasingly so as technology advances in the field of genetics and medicine. Are people comfortable sharing access to their medical and genetic information, and if so, who with? Genetic privacy is particularly important because testing in this area is largely predictive, and the presence of a gene does not guarantee the presence of cancer or another disorder. In 2008, the federal Genetic Information Nondiscrimination Act was passed to keep employers and health insurers from discriminating based on genetic information, but is that enough? This study analyzed responses to over 500 questionnaires to determine whether respondents trusted different people (doctors, researchers, etc.) and organizations (health insurers, law enforcement, etc.) with information as sensitive as medical and genetic records. Overwhelmingly, we found that medical and genetic confidentiality is very important, and that people are far more trusting of doctors and researchers than they are of those outside the medical field. People are generally distrustful of national online medical databases, especially if information is being entered without the patients' knowledge or consent. Finally, we discovered a very significant difference between how much access respondents believe that individuals or organizations have to their medical records and how much access respondents feel these individuals or organizations should have. Our findings indicate that people value medical and genetic confidentiality and would like to limit the amount of access that non-medical groups have to their records.

INTRODUCTION

The United States currently spends around 15% of its gross domestic product on healthcare, and that number is rising. Since insurance companies make profits by predicting health risks and setting premiums to compensate for them, genetic screening and privacy rights are becoming some of the biggest ethical issues concerning policymakers today. How much medical or genetic information do insurance companies have the right to, or for that matter, how much access does anyone have the right to? Under what conditions should genetic screening be undertaken?

When the Human Genome Project began in 1990, the project included several goals, including the sequencing of the 3 billion base pairs, the identification of all the genes contained within the genome, improving the sequencing technology necessary, and a continued study of the social, legal, and ethical implications of this new information (Knoppers, 2006). The aim of this paper is also to study perceptions people have of the ethical implications of genetic screening in the context of genetic privacy in the United States. This will include an extensive literature review of state, federal, and international genetic legislation, the different circumstances under which one takes a blood test, and a discussion of the concept of privacy, and how it has evolved in America. It will also include the results and findings from over 500 responses to a 75-question online survey.

The insurance industry sells insurance for premiums, which they determines based on a variety of factors including age, gender, health, lifestyle, and many others. They then collect these premiums from everyone, hoping to have to pay out big claims on only a small percentage of those they collect from and making a profit in the process. Genetic screening could be very helpful for insurance companies in this scenario, because it could identify future health risks for an individual. This would provide the insurance company with a basis for refusing to sell to an individual (Hall, 2000). Employers also have a stake in the genetic make-up of their employees. By screening out anyone who might potentially develop breast, colon, or some other type of cancer, the employer can protect himself/herself from additional health-related costs.

Unfortunately for the individual in this scenario, genetic testing tells more than just the genes a person has. By its very nature, genetic screening reveals genes found in a family, which could cause other people to be denied health insurance or subjected to other forms of discrimination, if this information were readily available to everyone. This violates the privacy of the individuals' family members, who did not undergo genetic screening themselves. Genetic screening is also limited in that it cannot predict whether a gene will become active or if/when a person will get sick (Wolf, 2006).

Many states have recently enacted laws that restrict health insurance companies from denying coverage to an individual based on genetic screening because health insurance is important as a community resource and the risks should be shared by all. These regulations do not, however, cover death insurance or disability insurance, nor are they present in every state (Rothenberg, 1997). The recent Genetic Information Non-discrimination Act of 2008 unifies state legislation and makes it illegal for health insurers and employers to discriminate based on genetic testing results.

Genetic discrimination has already occurred in several instances in the U.S. based on a potential future determined by a few drops of blood. The ethics of privacy are quickly coming to the forefront of public policy and research on this subject could not be timelier (Annas, 1995).

METHODS

(Modeled on the article *Using the Internet for Online Survey Research: A Case Study*)

Survey Instrument: A survey questionnaire to collect data that would help to obtain a better understanding of the levels of trust different individuals have with regard to sharing their genetic information. The data included general demographic information, comfort levels when sharing information with different people or groups, opinions on online databases, feelings on how much access to medical records people do and should have, the Trust in People Scale (Survey Research Center, 1969) and the Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978).

Survey Distribution: The survey was distributed entirely online. The link was posted on medical blogs and several organizations were contacted so that their members might participate. Responses were completely voluntary and participants were free to discontinue at any time.

Web Survey Application: A Web survey application was designed in SurveyMonkey for this research project by this author. It was used to generate surveys, and to collect survey data via the Internet.

Procedure: Using the web browser, a respondent can progress through the survey in the following way:

- 1) Load the survey main page. Once a respondent locates the survey website with a Web browser displays the survey main page, which explains the purpose of the survey, gives contact information for the researcher, and verifies the presence of informed consent.
- 2) After informed consent is verified, respondents complete the survey through an interactive process. Once the respondent completes the survey form, the browser navigates to a screen indicating that the survey has been completed and thanking participants for their time.

Survey Data Processing: Once all the survey data was gathered in an electronic form, it was downloaded into Microsoft Excel for further data analysis. Excel files were then transferred to the statistical software package SPSS for correlations and other tests of trends etc. (Zhang, 2000).

Alpha Level for all correlations is .05.

Reported reliability for borrowed questions:

Trust in People Scale: .48-.54

Multidimensional Health Locus of Control Scale: .61-.8

RESULTS:

After posting the questionnaire on several medical blogs, social networking websites and distributing it through organizations, 392 completed surveys were received in the designated three-week data-gathering phase. Several statistical tests were then run to analyze the information. Through these tests, it was established that respondents generally feel very strongly regarding the privacy of their medical and genetic information, and that people who are generally trusting will trust more people or organizations with this information. Respondents also tended to feel strongly that permission should be granted before medical or genetic records were used. This section contains the results for four hypotheses.

Hypothesis One: People will oppose their records going into the National Online Database without permission.

To determine how people feel about their records going into a national online database, a series of questions were asked. The first set of four questions asked how comfortable respondents were with certain types of information being stored in online databases, with possible responses of: very comfortable, somewhat comfortable, not too comfortable, not at all comfortable.

Table One

	Very Comfortable	Somewhat Comfortable	Not too Comfortable	Not at all Comfortable
Financial	3.2%	41.8%	36.7%	18.2%

Employment	16.2%	55.4%	20.5%	8.0%
Medical	6.7%	39.3%	32.0%	22.0%
Educational	26.7%	56.7%	12.1%	4.5%

In each case, the most frequent answer was that respondents were somewhat comfortable with their information being stored in online databases (See Table One). In the cases of financial and medical history, even though the largest percentage for a single category was for somewhat comfortable, more than 50 percent of people fall on the side of less comfortable. Whereas, over 70 percent of people are either somewhat or very comfortable with their employment and educational history being entered in to an online database.

Later in the survey, respondents were asked a second set of two questions. The first asked directly whether doctors and hospitals should have to obtain permission before they could release medical records to a national computerized database. On a one to six scale, with one being strongly agree and six being strongly disagree, respondents overwhelmingly said strongly agree, with over 80 percent of those surveyed choosing that option. The next question, with the same format of answers was: When you tell your doctor things about yourself in confidence, and the doctor records that information in your medical records, the doctor should be required to include that information in a national database without your permission. For this question, 69.9 percent of respondents strongly disagreed, with 14.8 percent disagreeing and 7 percent placing themselves somewhere between agreeing and disagreeing.

When Pearson correlation analysis was run between these two sets of questions, all eight tests came back significant at the .01 levels (See Table Two).

Table Two

Pearson Correlation Significance N	Doctors and hospitals should have to obtain your permission before they could release your medical records to a national computerized database.	When you tell your doctor things about yourself in confidence, and the doctor records that information in your medical records, the doctor should be required to include that information in a national database without your permission.
Online Database Comfort Level - Financial	-.181 .000 382	.200 .000 368
Online Database Comfort Level - Employment	-.164 .001 380	.128 .014 366
Online Database Comfort Level - Medical	-.193 .000 376	.235 .000 362
Online Database Comfort Level - Educational	-.167 .001 381	.191 .000 367

Hypothesis Two: People who are not generally trusting will not be trusting of others having access to their medical and genetic records.

In order to assess how generally trusting survey respondents were, the Trust in People scale (Survey Research Center, 1969) was included in the survey. The average answer to each of the three questions in the scale was obtained and added to the other two. This sum was then divided by three to form a new variable, GenTrust, to test against the idea of different groups of people (doctors, employers, etc.) gaining access to a respondent's medical and genetic records (Table Three).

Table Three

Pearson Correlation Significance N	GenTrust
I trust my health insurer to have access to my genetic test results	-.045 .394 367
I trust my employer to have access to my genetic test results	.038 .473 365
I trust my doctor to have access to my genetic test results	.131 .012 365
I trust researchers studying genetics to have access to my genetic test results	.219 .000 365
I trust my spouse to have access to my genetic test results	.136 .010 364
I trust law enforcement to have access to my genetic test results	.087 .096 366

There is a strong positive correlation between people who are generally trusting and people who trust their doctors, genetic researchers, and their spouses with their results from genetic tests. This indicates that people who scored lower on the general trust scale were less likely to trust their genetic testing results to doctors, researchers, and spouses.

The GenTrust variable was then tested against a series of questions designed to ascertain whom respondents would trust with and give their medical information to, and for what purpose (Table Four).

Table Four

Pearson Correlation Significance N	GenTrust
Researchers at a university conducting a study about a medical	-.224

condition that had affected some of your family members	.000 368
Government researchers conducting a study about a medical condition that had affected some of your family members	-.204 .000 368
A drug company interested in providing people with information and offers about new drugs and other health care products	.013 .805 368
A new health insurance plan that is offering better benefits at a lower cost than other plans in your local area	-.053 .309 368
A local hospital interested in providing people with information about how they might benefit from its preventive health programs	-.024 .643 368
An employer who was considering you for a new job	.023 .661 368

People who trust generally would support researchers, whether from universities or the government, using their medical records to study a medical condition. The tests showed that people who were less generally trusting were less likely to trust researchers, whether they are university or governmental. Significant results were not found for drug companies, health insurance plans, local hospitals or employers using medical records.

Finally, respondents were asked a similar question regarding who they would trust to use their genetic testing results, and for what purpose. These answers were also tested against the Gen Trust variable (See Table Five).

Table Five

Pearson Correlation Significance N	GenTrust
Researchers, to find new ways to diagnose, prevent or treat disease	-.130 .013 368
Doctors, to identify a person's risk of having a bad reaction to a particular medicine.	-.123 .018 368
Doctors, to identify a person's risk of a disease where treatment or medication exist	.002 .965 368
Doctors, to identify a person's risk of having a child with a serious genetic disease	-.064 .218 368
Doctors, to identify a person's risk of a disease where no treatment or medication exist	-.044 .402 368
Employers, to make decisions about hiring and promotion	-.055 .290

	368
Health insurance companies, to determine whom to insure or how much to charge	.004 .936 368

People with higher scores on the general trust scale tended to be more trusting of researchers and doctors who were trying to find adverse drug side effects. It also indicated that people with lower scores were less trusting of the same groups.

Hypothesis Three: There will be a strong sense of objection when it comes to non-medical groups (government, employers, health/life insurance companies) gaining access to medical and genetic records.

To determine how people feel about the confidentiality of their records a series of questions were asked. This set of four questions asked how important the confidentiality of certain types of information was, with possible responses of: very important, somewhat important, not too important, and not at all important (Table Six).

Table Six

	Very Important	Somewhat Important	Not too Important	Not at all Important
Financial	71.4%	23.2%	4.7%	0.6%
Employment	27.6%	44.1%	23.1%	5.1%
Medical	65.9%	26.7%	6.6%	0.9%
Educational	11.1%	31.7%	35.8%	21.4%

Overwhelmingly, people felt that the confidentiality of their financial and medical history was very important. Respondents also seemed fairly unconcerned regarding the confidentiality of educational information.

Later in the survey, respondents were asked whether medical or governmental researchers should be allowed to study their genetic information (for example, to identify genes thought to be associated with various medical conditions) without first obtaining their permission (Table Seven).

Table Seven

	Medical Researchers	Governmental Researchers
Strongly Agree	2.9%	1.3%
	4.8%	3.5%
	5.6%	3.0%
	5.6%	4.0%
	12.7%	13.6%
Strongly Disagree	69.1%	74.5%

Though the vast majority of respondents strongly disagreed with medical or governmental researchers using their medical records without permission, over five percent more people disagreed with it when the government was doing it. In another question, respondents were asked whether they would be inclined to give their medical records to different organizations for specific reasons (Table Eight).

Table Eight

Researchers at a university conducting a study about a medical condition that had affected some of your family members	96.2%
Government researchers conducting a study about a medical condition that had affected some of your family members	72.1%
A drug company interested in providing people with information and offers about new drugs and other health care products	24.0%
A new health insurance plan that is offering better benefits at a lower cost than other plans in your local area	23.5%
A local hospital interested in providing people with information about how they might benefit from its preventive health programs	47.3%
An employer who was considering you for a new job	2.5%

Respondents clearly feel more comfortable sharing their medical records with medical groups, such as researchers. There is a significant difference between how comfortable people are with sharing their medical records with medical groups and non-medical groups, such as drug companies and employers. A similar question was asked regarding how inclined people would be to share their genetic records, and for what reasons (Table Nine).

Table Nine

Researchers, to find new ways to diagnose, prevent or treat disease	92.3%
Doctors, to identify a person's risk of having a bad reaction to a particular medicine.	94.6%
Doctors, to identify a person's risk of a disease where treatment or medication exist	93.6%
Doctors, to identify a person's risk of having a child with a serious genetic disease	87.2%
Doctors, to identify a person's risk of a disease where no treatment or medication exist	77.2%
Employers, to make decisions about hiring and promotion	1.3%
Health insurance companies, to determine whom to insure or how much to charge	4.3%

Again, people are very favorable to the idea of giving their genetic tests to researchers and doctors for a wide variety of reasons. Fewer than five percent would give their information to employers and health insurance companies. Finally, we asked whether respondents trusted different people and organizations with their genetic information, regardless of the purpose it was being used for (Table Ten).

Table Ten

	Strongly Agree					Strongly Disagree
My Health Insurer	4.5%	8.1%	15.4%	12.1%	17.2%	42.7%
My Employer	0.8%	2.8%	8.4%	9.4%	20.6%	58.1%
My Doctor	59.1%	24.1%	10.4%	2.8%	1.3%	2.3%
Researchers	25.8%	17.4%	26.9%	12.0%	6.9%	11.0%
My Spouse	49.5%	25.8%	13.5%	3.8%	2.8%	4.6%
Law Enforcement	5.3%	5.6%	16.2%	11.9%	15.9%	45.1%

Well over half of the respondents either disagreed or strongly disagreed with giving their health insurers access to their genetic information, and the same was true for employers. Almost 75 percent of people strongly agreed or agreed with giving researchers access to their information, and the same was true for spouses. Over 60 percent of people disagreed or strongly disagreed with giving their genetic information to law enforcement

Hypothesis Four: The impressions people hold of how much access different people or organizations have and how much they should have varies.

In order to discover whether respondents felt that the amount of access that a particular person or group had was the correct amount, a series of questions was asked in the following format:

How much access do you *now* have to your medical records?

- Access to everything
- Limited Access
- No Access
- Unsure

How much access *should* you have to your medical records?

- Access to everything
- Limited Access
- No Access
- Unsure

Paired sample T-Tests were then run on these results to determine whether there was a significant difference between the way things are and the way things should be, with lower means being more access (Table Eleven).

Table Eleven

	Mean	t	df	Significance
How much access do you have to your medical records?	1.57	13.477	247	.000
How much access should you have to	1.02			

your medical records?

How much access does your partner have to your medical records?	2.27	13.876	212	.000
How much access should your partner have to your medical records?	1.57			
How much access do close relatives have to your medical records?	2.11	3.618	291	.000
How much access should close relatives have to your medical records?	1.96			
How much access does your employer have to your medical records?	2.75	1.726	203	.086
How much access should your employer have to your medical records?	2.69			
How much access does your health insurer have to your medical records?	1.49	-7.498	157	.000
How much access should your health insurer have to your medical records?	1.83			
How much access does your most frequently used doctor have to your medical records?	1.21	3.460	281	.001
How much access should your most frequently used doctor have to your medical records?	1.13			
How much access do other doctors involved in your healthcare have to your medical records?	1.64	3.790	195	.000
How much access should other doctors involved in your healthcare have to your medical records?	1.53			
How much access do doctors not involved in your healthcare have to your medical records?	2.51	-3.042	128	.003
How much access should doctors not involved in your healthcare have to your medical records?	2.67			
How much access do governmental agencies have to your medical records?	2.35	-3.889	81	.000
How much access should governmental agencies have to your medical records?	2.63			
How much access do pharmacies have to your medical records?	2.22	1.178	144	.241
How much access should pharmacies have to your medical records?	2.18			
How much access do drug companies have to your medical records?	2.78	-1.682	95	.096
How much access should drug companies have to your medical records?	2.83			

In eight out of the eleven cases, the amount of access people think that individuals or organizations have and how much they should have varies significantly. People feel reasonably comfortable with the amount of access that employers, pharmacies, and drug companies have to their medical records, and would maintain that. People would take access away from health insurers, doctors not involved in their healthcare, governmental agencies, and drug companies (though it is not statistically significant for drug companies). Respondents would increase their own access and the access held by their spouse, close relatives, their employer (though not significantly), their doctor, other doctors involved in their healthcare, and pharmacies (though not significantly).

DISCUSSION

Through analyzing the results of the online survey we were able to determine many factors that affect peoples view of genetic privacy. There were several significant findings, including the fact that people are generally distrustful of having their records kept in online databases (especially their financial and medical records), and are particularly distrustful if the records are kept in computer-based databases without permission. We also found that people who are not generally trusting will be less likely to trust a variety of other people and organizations with access to their medical and genetic information. This was primarily shown with distrustful people not trusting doctors, researchers, or their spouses.

Additionally, we discovered that there is a strong sense of objection when it comes to non-medical groups (health insurance companies, law enforcement, etc.) gaining access to medical and genetic records. A large percentage of people found confidentiality important, but would trust researchers and doctors to have that information for a variety of reasons. They did not trust health insurance companies, employers, or law enforcement agencies with this information. Finally, we learned through a series of questions about how things are and how things should be, that in most cases, there is a significant difference between the amount of access people think different people or groups now have and how much they should have.

These findings all play into the idea of genetic privacy. Genetic information is different than any other kind of personal information because of its predictive nature, and the issue of additional protection for this material has already inspired national legislation. This research supports the idea that people are very concerned with the confidentiality of this information and that they are largely not comfortable sharing it beyond those in the medical sphere.

To uncover how people felt about their information being stored in online databases, we asked a number of questions within the survey. In the first set of questions, respondents replied that they would be least comfortable with their financial and medical information being stored in computer-based systems. This indicates that these two types of information are considered the most sensitive, and the ones that people most need to protect. Respondents overwhelmingly stated that medical records should not automatically go into databases without permission, and that information given to a doctor in confidence should not go into a database without permission. This suggests that people want to maintain a high degree of control over their medical records (over half of respondents felt that their medical records were information that they owned or controlled) and not have anything done regarding them without permission.

Over 60 percent of survey respondents claimed to be somewhat worried or very worried about the privacy of their medical records. When correlation tests were run, we determined that the people who were very concerned with their financial, employment, medical, and educational information going into online databases were also concerned about their medical records being entered into a database without permission, and information that they give their doctors in confidence going into online databases without permission. This supports the idea that people want to maintain their confidentiality to the largest extent possible, and also that they want to have a high degree of control over this information. This could be because people feel that online databases are harder to secure when it comes to illegal data gatherers, or because as a national database more people will have access to the information than would if the files were paper and stored in a doctors' office. Also, because this information is so sensitive, people may feel like they have to control it so that it will not come back and be damaging to them. They may perceive that if more people have access to their medical history or genetic testing results, it will affect the premiums that they pay for health, life, or disability insurance. The recently passed Genetic Information Nondiscrimination Act is not yet widely known (almost 80% of survey respondents were not familiar with it), and only prohibits health insurers from using genetic testing results in the underwriting process.

Respondents in this survey, as mentioned earlier, felt very strongly about allowing non-medical groups to gain access to their medical and genetic records. There are several possible explanations for this. One is that respondents may feel that people like doctors are generally on a need-to-know basis in order to enhance the health of the patient, and would not misuse the information. For employers and health insurers to have access to this information greatly increases the chances that harmful information in a persons medical history or genetic code would put them at a disadvantage outside of the realm of health. Another reason that doctors and researchers may be trusted more than other groups is because predominantly they have an air of confidentiality built in to their missions. Genetic information can be very harmful for a person and their family, so it is relevant that employers, pharmacies, drug companies, law enforcement, and insurance companies tend to not be as associated with this idea of confidentiality.

This is important because it shows that the Genetic Information Nondiscrimination Act of 2008 is on the right track by limiting the access that employers and health insurance companies have to genetic information. The act also adds additional protection for people who wish to participate in genetic studies, which is very positive, as our study found that people would be willing to donate their information to further genetic research. The act does nothing to tamper with the existing doctor-patient relationship, which is already strong, and actually encourages people to get tested so that they might get treatment without fear of rising health insurance premiums.

Part of the questionnaire analysis centered on determining whether people were generally trusting or generally not trusting. Once we were able to establish that, we were able to see whether the trusting people felt more comfortable sharing their medical and genetic information, or if this was the exception to the rule. Significant positive results occurred where trusting respondents were asked if they trusted their doctor, their spouse, or researchers with genetic information. Trusting people trust those in the medical field. The correlation was negative when asked about health insurers having that information, and positive when asked about law enforcement and employers, but not significantly so. This is

consistent with findings discussed earlier, that people are generally trusting of those in the medical field.

Similar questions regarding who and for what purpose someone would allow others to have access to medical records revealed that university and governmental researchers would be trusted by generally trusting people, but that drug companies, health insurance providers, and employers would not be. This could be because generally trusting people have a desire to do good things, and to give information to those whom they perceive to need the information. If trusting people were to follow those assumptions, they might be more comfortable relaxing the confidentiality of their records.

Finally, we discovered that there is a very significant difference between how much access a patient believes that different groups or organizations now have to their medical records, and how much access they should have. Respondents tended to believe that they and their most frequently used doctor should have access to everything, but that they did not now have that access. A noteworthy portion of the population was unsure as to how much access different groups had to their information (up to 79.2 percent in the case of how much access governmental agencies have to their medical records). Eight of the eleven paired T-Tests that were run revealed that there is a very significant (at the .01 level) difference between the way things are and the way things should be. In five of those cases, respondents felt that the individuals or groups should have more access than they do, and in three of those cases, less access was necessary than the status quo currently provides.

There are a number of possible explanations for these findings. One possibility is that there are so many questions surrounding the concept of medical confidentiality that no one really knows how things are, but they do know how they would like them to be. This is supported by the high percentage of unsure respondents when it came to access for drug companies, pharmacies, governmental agencies, doctors not involved in a patients' healthcare, employers, and insurance companies. Another possible explanation is that people want to strengthen their control of their medical records and have more power over which organizations get what information, in some cases taking away any access that a person or organization has.

These findings support the conclusions from our other hypotheses, that people are generally more trusting of people in the medical field, and people who are perceived as needing-to-know. Our results indicated that access should be taken away from health insurers, governmental agencies, and drug companies, as well as from doctors who are not involved in a patients' healthcare. More access should be given to spouses, relatives, the most frequently used doctor, and other doctors involved in a patients' healthcare. Interestingly enough, respondents are comfortable with the amount of access that employers have, with a score of one being complete access and a three being no access, employer access only went from a 2.75 to a 2.69, which is not a significant change.

This could have implications for future legislation. The Genetic Information Nondiscrimination Act has already curtailed access to genetic records for health insurers and employers, and HIPAA has been strengthened since it was originally passed as well, but clearly people want more medical privacy, particularly when it comes to non-medical groups gaining access to medical and genetic records. Beyond legislation, there is very little information available regarding who has how much access, and we have found that people typically want more control over these things as opposed to less.

CONCLUSION

Genetic privacy is changing and expanding rapidly. Within the timeframe of this study, federal legislation has been passed to keep individuals from being discriminated against by employers and health insurers, based on their genetic information. The Genetic Information Non-discrimination Act of 2008 was a huge step forward in privacy protection, and it put in place a minimum standard of legal defense without limiting what individual states can do. But is this act enough?

By analyzing the results gathered from over 500 online questionnaires, we were able to draw several conclusions about which people and organizations individuals are comfortable sharing their medical and genetic information with. Within our survey we included a General Trust Scale (Survey Research Center, 1969) as a control for how trusting people generally are, and to see whether that influenced the amount of access that individuals would share. Many of the questions in the survey asked respondents to rate their level of comfort when it came to sharing their records with different groups, such as health insurers, employers, law enforcement, and the government, and individuals, such as their spouse, close relatives, and their doctors.

Our findings were conclusive. People surveyed were more comfortable sharing access to their medical and genetic records with people in the medical profession, like doctors and researchers, or people they are close to, like a spouse. Generally trusting people are more likely to share access than people who are not generally trusting. No one seems to be particularly comfortable with medical and genetic records going into a national online database, particularly without permission. Finally, in many cases people do not feel that other individuals or organizations have the appropriate level of access, and would either remove or grant additional access from them. Demographically, respondents were fairly evenly distributed in terms of income level and political orientation, though more females than males responded, and the education level of participants was fairly high.

These results indicate that putting more protection in place for genetic privacy would not be unwelcome. The new legislation is a good step, but the safety from genetic discrimination does not extend beyond health insurance to life, disability, or long-term care insurance. Our findings also suggest that people tend to want a higher degree of control over their genetic testing results, which the 2008 Act does little to address.

Future research could look more deeply into the issue of control with regard to genetic and medical records. Are people with an external locus of control more likely to share access to their records? It might also be interesting to perform another study after GINA has been in effect for a few years, to see whether people are less concerned with their genetic privacy, and whether more people are undergoing genetic testing. One of the limitations of this study was that it was haphazard and a convenience sample, so a more randomly selected respondent pool might benefit future studies. Finally, future studies could explore further the idea of access, perhaps by telling respondents how much access different groups or organizations legally have and having the respondents add or subtract access based on the actual amounts as opposed to the perceived amounts.

Because science often moves far more quickly than the law, the concept of genetic privacy is rising in importance. It was not even a decade ago that the Human Genome Project was completed, and now scientists can isolate numerous genes, including those that can cause

inherited breast and colon cancer. Unfortunately, this potentially life-saving information does have the potential to hurt people through discrimination. Even though there are more safeguards against this form of discrimination now than there have been in the past, many people are still uncomfortable with the idea of sharing access to their medical and genetic information.

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KRISPY KREME: A STRATEGIC ANALYSIS

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I. ABSTRACT:

Krispy Kreme has fallen on hard times as result of poor leadership throughout its infrastructure. After the company first went public in 2000, Wall Street was amazed with the impressive performance and consistent profits the company produced quarter after quarter. The desire to be the best and not let the investors down resulted in numerous ethical oversights and judgment shortfalls. By the end of 2004, many of Krispy Kreme's accounting scandals began to proliferate. The severe nature of many of these scandals made it nearly impossible to keep them out of the public eye and it became clear that Krispy Kreme was in a great deal of trouble, both legally and financially. In 2008 when this once great company was at its lowest point, it became clear that change was necessary if the company was going to survive. This paper analyzes the shortcomings of Krispy Kreme Doughnuts and proposes a strategic plan for turning things around and establishing a viable long-term plan.

II. Introduction

Krispy Kreme opened its doors in 1937 when Vernon Rudolph purchased the secret recipe for yeast-raised doughnuts. By the 1960's, Krispy Kreme had become very well known throughout much of the southeastern United States. Revival and upward expansion were paramount in the 80's and 90's. This resurgence that Krispy Kreme experienced was due to a renewed focus on a hot doughnut along with rapid growth outside of the southeastern United States. Since its quaint beginnings, Krispy Kreme has grown to be a multi-national and multi million-dollar corporation with quite a history along the way [3].

The purpose of Krispy Kreme, just like any other for-profit corporation, is to increase assets and instill loyalty in its consumer base. Krispy Kreme strives to be the leading choice of consumers for specialty baked goods and beverages. Krispy Kreme seeks to maintain its loyal customer base and attract new customers in both current and developing markets with its commitment to quality and consistency in its doughnuts, other baked goods, and beverages. Krispy Kreme's life cycle has followed that of many great corporations in the past. It began with a long period of steady growth followed by a period of rapid expansion until reaching its maturity and beginning to decline [4].

Krispy Kreme has three primary revenue generating segments, which are company stores, franchises, and the Krispy Kreme Supply Chain. Company Stores have been the basis of their operations; they include on-premises sales and off-premises sales, which are usually the factory stores. The on-premises sales are where you can find the "HOT" doughnut signs, all kinds of drinks, memorabilia, a seating area if you have time to sit down and enjoy your break, and the drive thru window when you just want a doughnut to go [4]. The on-premises sales are also, where community organizations can go to get the "fundraiser" doughnuts to raise money for their cause. The off-premise sales are mostly done in the large Company factory stores which have the capacity to make up 10,000 dozen doughnuts a day and supply the

convenience stores, grocery stores and other institutional accounts. The Company Stores represent \$326,199,000 that accounts for 70.7% of their total revenues in 2007, which is down 18% from 2006 [4]. It is important to note that direct operating expenses associated with generating this revenue account for 88.9% of the total revenues generated by company stores. In the end, company stores brought in 50.27% of net operating income in 2007.

Krispy Kreme Franchises are formatted in the same manner company stores are in respect to their on and off premises sales but of course the owners of these Franchises pay fees and royalties [4]. Under the franchises, Krispy Kreme does not generate a significant amount of total revenues, only bringing in 4.6% of total revenues at \$21,075,000 in 2007, which is up 14.6% from 2006 [4]. For Franchises; however, direct operating expenses only account for 21.8% of revenues. As a result, franchises are still able to bring in 22.94% of Krispy Kreme's total net operating income.

The Krispy Kreme Supply Chain is the main distribution channel for all the things needed for any store to operate. It provides the ingredients for the doughnuts, all the equipment needed, all beverages served, and all other store needs such as signs, display cases, and even the uniforms all employees wear. Krispy Kreme has pride in their distribution processes and strives to make it better by adding key suppliers to reduce their cost and making it more convenient for stores worldwide. The Supply Chain revenues went down from \$126,517,000 in 2006 to \$113,921,000 in 2007, thereby accounting for 24.7% of total revenues [4]. The direct operating expenses associated with generating this revenue account for 83.1% of it, which means that the Supply Chain was responsible for 26.79% of net operating income.

III. SWOT Analysis

Krispy Kreme has the potential to become a powerhouse in the United States again. Through the use of a S.W.O.T. analysis, Krispy Kreme can identify its internal strengths, internal weaknesses, external opportunities, and external threats [6]. One of Krispy Kreme's most powerful internal strengths has been their logistics program since having placed a renewed focus on it in recent years. Their program, MyKrispyKreme, has allowed the company to lower their transit and turnover times [3]. This has helped the company lower its waste levels caused by overproduction. Brand recognition is another strength that Krispy Kreme possesses. Their logo and doughnuts can be spotted by both sight and smell from far away. When consumers are able to witness the doughnuts being made fresh and are able to sample them, it allows for a hands-on grass-root campaign style. The smell and taste of this product has helped to make their doughnuts iconic. This recognition helps Krispy Kreme remain visible and therefore it is a productive strength for the company.

Although Krispy Kreme has many internal strengths that have gotten it to where it is today, they have many weaknesses within the company that are hurting its overall profitability. Since the consumer health craze began in the 90's and hit its peak in recent years, consumer perception of Krispy Kreme has become somewhat of a joke about obese children and a diabetic nation. Further, the lack of variety has increased exposure to changes in demand, thereby exposing the company too much greater risk. Krispy Kreme has made steps to cater to the more health conscious public in the United States; however, their national ad campaign does not adequately penetrate the market resulting in low consumer awareness. Between 2006 and 2007, Krispy Kreme closed 48 franchises and 9 company stores [4]. This can be attributed to the weaknesses and shortfalls of the screening and selection process when granting franchises and opening stores.

Even with so many weaknesses impacting the profitability and longevity of Krispy Kreme, the company still has many opportunities now as well as in the future that could potentially turn things around for the company. The global economy of today provides many avenues for expansion and diversification. The

primary reason for this is that demand trends differ greatly across different demographic regions. In many Asian and Eastern European countries, the value of sweet commodities is increasing at a fairly rapid rate while the market in the United States is stagnant. Here in the US, the education sector is another powerful opportunity for growth. They have the potential to further capitalize on brand recognition through affiliation with the local schools and their communities.

The fast food industry is a threat to Krispy Kreme. Krispy Kreme has primarily been perceived as a breakfast store due to the traditionally high demand of doughnuts and more recently, coffee. As a result, Krispy Kreme's sales tend to be the highest during breakfast hours. Other companies like McDonalds and Burger King have started entering the market and developing a similar selection with even more choices available at lower prices causing Krispy Kreme to lose part of its niche market. Krispy Kreme's biggest competitor is Dunkin' Donuts. This company has over 7,000 stores within the US and 30 countries worldwide. They have implemented an execution strategy stressing beverages over the carb-laden doughnut [2]. They still offer 25 varieties of doughnuts compared to Krispy Kreme's 20 [3]. Offering greater variety in the food they sell along with aggressive expansion makes Dunkin' Donuts a formidable competitor.

Other sources of competition are from Starbucks and Tim Hortons. Krispy Kreme has been trying to add more products to go along with its doughnut. Expansion into the coffee and coffee-like beverages has caused Starbucks Corporation to become a primary competitor with over 12,000 stores that offer many drinks and pastries that can be found at Krispy Kreme [7]. Tim Hortons has become a viable threat to Krispy Kreme since merging with Wendy's in 1995, and thereby greatly increasing their opportunities to expand into the United States market [8]. Tim Hortons currently has over 3,000 locations in the Canada and the northern United States with a strong foundation as a coffee and doughnut shop.

IV. Short-term and Long-term Goals

In order for Krispy Kreme to remain competitive and increase profitably in the future, they have established many short and long-term goals. One of their goals is to hold senior officers accountable by conforming to the Sarbanes-Oxley Act [4]. They are interested in increasing inventory turnover and creating a more efficient supply chain. Krispy Kreme is also working on improving the quality of the franchise store operations. They are developing and implementing a more beneficial international growth strategy through their use of political risk assessments. Finally, Krispy Kreme would like to alter their customer's preferences and perception from a negative connotation to one that is more amicable [4].

The most important aspect of goal setting for a corporation in Krispy Kreme's position is the way in which they approach it. The best approach would be to set S.M.A.R.T. goals—goals that are specific, measurable, attainable, realistic, and timely [1]. It is clear that the company already has a laundry list of goals that sound promising; however, simply listing the goals without a SMART approach often ends with poor or inefficient results. By quickly conforming to the Sarbanes-Oxley Act, Krispy Kreme can more efficiently reach many of its goals while positioning it to attack others [4]. Had Krispy Kreme implemented SMART goals and similar protocol of that put forth in the Sarbanes-Oxley Act as early as 2000, the company could have avoided the substantial loss of market share and could still be experiencing strong growth today [1].

V. Assessment

By combining the SWOT analysis with SMART goals we get the USED analysis. Under a USED analysis, management would be able to implement a four step strategic plan by using each strength, stopping each weakness, exploiting each opportunity, and defending against each threat [6]. This would allow them to reach their short-term and long-term goals in a timely and efficient manner. While their logistics programs have improved substantially in recent years, becoming lackadaisical is not an option. The first step in the strategic plan will be to hone in and focus on improving the supply chain and making it more efficient. A key component to this step is improving the relationship with the wholesalers and the communication between the strategic business units throughout the company's infrastructure [5].

The next step in this plan is to focus in on brand recognition. The Krispy Kreme trademark is arguably the most valuable asset the company has and therefore should be protected and improved upon. In order to do this the company needs to focus on improving consumer perception of their products via a more penetrating national ad campaign. It is clear that the vast majority of health conscious consumers in the United States have a negative perception associated with Krispy Kreme. To combat this negative stigma surround the company name, increasing research and development towards meeting the needs of the consumers is paramount. Another way to further capitalize off of the brand recognition would be to more aggressively reach out to the local schools and communities. This grass-root approach is one of the most cost effective and profitable advertising approaches available for enhancing market penetration.

The third step is aimed at expansion into foreign markets and providing a safer and more diverse investment opportunity to the shareholders. This can be accomplished by first developing a better screening process for company stores and franchises thereby decreasing the high turnover rate that is currently hindering the company. Next, the focus would be on international expansion. To ensure a smooth entrance into these developing markets, it is of utmost importance to have an effective political risk assessment plan in place. This means that Krispy Kreme would have to invest in gathering research aimed at identifying weaknesses as well as opportunities that will play a major role in the success of this endeavor.

The fourth and final step is aimed at effectively recognizing and handling competition. It is clear that Krispy Kreme has a great deal of competition in its market. The best approach to handling this competition is to understand the nature of its competition. Since many of the fast food restaurants will focus on offering better prices and have the resources to do so competitively, Krispy Kreme would have to focus on offering value to the consumers in another way. This can be accomplished by specializing in quality and customer service over lower prices. Their other major competitors are those that have major market share in the same avenues of service such as Starbucks and Duncan' Donuts. To remain competitive with these companies, Krispy Kreme would have to focus on establishing their niche market and meeting the needs of their specific customer base. Increasing research and development in areas such as new product development would be necessary to get the competitive edge in the health foods market over their primary competitors.

VI. Conclusion

Funding these additional expenses is necessary and feasible in order to regain profitability and to continue to expand globally. The company can generate the funds by starting a new aggressive marketing approach to investors emphasizing a total restructuring of the company that will turn things around in regards to profitability, consumer awareness, and the management within the company's infrastructure. If Krispy

Kreme effectively manages its resources and implements this four-step approach to transforming the company into a profitable entity, it will be able to not only increase market share but also resume a long period of steady upward expansion within the next three years. At that point, the company can begin to repurchases shares of stock and increase the earnings per share. It is, however, of utmost importance that the company continues to fund research and development and update their strategic business plan regularly to ensure that they remain ahead of the competition in order to prevent another substantial loss in consumer wealth and market share.

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Non-Expected Utility Theory and Behavioral Findings

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ABSTRACT

For many decades, the glory of von Neumann-Morgenstern framework has resisted all contradicting evidence collected by behaviorists. A major reason is simple: lack of a coherent mathematical apparatus to replace the formal rationality analysis. While proponents of rational analysis emphasized the importance of final outcome of action, behaviorists insisted to focus on the process of choice. In this paper, we review the findings that led to questioning many accepted facts in the study of mainstream economics. We explore proposed alternatives and pose intriguing questions. Our goal is to promote and draw attention to behavioral findings pertaining to the economic theory of decision making.

Keywords: Expected Utility Theory, Behavioral Economics, Psychology.

INTRODUCTION

A thorough and unbiased study of (even economic) decision-making takes us inevitably beyond economics and to other disciplines. There is now a vast literature on the topic. In psychology alone, there are more than one hundred books, about 3500 research articles, two major journals and a chapter every three to five years in the Annual Review of Psychology. There are sizable literatures in biology and anthropology as well. The literature clearly shows that economics has been built on profoundly false assumptions about human behavior and preferences, and indicates what economics might become if its practitioners would read beyond their discipline.

Experimental economists show increasing interest in incorporating findings from other disciplines into economics. However, they mostly remain faithful to standard probability theory and the fundamental assumptions traditionally imposed on decision-making. At most, they develop formalizations of bounded rationality through partial modifications of the standard expected utility Framework.

In this paper, we review some famous alternatives to the expected utility theory, and present contradicting evidence from observational studies as well as paradoxes developed by theorists that hint at the flawed set of assumption on which the EUT is built. The goal is to encourage incorporation of behaviorist findings in the mainstream practice of economics.

ALTERNATIVES TO EXPECTED UTILITY THEORY

An enormous amount of theoretical effort has been devoted to developing alternatives to the expected utility theory (EUT), and this has worked hand-in-hand with an ongoing experimental program aimed at testing those theories. The experiments in the economic laboratories show that the standard theory does not fit the facts. Therefore, developing a better understanding of the determinants of individual choice

behavior seems a natural research priority. Now the intriguing question is whether economic experiments have been generating a serious competitor for replacing EUT, at least for certain purposes.

Using non-expected utility models to explain real behavior is an interesting and active field in economics. Experimental economics plays a key role in investigations that provide evidence for valid and more realistic modeling of behavior. Expected utility theory has a fair number of deficiencies. Many economists have worked on some alternatives that can operate better at least for certain purposes. Experimental research provided this field with a rich ground of controlled observations that could both shed a light on the shortcomings of this model and provide theorists with ideas to develop alternatives and improvements. Optimization theory, as defined broadly, provides a rich theoretical framework that is capable of accommodating the anomalies within EUT as presented below.

Among the alternative to EUT is non-transitive preference theory. In this theory of choice, we are able to talk about people maximizing their utilities without transitive preferences. Bell, Fishburn, and Loomes & Sudgen all proposed this theory independently in 1982. Loomes and Sudgen (1987) present a version of this theory called regret theory. Despite a conventional theory that assigns value independently of individual prospects, regret theory allows comparisons between the consequences of alternative choice options. They introduce the “regret aversion” assumption which implies that a large difference between what you get from a chosen action and what you might have gotten from an alternative gives rise to a disproportionately large regret, so people prefer greater certainty in the distribution of regret. Consequently, regret theory could explain the standard violations of the independence axiom for statistically independent prospects.

Weighted Utility theory is a special case of regret theory, used by Segal and Spivak (1990) to resolve counter-intuitive implications of EUT that are carried through to non-expected utility theories, which have similar smoothness properties. The fact that risk averse behavior can be generated by nonlinear probability weighting, even when the utility function has a linear form, is the reason why models with probability transformations do not imply approximate risk neutrality for small risks. Therefore, aversion to probabilistic insurance could be explained by over weighting of the small probability of non-payment. Weighted utility theory could be used to explain insurance purchasing behavior that violates the expected utility theorem axiom of transitivity. An experiment performed by Wakker, Thaler and Tversky.

PSYCHOLOGICAL FINDINGS RELEVANT TO ECONOMICS

Economics conventionally assumes an individual with coherent preferences, who rationally maximizes a utility function, given a set of options and probabilistic beliefs. In what follows, we will look at experimental evidence that can be explained by slight modifications of the standard economic framework, as well as empirical cases, which increasingly challenge standard economics. This section heavily draws on Rabin (1998) that calls the relevant psychological evidence to economists’ attention. He suggests that “a blooming [of] understanding would come out of an active exchange between the two disciplines.” He deliberately avoids arguments that question the relevance of behavioral research to economics, because he finds no intellectual benefit in such a discussion. He simply holds that incorporating psychological findings into economics is doable and embodies no methodological complication. He invites economists to treat relevant psychological claims as presumptively plausible: Claims such as irrational investment as a result of reading too much into the short term performance of stock market, or the resentfulness of employees who feel they are mistreated. He further says that “the methodological illicitness of departing from habitual assumptions is rooted in lack of awareness of empirical findings and that this prejudice should be abandoned in favor of empowering the economics framework.” The emphasis should be put on “what we learn from experience not how to conduct one.”

MODIFICATIONS TO THE RATIONAL CONCEPTION OF HUMAN CHOICE IN PSYCHOLOGY

Economics and psychology are nonbearing disciplines that do not have a long history of communication. In this section, we heavily draw on Rabin's classic work [4] to present a profile of where these two fields meet. Changes in outcomes relative to preferences will change the preference structure and ordering. And thus the preference ordering does not depend merely on the absolute levels of outcome but on the changes according to the status quo. People have a directed preference for gains and losses; they dislike loss significantly more than they like a gain of the same amount. Furthermore, people depart from self-interest in favor of goals such as fairness, reciprocal altruism, and revenge. Mild modifications could capture this phenomenon to some extent. These modified frameworks are faithful to standard economics. A method for considering the effect of reference points (the primary status) is to incorporate habitual levels of consumption into utility analysis. Traditionally we consider the utility at time t , $u(t)$ as a function of consumption at time t , $c(t)$. In addition to that, we can define a preference level at time t , $r(t)$, which depends on consumption before t or at the expectation of future consumption or both. Then $u = u(r, c)$ at any time t , will be a more general function that accounts for reference point influence on behavior.

The displeasure of loss being greater than the pleasure of same size gain is implied by the regular concave utility function that holds for familiar explanation of risk aversion. But loss aversion says more than this. Tversky and Kahneman (1991) show that people value modest losses almost twice as much as gains of the same magnitude. This suggests an abrupt change in the slope of the value function at the reference level. Mehra and Prescott (1985) and Epstein and Zin (1990) observed that according to macro data, expected utility theory cannot provide us with an explanation for the attitudes toward large-scale risks and small-scale risks at the same time. Rabin (1997, "calibration theorem") shows that no concave utility function can do so. Rabin then captures both risk attitudes in an expected utility framework by introducing a reference-based kink in the utility function. Segal and Spivak (1990) develop a non-expected utility theory to explain the same thing. Kahneman, Knetsch, and Thaler (1990) identify and illustrate the endowment effect as a phenomenon related to loss aversion. People value a thing higher after possessing it.

Two other related observations are as follows: a status quo bias, where people choose not to trade when different goods of the same monetary value have been allocated to them randomly (see Knetsch, 1989); and diminishing sensitivity, meaning they move from risk-aversion over gains to risk-loving over small losses (see Kahneman and Tversky, 1979). Raymond Hartman, Michael Doane, and Chi-Keung Woo (1991) report empirical evidence for a status quo bias in consumer demand for electricity. Loss aversion has been investigated and supported by John Shea (1995) through observing a smaller increase in consumption level in response to good news than the decrease in consumption in response to bad news.

An example of a model that takes the above considerations into account is given by economists Ryder and Heal (1973). They develop the idea of a parameter a that measures the speed with which reference points are adjusted, which is correlated with the weight that people put on the past consumption. For a long run utility maximizer, the current reference level $r(t)$ is calculated as a weighted average of the past reference level $r(t-1)$ and past consumption level $c(t-1)$. Evidence is sparse for the two ideas that this model rests on: that reference levels exist, and that changes in reference levels affect people's preferences.

Experimental research reveals many instances of subjects' behavior that cannot be explained by pure self-interest: big contributions to public goods, sharing money voluntarily, sacrificing money to punish unjust behavior by other subjects. Hence, realism suggests that economists should depart from the presumption of naïve self interest and move toward models that permit human considerations such as equity, fairness, and status-seeking. The last has been shown to play an important role in employee behavior. It is worth

mentioning that some market structures such as double-auction generate self- interested behavior in the laboratory. However, the fact that self- interest explains behavior in some cases should not lead us to ignore institutional and environmental effects on behavior in other cases. Nor should it be used to argue that a completely different framework is needed to explain all economic phenomena. From a pragmatic point of view, any model could be good as long as it achieved the objective of our inquiry, namely, explaining consumers' behavior.

CONCLUDING REMARKS

Mainstream economics employs a powerful combination of methods: methodological individualism, mathematical formalization of assumptions, and sophisticated empirical field-testing. Rabin says that in the light of these methods we can understand psychological findings. He further suggests that we integrate and incorporate these findings into economics, to enrich our field and expand the scope of choices that economics can explain.

Economists usually place a high premium on mathematical and logical accuracy, thereby ignoring important details of human behavior. The intriguing question remains unresolved: is there a meaningful trade-off between mathematical accuracy and detailed quantification on one side and describing the details of real human behavior on the other hand? Or this is just another version of the prominent dualistic approach, like “tractability” and “parsimony” versus “integrating realistic evidence into our research”? Can we avoid all the dualistic tradeoffs by employing an integrative new framework for our understanding of human behavior? These remain to be open questions to be explored.

We looked at the results of studies of the human behavior in experimental labs and when faced with gambles and tried to learn something outside traditional economics. It is amazing that behavior observed by the researchers in many different fields suggests a fundamental revision of the economic theory of choice, yet economists keep developing their ideas within the traditional framework. Mainstream economists are interested in “non-psychological” models of bounded rationality. Some of those have been formulated based on intuition, computer science, or artificial intelligence. These models are meant to capture cognitive limits of economic actors but do not invoke research on the specific patterns of errors that human beings make. Economic theories that can only calculate cannot comprehend economic deliberation; hence, they can benefit from incorporating findings of actual human behavior from many neighboring disciplines, especially psychology.

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WHEN DID INFLATION BECOME MORE VOLATILE AND WHY?

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ABSTRACT

This paper investigates the behavior of inflation over the recent past with primary focus on volatility, not the level of inflation. Over the past 60 years, the inflation rate has shown periods of tranquility as well as periods of volatility. Recent evidence suggests that inflation, after a period tranquility during the 1990s, became more volatile early in the new century (perhaps even as early as 1999)—prior to the current run-up in the energy and food sectors. Evidence of the increased volatility is presented and the volatility is modeled with a relatively simple autoregressive conditional heteroskedasticity (ARCH) model. We also attempt to offer some explanation for the recent volatility.

INTRODUCTION

The autoregressive conditional heteroskedasticity (ARCH) model was developed by Robert Engle to explain volatility “clustering,” that is, periods in which the variance of a time series is tranquil and other periods in which the variance of the series is more volatile. The ARCH model and its extension, generalized ARCH (GARCH), have been applied to numerous economic and financial series. These models are important in identifying periods of volatility and they also aid in producing more realistic interval forecasts.

DATA, METHOD, PRELIMINARY RESULTS

We collected the monthly measure of the Consumer Price Index (CPI) for the period January 1947 to April 2008. The measure of inflation is the monthly log difference in the CPI at annual rates. That series is shown in Figure 1.

Casual observation of Figure 1 suggests that inflation was quite volatile in the late 1940s and early 1950s, again in the 1970s, and yet again starting around the turn of the century. Periods of tranquility were evident in the late 1950s through most of the 1960s and again in the 1990s. Of course, it is well known that simple inspection of the variance of a series can be misleading when the series is autocorrelated. To correct for this, we fit an autoregressive model to the inflation rate. The lags are chosen using standard penalized likelihood model selection criteria. The form of the autoregressive model can be represented as follows:

$$INFL_t = a_0 + \sum_{i=1}^p b_i INFL_{t-i} + e_t \quad (1)$$

where $INFL$ is annualized monthly inflation, t indexes time, e_t is a white noise disturbance term and the b_i ($i = 1, \dots, p$) are the lag coefficients, and p indicates the order of the lags. The two standard penalized likelihood selection criteria are the Akaike information criterion (AIC) and the Schwarz information criterion (SIC) represented as follows:

$$AIC = (2k / T) + \log(\sigma) \quad (2)$$

$$SIC = [k \log(T) / T] + \log(\sigma), \quad (3)$$

where k is the total number of estimated coefficients in the VAR, T is the number of usable observations, and σ is the scalar estimate of the variance of the equation's disturbance term. If the AIC and the SIC differ on the number of lags, each indicated model was estimated, with evidence presented here for the most parsimonious model. The SIC chooses $p = 12$, and we present additional evidence based on that model.

FIGURE 1: MONTHLY INFLATION AT ANNUALIZED RATES

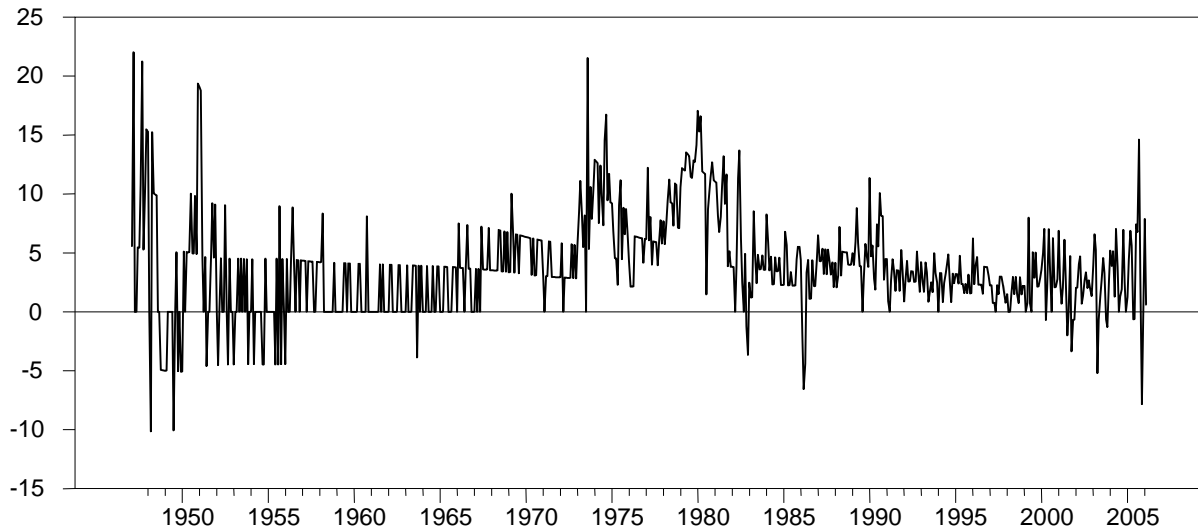


FIGURE 2: RESIDUALS FROM THE AR MODEL

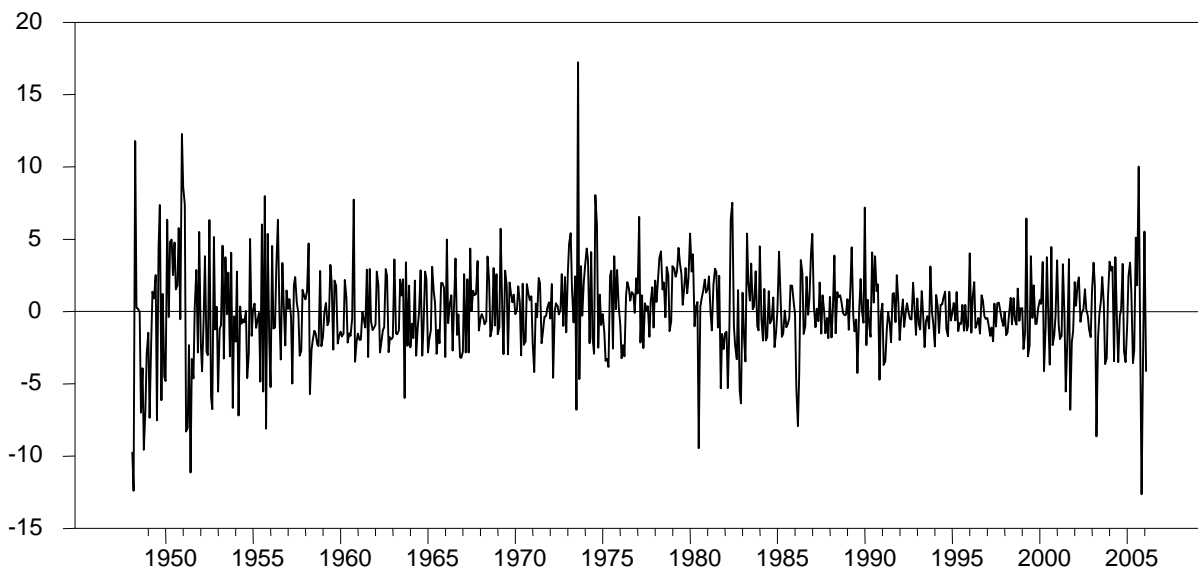


Figure 2 depicts the residuals from the autoregressive model for inflation, with the same periods of volatility and tranquility evident.

Testing for volatility is usually accomplished by analysis of the squared residuals from an autoregressive model, such as depicted in Figure 3. The reasoning for testing the squared residuals is simple. The residuals from the autoregressive model (see Figure 2) will be serially uncorrelated as a result of the autoregressive lag fit. Those residuals are, however, not independent. Small (in absolute value) residuals are likely to be followed by additional small residuals, and large residuals are likely followed by other large residuals—that is the meaning of volatility clustering.

FIGURE 3: SQUARED RESIDUALS FROM THE AR MODEL

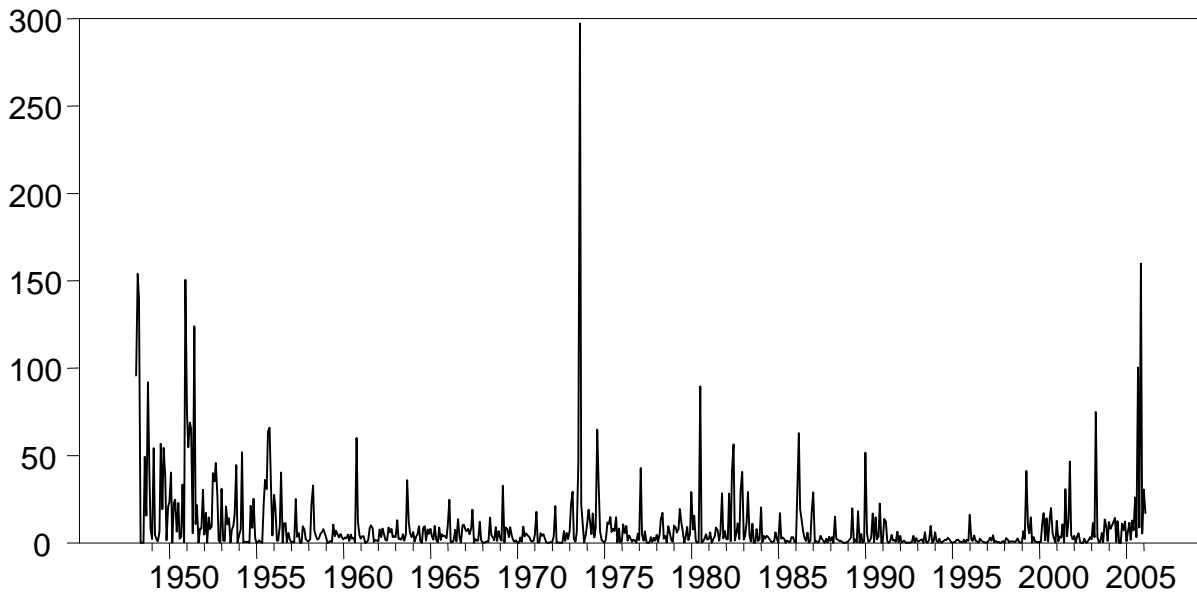


Figure 3 shows the same clustering effect for the squared residuals. To test for ARCH errors, a second regression is run:

$$e_t^2 = c_0 + \sum_{i=1}^p d_i e_{t-i}^2 + v_t \quad (4)$$

Where e_t^2 represents the squared residuals from equation 1, and the d_i ($i = 1, \dots, p$) are lag coefficients and p again indicates the order of the lags. If there are no ARCH effects, then equation 4 will have little explanatory power, i.e., R^2 will be very low. The existence of ARCH effects can be tested in two ways. First with a sample of T residuals, TR^2 is distributed as χ^2 with p degrees of freedom. Alternatively, an F -test that all d_i coefficients are jointly zero will also indicate whether or not ARCH effects are present. The SIC chooses 2 lags for equation 4.

The estimated equation for (4) is:

$$\hat{\epsilon}_t^2 = 5.77 + 0.20\hat{\epsilon}_{t-1}^2 + 0.16\hat{\epsilon}_{t-2}^2 \quad (4')$$

$$R^2 = 0.0891$$

$$T = 695$$

The null hypothesis of no *ARCH* effects can be written:

H₀: $d_1 = d_2 = 0$ (there are no *ARCH* effects)

H₁: some $d_i \neq 0$ (there are *ARCH* effects)

As expected, the null hypothesis is rejected resoundingly for either the χ^2 test ($\chi^2 = 61.95$, p-value = 0.0000), or the *F*-test ($F_{(df=2,692)} = 33.86$, p-value = 0.0000). We conclude that the process of inflation is subject to *ARCH* effects. Thus we have confirming statistical and visual evidence that small squared residuals tend to be followed by small squared residuals, and large squared residuals are more often followed by other large squared residuals.

OTHER RESULTS

The *ARCH* errors model is typically estimated simultaneously with the autoregressive model of inflation by maximum likelihood methods. That estimation also yields an estimate of the variance of the series, typically known as the *h* series. Again choosing $p = 12$ for the autoregressive presentation for inflation, and $p = 2$, for the variance of the series, we present the portion of the equation that represents the variance (here, *h*) of the inflation series (here we are less interested in the autoregressive parameters of the estimate of inflation, since many, many, alternative inflation forecasting models are possible):

$$h_t = 4.29 + 0.36\hat{\epsilon}_{t-1}^2 + 0.20\hat{\epsilon}_{t-2}^2 \quad (5)$$

(5.80) (3.93)

Where *h* is the estimated conditional variance in inflation and the numbers in parentheses are t-statistics. The reader will note the striking similarity between equations 4' and 5. Either of those equations would produce similar estimates of the conditional variance in the rate of inflation.

Figure 4 represents the conditional variance of inflation based on *ARCH* model estimated by maximum likelihood methods. Two things from Figure 4 are striking for recent inflation. First, consistent with prior results, there was a marked period of tranquility, beginning near 1991 and lasting through 1998. Second, the beginnings of recent increased volatility began earlier than we would have anticipated, even as early as 1999. As a final visual for the effects on forecasting of the increase in volatility, we offer Figure 5, an estimate of 95% error bands for inflation forecasts. In the graph, we limit the time period to the 1990s until the end of the dataset and, for simplicity, we assume a 2.5% forecast of inflation.

In the graph, it is once again clear that the variance in inflation, and hence the 95% confidence interval around inflation forecasts was relatively narrow for most on the 1990s and began to widen in 1999, and continues on a wider path through the most recent data.

FIGURE 4: ESTIMATED VARIANCE OF INFLATION FROM THE ARCH MODEL

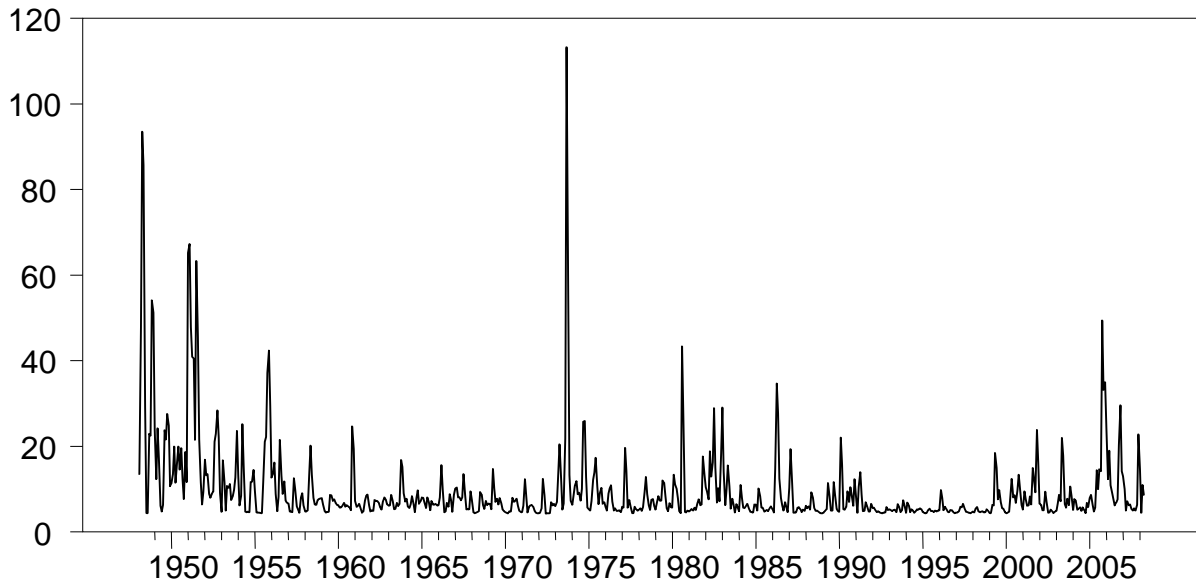
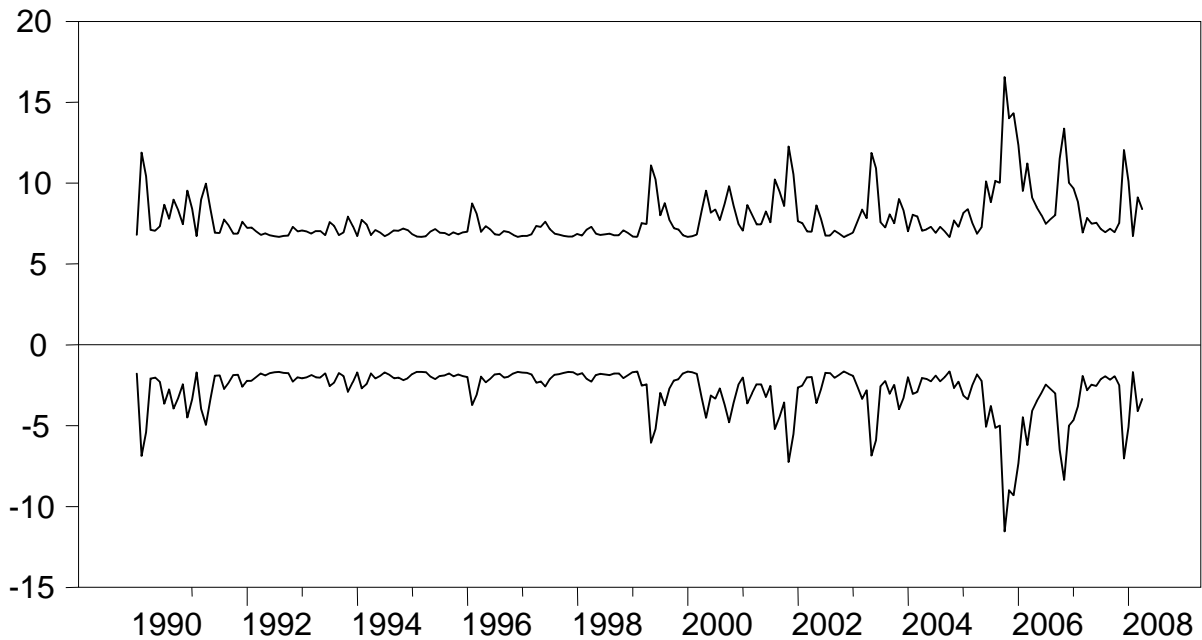


FIGURE 5: NINETY-FIVE PERCENT ERROR BANDS FOR INFLATION FORECASTS



To summarize the results of this section, we find in favor of *ARCH* effects for the inflation series. The statistical and visual evidence are (we think) very clear. That result is interesting, but not particularly surprising. We do not find surprising the extremely tranquil period through most of the 1990s. That inflation in the middle to late 2000s is also more volatile is also unsurprising. That the genesis of that increased volatility seems to have begun as early as 1999 is (at least to us) a surprise.

ECONOMIC EVENTS AND INFLATION

Why would inflation have been less volatile in the 1990s and more so in the 2000s? Here we present some economic events that may be associated with those effects.

The tranquil period of the 1990s can be considered a part of *The Great Moderation*. This term, coined by Stock and Watson (2003), refers to the simultaneous reduction in the volatility of inflation and real output that began in 1984. Bernanke (2004) popularized this moniker and explained that economists attribute its occurrence to structural changes in the economy, improved monetary policy, and good luck. Structural changes include the smaller share of output attributed to durable goods production, improvements in inventory management, and increased openness in international trade and capital flows. The change in monetary policy refers to the increased emphasis on fighting inflation that began in 1979. Good luck took the form of fewer exogenous shocks, such as oil and other commodity price increases and financial crises. The empirical evidence on the relative importance of these three classes of causes of decreased economic volatility is decidedly mixed and it remains an important area of research.

As noted above, the increased volatility of inflation over the past few years is not surprising. Perhaps the good luck of the 1990s simply ran out. The terrorist attacks on New York and Washington, wars in Afghanistan and Iraq, oil and food price shocks, and the bursting of two speculative bubbles can all be classified as exogenous shocks. The fact that the earliest of these shocks, namely the precipitous decline in stock prices in 2000, occurred in the year *after* the current period of inflation volatility began is surprising and interesting to us. It may be the case that The Great Moderation has ended. Additional research on changes in the volatility of inflation and real output growth, along with a better understanding of their determinants, will surely be forthcoming.

CONCLUSIONS

This research finds in favor of modeling inflation as an *ARCH* process, consistent with much other research on inflation. Our primary findings in this paper include the following three conclusions. First, for much of the 1990s, the variance in inflation was very low in comparison with prior and succeeding periods. Second, the increased variance in inflation that followed the period of tranquility began earlier than expected—as early as 1999. Third, the increased variance in inflation continues through the current period. We provide several explanations for both the period of tranquility and the more volatile path of inflation in the post 1999 era.

Since the measure of inflation we use in this paper includes food and energy prices, a future paper based on core inflation (excluding the more volatile food and energy sectors) is an obvious extension. Such an investigation could determine whether the results of this paper are driven by the more volatile CPI components.

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EDUCATIONAL ATTAINMENT AND ECONOMIC GROWTH ACROSS COUNTRIES: DO TIMSS & PISA TEST SCORES EXPLAIN GROWTH?

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Abstract

In recent decades, individuals and nations around the world have become more and more concerned with education. Parents want their children to go to school and be educated to better their lives. However, on a larger scale, education is believed to have important influences on the economic growth of countries because it directly affects human capital levels. This paper investigates the ways in which education may determine economic growth, following on a famous study, titled *Natural Resource Abundance and Economic Growth*, by Sachs and Warner in the 1990s. This study finds that cross-country economic growth rates are directly related to educational attainments, measured by international standardized test scores, including Trends in International Mathematics and Science Study (TIMSS) and Program for International Student Assessment (PISA). The paper also demonstrates that these results are robust to several widely known specifications in the literature.

Introduction

I. Role of Education

Education has always been an important determinant of economic growth. People who have achieved higher levels of education attainment are seen as more skilled and more productive workers. Across countries, more educated workers are capable of utilizing advanced technology from developed countries to produce more goods and services effectively and efficiently. Some previous empirical studies measured educational attainment levels by school enrollment ratios or literacy rates. However, these measures do not provide an overall picture of the aggregate stock of human capital of any country. Thus, this paper will move beyond these traditional variables to study the influence of education on the overall performance of the economy.

In today's world, the knowledge of science and mathematics are especially important. Many of the world's problems, such as global warming, deforestation, rapid population growth, ozone depletion, rising obesity rates and pandemic virus infections, can be solved if the general public has sufficient scientific and mathematical knowledge to understand the cause of these problems and is able to reach consensus on what to do.

II. Literature Review

The research conducted by Sachs and Warner found that cross-country levels of economic growth are negatively correlated to the ratio of natural resource exports to GDP. This study also investigates the relationships of other variables, which can influence a country's economic growth. In the *Working Paper* written by Sachs and Warner, new variables are added to regressions from four previous studies Barro (1991), DeLong and Summer (1991), King and Levine (1999) and Mankiw, Romer and Weil (1992) to examine the negative relationship between natural resource abundance and economic growth during the subsequent 20-year period 1970 to 1990. Sachs and Warner also looked at many different variables that contribute to a nation's economic development, such as the openness of the economy, to draw the above conclusion.

We will use these four studies as a baseline from which to investigate human capital as measured by TIMSS and PISA test scores. If our new variables are statistically significant in all four of these research papers, and their regression models, then we will be able to claim a robust relationship between them and economic growth.

Among the studies used in Sachs and Warner's paper, the study by Barro conducted in 1991 also includes the estimates of educational attainments for the population aged 15 and over because this age group corresponds better to the labor workforce in many developing countries (Barro and Lee, 2). Education attainment is hard to measure with precision in a quantitative form. However, educational attainment is approximated based on the component of the human capital stock obtained at school.

Thus, the education variables in this research paper are the TIMSS and PISA test scores, which are the alternative measures of human capital. TIMSS is used to compare the education achievement of the fourth and eighth-grade levels across nations in the areas of mathematics and science as well as to track changes in education attainments over time. In addition, TIMSS also provides an indication of the degree to which students have learned concepts in mathematics and science they have encountered in school to each country. The International Association for the Evaluation of Educational Achievement (IEA), has been administered TIMSS since 1995 with the participation of an increasing number of countries around the world. TIMSS requires countries to select random, national representative samples of schools and students. The fourth-grade assessment was offered in 1995 and 2003, while the eighth-grade assessment was offered in 1995, 1999, and 2003.

While TIMSS is based on attained curriculum knowledge at a particular grade level, PISA is based more on skills and abilities in certain areas of 15-year-olds in the member countries. The PISA assesses the knowledge and skills in reading literacy, mathematics literacy, and science literacy of 15-year-olds across nations. PISA is administered every 3 years starting in 2000 through the collaboration of participating countries and the Organization of Economic Cooperation and Development. PISA 2006 results include more than 400,000 students across nations making up close to 90 percent of the world economy. Furthermore, it also collects data on student, family and institutional factors that may influence or help explain differences in the performance on PISA. Thus, this assessment takes into account learning that may occur outside formal academic settings. Because of these technical and practical reasons, the results of TIMSS and PISA are not directly comparable. Thus, this paper will use both TIMSS and PISA scores to measure cross-country educational attainments.

Methodology

The hypothesis of this paper is that the TIMSS and PISA test scores are positively correlated with the economic growth rates in the most prominent economic growth papers in the literature. This research adds the new variables of cross-country educational attainments, measured by TIMSS Math, TIMSS Science and PISA test scores, to Sachs and Warner's regression equations to examine these variables' correlations to the countries' economic growth rates.

The results of these tests are not to be taken literally as there are many statistical problems with this approach. For one, the growth rates used as dependent variable in most of these studies predate the TIMSS and PISA test scores. This is a significant issue but one can interpret test scores in one year to embody significant investments in the educational sector several years prior, especially in the cross country context. Working out the interpretation for this lag structure is a complex issue for future work. The TIMSS and PISA data were not available in the years of interest and the results are therefore suggestive. From previous work in this area, however, the authors have good reason to suspect that these results will be robust in future work when test scores can be more accurately linked to growth rates.

The tables below are meant to present our findings in the most simple format possible. We have simply reported the T-statistics from our regression results and included the T-statistic for only our newly included educational variables. We added our TIMSS and PISA variables to the most widely reported

equation used in each prominent paper. We only added one variable at a time to ensure that you are seeing a true test of each variable. The results are very strong and highly suggestive. The full Stata regression log for each equation is available upon request.

We ran one further set of tests as well. Following standard econometric practice, we eliminated all non-significant variables from our equations as noted below. To reflect the relationship between the test scores and economic growth, the insignificant variables used by the Sachs and Warner et.al. (with absolute values of t-statistics lower than 1.5) are eliminated. Then, the regressions are run to test the t-statistics of those test scores against other variables in the original studies as well as Sachs and Warner's study. We now present our findings.

Results

Table 1: Regressions from Barro Paper (1991), Sachs and Warner's paper (2000) with TIMMS and PISA educational variables included. T statistics reported below.

Educational Variables	Barro	Sachs & Waner	Barro without insignificant variables	Sachs & Warner without insignificant variables
TIMSSMATH95	0.23	-	2.61	2.24
TIMSSMATH99	4.75	2.91	3.85	3.44
TIMSSMATH03	4.49	3.29	3.78	3.26
TIMSSSCI95	-0.99	-	0.90	2.28
TIMSSSCI99	3.70	2.69	2.24	2.08
TIMSSSCI03	4.61	3.45	2.53	2.04
PISA00	1.99	0.96	3.37	1.58
PISA03	5.73	4.33	3.23	2.81
PISA06	6.31	4.91	4.04	4.02

Table 2: Regressions from King and Levine Paper (1993), Sachs and Warner's paper (2000) with TIMMS and PISA educational variables included. T statistics reported below.

Educational Variables	King & Levine	Sachs & Warner	King & Levine without insignificant variables	Sachs & Warner without insignificant variables
TIMSSMATH95	0.97	-3.54	3.15	2.05
TIMSSMATH99	5.34	3.26	5.08	4.77
TIMSSMATH03	5.05	3.07	5.17	4.15
TIMSSSCI95	1.32	-5.32	2.38	1.62
TIMSSSCI99	4.19	2.12	3.62	2.90
TIMSSSCI03	4.87	2.64	3.82	2.65
PISA00	1.62	3.77	2.05	4.57
PISA03	3.04	2.85	4.09	3.99
PISA06	3.63	3.15	5.64	5.91

Table 3: Regressions from Mankiw, Romer and Weil (1992) Paper, Sachs and Warner's paper (2000) with TIMMS and PISA educational variables included. T statistics reported below.

Educational Variables	Mankiw, Romer & Weil	Sachs & Warner	Mankiw, Romer & Weil without insignificant variables	Sachs & Warner without insignificant variables
TIMSSMATH95	2.85	1.51	2.85	1.79
TIMSSMATH99	4.03	3.54	4.03	3.19
TIMSSMATH03	4.07	3.32	4.07	3.23
TIMSSSCI95	0.95	1.01	0.95	0.72
TIMSSSCI99	2.47	2.10	2.47	1.70
TIMSSSCI03	2.93	2.33	2.93	1.88
PISA00	1.87	3.73	1.87	3.04
PISA03	3.05	3.38	3.05	3.37
PISA06	3.85	4.88	3.85	4.53

Table 4: Regressions from DeLong and Summers (1991) Paper, Sachs and Warner's paper (2000) with TIMMS and PISA educational variables included. T statistics reported below.

Educational Variables	DeLong & Summers	Sachs & Warner	DeLong & Summers without insignificant variables	Sachs & Warner without insignificant variables
TIMSSMATH95	0.32	-	-0.73	-
TIMSSMATH99	4.44	2.14	4.94	1.64
TIMSSMATH03	3.17	1.45	3.61	0.80
TIMSSSCI95	-5.27	-	-7.00	-
TIMSSSCI99	5.24	1.44	4.98	1.77
TIMSSSCI03	4.10	1.23	4.64	0.94
PISA00	2.20	4.30	2.29	3.22
PISA03	4.56	3.48	3.91	3.59
PISA06	5.46	3.91	5.02	3.69

The numbers, which are shown in the tables, are the t-statistics of the educational variables. The t-statistics show that TIMSS Math, TIMSS Science and PISA all demonstrate a strong positive relationship between educational attainment and economic growth.

Conclusions

We find that the economic growth rate is positively related to educational levels, as measured by the TIMSS and PISA test scores over a broad range of countries. The results of this study support the stated hypothesis that education attainment level is positively correlated with a country's economic growth. In short, education is an important factor in the economic development of any country. The study also implies that the inclusion of these new human capital measures matter. Future work will focus on linking TIMSS and PISA scores to growth rate series closer to those test scores. We await the data and regression papers which will make this possible.

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"NAVIGATING THE MAZE: UNDERSTANDING THE FINANCIAL IMPLICATIONS OF COMMON BUSINESS STRUCTURES"

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ABSTRACT

Students and entrepreneurs alike, struggle with the challenging, yet crucial need to project the financial implications of undertaking a new business venture. In the current economic environment financial organizations and investors are more closely scrutinizing financial plans before extending credit. This paper will focus on the difficult choice of what legal form to choose when setting up a new business and the some of the resulting differences in financial statement presentation. In addition the impact on owners' wealth will be examined as a result of entity choice.

INTRODUCTION

Many call the United States the land of opportunity. This is exemplified by the large number of "legal" immigrants into the United States on a yearly basis. According to the Department of Homeland Security over one million people legally immigrated to the U.S. in 2007 (Monger, 2008). The free-enterprise structure of the United States economy allows individuals the right to open their own business. Along with this privilege comes the risk of failure which is a real possibility due to the sluggish U.S. Economy. So never before has the need to accurately project the financial impact of an owner's investment in new business been more important.

Often one of the first decisions made by "new business" owners is the legal form of the business organization. Many new businesses choose their legal structure before start-up costs are estimated and profits or losses have been projected. The timing of this decision is often premature before a clear financial projection has been developed. Certainly the amount of capital needed to start a business will influence the decision on business form, as well as, the impact on the individual owner's personal taxes.

This paper will focus on three of the more common forms of legal structure: C Corporations, S Corporations and Limited Liability Companies (LLCs) because they all provide some degree of protection from personal liability. According to the Internal Revenue Service in 2006 there were approximately 3,825,000 S Corporation tax returns filed, 2,773,000 partnership returns and 2,454,000 C Corporation returns. Of the partnership returns filed Limited Liability Companies accounted for 79% of the total, clearly the most popular form of partnerships. In addition, S Corporations and LLCs

experienced growth between 2005 and 2006 of approximately 5% and 4% respectively, while C Corporations declined by approximately 1.6% (SOI Tax Stats - Partnership Statistics by Sector or Industry, 2004) . Two commonly used forms of business entities, the Sole Proprietorship along with the General Partnership, provide no protection from personal liability so it is best to avoid their use. Maybe the use of one of these two organizational structures would be OK if you are 12 years old and running a lemonade stand in your front yard, but keep in mind, there is always someone waiting to sue because they choke on a lemon seed or found an ant in their cup. The simplest plan can often become your biggest nightmare.

OVERVIEW AND TAXATION

A C Corporation is taxed as a separate legal entity from its owners. A C corporation offers owners (referred to as shareholders) limited liability and the ability to easily transfer their ownership shares to others. Profits from operations of a C corporation are taxed based on a progressive tax structure; in other words the tax percentage increases as the amount of income increases. The progressive structure flattens out and appears to be a flat tax rate of 34% between earnings of \$335,001 and \$10,000,000 and again at \$18,333,334 and up, at a flat tax rate of 35%. A shareholder will only pay tax at the individual level if they receive dividends from the Corporation. Since these dividends are paid from earnings already taxed at the corporate level and then again when earnings are distributed to shareholders this double taxation is seen as a disadvantage of a C Corporation.

“An S Corporation is a regular corporation under state law that meets certain requirements and has elected to be taxed under a pass-through system similar to partnerships” (Doran, 2004). Instead income of the S corporation is taxed at the individual shareholder level at their own individual tax rate. Much like C corporations, ownership of S corporations is in the form of stock which makes the transfer of ownership very easy. However S Corporations can only have 100 shareholders and all shareholders must be U.S. citizens or resident aliens; therefore, the limitations on the number and type of shareholders does limit the pool of available buyers. Taxable income of the S Corporation is allocated to the owners based on ownership percentages and reported on their individual tax returns. As the income flows to the individual shareholder it is important to point out that the income and expenses maintain their own identity. Capital gains and charitable contributions are examples. Capital gains will appear on the individual’s 1040 Schedule D and charitable contributions will be on the 1040 Schedule A to maintain their special tax treatment. Dividends paid to owners of an S corporation are nontaxable.

"In 1980 a new form of business entity was introduced in the United States, the Limited Liability Company (LLC) and since 1997 every state has a statute authorizing LLCs" (Doran, 2004). According to guidance in Practice Bulletin 14 provided by the Accounting Standards Executive Committee, LLCs have the following characteristics:

"An LLC is an unincorporated association of two or more persons

Its members have limited personal liability for the obligations or debt of the entity

It is classified as a partnership for federal income tax purposes" (Committee, 1995)

The LLC form of organization offers several advantages, such as a more flexible ownership structure and allocation of profits, losses, income and credits without concern about entity liabilities or the degree of participation in management.

FINANCIAL REPORTING: OWNERS INVESTMENTS

The key difference in financial statement presentation due to the choice of entity is the equity section of the balance sheet or statement of financial position. C and S corporation equity sections are very similar. Owners are referred to as shareholders and the amounts invested by shareholders are recorded in stock accounts and kept separate from the earnings of the corporations. Payments to shareholders take the form of dividends. LLC owners are referred to as members; therefore the equity section in the statement of financial position should be titled "members equity." According to Practice Bulletin 14, if more than one class of members exists, each having varying rights, preferences and privileges, the LLC is encouraged to report the equity of each class separately within the equity section. If the LLC does not report the amount of each class separately, it should disclose these amounts in the notes to the financial statements. In addition the AcSEC recommends that the presentation of the equity section of the statement of financial position should be similar to a partnership which does not maintain separate accounts for invested capital and earnings. Finally S and C Corporations show changes in equity in a separate statement. An LLC may show changes in members' equity in a separate statement combine with the statements of operations or include in the notes to the financial statements. Payments to members take the form of distributions.

SPECIAL ISSUES: WAGES, FICA TAX AND FRINGE BENEFITS

Additional guidance is needed regarding the taxation of wages, self employment tax and fringe benefits before we can analyze the impact of business entity choice on the owners' wealth. Shareholders who are also an employee of a C Corporation will be

treated like any other employee of the company. Their wages will be subject to Federal Insurance Contributions Act (FICA) taxes and any fringe benefits received will not be taxable to the employee as long as all discrimination rules are met.

Since 2005 the IRS has sent out reminders that a reasonable salary must be paid to shareholder-employees (SE) of S corporations. The IRS warns that it can reclassify as salary any distribution to shareholders. There are no published criteria currently from the IRS on what a reasonable SE salary or salary range might be. The IRS goal is to collect Federal Insurance Contributions Act (FICA) taxes on the salaries and Federal Unemployment Tax Act (FUTA). Several suggestions include examining comparable wages within its industry by consulting trade publications. "The salary should also consider the SE's experience and skill, the geographic region, customer base, numbers of employees and time committed to the corporation" (Jewell, September 2007). In other words, if you are the accountant of the Corporation and receive \$70,000 as an employee, which is similar to that of other Corporations for that position, the pass-through income will be exempt from FICA tax. On the other hand, if you receive only \$20,000 as the accountant when other Corporations are paying \$70,000 you could find your pass-through income subject to FICA Tax. Disguised distributions such as a loan to the shareholder or perhaps a distribution of property can also be reclassified as salary (Jewell, September 2007). Employee fringe benefits, received by a 5% or more owner of an S Corporation, will be included in taxable income by the taxpayer. There are some exceptions such as employee discounts, de minimis benefits and contributions to retirement plans.

Now the confusion starts. It appears as the tax code is written that payments made to members of a LLC who perform services for the LLC will be treated as a Partnership. Under the rules of a partnership all pass-through income will be subject to FICA Tax. However, Section 1402(a)(13) of the Internal Revenue Code states, "there shall be excluded the distributive share of any item of income or loss of a limited partner, as such, other than guaranteed payments...to that partner for services actually rendered to or on behalf of the partnership" (Internal Revenue Bullentin 2006-51). So now the question becomes is a member of a LLC to be compared to a limited partner of a partnership? In 1997 the IRS proposed, Reg. Sec. 1.1402(a)-2(h) (5) to help clarify the FICA tax question. As things go in the world of the tax code, the proposed regulation to help clarify the question of SE tax created more confusion. The proposed regulation still stands and currently the best strategy is to treat a member of a LLC as a limited partner of a partnership. Therefore it is reasonable to subject wages (guaranteed payments) of the member of the LLC to the FICA tax and not to the flow through income.

EXAMPLE OF TAX EFFECTS ON PERSONAL INCOME TAXES FOR COMPANY INCOME

A and B has started a company and are looking at the effects on their personal income tax returns under both a company that is a Flow through entity (S Corporation or Limited

Liability Company) and a C Corporation. Both A and B invest \$60,000 each, giving each 50% ownership in the company. A and B each receive an annual salary of \$25,000 which is considered normal for the position that they have in the company; therefore, any distribution of taxable income will not be subject to Social Security Tax.

In analyzing the impact on A and B's individual tax returns, the following assumptions are made. Both owners are Married Filing Joint with no dependents and will itemize their deductions. The income from the new business is projected to be \$60,000; therefore A and B will each report \$30,000 of the taxable income for the Flow Through entities based on their ownership percentage and a nontaxable distribution of \$10,000. If a C Corporation legal structure was chosen, the salary will be the same \$25,000 each and dividends paid to the owners will be \$10,000 each. The taxable income of \$60,000 from the C-Corporation will be paid by the Corporation on its Form 1120. The tax on the Form 1120 will be \$10,000 based on the current corporate tax tables. The big difference in the two individual tax returns is income from other sources. A's spouse has a very large salary and they have a lot of investment income from other sources therefore their AGI is much higher.

The table shown below illustrates the impact on owners A and B's individual tax returns without any income from the new business in the first column and then the impact related to the business income under a flow-through entity or a C corporation.

Mr. and Mrs. A

	Before Any Business Income	With Flow- Through Income	With C-Corp Dividends
Adjusted Gross Income	\$356,072	\$385,615	\$366,072
Itemized Deductions	\$19,854	\$19,263	\$19,654
Exemption Deduction	\$2,357	\$2,266	\$2,266
Taxable Income	\$333,861	\$364,086	\$344,152
Tax Before AMT	\$87,801	\$97,888	\$89,397
Alternative Minimum Tax	\$2,037	\$2,290	\$2,641
Tax Before Credits	\$89,838	\$100,178	\$92,038
Marginal Tax Rate	33%	35%	33%
Effective Tax Rate	26.90%	27.50%	26.80%

Mr. and Mrs. B

	Before Any Business Income	With Flow- Through Income	With C-Corp Dividends
Adjusted Gross Income	\$83,787	\$114,053	\$93,787
Itemized Deductions	\$13,297	\$13,297	\$13,297
Exemption Deduction	\$6,800	\$6,800	\$3,800
Taxable Income	\$63,690	\$93,726	\$73,690
Tax Before AMT	\$8,769	\$16,279	\$10,269
Alternative Minimum Tax	\$0	\$0	\$0
Tax Before Credits	\$8,769	\$16,279	\$10,269
Marginal Tax Rate	15.00%	25.00%	15.00%
Effective Tax Rate	15.30%	18.40%	15.30%

As you can see from the example of the A's and B's personal taxes A will pay more taxes than B on the same amount of additional income. If the company is a flow-through entity A will pay \$10,340 additional tax and B will pay \$7,510; therefore it costs A \$2,830 more dollars than B on the same amount of additional income. Looking at the C-Corporation example A will pay \$700 more than B on the additional income.

Now, let's look at the actual effect on A and B's personal wealth. They invested \$60,000 each and they want a five percent return on that investment, which is a reasonable return based on current market conditions. The projected return on their \$60,000 equates to \$3,000. It is very important to have a target for the return on investment because if a dividend or distribution is never paid, the money invested in the business would have been better off in a CD or even obtaining employment with an existing business. The cash dividend or distribution to the owners should be enough to cover the additional taxes on each owner's share of income and expected return on their investment.

	A – Flow through	B – Flow Through
Cash received:		
Cash Distribution	<u>(10,000)</u>	<u>(10,000)</u>
Cash needed:		
Taxes on Income	\$10,340	\$ 7,510
Return on Investment	<u>3,000</u>	<u>3,000</u>
Total cash	\$13,340	\$10,510
Cash Shortfall	(3,340)	(510)

As the previous example illustrates, the personal wealth of both owners is negatively impacted under the flow through option. They received \$10,000 but it is not enough to cover the tax on the additional income and to leave them with the \$3,000 return on their \$60,000 investment.

	A – C Corporation	B – C Corporation
Cash Dividends	\$10,000	\$10,000
Less Return on Investment	3,000	3,000
Less additional Tax	2,200	1,500
Less half of Corp Tax		
(Reduction of equity)	<u>5,000</u>	<u>5,000</u>
Impact on Wealth	(200)	500

With a C Corporation the impact on the owner's wealth is much more favorable. Owner A has a slight negative impact of \$200 while owner B actually has a projected increase in wealth of \$500. It appears that both owners would be better off than as a Corporation. This positive impact is possible due to the current tax laws which allow dividends paid by C Corporations to be takes at 15% for individuals in the 25% of higher tax bracket and 5% for individuals in the less than 25% tax bracket. The lowest individual tax bracket is 25% so the flow through income would always be taxed at a higher rate.

Conclusion

In addition to fulfilling life-long dreams, most business owners expect to earn a return on their investment over time. There are various ways that this can be accomplished; however individuals forget to complete several reasonableness tests that can be quickly reviewed to assess the soundness of the financial investment. First evaluate the amount of cash on hand shown on the balance sheet. If the amount of cash exceeds the amount necessary to cover three months of expenses consider increasing increase distributions to owners. Also make sure dividends or distribution payments are sufficient to cover the individual tax liability and provide an adequate return on the owner's investment. Finally review the capital structure of owner investment versus outside borrowing. Ensure the return to the owners of the business is reasonable compared to the interest rate being paid to outside lenders. This paper discusses some of the key difference in three popular choices for business entity form and illustrates the potential impact on an owner's individual wealth. The C Corporation is an option worth considering due to the current tax laws which allow dividends to be taxed at rates lower than individual tax rate used on the 1040 and the ability to deduct one hundred percent of fringe benefit costs. With frequent changes in the tax code this challenging issue will continue to require time and attention to make the best decision possible.

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MEASURING IMPROVEMENTS IN UNDERSTANDING OF BASIC ECONOMIC TERMS, PRINCIPLES, AND CONCEPTS RESULTING FROM TAKING A COLLEGE GENERAL EDUCATION ECONOMICS COURSE

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ABSTRACT

The purpose of this study was fourfold: (a) to evaluate the economic literacy of college participants in a small state-operated, liberal arts university in South Carolina relative to the 2004 SCCEE study; (b) to explore the impact of an introductory general education course on changing the knowledge and understanding of basic economic principles and concepts of participants; (c) to determine the relationship between improvement in assessment scores and the final grade awarded in the course; and (d) to determine the relationship between post-test scores and the final grade earned in the course. Using a variation of a survey instrument developed by National Council of Economic Education's (NCEE), data were collected from 269 participants taking an entry-level general education economics course.

Overall, students improved their knowledge score after completing the introductory course at the university. A significant increase in the understanding of basic economic terms, principles, and concepts was noted in 12 of the 20 areas assessed. Change between pretest and post-test assessment scores using this tool was not a predictor of the final grade earned by participants. Additionally, this tool may be used, in whole or in part, to assess general education competencies that have been established by this university.

INTRODUCTION

The National Center for Educational Statistics (NCES) has reported trends in student academic achievement in several subject areas since 1969. While topics such as mathematics, reading, science, and writing were part of the national assessment program, economics was not included [5]. The emphasis on assessing student performance and their ability to demonstrate knowledge and skills is increasing across all educational levels, including colleges and universities. Recent changes have taken place in the

assessment process and new subject areas, including economics, were added to the cadre of assessments being completed in 2007. The data reported by NCES on student achievement in economics is based on performance of high school seniors.

Accreditation standards developed by regional accrediting bodies for colleges and universities are used to assist faculty in defining the general competencies that all students should possess at the time of graduation. Identifying strategies to assess these competencies is a challenge currently being addressed at the collegiate level for those colleges and universities that strive to attain or maintain accreditation status. Identifying tools that can be used to determine if high schools and college are meeting the expectations of national educational organizations and accreditation bodies is part of the accountability process for educators.

LITERATURE REVIEW

While economics was not historically one of the topics included in the federal reporting process, the National Council on Economic Education (NCEE) began conducting biennial surveys to determine the status of economic education in grades K-12 in the United States in 1988. Established in 1949, NCEE has worked toward eliminating the gap between what young people need to know about economics and what they are being taught. Their pro-active approach to establish economics as a core component of the high school curriculum is based on a mission to “help students develop the real-life skills they need to succeed: to be able to think and choose responsibly as consumers, savers, investors, citizens, members of the workforce, and effective participants in a global economy” [7].

The ability of individuals to apply basic economic concepts in day-to-day decision-making and long term planning has gained increased national attention of both educators and policy makers for the past two decades. In 2002, the U.S Department of Education – National Assessment Governing Board published the “Economics Framework for the 2006 National Assessment of Education Progress” which included explicit recommendations about what should be included in a national assessment of economic literacy of high school seniors. The NCEE’s definition of economic literacy, “the ability to identify, analyze, and evaluate the consequences of individual decisions and public policy” [9, p. v] provided the foundation for the framework of its assessment.

At the same time that the 2006 National Assessment of Education Progress (NAEP) Economics Assessment was being finalized, the Second National Summit on Economic and Financial Literacy was being held in Washington DC to address the state of economic education in the United States. The increased emphasis on economic literacy led to the development of the first national assessment for economics which was completed in May 2006.

The sample for the 2006 National Assessment of Education Progress (NAEP) Economics Assessment included 11,500 twelfth grade students attending 590 public and private high schools across the United States. Content areas of the assessment included (a) market economy - choices made by buyers and sellers in the marketplace, (b) national economy - conditions in the U.S. Economy, and (c) international economy - interaction of national economies with one another. Results were reported for three levels of accomplishment; basic, proficient, and advanced. Seventy-nine percent of the students performed at the basic level or higher, indicating that they had at least a partial level of mastery of the subject matter. Forty-two percent of the students reached the proficient level which demonstrated a solid level of knowledge of the subject matter, and three percent of the students reached the advanced level which demonstrated superior performance. Results of the study based on national findings and state by state results are not yet available [3].

The most recent NCEE report on progress in our nation's schools in incorporating economic education in the public school system indicates that all states require that economics be included in their educational standards [6]. In 2007, 41 states required that those economic standards be implemented; an increase from 38 states in 2004. Other states have not only developed and implemented standards for economic education, but include an economics course as a requirement for high school graduation. The number of states requiring an economics course has steadily increased from 13 in 1998 to 17 states in 2007. While these reports are encouraging, the number of states that require testing of student knowledge in economics has decreased from 25 states in 2004 to 22 states in 2007. South Carolina is among the states that require the standards for economic education be implemented, that all students take an economics course in high school, and that all students are tested in their knowledge of economics [6].

The South Carolina Council on Economic Education (SCCEE) released a report of the knowledge and understanding of economic principles and concepts of high school juniors and seniors in South Carolina in 2004. Ten high schools from across the state were selected for inclusion in the study that involved 529 students. Average scores from individual high schools were well below desired levels and ranged from 38% correct to 61% correct [1].

In 2006, DuPont and Natvig conducted a pilot study to develop a research methodology to evaluate a general education introductory course in economics. As a result of this pilot study, a slightly modified version of the instruments used by the NCEE and the SCCEE was developed. It was determined that this assessment tool could be used to explore the impact of the college course in improving student performance in economics.

PURPOSE

The purpose of this follow-up study was fourfold: (a) to evaluate the economic literacy of college participants in a small state-operated, liberal arts university in South Carolina relative to the 2004 SCCEE study; (b) to explore the impact of an introductory general education course on changing the knowledge and understanding of basic economic principles and concepts of participants; (c) to determine the relationship between improvement in assessment scores and the final grade awarded in the course; and (d) to determine the relationship between post-test scores and the final grade earned in the course.

METHODOLOGY

Sample

Participants in the study included all college freshmen taking the introductory course in economics during the 2006-07 academic year at a small state-operated, liberal arts university in South Carolina. One of the general education goals at this university is that students acquire an understanding of social structures and processes. This course is one of five from which students may choose to fulfill the political/economy general education requirement [2].

Survey Instrument

The original questionnaire was used by the National Council on Economic Education (NCEE) in a 1999 national telephone survey, to examine the knowledge of basic economic terms, principles, and concepts of adults and high school students in the United States [5]. The questionnaire consisted of 36 multiple-choice questions, each having four possible responses. The first 20 questions gauge the level of understanding of economic concepts and the last 16 questions allow researchers to evaluate the demographics of the participants. A slightly modified online version was used in a national study in 2005. The South Carolina Council on Economic Education (SCCEE) used a paper-pencil format of the 1999 version of the questionnaire in the fall of 2004 to gauge the level of understanding of economic concepts among high school students across the state of South Carolina [1].

Two new questions were added to the demographics portion of the SCCEE questionnaire for use in a pilot study conducted in the summer of 2006 [1]. These questions provided information about the number of economics and finance courses that participants had taken previously. Based on the results of this pilot study, another question was added for the fall 2006 survey to determine if the participants had completed all high school graduation requirements in the state of South Carolina. The results of those who had not were eliminated from comparisons of participant scores with SCCEE findings. For data collection in spring semester 2007, Internal Review Board (IRB) approval was obtained that allowed coded student identifiers to be included on individual answer sheets to facilitate comparisons of pretest/post-test results. An additional question was added that asked participants whether or not they had taken this particular introduction to economics course before. For purposes of this study, the instrument will be referred to as the *Economics Literacy Assessment Tool*. It is important to note that no changes were made to the first 20 questions that measure an understanding of basic economic terms, principles, and concepts.

Procedure

The Economic Literacy Assessment Tool was distributed to students enrolled in all sections of an introductory general education economics course at the beginning and end of the fall 2006 semester and the spring 2007 semester. The pretest was administered unannounced at the start of the first day of classes. The post-test was administered at the beginning of the last day of classes with no advance notice given to students. On all occasions, the questionnaire was distributed by a faculty member other than the course instructor. Participation was voluntary and participants recorded their responses on scantron forms which were returned to the researchers for analysis.

FINDINGS

Preliminary analyses were performed to determine whether the knowledge of basic economic terms, principles, and concepts differed between groups of high school juniors and seniors and students enrolled in an introductory college level economics course. Using the Economics Literacy Assessment Tool, the range of scores for participants enrolled in the general economics course in college, was 25% to 90% correct with an average score of 60% correct. While the range of scores is not available for the high school participants in the 2004 SCCEE study, an average score of 53% correct was reported [4]. The SCCEE study reported only those participants who scored equal to or greater than 50% on the Economics Literacy Assessment Tool. The SCCEE study also only reported 13 of the 20 terms, principles, and concepts assessed. Therefore, only those college participants having scores equal to or greater than 50% correct on the Economic Literacy Assessment Tool were included for this comparison. Additionally, for participants in the college group, only those who indicated that they had completed high school

requirements in the state of South Carolina (which requires completion of an economic course) were included. From 269 participants enrolled in the college course, 210 participants met this criterion. Of this subgroup, 134 (64%) indicated their rank as a freshmen student.

Table 1 provides a demographic comparison of high school participants who completed the Economic Literacy Assessment Tool in 2004 and college participants who completed the Economic Literacy Assessment Tool at the onset of an introductory college course in economics during academic year 2006 - 2007.

TABLE 1: DEMOGRAPHIC COMPARISON: 2004 SCCEE STUDY VS. 2006-07 PRETEST*.

Demographic	SCCEE-HS 2004 (n = 522)	Pretest College (n=210)
Gender		
Female	52%	72%
Male	48%	28%
Typical school grades		
A's	21%	24%
B's	43%	59%
C's	32%	16%
D's and F's	4%	1%
Interest/background in economics		
At least somewhat interested in the subject	58%	63%
Personal Finance		
Use a credit card	40%	48%
Have an ATM card	40%	90%
Have a savings or checking account	73%	96%
Believe they have adequate knowledge to manage their finances	78%	86%
Learned most about managing money at home from family.	62%	73%
Learned the most about money management from experiences managing their own funds	22%	20%

* Scores \geq 50% correct and SC HS graduates only.

Based on the information provided by participants, there were several demographic differences noted between the high school students and the college students. Not surprisingly, differences were reported with respect to use of credit cards, ATM cards, and bank accounts. This may be attributed to the fact that many of the college participants live away from home and are generally more independent than high school participants.

Overall, a greater percentage of college participants reported having higher grades than the high school participants. While a slightly higher percentage of college level pretest participants claimed to be "A" students, greater differences were reported in the "B" and "C" ranges. More of the college participants reported "B" averages and fewer college participants reported "C" and "D" averages than the high school participants. These differences may reflect the inclusion of high school students who completed the survey, but were not destined for college.

The percentage of males and females in the college group differed from the high school group, but the percentages of males and females in the college group approximate the gender mix at the university. Most participants in both groups claimed to learn about money management from home and family. Only 22% of the high school group and 20% of the college group indicated that they learned about money management from managing their own funds. College participants claimed a greater knowledge in managing their finances.

Hypotheses

Hypothesis 1: The first hypothesis, that there is no difference in the knowledge of economic concepts between high school participants in the SCCEE Economic Literacy Assessment and college participants before taking a general education college course in economics, was tested using a two sample pooled proportion z-test. The topics included in the Economic Literacy Assessment Tool are reported in Table 2, along with the comparison of the results from the high school participants and college participants. Since the 2004 SCCEE study of high school participants reported findings of only participants having scores equal to or greater than 50% correct and 13 of the 20 basic terms, principles, and concepts, Table 2 uses similar data from college participants who completed all high school requirement in the state of South Carolina. The data for this comparison was collected prior to content delivery in the college course in economics.

TABLE 2: 2004 SCCEE RESULTS VS. 2006-07 PRETEST.

Topic	Concept	High School Participants Percentage Correct (n = 364) ^a	College Participants (Pretest) Percentage Correct (n = 210) ^a	p values
1	Effects of additional competition on price and quality.	54	49	.25
2	Definition of an entrepreneur.	91	97	.01*
3	Increasing interest rates encourages saving.	59	50	.04*
5	Components of Gross Domestic Product.	28	20	.03*
8	Effects of government rent controls.	50	55	.25
12	Scarcity.	59	63	.35
13	Markets help buyers and sellers find each other.	50	46	.36
10	Beneficiaries of transactions.	80	80	1
16	Beneficiaries of public goods and services.	43	47	.35
17	Definition of a budget deficit.	33	44	.01*
18	Money borrowed at a fixed rate helps individuals during times of inflation.	21	26	.17
19	Investment in research and development leads to increased innovations.	62	63	.81
20	Money does not hold value well in times of inflation.	40	40	1

^a n represents the total number of participants scoring 50% or greater correct on the Economic Literacy Assessment Tool and college participants = SC HS education only. Total students participating in the survey: 2004 SCCEE = 529; 2006-07 pretest = 269.

* $p \leq .05$ statistically significant.

There was no significant difference noted in the knowledge level of high school (n = 364) and college participants (n = 210) in 9 of the 13 concept areas assessed. Where significant differences were found, high school participants scored higher in knowledge of increasing interest rates (p = .04) and components of the gross domestic product (p = .03). College participants scored higher with respect to the concepts of entrepreneurship (p = .01) and budget deficits (p = .01).

Hypothesis 2: The second hypothesis, that there is no difference in the knowledge of economic concepts of college participants after taking a general education course in economics as evidenced by pretest/post-test scores on the Economic Literacy Assessment Tool, was tested using a two-sample pooled proportion z-test. To examine the impact of an introductory general education course on changing the knowledge and understanding of basic economic terms, principles and concepts, data from all participants completing the Economic Literacy Assessment Tool during the 2006-2007 academic year were included. Of the 377 students enrolled in the general education economics course, 269 completed the pretest and 241 completed the post-test. The pretest/post-test assessment results for the 2006-2007 academic year are reported in Table 3.

TABLE 3: PRETEST VS. POST-TEST FINDINGS, FALL 2006 AND SPRING 2007.

Topic	Concept	Pretest Percentage Correct (n = 269) ^a	Post-test Percentage Correct (n = 241) ^a	p-values
1	Effects of additional competition on price and quality.	45	55	.02*
2	Definition of an entrepreneur.	94	95	.62
3	Increasing interest rates encourages saving.	48	60	.01*
4	Sources of personal income.	93	95	.34
5	Components of Gross Domestic Product.	20	30	.01*
6	Substitute goods.	91	92	.69
7	Benefits of trade.	84	86	.53
8	Effects of government rent controls.	48	66	.00*
9	Who determines what goods are produced.	65	66	.81
10	Benefactors of trade.	82	89	.02*
11	Effects of demand shift on price.	71	81	.01*
12	Scarcity.	58	74	.00*
13	Markets help buyers and sellers find each other.	40	55	.00*
14	Beneficiaries of transactions.	75	87	.00*
15	Cost/Benefit analysis.	90	83	.02*
16	Beneficiaries of public goods and services.	41	62	.00*
17	Definition of a budget deficit.	40	41	.82
18	Money borrowed at a fixed rate helps individuals during times of inflation.	22	33	.01*
19	Investment in research and development leads to increased innovations.	55	61	.17
20	Money does not hold value well in times of inflation.	34	48	.00*

^a n represents the total number of participants in the fall 2006 and spring 2007 surveys.

* p<.05 statistically significant.

A significant increase in the understanding of basic economic terms, principles, and concepts was noted in 12 of the 20 areas assessed after participants completed the introductory college course in economics. While a large percentage of participants answered the question about cost benefit analysis correctly on both the pretest and the post-test, the decrease in the percentage of participants answering the question correctly from pretest to post-test was statistically significant. The remaining seven questions showed an increase in knowledge but not to a significant level. Of these, 91% or more of the participants answered three of these questions correctly on the pretest, so the opportunity to improve in that area was limited. Overall, participant mean scores increased both semesters, with participant mean scores increasing from 60 to 66 points during fall semester and 59 to 71 points in the spring semester.

Hypothesis 3: the third hypothesis, that there is no relationship between changes in assessment scores (pretest vs. post-test) and the final course grade received as a result of taking a general education course in economics, was tested using five level single-factor ANOVA with an alpha level of .05. With IRB approval, the researchers were able to match individual college participant pretest/post-test scores and final course grades during the spring 2007. Table 4 provides a comparison of course grades and the average change in pretest and post-test assessment scores for participants completing both the pretest and post-test (n = 76).

TABLE 4: GRADE DISTRIBUTION COMPARED WITH AVERAGE CHANGE BETWEEN PRETEST AND POST-TEST ASSESSMENT SCORES.

Groups	Count	Sum	Average Score Increase	Variance
A	10	115	11.5	228.0556
B	26	375	14.42308	210.6538
C	29	240	8.275862	112.9926
D	7	30	4.285714	153.5714
F	4	40	10	66.66667

Participants who earned a final course grade of “B” demonstrated a higher average increase in scores from the pretest to the post-test than participants earning grades of “A” for the course. While only four participants who earned grades of “F” completed both the pretest and the post-test assessments, their average change in knowledge of basic economic terms, principles, and concepts was greater than those students who earned final grades of “C” or “D”.

Table 5 provides a summary of the analysis of variance which examines final course grades and average change between pretest and post-test assessment scores.

TABLE 5: ANOVA SUMMARY OF FINAL COURSE GRADES AND AVERAGE CHANGE BETWEEN PRETEST AND POST-TEST ASSESSMENT SCORES.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	824.8795	4	206.2199	1.261765	0.293139	2.50076
Within Groups	11604.07	71	163.4376			
Total	12428.95	75				

Selecting an alpha level of .05, the effect of change in pretest/post-test assessment scores was not statistically significant, $F(4,71) = 1.26, p = .29$. Therefore, the researchers were unable to reject the null hypothesis.

As shown in Table 6, further analysis of the data was conducted to determine the changes in the number of correct responses that participants achieved on the post-test relative to their performance on the pretest and the distribution by final course grade earned.

TABLE 6: INDIVIDUAL CHANGES IN ASSESSMENT SCORES PRETEST VS. POST-TEST AND DISTRIBUTION BY FINAL COURSE GRADE EARNED.

Change ^a	Number		Distribution				
	(n = 76)	Percentage	A	B	C	D	F
-2	4	5%	-	1	1	2	-
-1	7	9%	1	1	5	-	-
0	12	16%	2	4	4	1	1
1	13	17%	3	5	4	1	-
2	10	13%	-	2	4	2	2
3	7	9%	1	1	5	-	-
4	9	12%	1	5	2	-	1
5	8	11%	1	2	4	1	-
6	2	3%	-	2	-	-	-
7	2	3%	-	2	-	-	-
8	0	0%	-	-	-	-	-
9	1	1%	1	-	-	-	-
10	1	1%	-	1	-	-	-

^a the number of topics correct on post-test compared with pretest assessment.

Seventy percent of participants demonstrated an increase in the knowledge of basic economic terms, principles, and concepts from the pretest to the post-test. Sixteen percent showed no change in knowledge, while 14% of participants showed decreases in knowledge. Fifty-one percent of the participants demonstrating an increase in knowledge were distributed among those receiving final course grades of “B” and “C.”

Hypothesis 4: The fourth hypothesis, that there is no relationship between post-test scores and the final grade earned in the course, was tested using five level single-factor ANOVA with an alpha level of .05. The comparison of final grades earned and actual post-test scores included only the data from those participants who completed both the pretest and post-test assessments in the spring 2007. An examination was conducted to determine the relationship between post-test assessment scores and the final grade earned by participants in the course. A summary of the average post-test assessment scores and the final grade earned by participants in the course is presented in Table 7.

TABLE 7: AVERAGE POST-TEST ASSESSMENT SCORES VS. FINAL GRADE EARNED IN THE COURSE.

Groups	Count	Sum	Average	Variance
A	10	770	77	145.5556
B	26	1975	75.96154	100.0385
C	29	1985	68.44828	110.899
D	7	405	57.85714	82.14286
F	4	230	57.5	475

Table 8 provides a summary of the analysis of variance which examines final course grades with the post-test assessment scores.

TABLE 8: ANOVA SUMMARY OF FINAL COURSE GRADES AND POST-TEST ASSESSMENT SCORES.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3114.4	4	778.591	6.257643	0.000226	2.50076
Within Groups	8834	71	124.4224			
Total	11948	75				

Using an alpha level of .05, $F(4,71) = 6.26$, and $p = .00$, the null hypothesis was rejected. Further examination of the data using multiple comparisons indicated that a significant difference exists between the means of groups “A” and “D”, “A” and “F”, “B” and “D”, and “B” and “F”. This indicates that participants scoring higher on the post-test earned final course grades of “A” or “B” and those participants scoring lower earned final grades of “D” and “F.” Table 9 provides the range of scores earned by participants on the post-test assessment during the spring 2007 semester and the final course grades that participants within these ranges earned.

TABLE 9: RANGE OF POST-TEST ASSESSMENT SCORES AND DISTRIBUTION BY FINAL COURSE GRADE EARNED.

Range ^a	Number		A	B	C	D	F
	(n = 76)	Percentage					
90 - 100	7	9%	2	4	1	-	-
80 - 89	17	22%	2	8	6	-	1
70 - 79	19	25%	4	9	6	-	-
60 - 69	25	33%	2	5	12	5	1
50 - 59	4	5%	-	-	4	-	-
40 - 49	4	5%	-	-	-	2	2
0 - 39	0	0%	-	-	-	-	-

^a Score earned on post-test assessment.

Participants earning grades of “A” and “B” had post-test scores within the range of 60 – 100% correct; while, with one exception, those earning grades of “D” or “F” scored less than 70% correct. Participants earning a final course grade of “C” had post-test assessment scores equal to or greater than 50%.

CONCLUSION

Prior to taking a college general education course in economics, there was no significant difference noted between high school and college participants in 9 of the 13 concept areas assessed. Of the significant findings, high school participants scored higher in knowledge of increasing interest rates and components of the gross domestic product, while college participants scored higher with respect to the concepts of entrepreneurship and budget deficits.

A significant increase in the understanding of basic economic terms, principles, and concepts was noted in 12 of the 20 areas assessed after participants completed the college general education course in economics. The remaining eight topic areas showed an increase in knowledge but not to a significant level. Participant mean scores increased in each semester surveyed. In the fall 2006 assessment, participant mean scores increased six points, while in the spring 2007 assessment, participants showed an increase of 12 points.

Results of testing to determine if a link exists between changes in participant post-test and pretest assessment scores and the final course grade earned indicated that the null hypothesis could not be rejected. Changes between pretest and post-test assessment scores using the Economic Literacy Assessment Tool was not be a predictor of the final grade earned by participants in this course. Changes of pretest to post-test performance ranged from a two topic decrease to a 10 topic improvement. Of special interest were the results for participants receiving a final grade of "F" for the course. Of the sample group, three of the four participants receiving this final grade had improved post-test scores of at least two topics compared to pretest assessment scores. No negative score changes for participants receiving this final grade were noted.

Seeking a link between post-test assessment scores and final course grades earned by participants, the null hypothesis was rejected. Significant differences were found between the means of groups A and D, A and F, B and D, and B and F, indicating that participants scoring higher on the post-test earned final course grades of A or B and those participants scoring lower on the post-test earned final grades of D and F. Post-test assessment scores using the Economic Literacy Assessment Tool may be a predictor of the final grade earned in this course. Additionally, the Economic Literacy Assessment Tool may be used, in whole or in part, to assess general education competencies that have been established by this university.

Participants showed greater overall improvement in the spring 2007 semester compared to the fall 2006 findings. It should be noted that one of the instructors teaching this course in the fall 2006 semester was new to the college and was teaching this course for the first time. This professor continued to teach the course in the spring 2007 semester. Unknown to the researchers at the time, during the fall 2006 semester, this professor released 17 students scoring 90% or more in their coursework for the semester before the post-test was administered. These students received exemptions from taking the final examination. For this reason, scores recorded for the fall 2006 semester are assumed to be slightly lower than actual.

SUGGESTIONS FOR FURTHER STUDY

During the fall 2006 semester, there was no system to definitively link participants' post-test assessments with their pretest assessments. It is assumed that some participants withdrew and others failed to participate in either the pretest or the post-test. Additional studies should be conducted using coded

identifiers to ensure that results are as accurate as possible. The findings of this study should also be discussed with professors of this course to adjust course content to improve identified deficiencies in participant knowledge. Additional surveys should be taken to determine if improvements in deficiencies have been made. Additional studies should also investigate whether the knowledge of basic economic terms, principles, and concepts of each rank of participant (freshmen vs. sophomores, sophomore vs. juniors, etc.) improve at the same rate. The results of these studies may allow professors to adjust their course and presentations based on class makeup. Testing should also be conducted on other general education courses to determine if the results are similar. Surveys should be developed within other disciplines to monitor progress within their programs.

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LARGE DAILY PRICE CHANGES AND SUBSEQUENT RRESPONSES:

THE CASE OF THE S&P 500

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ABSTRACT

This paper presents the results of an analysis of daily price-changes for the S&P 500 for the period August 16, 1958, through August 15, 2008. Price changes of more than 1%, 2%, 3%, 4%, 5%, and 6% were identified and presented for the 50-year period. In addition, relative price changes for days following “large” price changes were analyzed in order to determine if a profitable market timing strategy could be generated based on the analysis of the data.

INTRODUCTION

Anyone who has ever invested, whether in real estate, gold, the stock market, or beanie babies, will immediately recognize and be empathetic to the psychological dementia that sometimes overwhelms even the most prudent of investors, causing them to suddenly veer off from what for them might have been a proven investment strategy. As with any other investment strategy, investing in stocks is often about timing---buying into the market when stock prices are low and relatively undervalued, and selling when prices are high and perhaps overvalued. The age old question, however, is how does anyone know for certain whether the market valuation is low enough to enter, or, too high and ripe for exit? Experience has shown that even the most erudite stock analysts (including Nobel Prize economists) often incorrectly predict not only the magnitude but the direction of market moves. The safest strategy then, particularly for long term stock investors, is simply to stay invested over the long haul, making only minor adjustments by sector based on prudent analysis of current economic conditions. The worst possible move, over time, appears to be those situations where investors panic and sell after large downturns, or when they buy under conditions of irrational exuberance. But again, how can anyone know, even generally, whether to buy or sell during periods of highly volatile markets? Everyone, apparently, is an expert when it comes to picking historical market high and low points given the benefit of hindsight---but that is never an option.

PURPOSE

Armed with the knowledge that no one is consistently able to make accurate predictions in the magnitude and direction of the market, professional analysts are still, apparently, genetically programmed to prognosticate. And we the investor are still, apparently, prone to listen and make snap judgment investment decisions that may or may not be in our best interest. Given the economic uncertainty of the

past decade, however, it would be interesting to determine whether investors might be justified in attempting to micro-manage their portfolios using rules similar to those employed by market timers. In other words, should investors be looking at specific percentage moves in stock indexes as a hint for when to buy and sell stocks----and if so, what percentage moves would that be in order to beat the returns one would receive if s/he simply stayed invested over the long haul? Additionally, once the change data is investigated, will a clear pattern emerge validating the proposition that incremental decreases and increases provide specific buying and selling opportunities? Further, do these “opportunities” offer greater advantage to investors than simple long term buy and hold strategies? If market timing works, the authors expect that evidence should emerge pointing to that effect.

The authors of the current study thus investigated five separate decade long increments beginning 1958-1968 and running through the period 1998-2008 for evidence that buying and selling during periods of market turbulence will demonstrate an advantage over buy and hold strategies. By isolating daily incremental fluctuations (of between 1% and 6%) occurring in the S&P 500 over these periods, the authors were able to make some tentative conclusions on the validity of buying and selling of stocks based solely on specific percentage movements in the market. A recap of the study and methodology is provided in the following sections.

DISCUSSION

Consider, for example, the economic news investors have endured just over the past ten months: rapid increases in energy costs associated with the rising price of imported oil; weak consumer confidence due to rising inflation, high unemployment, and the potential (if not actual) specter of recession; increased foreclosures in the housing market and the subsequent evaporation of housing prices; bank foreclosures; problems at Fannie Mae and Freddie Mac, record losses at big brokerage houses such as Bear Stearns and Merrill Lynch; the declining value of the dollar in relation to other major currencies such as the Euro; the demise of the American auto industry; etc. From an economic perspective, American consumers have been treated to a constant stream (ad-nauseam) of bad economic news, punctuated of course by incendiary political rhetoric from both sides of the political aisle claiming that the fault lies with the other side. No small wonder then that having exacted its “pound of flesh,” the stock market has acted rather erratically. Table 1 below presents aggregate changes over the most recent ten months using the market-close peaks for the three most common market measures, the DJIA, the NASDAQ, and the S&P 500.

As can be gleaned from Table 1, a substantial decline in market value began in October 2007 and extended through July 15, 2008. In addition to the decline in market value, it should be noted that the period has also seen higher than average variations in closing stock index values from one trading day to the next. Hence, as one might expect, the uncertainty surrounding the economic environment appears to be reflected in the increased number of significant (i.e., > 1%) daily advances and declines in the market. Analysis of the daily changes in the S&P 500 index from October 9, 2007 to August 15, 2008 reveals that of the 214 available trading days, 87 witnessed market-closings changes of 1% or greater from the previous trading period. In other words, when daily market changes of more than one percent occur roughly 40% of the time, daily changes of this magnitude are quite obviously no longer a rarity. As indicated in Table 2 below, 39 of the 87 daily changes of $\geq 1\%$ were increases while 48 were decreases, with several increases/decreases being 3% and one increase during the period of 4%.

TABLE 1
Recent Price Changes

Measure	Decline from Peak* to Low**	Decline from Peak* to 8/15/08	Decline from Beginning of 2008	Increase from Low** to 8/15/08
DJIA	23.6%	17.7%	12.1%	6.4%
NASDAQ	24.1%	14.2%	7.5%	13.1%
S&P 500	22.4%	17.1%	11.6%	6.9%

* The peak-close for the DJIA and the S&P 500 occurred on October 9, 2007. The recent peak-close for the NASDAQ occurred on October 31, 2007. Obviously, the NASDAQ peaked earlier (March 10, 2000).

** The low-close for 2008 for the NASDAQ occurred on March 10. For both the S&P 500 and the DJIA, the 2008 low-close was July 15.

TABLE 2
Daily Increases and Decreases
October 9, 2007 to August 15, 2008

<u>Daily Change at Least</u>	<u>Increases</u>	<u>Decreases</u>
5.0%	0	0
4.0%	1	0
3.0%	3	2
2.0%	12	18
1.0%	39	48

In order to evaluate whether the percentage of change frequencies appear large in comparison to historical average daily price fluctuations, the authors investigated the daily price change of the S&P 500 over the past 50 years. Table 3 is a compilation of our investigation.

Table 3 presents evidence of increasing variability over time, with the 10-year period ending in 1998 being the only decade not experiencing an increase from one period to the next. From an overall perspective, there were 60 more “large” price-change increases than decreases (i.e., 1297 verses 1237) occurring over the last five decades, suggesting that down turns of 1% or greater are being offset by incremental upturns of similar magnitude. Further analysis of the data indicates that as the percentage changes increase to 2% or higher, advances still outnumber decreases by 45 (351 versus 306) over the same period with more percentage change advances than decreases until we reach the 5% level (with one more decrease of the magnitude than increase). Relatively speaking, changes of 5% or more have

TABLE 3
Cumulative Fifty-Year Daily Changes in the S&P 500
(Year-end August 18)

<u>Decade</u>	<u>Change</u> <u>≥ 1%</u>	<u>Change</u> <u>≥ 2%</u>	<u>Change</u> <u>≥ 3%</u>	<u>Change</u> <u>≥ 4%</u>	<u>Change</u> <u>≥ 5%</u>	<u>Change</u> <u>≥ 6%</u>
98-08	776	213	55	16	6	1
88-98	435	55	10	3	3	2
78-88	600	113	24	11	6	4
68-78	481	74	14	4	1	0
58-68	242	30	8	2	1	1
Total	2534	485	111	36	17	8

<u>Decade</u>	<u>Up</u> <u>≥ 1%</u>	<u>Up</u> <u>≥ 2%</u>	<u>Up</u> <u>≥ 3%</u>	<u>Up</u> <u>≥ 4%</u>	<u>Up</u> <u>≥ 5%</u>	<u>Up</u> <u>≥ 6%</u>
98-08	383	105	32	11	4	0
88-98	246	28	4	1	1	0
78-88	328	63	12	4	2	1
68-78	228	45	11	4	1	0
58-68	112	16	5	1	0	0
Total	1297	257	64	21	8	1

<u>Decade</u>	<u>Down</u> <u>≥ 1%</u>	<u>Down</u> <u>≥ 2%</u>	<u>Down</u> <u>≥ 3%</u>	<u>Down</u> <u>≥ 4%</u>	<u>Down</u> <u>≥ 5%</u>	<u>Down</u> <u>≥ 6%</u>
98-08	393	108	23	5	2	1
88-98	189	27	6	2	2	2
78-88	272	50	12	7	4	3
68-78	253	29	3	0	0	0
58-68	130	14	3	1	1	1
Total	1237	228	47	15	9	7

historically been quite rare, with only 7 daily periods experiencing an extreme price-change of greater than 6% in the last fifty years. Unfortunately, out of that seven days of 6% fluctuation, six have been price-decreases. Losses at the 6% or greater level, while severe, have occurred no more than three times during any one ten-year period. While some declines have been of enormous magnitude (e.g., October 19, 1987), from an historical perspective, such declines now appear an aberration and pale in comparison to the overall increase in the valuation of the market indices since that period. A 419 point decline in 2008, for example, would amount to around 4%---a bad day, but hardly the earth shaking crisis such a drop had on the financial markets back in 1987. Overall, it would appear from the historical data that missing out on the incremental increases would, in the long run, be more costly than simply absorbing the decreases while being fully invested in the market. Over time, there are clearly more advances than there are declines. This trend appears to hold even at the 5% or greater level. Only at the 6% of greater level do we see significantly more declines than advances, but those declines have occurred only 7 times during periods of 1% or greater change in market valuations---out of over 2500 available periods---or, less than 3 in 1000 odds. Based on historical trends, the fact that market advances appear to have a distinct advantage

over market declines of any significance, the best bet still appears to be one of a buy and hold strategy as opposed to trying to beat the market.

In addition to analyzing the data by decade, we broke down the final decade (the most volatile) into one-year periods. Table 4 shows the price-change data by year.

Roughly 100 changes of more than 1 percent is approximately the norm for each year. Since there are about 250 trading days for each year, roughly 40% of the time we see changes of more than 1%. The year 2003 was unusual and had substantially more volatility than the typical year during that decade. For 2003, about 60% of the trading days experienced changes of more than 1%. The 4-year period after that, 2004-2007, was a period of substantially reduced volatility. Only about 15% of the trading days had changes of more than 1%. Inconsistency seems to be the norm.

TABLE 4
Large Price Changes for Past 10 Years

Year Ended	Change	Change	Change	Change	Change	Change
<u>August 17</u>	<u>> 1%</u>	<u>> 2%</u>	<u>> 3%</u>	<u>> 4%</u>	<u>> 5%</u>	<u>> 6%</u>
2008	98	33	5	1	0	0
2007	36	7	1	0	0	0
2006	34	2	0	0	0	0
2005	32	0	0	0	0	0
2004	49	1	0	0	0	0
2003	153	59	20	6	2	0
2002	107	37	13	4	2	0
2001	105	29	9	3	1	0
2000	98	31	8	2	1	0
1999	99	35	8	3	2	1

Year Ended	Up	Up	Up	Up	Up	Up
<u>August 17</u>	<u>> 1%</u>	<u>> 2%</u>	<u>> 3%</u>	<u>> 4%</u>	<u>> 5%</u>	<u>> 6%</u>
2008	47	14	3	1	0	0
2007	16	2	0	0	0	0
2006	18	2	0	0	0	0
2005	16	0	0	0	0	0
2004	25	1	0	0	0	0
2003	69	28	12	5	2	0
2002	49	17	7	3	2	0
2001	45	14	6	2	1	0
2000	54	14	5	1	0	0
1999	55	21	4	2	1	0

Year Ended	Down	Down	Down	Down	Down	Down
<u>August 17</u>	<u>≥ 1%</u>	<u>≥ 2%</u>	<u>≥ 3%</u>	<u>≥ 4%</u>	<u>≥ 5%</u>	<u>≥ 6%</u>
2008	51	19	2	0	0	0
2007	20	5	1	0	0	0
2006	16	0	0	0	0	0
2005	16	0	0	0	0	0
2004	24	0	0	0	0	0
2003	84	31	8	1	0	0
2002	58	20	6	1	0	0
2001	60	15	3	1	0	0
2000	44	17	3	1	1	0
1999	44	14	4	1	1	1

SUBSEQUENT PRICE CHANGES

In our attempt to determine whether investors might be justified in attempting to micro-manage their portfolios, we analyzed the returns for the day following a large price change. We used data from various time periods and found consistent results. Table 5 presents the results using the data for the entire 50-year period.

TABLE 5
Price Change Day-After Large Price Change
(in Percent)

<u>Increase</u>	<u>Average Change</u>	<u>Standard Deviation</u>
>1%	0.18	1.04
>2%	0.31	1.35
>3%	0.28	1.98
>4%	0.30	2.79
>5%	0.57	3.90
>6%	-3.92	Single Observation

<u>Decrease</u>	<u>Average Change</u>	<u>Standard Deviation</u>
>1%	-0.08	1.39
>2%	0.06	2.19
>3%	0.10	3.65
>4%	0.68	6.21
>5%	0.96	8.13
>6%	3.69	1.43

The data do not support any appreciable pattern of price-change after a large price change. Variation in the price-change is simply too great. Unfortunately, the data suggest that large price changes don't provide the investor with sufficient information which would lead to a profitable timing strategy. Buy and hold continues to be the investor's optimal policy.

LOOKING FOR A CHANGE: USING FINANCIAL RATIOS TO PREDICT DISTRESSED STOCKS

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ABSTRACT

The purpose of the study is to cross examine the predictive power of fundamental measures in identifying distressed stocks during stock market crashes. A number of stock market crashes occurred around the world. The most recent one was the 2000 US stock market crash, where the stock price of all US indexes was adversely affected. This study sheds a light on what might be a new way to identify stock price movement based on fundamental measures. It builds on initial results of a study testing the predictive power of financial measures in identifying risky stocks (Bahhouth et al 2008). Research methodology includes the use of binary logistic regression along with the t tests, chi-square and other measures. The study showed that fundamental ratios have a significant predictive power in determining distressed stocks, but still need to be defined.

INTRODUCTION

Studies discussing stock market crashes are dated back to the 1980s, where the increase of the market stock price was not justified with the economic growth. Moreover, there were factors that were not explained by modern investment theories that forced these markets to surge. In October 1987 Wall Street lost over 20% of its value in one day and it was not followed by a recession. In the days preceding the crash, there were no significant external events or "bad news" that could justify the dramatic price fall. Stock crash market of year 2000 destroyed more than \$8 trillion of investors' wealth. Its effect was felt in all industries at all levels. In year 1997, the Price/Earning ratio passed the record high of year 1929 and increased by an additional 33 percent in year 2000 (Baker, 2000). During the period from 1992 to 2000 the markets and economy experienced a period of record expansion. The IPO market had new companies trading at over a one billion dollar market capitalization with no profits and less than one million dollars in revenue (Bull Investors, 2004). Investors recognized that the market was highly priced. This paper discusses the stock crash from a different point. It will try to set measures that will allow investors to identify distressed (risky) stocks during crash periods.

LITERATURE REVIEW

There is no clear explanation to market crash. Zuckerman E. and Rao H. (2004) related the market crash of year 2000 to the main features of trading in Technology stocks early in the 1990s. Investors and stock traders were not able to explain the implications of the rise and fall of the Internet stock for many years. Ofek and Richardson (2002) pointed out that during that period the very high trading volume of trade in Internet stocks indicated the wide gap between the prices and their fundamental values. Demers and Lev (2001) gave two broad reasons for how Internet stocks reached unjustifiably high prices in the late 1990s and early 2000. The first focuses on the fundamental values that highlight the elements of capital gains and losses. Investors change their opinion often based on indicators rather than on fundamental values. The second suggests that fundamentals were indeed responsible for market prices but investors' interpretations of fundamentals were irrationally optimistic in making their assessments. Other researchers explained that fundamental limitations on arbitrage (De Long et al., 1993; Shleifer and Vishny, 1997) might have been responsible. Ofek and Richardson (2003) described a process whereby the significant constraints on the short selling of the Internet stocks prevented the opinions of more reasonable investors from being incorporated into prices. In the early 2000, with the expiration of the lock-up period that prevented insiders from selling stocks, prices of the Internet stocks fell, which led into a price crash (Ofek and Richardson, 2003).

Some other research focused on the trading activities between the markets by studying stock returns, volatility, price movements, co-movements, correlations, co-integrations, etc.... However, few studies present measures that would help small investors make rational decisions to protect their investments.

Datar, Naik and Radcliffe (1999) suggested that liquidity played a significant role in explaining cross-sectional stock returns. Chordia, Roll and Subrahmanyam (2000) concluded that liquidity retained a significant influence after adjusting for trading volume, volatility, and price movements. While Campbell, Crossman and Wang (1993) as well as Blume, Easley and O'Hara (1994) studied the liquidity effects of asymmetric information, which were influenced by trading costs. Alexander (1999) introduced the co-integration approach to portfolio modeling, which enabled the use of the entire set of information in a system of stock prices. Granger and Terasvirta (1993) argued that stock prices were long-memory process and co-integration was able to explain their long-run behavior. The co-integration rationale is based on the price difference between a benchmark (industry index) and the portfolio as well as the In explaining the factors that were behind the stock crash market, Stroh (2000) talked about unusual earnings. The cumulative P/E ratio of all domestic NASDAQ stocks hit unprecedented, levels of 81.2. He added, it would require a decline of over 75 percent to the stock price index to take back the NASDAQ's P/E ratio to where it started at the beginning of the bull market.

Mann (2000a,b) argued that investors' behavior and their confidence are prominent factors influencing stock markets. He said that overconfidence is the reason behind why investors tend to become irrational in the face of uncertainty. When investors face imminent danger, they tend to react instinctively rather than rationally. However, overconfidence causes investors first to misinterpret the accuracy of the information and then to overestimate their skills in analyzing it. This can lead to poor investment decisions, which is often reflected with excessive trading, risk

taking, and significant losses. In the same direction, Nofsinger (2001) argued that people in general tend to be overconfident, which leads investors to overestimate their knowledge, underestimate all kinds of risk, and exaggerate their ability to control and to predict events. Psychologists have found that two factors triggered people overconfidence, the successful experience they had in the past and the massive load of information. Thus, investors were trapped with the illusion of knowledge and the illusion of control.

In the era of Internet Technology, it is clear that investors have access to large volume of information on the stock market. Most of that information explains technical issues of trading activities, which in most of the cases overlooks measures that highlight strength and weakness of stocks. These measures if introduced may lead investors to make better assessments. The purpose of this study is to cross verify the predictive power of financial measures in identifying distressed stocks by comparing the results of two samples taken from U.S. stock market. The first sample is taken from companies whose stocks are traded at NASDAQ and the second sample is taken from companies whose stocks are traded at S&P 500. NASDAQ is the stock exchange of the Over-The-Counter (OTC) stock market that was developed by the National Association of Securities Dealers (NASD). It started February 5, 1971 with an index value of 100. In contrast to the S&P 500, which has about a quarter of its market cap in technology, two-thirds of the NASDAQ Composite market capital is made of computers, software and telecommunication (telecom) companies. NASDAQ is the third-largest market in the world, after the New York and Tokyo exchanges, and handles over 45 percent of all shares traded in the major U.S. markets (Madura 2001). The Index crossed the 4,131 points early in January 2000 (Start of US crash market period) and ended up at a level below 1,979 points by December 2002 (end of the crash period. This reflects almost 52 % decline in average stock prices listed on NASDAQ.

The S&P 500 Index was introduced by McGraw Hill's Standard and Poor unit in 1957. Most of the time, it is used as a proxy for the US stock market (Gray, 2004). During the observed period, the index lost 21% of its market value (negative market swing) i.e. between the period of January 01, 2000 (Index points 1,455.22) and January 02, 2002 (Index points 1,154.67).

METHODOLOGY AND DATA DESCRIPTION

A binary logistic regression model (BLRM) is used to test the research problem. Logistic regression is superior to linear regression when the normality assumption of the independent variables is not met. It is simpler to read and to interpret because its values are between zero and one (Tsun-Siou, Yin-Hua & Rong-Tze, 2003).

The use of the logistic regression model in this study is to evaluate the predictive power of the independent variables (fundamental measures) in classifying traded stocks into two groups (dependent variable). The dependent variable is a non-metric measure and is used to identify these two-stock groups; distressed stocks (assigned a value = 0), and financially reliable stocks (assigned a value = 1).

Data used is a secondary type and is taken from morningstar.com. It is made of two samples. The first sample is made of 200 companies that are listed on the NASDAQ stock exchange market. Data of these companies were collected at two different times; the first time was on January 01, 2000 when the NASDAQ index was at high of 4131.15 points, and the second time was on January 01, 2002 when the NASDAQ index was at a low of 1,979.25 points. The sample was split equally into two groups: 1- a group of companies (distressed) experienced a sharp decline in its stock prices (i.e. a decline exceeds the average decline of NASDAQ - 52%. 2- a group of companies (financially reliable) didn't experience a sharp decline in its stock prices (i.e. a decline didn't exceed the average decline of NASDAQ - 52%.

The second sample is made of 100 companies that are listed on the S&P 500. The sample selection and criteria is the same as sample one with an average decline of 21% in the index. Financial information collected from each company included 31 variables, which represent the company's fundamental measures (financial ratios).

These fundamental measures are subdivided into four major areas: 1- Liquidity and activity ratio measures which indicate the adequacy of short term resources to pay the anticipated short term debt liabilities and the efficiency in using firm's resources (Monetary Bulletin, 2004). 2- Leverage Ratios measure the extent of the firm's "total debt" burden. They reflect the business's ability to meet both short- and long-term debt obligations (Chesnick, 2000). 3- Profitability Ratios measure the success of the firm in making earnings (Tyran, 1986). 4- Cash Flow Ratios provide information about organization's quality earnings and its financial growth (Urbancic, 2005). A list of these measures is as follows:

- 1 - Liquidity and efficiency ratios: A- Current Ratio (CR), B- Acid Test or Quick Ratio (QR), C- Working Capital (WC), D- Working Capital per Dollar of Sales Ratio (WCS), E- Working Capital to Total Assets Ratio (WCTA), F- Accounts Receivable Turnover Ratio (ART), G- Inventory Turnover Ratio (ITR), H- Fixed Asset Turnover Ratio (FAT), I- Asset Utilization Ratio (AU), J- Asset Turnover Ratio, K- Days Sales Outstanding Ratio (DSO), L- Payable Period Ratio (PPR).
- 2 - Solvency Ratios: A- Financial Leverage Ratio (FLR), B- Debt to Equity Ratio (DTE), C- Equity to Asset Ratio (EQTA), D- Debt to Asset Ratio (DTA), E- Debt to Fixed Asset Ratio (DTFA), F- Long Term-Debt to Total Assets Ratio (LDTA), G- Equity Multiplier Ratio (EM), H- Expense Ratio (ER).
- 3 - Profitability ratios: A- Net Profit Margin Ratio (NPM), B- Return on Asset Ratio (ROA), C- Return on Equity Ratio (ROE), D- Earning per Share Ratio (EPS).
- 4 - Cash Flow Ratios: A- Free Cash Flow to Sales Ratio (FCFS), B- Free Cash Flow to Net Income Ratio (FCFNI), C- Cash Conversion Cycle Ratio (CCC), D- Operating Cash Margin Ratio (OCM), E- Earnings Quality Ratio (EQR), F- Asset Efficiency Ratio (AER), G- Capital Asset Ratio (CAR), H- Current Liability Coverage Ratio (CLC).

Testing Reliability and Validity

In testing the reliability of the model, the coefficient of determination (R^2_{Logit}) is used. It is similar to that of the ordinary least squares (OLS) regression:

$$R^2_{\text{Logit}} = 1 - (2LL_0 / 2LL_1)^{1/2}, \quad (1)$$

where $-2LL_0$ is the log-likelihood (represents unexplained variations) of the model without the independent variables. $-2LL_1$ is the log-likelihood of the research model based on the independent variables that remained in the model and exhibited significant power in explaining the two stock groups. In general, the interpretation of R^2_{logit} is similar to the coefficient of determination R^2 in multiple regression. It has a value that ranges between 0 and 1. When R^2_{logit} approaches 0, the model is poor. When R^2_{logit} approaches 1, the model is a perfect predictor.

Testing Validity: The external validity of the research model is tested by comparing the results of the two samples - i.e NASDAQ versus S&P 500.

Data collection: The selection process of data was carefully done. Cases with missing information were avoided. In studying outliers, few cases reported values that exceeded three standard deviations. In checking these cases, nothing abnormal was found about these companies and accordingly they were kept in the model.

DATA ANALYSIS

The first step in the analysis was done by using the forward stepwise procedure of logistic regression. This procedure allows only those variables that exhibit significant predictive power to enter into the model. At a level of significance of 5% of the thirty-one independent variables that were in the model, only eight variables entered into the model. These variables are Current Ratio, Quick Ratio, Receivables Turnovers, Days Sales Outstanding Ratio, Expense Ratio, Return on Assets, Capital Asset Ratio, and Current Liability Coverage Ratio. The summary output of the SPSS showed the following hit ratio results:

Table 1: predicted Ratios

<i>NASDAQ</i>	Predicted		Correctly classified %
	Distressed	Reliable	
Observed - Distressed	49	1	98%
Observed - Reliable	3	47	94%
Overall Hit Ratio			96 %
<i>S&P 500</i>			
Observed - Distressed	37	13	74%
Observed - Reliable	14	36	72%
Overall Hit Ratio			73%

The model correctly classified distressed stocks during crash period - 0 group - 98% (NASDAQ) and 74% (S&P 500). The model misclassified the same group 2% (NASDAQ) and 26% (S&P 500). As for reliable stocks, the model correctly classified 94% (NASDAQ) and 72% (S&P %). The model misclassified 6% (NASDAQ) and 28% (S&P 500). The overall hit ratio (average) is 96% (NASDAQ) and 73% (S&P 500), it means the model correctly classified 96% NASDAQ stocks and 73% S&P500. While, it misclassified 4% of NASDAQ stocks and 27% S&P 500 stocks.

Variables remained in the model and exhibited significant predictive power are listed in the following table:

Table 2: Variables in the Model

NASDAQ	Common Variables	Coefficient
Current Ratio	No	-3.8897
Quick Ratio	No	+7.0354
Receivables Turn over	No	-0.4857
Days Sales Outstanding	No	-0.0780
Expense Ratio	No	-9.6143
Return on Assets	No	-0.3091
Capital Assets Ratio	No	+1.2558
Current Liabilities Coverage Ratio	No	-15.3474
S&P 500	No	
Working Capital – WC	No	-.003
WC to total assets	No	6.391
Fixed assets turnover	No	-.200
Cash Conversion Cycle	No	-.017
Earning Quality Ratio	No	-.511
Payable Period	No	-.016

Eight variables exhibited significant power in predicting distressed NASDAQ stocks, while six variables exhibited significant power in predicting S&P 500 stocks.

Testing Reliability and Validity

Testing the reliability of the model is done by using the coefficient of determination (R-Square), which represents the proportion of the total variation that is explained by the independent variables. The model explained 87% of the total variation of NASDAQ stocks and 51 % of S&P 500 stocks. Both are considered significant.

External validity of the research model was addressed by using two different samples. Both samples showed that financial measures have significant predictive power with a coefficient of determination exceeding the 50%.

Limitations of the study

There are two practical problems associated with this study. First is that the data is secondary that was taken from a public site. Secondly, the study is based on a limited number of companies and thus the sample issues.

CONCLUSIONS

The results of the study showed that there is a major structural difference in the fundamental measures between the two stock groups of firms (financially reliable versus distressed). But a clear issue there were a be addressed and these are 1) even though, the coefficient of determination of both were significant, but that showed significant Even though, the model showed a significant predictive power but Accordingly, this model could be used to help investors to identify those stocks that are adversely affected during traumas from other stocks. Future research could include testing the external validity of this model by applying the model to other stock markets. In addition, it is advisable to focus on standardized models that are derived from fundamental measures, which would better help investors in making better decisions.

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DETERMINANTS OF STATE ECONOMIC GROWTH: COMPLEMENTARY RELATIONSHIPS BETWEEN R&D AND HUMAN CAPITAL

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ABSTRACT

According to a recent Cleveland Federal Reserve Study, economic growth is a function of education, innovation (measured by patent statistics), and industry specialization. In another Cleveland Federal Reserve study, Bauer et al. find both the percent of the population with a college degree and the percent of the population with a high school diploma to be highly significant in determining economic growth rates. We wish to use these findings as an empirical baseline to guide our own research and determine the importance of research and development in economic growth rates. Using data from the National Science Foundation's (NSF) annual surveys of government, academic, industry and non-profit R&D expenditures, the U.S Bureau of Economic Analysis determined R&D contributed 6.5 percent to economic growth between 1995 and 2002. (NSF 2006). In our study, we will substitute research and development expenditures for patents as the innovation variable as R&D is more easily controlled from a policy standpoint. Our hypothesis will be that it should produce results similar to the patent variable used by the Fed. We anticipate that R&D will complement college education. We hope to find a correlation between the states with higher per capita incomes and the states that partake more in research and development.

MOTIVATION

Many studies have linked innovation to the lack of complete per capita income convergence within the United States through patent data. We have chosen to instead look at the amount of money spent within a state on research, and then to break that down into money spent by the federal and state governments, the industrial or private sector, and academic institutions. States that host a large degree of research, be it applied or basic, tend to attract a higher percentage of educated people who will draw higher salaries than people who are less educated. This in turn will increase the per capita income of the research-heavy state (Barro et al. 1991).

Patents measure the creative output of research and development, but they do not reflect the differing amounts of capital that go into producing them. Also, patents cannot entirely measure basic research; they are better indicators of applied research, which often depends on the foundations established by basic research. So while patents are a reasonable measure of inventive output, they fall short as a measure of innovative inputs. However, since most studies focus more heavily on patent statistics, we have chosen to look more stringently at the amount of money involved and use research and development data. (Grilches 1990).

Characteristically, much of the R&D in the United States occurs at universities across the country, which is why we expect an education compliment. Universities are linked to overall research and development not only in the sense that a great deal of the actual research transpires at them, but also because they train students and give them the skills necessary to excel in science and engineering, which are often imperative for new research and innovation. A 2006 study looked at the percentage of patents that listed inventors who had an advanced degree in engineering or in the natural or life sciences; an indicator of an extensive training period. In 1985, 6.9 percent of inventors had an advanced degree, while only twelve years later that number had risen to 14.7 percent (Kim and Marschke, 2006). Often, companies or firms

will pay universities to perform applied research, or to investigate a specific problem and find a solution. Knowledge spillover is also an important aspect of the close proximity of academia and industry (Foray, 101).

METHODS AND RESULTS

In our study, we looked at the effects of total R&D expenditures on growth rates from 1980-2005, growth rates from 1995-2005 and income levels in 2005. We then multiplied variables together in order to determine interaction results and ran the new variables in the same regressions. We had significant findings in all three categories, so we will describe the regression results in detail.

Income Levels

One of the first things we wanted to examine was the idea that differences in total R&D spending explain the differences in income levels across the United States. In order to do this, we used Per Capita Personal Income for 2005 as the dependent variable and 1999 tax rates, 1999 business failure rates, 1999 college graduation rates, and total per capita research and development expenditures for the independent variables. These variables were used in the Cleveland Federal Reserve study, which we used as a baseline for our regression. Both total per capita research and development and college graduation rates were significant above the 1% level. The R&D variable had a T-Score of 2.83. We then added an additional independent variable: 1999 high school graduation rates. Even with this extra variable, both college and total per capita R&D were still significant at the 1% level, and the R&D variable actually had a stronger T-Score (2.99).

Economic Growth Rates 1980-2005 and 1995-2005

We expected to get roughly the same results as the Cleveland Federal Reserve Bank when we ran regressions with the growth rates as the dependent variable, since we used their data for some of the independent variables and replicated their study as closely as possible. Using the 1999 tax rate, the 1999 business failure rate, the per capita research and development variable and 1999 college graduation rates either produced negative T-Scores for research and development or positive and insignificant T-Scores. The same results were true when high school graduation rates were added. Also, when we took out the research and development variable, and put in the patent statistics that the Cleveland Fed used in their original papers, the patent statistic T-Scores were negative as well, which is not at all what they found. Possibly because the Cleveland Federal Reserve used a panel data set, while we only used data from one year and did an OLS linear regression. We did not control for as many variables as the Federal Reserve did, which may have made a difference in our results.

Interaction Effects

The most significant results that we found were regarding interaction effects. We created three new variables using our data. These are: the product of college graduation rates and total per capita R&D, the product of per capita patents and total per capita research and development, and the product of college grad. rates, total per capita R&D and per capita patent statistics.

We have found an instance of highly complimentary variables in our study, in terms of both growth rates and income levels. When the three new variables were added to the income level regressions, each new variable was statistically significant, and in only one regression was the new variable not significant at above the 1% level. This indicates that a college education, patent statistics, and research and development are highly complimentary and that each is needed in order to achieve a high-income level.

When the new variables were added to the growth rate regressions, most of the results were highly significant as well, showing that the multipliers for the new variables are all necessary for economic growth, as well as for high income levels. These regression results can be found in the following tables.

PER CAPITA INCOME GROWTH RATES 1985-1995

P.I.G.	1	2	3	4	5	6	7
1980-2005							
Per Capita	.000	.000	.000	.000	.000	.000	.000
Income 1980	-2.82	-2.68	-3.18	-3.24	-2.76	-3.4	-3.57
Tax Rates	-1.392	-1.386	-1.414	-1.483	-2.188	-1.617	-1.678
	-1.61	-1.57	-1.70	-1.76	-2.36	-1.91	-2.02
Business	-9.419	-9.423	-8.168	-7.936	-6.064	-7.742	-7.29
Failure Rates	-2.53	-2.51	-2.26	-2.17	-1.51	-2.12	-2.03
Total Per	.0245	.0240	-.1978	-0.2222	-0.015	-0.056	-0.037
Capita R&D	1.05	.97	-1.83	-1.96	-.38	-1.41	-1.17
College Grad.	.0098	.0098	.0023	.0001	X	.0099	.0064
Rates	3.48	3.1	.51	.03		3.28	2.00
High School	X	-.0001	X	.0021	.0045	.0008	.0014
Grad. Rates		-.06		.74	1.62	.30	.55
Patents Per	X	X	X	X	-0.212	-.246	-.158
Capita					-1.53	-1.97	-1.76
R&D x	X	X	.0087	.0099	X	X	X
College			2.11	2.22			
R&D x	X	X	X	X	.2858	.2964	X
Patents					2.17	2.51	
R&D x	X	X	X	X	X	X	.0087
Patents x							2.85
College							

PER CAPITA INCOME GROWTH RATES 1995-2005

P.I.G. 1995-2005	1	2	3	4	5	6	7
Per Capita Income 1995	.000	.000	.000	.000	.000	.000	.000
Tax Rates	-1.73	-1.85	-1.96	-2.41	-1.87	-2.48	-2.53
Business Failure Rates	-0.5711	-0.6159	-0.6227	-0.7241	-0.8483	-0.739	-0.7833
Total Per Capita R&D	-0.89	-0.99	-0.97	-1.2	-1.38	-1.24	-1.30
College Grad. Rates	-0.9298	0.6589	1.206	1.068	1.922	-0.9702	-1.056
High School Grad Rates	-0.36	-0.26	0.46	0.43	-0.79	-0.41	0.44
Patents Per Capita	-0.0017	0.0059	-0.0806	-0.1452	-0.0267	-0.2236	-0.0245
R&D x College	-0.10	0.34	-1.05	-1.8	-0.98	-2.60	-1.08
R&D x High School	0.0057	0.0036	0.0029	-0.0019	X	0.0043	0.0022
Patents x College	2.68	1.57	0.89	-0.54		1.98	0.97
R&D x High School	X	0.0037	X	0.0049	0.0060	0.0044	0.0048
Patents x College		1.97		2.55	3.50	2.46	2.58
R&D x College	X	X	X	X	-2.03	-2.237	-1.449
Patents x College					-2.30	-2.60	-2.28
R&D x College	X	X	0.0034	0.0061	X	X	X
Patents x College			1.05	1.91			
R&D x College	X	X	X	X	0.1918	0.2100	X
Patents x College	X	X	X	X	2.25	2.53	0.0054
Patents x College							2.41

PERSONAL INCOME LEVELS IN 2005

P. I. Levels 2005	1	2	3	4	5	6	7
Tax Rates	-104593	-105796	-102375	-103969	-139527	-110527	-112213
Business Failure Rates	-2.56	-2.59	-2.65	-2.79	-3.56	-3.02	-3.15
Total Per Capita R&D	-115297	-124134	-60082	-63103	28986	-61647	-44022
College Grad. Rates	-0.66	-0.71	-0.36	-0.39	-0.17	-0.39	-0.29
High School Grad. Rates	3029	3285	-9633	-12339	-378.52	-2164	-992.19
Patents Per Capita	2.83	2.99	-1.86	-2.37	-0.2	-1.19	-0.68
R&D x College	525.8	450.8	90.69	-163.34	X	435	224.51
R&D x High School	3.95	2.95	0.42	-0.67		3.16	1.55
Patents x College	X	131.8	X	253.26	327.58	152.6	186.09
R&D x College		0.99		1.99	2.75	1.26	1.57
R&D x High School	X	X	X	X	-12490	-13670	-8141
Patents x College					-2.02	-2.44	-2.02
R&D x College	X	X	492.28	616.5	X	X	X
Patents x College			2.49	3.06			
R&D x College	X	X	X	X	17855	17869	X
Patents x College	X	X	X	X	3.12	3.45	513.31
Patents x College							3.86

Summary

Each year, billions of dollars are spent on research and development in the United States. Is it worth it? Do states benefit? If so, do they benefit more from research and development than they would if the money were spent on infrastructure or education? In 2006, the Cleveland Federal Reserve Bank published a study that examined five variables that impact economic growth rates. This study found that the largest factor causing income differences across states is innovation (proxied by patent statistics), followed by education and industry specialization, while tax policy and public infrastructure are not significant. These results are new and striking. We have used this Fed study as our baseline. However, while patent stats are certainly important, we decided to focus on R&D as this variable can be influenced directly by public policy.

Through regression analysis we found positive effects from total R&D expenditures on income levels. Our paper is innovative in showing “complementarities” between R&D and college education and patents. These joint effects are very strong. States can significantly increase their growth rates by investing more in universities and innovation. The empirical results confirm the intuition that college education by itself will not fully generate innovation. Similarly, benefits of research and development do not occur without first investing in higher education. Education and R&D complement each other.

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**NO STATE LEFT BEHIND: CAN STATE POLICY ENHANCE
BUSINESS CLIMATE AND STUDENT PERFORMANCE?**

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Abstract

This paper will investigate whether the NAEP test explains cross state differences in incomes and growth rates across U.S. states. The entire accountability project in education is likely due to two main objectives: to increase the productivity of our education investments and achieve higher standards of living and second, to ensure that equity considerations are taken into account in terms of education opportunity and the ability to meaningfully take part in the modern economy. The paper will also seek to determine if state policy can be effective in promoting human capital accumulation and economic growth. Why do some states have higher NAEP test scores than others? Based on our study of this question, we will ask if state policy can be effective in promoting human capital accumulation. This is an important question for several reasons. Since human capital is such an important component of economic growth, it is reasonable to assume that states will compete to produce and retain human capital. In fact, many states explicitly compete in this area by advertising their highly skilled workforce capacity to modern corporations in search of new plants and headquarters. Do states that compete in this way have higher test scores? Several new indicators related to state business climate will help us to understand this story.

Introduction

This paper has two objectives. First, we want to explain the factors which have caused some states to grow more quickly than others. As our baseline for research, we will use a widely circulated paper by Bauer et. al. (2006) from the Cleveland Federal Reserve Bank. They have a great story; however, we want to add to this story and in our story, we want to focus on human capital, and more specifically, we want to see if cross-state NAEP test scores serve as a good measure of human capital. Most of the cross-state literature uses high school and college graduation rates as their measure of human capital. The NAEP scores, however, seem intuitively much better as measures of human capital as they actually measure student performance across various subjects. We do in fact find that our NAEP human capital variable better explains cross-state growth performance than the typical high school variables in the literature.

The second objective of this paper is to focus on the determinants of NAEP test scores. Why do some states have higher NAEP scores than others? In particular, we are interested in the hypothesis that good governance and good state policy might be correlated with good NAEP scores. States that care about their long-run growth prospects, should also very much care about developing their human capital stocks. Again, we follow the leaders in this field and then add to their story. Grissmer et. al. (2000) have offered a detailed analysis of the primary variables which determine NAEP test scores across states. We summarize their findings and then proceed with our own regression analysis in order to analyze several policy variables of interest.

MODELS

I. Cross State Growth

We have chosen to use the cross state growth model used by Bauer et. al. as their paper is based on determining the factors that affect cross state growth in the long-run. Since we have chosen to use the model used by Bauer et. al., we will allow them to introduce it.

At any given time t , the income ($Y_{t,s}$) of state s is assumed to follow a Cobb-Douglas function of its capital ($K_{t,s}$) and labor ($L_{t,s}$).

$$Y_{t,s} = K_{t,s}^{\alpha} (L_{t,s} X_{t,s}^{\gamma} A_t)^{1-\alpha} \quad (1)$$

The equation also contains the familiar labor-augmenting rate of productivity growth in the national economy (A_t), which accounts for all increases in labor-augmenting productivity including the average of any state-specific labor-augmenting factors at time t . State-specific labor augmenting factors $X_{t,s}$, allow for relative differences in the state-varying factors. Without the addition of these state-specific factors, this equation is completely standard in the international income convergence literature.¹ Although [many] others have accounted for human capital differences in a similar manner, we can do so with greater precision because we have a longer time period and we can control for more factors. The data available for U.S. states are richer than what is available internationally, allowing us to examine a wider set of factors.²

Specifically, we examine a set of factors that might offer a production benefit, such as human capital or public infrastructure, and that are either a characteristic of the resident workforce or that are more available to that workforce than to other workforces. By construction, the aggregate productivity level (A_t) will capture the average effect over all 48 states of all such production amenities, while the state factors are measured relative to the overall average and thus have a mean of one. This construction makes the estimation of the X variable a between-state estimator of the full effects in cases where the X variable is likely to have general as well as relative effects.”³

II. Cross State NAEP score determinants

Grissmer et. al. (2000) performed a study on the NAEP from 1990-1996 focusing on cross-state analysis. The model we used to analyze the cross-state NAEP scores and the factors that influence them is roughly the same model as used by Grissmer et. al. (2000), since we are following their work.

¹ For ease of exposition in the development of our model, we treat X as a single factor. It is straightforward, but more tedious, to reformulate our exposition by modeling X as a log-linear function of multiple factors, Z .

² More factors could be considered with a shorter period, but we believe that the longer period is more desirable because it provides more reliable estimates of the effects. Higgins, Levy, and Young (2006) follow this former approach using many factors in a shorter panel of U.S. county-level data.

³ Bauer et. al. (2006)

We made a few changes to the Grissmer et. al. (2000) model. One change being that we observed 48 states whereas they observed only 44 states. Another difference is that Grissmer et. al. (2000) used a panel data set where as we focused on one particular year (2005). We did, however, follow Grissmer et. al. (2000) and others in including the main variables that have been found to influence test scores on the NAEP. Basically we ran an ordinary least squares (OLS) regression as Grissmer et. al. (2000) and others have done on all of our state policy variables that could possibly have an effect on the NAEP score of a state.⁴

We extended the Grissmer model by including several business policy variables as defined by Forbes.com. The variables were economic climate, quality of life, business costs, growth prospects, labor, and regulatory environment.

III. Results – Determinants of Cross State Growth

In our study, we examined three periods in U.S. history: 1934-2005 (as per the Bauer et. al. paper), 1980-2005, and 1995-2005. After controlling for the respective income levels in each period and for the other variables used by Bauer et. al. (2006), the NAEP scores proved to be a better measure of human capital in the third time period rather than the first two. This result is expected as the NAEP was not introduced until 1969, thirty-five years after the start of the first period studied. Since the NAEP began administering the test on the state and national level in 1990, the NAEP tends to be a more accurate measure of human capital in the last period.

The percent of the population with at least a bachelor's degree (college variable) is one of the human capital variables used by Bauer et. al. and this variable tended to explain most of the convergence in incomes for the 1934-2005 period.

We also checked to see if physical capital had any effect on the convergence of income over the three specified periods, as this variable was surprisingly absent from the Bauer framework. However, we found that neither of our two measures of capital were statistically significant.

After running regressions on the three growth rate periods, we concluded that the college variable (in Bauer) was the most important determinant of real growth rates in the first two periods as it consistently demonstrated more explanatory power in the regressions than the NAEP variable. The NAEP was still significant in the first two periods, just not nearly as much as the college variable. The NAEP was the most important determinant of real growth rates in the third period as it consistently had more explanatory power in the regressions than the college variable.

The first two periods demonstrate that the percent population with a bachelor's degree was the most important determinant of real growth rates. Although the college variable was the most important determinant, the NAEP was still significant when regressed in the first two periods. The third period shows that in more recent years, the NAEP has become a more important determinant of real growth rates than the percent population with a bachelor's degree. The NAEP is the most significant variable even with the college variable and the high school variable added. These results can be seen below in tables 1-3.

We also checked to see if the college variable was complementary with the NAEP (k-12 variable) by running interaction terms in our regressions, however they were not statistically significant in any time period.

⁴ For details on the specific model we followed, see Grissmer et. al. (2000)

The results of our regressions can be seen below in Tables 1-5. For ease in understanding the regression results, variable names can be found at the end of the paper in Table 6. Coefficients that are statistically significant at the 5% level are in bold.

Table 1. Real Growth Rate 1934-2005

Table 1. Real Growth Rate 1934-2005	Regression 1 (Fed Baseline)	Regression 2	Regression 3	Regression 4	Regression 5
Constant	3.10 (8.17)	1.696 (2.06)	1.367 (1.54)	2.149 (2.62)	1.720 (2.03)
PI34Fed	-0.0002 (-12.75)	-0.0002 (-13.12)	-0.0002 (-11.75)	-0.0002 (-12.64)	-0.0002 (-11.72)
Pat99Fed	-0.122 (-1.00)	-0.166 (-1.38)	-0.085 (-0.66)	-0.152 (-1.22)	-0.083 (-0.65)
HS99Fed	-0.004 (-0.92)	-0.012 (-1.97)	-0.008 (-1.24)		
Coll99Fed	0.015 (3.04)	0.014 (2.94)		0.012 (2.48)	
Tax99Fed	-1.845 (-1.29)	-1.440 (-1.03)	-1.944 (-1.28)	-1.585 (-1.10)	-1.994 (-1.31)
Fail99Fed	-3.450 (-0.55)	0.565 (0.09)	4.370 (0.64)	-2.871 (-0.45)	1.555 (0.24)
NAEP8th05		0.007 (1.90)	0.009 (2.01)	0.002 (0.78)	0.005 (1.59)
Adjusted R ²	0.8403	0.8499	0.8219	0.8394	0.8196

Table 2. Real Growth Rate 1980-2005

Table 2. Real Growth Rate 1980-2005	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Constant	1.493 (6.62)	0.659 (1.37)	0.390 (0.71)	0.878 (1.88)	.0531 (1.03)
PCPI80	-0.00003 (-2.56)	-0.00003 (-2.64)	-0.00002 (-1.38)	-0.00003 (-2.76)	-0.00002 (-1.54)
Pat99Fed	0.039 (0.60)	0.014 (0.22)	0.086 (1.21)	0.024 (0.37)	0.089 (1.26)
HS99Fed	-0.001 (-0.39)	-0.005 (-1.58)	-0.003 (-0.80)		
Coll99Fed	0.011 (3.82)	0.010 (3.76)		0.0097 (3.47)	
Tax99Fed	-1.195 (-1.41)	-0.956 (-1.15)	-1.159 (-1.22)	-1.052 (-1.25)	-1.207 (-1.27)
Fail99Fed	-9.763 (-2.59)	-7.382 (-1.92)	-5.703 (-1.30)	-8.841 (-2.33)	-6.637 (-1.58)
NAEP8th05		0.004 (1.95)	0.005 (1.99)	0.002 (1.18)	0.004 (1.99)
Adjusted R ²	0.3134	0.3572	0.1515	0.3335	0.1588

Table 3. Real Growth Rate 1995-2005

Table 3. Real Growth Rate 1995-2005	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Constant	0.109 (0.66)	-0.589 (-1.83)	-0.700 (-2.14)	-0.587 (-1.91)	-0.748 (-2.43)
PCPI95	-4.68e-06 (-1.55)	-5.09e-06 (-1.78)	-2.34e-06 (-0.91)	-5.08e-06 (-1.82)	-2.33e-06 (-0.92)
Pat99Fed	-0.031 (-0.67)	-0.050 (-1.13)	-0.035 (-0.78)	-0.050 (-1.15)	-0.035 (-0.79)
HS99Fed	0.0037 (2.01)	-0.0001 (-0.02)	0.002 (0.46)		
Coll99Fed	0.0042 (1.95)	0.0040 (1.94)		0.0004 (2.03)	
Tax99Fed	-0.417 (-0.70)	-0.235 (-0.42)	-0.219 (-0.38)	-0.236 (-0.42)	-0.212 (-0.37)
Fail99Fed	0.574 (0.23)	2.551 (1.02)	3.652 (1.45)	2.535 (1.06)	4.039 (1.71)
NAEP8th05		0.004 (2.47)	0.0039 (2.49)	0.0037 (3.30)	0.0044 (3.95)
Adjusted R ²	0.1700	0.2619	0.2120	0.2799	0.2267

Table 4. Per Capita Personal Income 2005

Table 4. Per Capita Personal Income 2005	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5
Constant	20844.09 (1.86)	-9309.18 (-0.37)	-23027.82 (-0.78)	-3850.8 (-0.16)	-24661.44 (-0.89)
Pat99Fed	5965.24 (1.86)	5058.82 (1.56)	10902.16 (3.06)	5260.86 (1.63)	10909.89 (3.10)
HS99Fed	19.756 (0.14)	-140.53 (-0.78)	36.366 (0.17)		
Coll99Fed	628.02 (4.51)	610.75 (4.41)		586.67 (4.37)	
Tax99Fed	-86002 (-2.04)	-77330.52 (-1.83)	-103130.9 (-2.05)	-79108.68 (-1.88)	-102923.7 (-2.07)
Fail99Fed	-137777.6 (-0.74)	-51583.63 (-0.27)	121447.8 (0.53)	-92887.18 (-0.50)	134552.6 (0.63)
NAEP8th05		160.21 (1.35)	208.35 (1.47)	99.373 (1.12)	225.43 (2.25)
Adjusted R ²	0.5251	0.5343	0.3297	0.5386	0.3448

IV. Results – Determinants of NAEP

NAEP is important because it explains both income growth rates and levels, so a better understanding of what causes higher NAEP scores may also help state policy makers. After controlling for all of the standard variables which can arguably determine student performance, only a subset were robust across our regressions. The four main variables that influence the combined math and reading NAEP test scores from 2005 are: per capita personal income, annual unemployment rates, high school graduation rates, and the economic climate (as measured by Forbes) of a state. The latter two can potentially be affected by state policy. The reason we conclude that these four policy variables are the most important is that they were all statistically significant when regressed with almost any other variable(s). All four had the expected sign when regressed without any other variables and were mostly significant. When just the four variables were run on the combined math and reading NAEP test from 2005, they were all significant at the 3.1% level or lower.

Despite what some researchers have found, we were unable to find any relationship between state and local funding per pupil and the combined 2005 NAEP test scores. State and local funding per pupil had a t-statistic of 0.63 and would have had very little effect as the coefficient was 0.0003. We also checked state funding per pupil and it also had no significant relationship to the combined 2005 NAEP test scores. The state funding per pupil variable had an even worse t-statistic of 0.08 and would have had even less of an effect as the coefficient was 0.00004. We were also unable to find any significant relationship between the average class size (student-to-teacher ratio) and the combined 2005 NAEP test scores. Even though we had the right sign (negative), the t-statistic was a mere -0.70 with a coefficient of -0.187. Although not presented in Table 5 below, we also checked the real growth rates from 1980-2005 and from 1995-2005 and their effect on combined 2005 NAEP test scores and were unable to find a statistically significant relationship. In addition to real growth rates, we examined expenditure variables such as total federal expenditures per capita, state expenditures per capita, local expenditures per capita and combinations of the three and found no statistically significant relationship with the combined 2005 NAEP test scores.

Another potentially interesting avenue for research in this area is determining whether state business climate might have an effect on NAEP. If business is interested in improving work force quality, could it be the case that they might indirectly be able to positively influence student performance by using their influence in the policy arena? The potential variables we tested were: economic climate, quality of life, business costs, growth prospects, labor, and regulatory environment.

The only Forbes variable to show up statistically significant consistently was economic climate. The t-statistics for economic climate ranged from 1.22 to 2.26. The only other two Forbes variables to show up significant in any of the regressions were labor and quality of life. Labor appears to be mildly correlated with per capita personal income because per capita personal income loses its significant when the labor variable is added. The correlation coefficient of the two variables is -0.5405 suggesting a mild correlation. Although not shown below, the average of all six Forbes variables almost had a statistically significant relationship with NAEP test scores (t-statistic of -1.47). The only problem is that it had a negative sign rather than the expected positive sign. All of the results can be found at the end of this section in Table 5.

Our results conclude that over time, the NAEP test has become a more important determinant of real growth rates than the percent population with a bachelor's degree. Despite what previous research has shown, we were unable to find a statistical relationship between average class size and NAEP and between state and local funding per pupil and NAEP. We were able to show, however, that the four main determinants of a state's score on the NAEP test are per capita personal income, annual unemployment rates, high school graduation rates, and economic climate. This last result answers one of our original questions of how state policy affects a state's NAEP score. Although two of the four explanatory variables cannot be controlled by state policy, two of them can: high school graduation rates and economic climate. Albeit states don't have a huge amount of control over high school graduation rates, they do have some control over the teachers, schools, supplies, etc. which would ultimately affect graduation rates. The economic climate of a state is very much controlled by state policy as it includes the presence of big companies, income, and gross state product growth among other things.

Table 5. 8th Grade NAEP

Table 5. 8th Grade NAEP	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11
PCPI05	0.0003 (2.19)	0.0004 (2.37)	0.0003 (1.92)	0.0002 (0.97)	0.0003 (2.10)	0.0004 (2.50)	0.0002 (1.04)	0.0003 (2.17)	0.0003 (2.23)	0.0002 (1.51)	0.0003 (2.18)
AnnUn	-1.897 (-1.92)	-1.719 (-1.71)	-1.939 (-1.92)	-1.941 (-1.94)	-1.891 (-1.88)	-1.479 (-1.42)	-1.673 (-1.71)	-1.874 (-1.88)	-1.881 (-1.89)	-1.322 (-1.28)	-1.731 (-1.69)
StLFundPP				0.0003 (0.63)							
StFundPP					0.00004 (0.08)						
BusCost						-0.064 (-1.21)					
EconClim	0.124 (2.06)	0.119 (1.97)	0.126 (2.06)	0.117 (1.90)	0.123 (2.01)	0.118 (1.96)	0.134 (2.26)	0.116 (1.86)	0.113 (1.77)	0.080 (1.22)	0.114 (1.85)
GrowPros									0.028 (0.56)		
QualLife										-0.123 (-1.59)	
Labor							-0.086 (-1.67)				
RegEnvi								-0.025 (-0.57)			
GarofaloK			2.55 (0.31)								
K1996		-0.0007 (-0.98)									
HSGradRate04	0.490 (5.00)	0.493 (5.03)	0.496 (4.91)	0.473 (4.63)	0.490 (4.94)	0.499 (5.11)	0.505 (5.24)	0.497 (4.99)	0.469 (4.44)	0.355 (2.77)	0.478 (4.78)
STRatioDoE											-0.187 (-0.70)
Adjusted R ²	0.6030	0.6025	0.5940	0.5970	0.5931	0.6074	0.6195	0.5963	0.5962	0.6171	0.5979

Conclusion

“Our results are easily summarized: A state’s stock of knowledge is the main factor explaining its relative level of per capita personal income. If state policymakers want to improve their state’s economic performance, then they should concentrate on effective ways of boosting their stock of knowledge.”⁵

Just as Bauer et. al. found that “a state’s stock of knowledge is the main factor explaining its relative level of per capita personal income,” we found that a better measure of a state’s stock of knowledge, at least in the past 15 years or so, is the NAEP test rather than high school or college graduation rates.

Our analysis of Cross-State NAEP test scores in relation to variables that can be controlled by state policy has led us to conclude that some variables that influence NAEP test scores can be controlled by state policy. Although the most important variables in determining a state’s score on the NAEP are demographic variables that states cannot control, states do have control over some of the variables that influence NAEP test scores.

Between both of our studies, we conclude that states do have some control (although relatively small) over what their score will be on the NAEP test. Because the NAEP test is a better measure of human capital than high school and college graduation rates within the past 15 years or so, states should be able to raise their per capita personal incomes by investing in education, specifically those areas that are tested by the NAEP. Since there is probably two-way causation between per capita personal incomes and educational attainment, states that invest in education will see gains in per capita personal incomes, which will in turn lead to gains in education.

⁵ Bauer et. al. (2006)

Table 6. Variable Names, Definitions, and Sources

Definition	STATA Symbol	Source
Population (Estimated, 2005)	Pop05JLARC	U.S. Census Bureau annual population estimates.
Percent Change in Population (Estimated, 2000-2005)	PerPopChg	U.S. Census Bureau annual population estimates.
Percent Change in Foreign-Born Population (Estimated, 2000-2005)	Foreign	U.S. Census Bureau annual population estimates and American Community Survey.
Per Capita Personal Income (2005)	PCPI05	U.S. Bureau of Economic Analysis regional economic information system (Sept. 2006).
Annual Unemployment Rate (2005)	AnnUn	U.S. Department of Labor Bureau of Labor Statistics.
Per Capita State and Local Revenue (FY 2004)	PCSLRev	U.S. Census Bureau data on state and local government finances (2003-2004) and population.
State and Local Revenue as a Percent of Personal Income (FY 2004)	SLRPerPI	U.S. Census Bureau data on state and local government finances (2003-2004); Bureau of Economic Analysis.
Per Capita State Revenue (FY 2004)	PCStRev	U.S. Census Bureau data on state and local government finances (2003-2004) and population.
Per Capita Local Revenue (FY 2004)	PCLocRev	U.S. Census Bureau data on state and local government finances (2003-2004) and population.
Per Capita State and Local Taxes (FY 2004)	PCSLTax	U.S. Census Bureau data on state and local government finances (2003-2004) and population.
State and Local Taxes as a Percent of Personal Income (FY 2004)	SLTPerPI	U.S. Census Bureau data on state and local government finances (2003-2004); Bureau of Economic Analysis.
Per Capita Local Taxes (FY 2004)	PCLocTax	U.S. Census Bureau data on state and local government finances (2003-2004) and population.
Per Capita State Taxes (FY 2005)	PCStTax	U.S. Census Bureau data on state tax collections (2005).
Per Capita Federal Grants (FFY 2004)	PCFedGr	U.S. Census Bureau Consolidated Federal Funds Report (2005) and population data.
Federal Expenditures Per Capita (FFY 2004)	FedExpPC	JLARC staff analysis of U.S. Census Bureau Consolidated Federal Funds Report data (issued December 2005) and Population data.
Per Capita State Expenditures (FY 2004)	PCStExp	U.S. Census Bureau data on state and local government finances (2004) and population.
Per Capita General Fund Expenditures (FY 2005)	PCGFExp	National Association of State Budget Officers' 2005 State Expenditure Report; U.S. Census Bureau population data.
State General Fund Expenditures as a Percent of Personal Income (FY 2005)	SGFEPtPI	National Association of State Budget Officers' 2005 State Expenditure Report; U.S. Bureau of Economic Analysis.
Per Capita State and Local Debt Outstanding (FY 2004)	Debt	U.S. Census Bureau data on state and local government finances (2004) and population.

Bond Ratings (October 2006)	SandP	Virginia Department of the Treasury data (October 2006).
	Moody	
	Fitch	
Per Capita Total Medicaid Expenditures (FY 2004)	Medicaid	U.S. Department of Health & Human Services Centers for Medicare and Medicaid Services Quarterly expense report 2004-1997.
Percent of Population Under Age 65 With Health Insurance (2005)	HealthIn	U.S. Census Bureau data on health insurance (2006 Annual Social and Economic Supplement) and population.
State and Local Funding Per Pupil, K-12 (2003-2004)	StLFundPP	U.S. Census Bureau data on local government finances for public education (2004).
State Funding Per Pupil (2003-2004)	StFundPP	U.S. Census Bureau data on local government finances for public education (2004).
Average Salary of Public Schoolteachers (2003-2004)	SalPTch	National Education Association Rankings of the States 2005 and Estimates of the States (November 2006).
Average Annual In-State Tuition and Fees at Public 4-Year Institutions (2005-2006)	AlnStT	College Board data in Trends in College Pricing (2006).
State Government Full-Time Equivalent Employment Per 100 Persons (2005)	SGFTEmp	U.S. Census Bureau data on state government employment and payroll (March 2005).
Business Costs - Index based on cost of labor, energy and taxes.	BusCost	Moody's Economy.com; Pollina Corporate Real Estate; Pacific Research Institute; CFED; Moody's.
Labor -Measures educational attainment, net migration and projected population growth.	Labor	
Regulatory Environment - Measures regulatory and tort climate, incentives, transportation and bond ratings.	RegEnvi	
Economic Climate - Reflects job, income, and gross state product growth as well as unemployment and presence of big companies.	EconClim	
Growth Prospects - Reflects projected job, income and gross state product growth as well as business openings/closings and venture capital investments.	GrowPros	
Quality Of Life - Index of schools, health, crime, cost of living, and poverty rates.	QualLife	
NAEP 4th Grade Math 2005	MTH4th05	
NAEP 4th Grade Reading 2005	RDG4th05	
NAEP 4th Grade Science 2005	SCI4th05	
NAEP 8th Grade Math 2005	MTH8th05	
NAEP 8th Grade Reading 2005	RDG8th05	
NAEP 8th Grade Science 2005	SCI8th05	
Student-to-Teacher Ratio	STRatioDoE	U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 2004-05, Version 1d.

High School Graduation Rate	HSGradRate04	U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary/Secondary Education," 1999–2000, Version 1c; 2000–01, Version 1b; 2001–02, Version 1b; and 2004–05, Version 1d. GED data were acquired from the General Educational Development Testing Service.
NAEP 4th Grade Math 2005 School Lunch Program	SL4Mth05	National Center for Education Statistics
NAEP 4th Grade Reading 2005 School Lunch Program	SL4Rdg05	
Physical Capital 1996	GarofaloK	"Regional Convergence: Evidence from a New State-by-State Capital Stock Series"
Physical Capital Growth Rate 1947-1996	KGR4796	
Physical Capital 1996	K1996	"Whether State Fiscal Policy Affects State Economic Growth"
Best State to Conduct Business (Average of 6 Forbes' variables)	Forbes	Moody's Economy.com; Pollina Corporate Real Estate; Pacific Research Institute; CFED; Moody's.
Per Capita Personal Income 1980	PCPI80	http://www.infoplease.com
Per Capita Personal Income Growth Rate 1980-2005	PIGR8005	calculated
Personal Income (real per capita)	PI05Fed	Note: Same as JLARC variable
Patents (per capita)	Pat99Fed	"State growth empirics: the long-run determinants of state income growth"
High School+ (percent)	HS99Fed	
College+ (percent)	Coll99Fed	
Tax Rate (proportion)	Tax99Fed	
Business Failure Rate (proportion)	Fail99Fed	
Real Growth Rate	RGR3405	

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TRANSACTION EXPOSURE AND VALUE AT RISK: A PRACTICAL APPLICATION FOR MNCs¹

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ABSTRACT

This research paper measures the “value at risk” for an MNC transacting business in five specific foreign currencies for a recent time period. These foreign currencies include the British pound, the Euro, the Swiss franc, the Japanese yen and the Canadian dollar. The values at risk for each possible two-currency portfolio (*vis-à-vis* the U.S. dollar) are computed and evaluated. The effects of each currency’s volatility as well as the correlations between the currency movements are examined. These findings should inform MNCs about the degree of transaction risk faced and provide key insight into decisions for managing this risk.

INTRODUCTION

Because multinational corporations (MNCs) conduct business in a variety of currencies, they are exposed to exchange rate risk on a continuing basis. One form of exchange rate risk is “transaction exposure.” This is the risk that the MNC’s cash flows will be affected by exchange rate changes. Both receivables and payables denominated in foreign currencies contribute to this risk.

“Value at risk” is a probabilistic approach to measuring downside risk (i.e., the maximum loss) that is likely to occur within a specific time frame at a particular level of confidence. Multinational corporations may utilize this model to assess the transaction risk associated with net cash flows denominated in one or more foreign currencies.

To understand exactly how this approach to measuring transaction risk can be applied, this research paper employs daily data from February 12, 2007 through March 30, 2007 (a total of thirty consecutive observations) to evaluate the value at risk for a variety of two-currency portfolio models involving the following currencies: the Swiss franc, the British pound, the Euro, the Canadian dollar, and the Japanese yen. The value at risk is determined for each combination of currencies for this particular time period (i.e., a total of ten combinations), at the 95-percent confidence level.

Optimally, this risk should be viewed on a consolidated basis; that is, across all the firm’s divisions and across all countries. The transaction exposure associated with payables denominated in one particular currency (in any division) will be offset, in whole or in part, by any receivables denominated in that same currency. However, any positive (or negative) net cash flow in a particular currency will subject the MNC to transaction exposure due to potential fluctuations in exchange rates.

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In certain circumstances, an MNC may decide not to hedge its transaction exposure. In other circumstances, the MNC may decide to hedge this risk using one or more techniques including a forward hedge, a money market hedge, a futures hedge, a currency option hedge, or some other technique. But in order to make these decisions (i.e., to hedge or not to hedge) in an optimal fashion, the corporation needs an objective assessment of exactly how much risk it faces. Value at risk is one particular approach to assessing risk that has become increasingly popular since the middle of the 1990s. While the value at risk approach has wide applicability, it is increasingly used by MNCs to assess transaction exposure. Articles about this approach to measuring risk are now common in the literature.

As noted above, value at risk technique is a probabilistic approach to measuring downside risk (i.e., the maximum loss) that is likely to occur within a specific time frame at a particular level of confidence. A business may utilize this approach to assess the transaction risk associated with net cash flows denominated in one (or each) particular currency. In this case, the downside risk (maximum loss) is a function of the standard deviation in the percentage changes of the particular exchange rate, the (dollar) value of the net cash flow itself, and the desired confidence level. The “value at risk” (the maximum loss) is positively associated with each of these three variables.

In addition, an MNC may utilize this basic approach to assess the riskiness of the net cash flows associated with the variety of currencies in which it transacts business. This use of the model, which measures the transaction risk associated with the net cash flows associated with an entire “portfolio” of currencies, is particularly valuable for MNCs that transact business in multiple currencies on a routine basis. Based on standard portfolio theory, the transaction risk (i.e., the maximum loss) in this latter case is a function of the proportions of the total portfolio in each currency, the standard deviations of the percentage changes in each exchange rate, the correlation coefficients of the percentage changes of the relevant exchange rates, the (dollar) value of the net cash flows, and the desired confidence level. [See Madura, 2008, for a clear and concise description of the basic value at risk approach to measuring transaction risk.]

Of course, a portfolio of currencies whose values are highly volatile vis-à-vis the dollar (i.e., the standard deviations in percentage changes in the dollar exchange rates are high) will have a high level of transaction risk, *ceteris paribus*. Portfolios of currencies that possess positive and high correlation coefficients will also face more “value at risk,” other things equal. On the other hand, portfolios of currencies that have low (or even negative) correlation coefficients will have less value at risk due to internal (or natural) diversification effects.

Value at risk is sensitive to the particular time period being considered. For example, if a particular exchange rate varies more over a month than over a week, or if the anticipated net cash flow denominated in a particular currency is greater for the next month than the next week, then the value at risk (i.e., the maximum loss) will be greater for the next month than the next week, given the same level of confidence. Because MNCs can predict their net cash flows with far more accuracy over relatively shorter periods of time, the value at risk model is most often used for predicting the maximum loss over relatively short periods of time. However, it may be that an MNC would find it useful to predict the value at risk for multiple time periods.

REVIEW OF LITERATURE

The usage of value at risk (VAR) as a management tool gained popularity in the second half of the 1990s as the Securities and Exchange Commission required that publicly held corporations quantify and disclose their market risk associated with volatility in foreign currency exchange rates, interest rates, commodity prices, and additional risk factors. (See Thiem and Ruiz-Zaiko,

1998) Another factor which promoted the usage of VAR was the Basle II Capital Accord (1997). (See Sacks, 1997) An article by Platt (2007) provides an excellent discussion of the increased use of value at risk resulting from globalization.

While the expression “value at risk” is widely used, the expression does not refer to one particular methodology (or approach) to quantifying risk. Rather it refers to a family of related approaches including: 1) the variance-covariance approach, 2) historical simulation, and 3) the use of Monte-Carlo simulations. Janabi (2006) provides an excellent primer on the variance-covariance method to measuring value at risk. The article by Glasserman, Heidleberger, and Shahabuddin (2002) discusses the use of Monte Carlo simulations to estimate value at risk.

The following articles provide good overviews of VAR or empirical tests of the different approaches: Carrada-Bravo, Hosseini, and Fernandez (2006), Tardivo (2002), Stambach (1996), Hendricks (1996), Angelidis and Degiannakis (2005), Chong (2004) and Gramlich (2002).

Despite the widespread usage of the value at risk methodology, the potential shortcomings of this approach to measuring downside risk are fairly well known. One of these shortcomings is the possibility that the assumption the variable (or variables) in question is normally distributed is incorrect. Articles that explore the implications of nonnormal distributions, including fat tails and how to employ VAR in these cases (sometimes referred to as “extreme value theory”), include Neftci (2000), Hull and White (1998), Bekiros (2008), Novak, Dalla, and Giraitis (2007), Yamai and Yoshida (2005), Ferreira (2005), Castellano and Giacometti (2001), Taylor (2000), Mittnik and Paolella (2000), Kaut, Vladimirov, Wallace, and Zenios (2007), and Ghaoui, Oks, and Oustry (2003).

Another potential vulnerability of the VAR approach is that the ability to forecast volatility deteriorates as the time horizon lengthens. Relevant articles include Christoffersen and Diebold (2000), Fernandez (2005), and Chiu, Lee, and Hung (2005).

Despite the potential weaknesses of the VAR approach to measuring risk, the article by Jorion (2002) presents evidence the “VAR disclosures [by commercial banks] are informative in that they predict the variability of trading revenues.”

RESULTS AND INTERPRETATIONS

The standard deviations (of the daily percentage changes) for each exchange rate (i.e., vis-à-vis the U.S. dollar) were computed for the time period under consideration. The results are shown in Table 1, below.

Table 1 -- Standard Deviations

U.S. dollar/Swiss franc	0.471
U.S. dollar/British pound	0.302
U.S. dollar/Euro	0.347
U.S. dollar/Canadian dollar	0.450
U.S. dollar/Japanese yen	0.725

Because the variability in the U.S. dollar/Japanese yen exchange rate was relatively large (as shown above), one can infer that receivables or payables denominated in Japanese yen would contribute more to transaction risk than receivables or payables denominated in other currencies, *ceteris paribus*. Alternatively, due to the relatively low volatility in the U.S. dollar/British pound exchange rate, receivables or payables denominated in British pounds would cause less transaction risk than receivables or payables denominated in other currencies, *ceteris paribus*. By comparison, transactions denominated in Euros, Swiss franc or Canadian dollars would create an intermediate amount of transaction risk for the MNC (*ceteris paribus*).

Of course, the total transaction risk of a portfolio of currencies will also depend on the correlation coefficients between the movements in the currencies. Table 2, below, represents the correlation coefficients for the time period considered.

Table 2—Correlation Coefficients

	Swiss franc	British pound	Euro	Can. dollar	Japanese yen
Swiss franc	1	0.139485	0.66777	0.027042	-0.348722
British pound		1	0.21865	0.440179	0.211755
Euro			1	0.308446	-0.13542
Can. dollar				1	-0.010833
Japanese yen					1

As can be seen in the above data, seven of the ten two-currency portfolios have positive correlation coefficients, while three of the two-currency combinations are negatively correlated. These statistics have a direct bearing on value at risk.

For example, because the correlation coefficient for the U.S. dollar/Swiss franc exchange rate and the U.S. dollar/Euro exchange rate (i.e., between the percentage changes in these exchange rates) is relatively high (at 0.6677), an MNC with net cash flows in these two currencies will face more value at risk (i.e., a greater maximum loss) than if it transacted business denominated in the other currencies, *ceteris paribus*. Alternatively, because the correlation coefficient for the U.S. dollar/Swiss franc exchange rate and the U.S. dollar/Japanese yen exchange rates is negative (at -0.348722), an MNC doing business denominated in these currencies might be expected to face less value at risk due to the internal diversification.

However, comparing the standard deviations of the two, two-currency portfolios mentioned in the above paragraph is revealing. One might anticipate that because the U.S. dollar/Japanese yen exchange rate is so much more volatile than the U.S. dollar/Euro exchange rate (i.e., in terms of the percentage changes), a two-currency model including the Japanese yen would result in significantly more risk than a two-currency model including the Euro.

However, when comparing the relative risks of a portfolio including the Swiss franc and the Japanese yen to a portfolio including the Swiss franc and the Euro, the transactions risks are, in fact, very similar. Specifically, while the standard deviation of the former portfolio (including the

Japanese yen) is 0.357, the standard deviation of the latter portfolio (including the Euro) is slightly higher at 0.374. [This assumes that the proportions of the net cash flows in each currency are equal; i.e., assuming a 50/50 split.] See Table 3.

The explanation for this seeming anomaly, of course, is that the correlation coefficient between the Swiss franc and the Japanese yen is negative, whereas the correlation coefficient between the Swiss franc and the Euro is strongly positive. In effect, the portfolio with the Swiss franc and the Japanese yen achieves a significant degree of internal diversification due to the negative correlation in the percentage changes in these two exchange rates. This natural diversification is, apparently, more than enough to offset the fact that the U.S. dollar/Japanese yen exchange rate exhibits significant volatility.

The two standard deviations noted above can be used to determine the actual dollar value of the maximum one-day loss to the MNC for each of these two, two-currency portfolios, at a particular confidence level. Specifically, assuming these probability distributions are normally distributed, the 95-percent confidence interval for these portfolios can be determined by multiplying each standard deviation by 1.65. For example, there is a 5-percent chance that the loss experienced on the portfolio including Swiss francs and Euros will be greater than 0.617 percent of the net cash flows over the next day (i.e., 0.374×1.65). Accordingly, the maximum one-day loss on a portfolio of \$1,000,000 of net cash flows in the portfolio containing Swiss francs and Euros is \$6,170.

The comparable figure for the portfolio including Swiss francs and Japanese yen is slightly less at \$5,891. Obviously, the greater the (dollar value) of the net cash flow, the greater the value at risk, in absolute amount.

Broadening out the analysis, the maximum one-day loss for each of the ten, two-currency portfolios can be determined based on the standard deviations of the relevant portfolios shown in Table 3, below.

Table 3 – Risks (Standard Deviations) of Two-Currency Portfolios

	Swiss franc	British pound	Euro	Can. dollar	Japanese yen
Swiss franc		0.29708	0.374327	0.329932	0.35699
British pound			0.25381	0.321409	0.421467
Euro				0.323534	0.380269
Can. dollar					0.424633
Japanese yen					

At the 95-percent confidence level, the maximum one-day loss (in terms of percent) for each of the above two-currency portfolios is shown in Table 4, below.

Table 4 – Maximum One-Day Loss of Two-Currency Portfolios

	Swiss franc	British pound	Euro	Can. Dollar	Japanese yen
Swiss franc		-0.490182	-0.61764	-0.544389	-0.589034
British pound			-0.418787	-0.530325	-0.69542
Euro				-0.533832	-0.627444
Can. dollar					-0.700645
Japanese yen					

Based on Tables 3 and Table 4, above, it is clear that an MNC with net cash flows denominated in Canadian dollars and Japanese yen (i.e., vis-à-vis the U.S. dollar) faces more transaction risk than an MNC with net cash flows denominated in any other two-currency portfolio. A two-currency denominated in British pounds and Japanese yen also faces a relatively high degree of transaction risk. [These particular two-currency portfolios have standard deviations of 0.425 and 0.421, respectively.] The two-currency portfolios with the least transaction risk are the portfolios with net cash flows denominated in 1) British pounds and Euros and 2) Swiss francs and British pounds. [The standard deviations of these portfolios are, respectively, 0.254 and 0.297.] The remaining two-currency portfolios result in an intermediate level of transaction risk.

LIMITATIONS AND FUTURE RESEARCH

A principal advantage of the value at risk approach to measuring transaction exposure is its simplicity. MNCs can utilize this approach to risk management at a relatively low cost in terms of both time and effort, assuming the data are available. In addition, this approach to quantifying transaction risk is, at a conceptual level, relatively straightforward.

Nonetheless, the value at risk approach has shortcomings. One potential shortcoming is the implicit assumption that the variables in question are normally distributed. While the assumption of normality makes value at risk easier to employ, it has been observed that the distributions of some variables (especially asset prices) may have “fat tails” and, as a result, the likelihood of extreme events may be underestimated.

Another potential weakness is that the ability to forecast generally deteriorates as the time horizon lengthens. On a related note, if the variability in a particular exchange rate changes over time, or if the correlations between exchange rate movements change over time, the value at risk for one particular time period may not accurately reflect the value at risk for another time period. Subsequent studies may shed light on the temporal stability of these relationships.

Despite these limitations, the authors believe this analysis is both revealing and instructive for MNCs concerned about the amount of transaction risk to which they are exposed. The value at risk approach and results provided by this study should help firms measure and manage the risk of conducting business on a world-wide basis.

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RISK, MORAL HAZARD AND THE BAILOUT OF BEAR STEARNS

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ABSTRACT

In March 2008 the Federal Reserve Bank and the US Treasury department made financial history by orchestrating the bailout of Bear Stearns, a major US and global investment bank, by a commercial bank JP Morgan Chase. Never before until this time had the Federal Reserve or US Federal Government come to the rescue of an major financial institution like this one. This research examines the factors leading up to the decision to rescue the Bear Stearns, and the issues of moral hazard and risk management the rescue operation raised. The paper has pedagogical value in teaching undergraduate students about moral hazard, risk and the role of the Federal Reserve Bank and the functioning of financial markets.

INTRODUCTION

Until March 2008 Bear Stearns was a highly respected large publicly traded investment banking firm head quartered in New York City, New York . On June 1, 2007, the shares of the firm (NYSE symbol: BSC) traded for as much as \$153.95 per share giving the firm an aggregate market value in excess of \$25 billion. The company operated as a financial supermarket having for its clients individuals, institutions, corporations and the government. The company made markets in a variety of US treasury securities, both short term and long term and like many investment banking firms the firm was active in the securitization of a variety of debt instruments including residential mortgage debt. The wealth management division of the firm provided investment advisory and management services to high net worth individuals. The firm also managed money for its clients via hedge funds it owned and operated.

HEDGE FUNDS

The start of the twenty-first century saw an explosive growth in hedge funds. Hedge funds are investment vehicles that have far fewer constraints in their investments relative to mutual funds and hedge funds are not regulated by the Securities and Exchange Commission. It is estimated that over \$2 trillion dollars are invested in hedge funds all over the world and this number represents a 1000% increase over the amount invested in 1999. According to a study by D. MacDonald, [1] there are over 9000 hedge funds in existence of which over 350 manage more than \$1 billion each in assets. Both individuals and institutions invest in hedge funds and Bear Stearns managed several hedge funds on behalf of its clients. Hedge funds typically charge high fees and in exchange promise large returns to their clients, but not all deliver on that promise. While hedge fund may have originally been designed to hedge, i.e, provide some downside risk

protection via active hedging strategies, increasingly hedge funds are highly leveraged and undertake very risk strategies attempting to generate higher returns for clients. In short hedge funds often make very risky investment bets. Many hedge funds in the recent past invested heavily in mortgage backed securities (MBOs) and collateralized debt obligations (CDOs) created from sub-prime mortgages.

SUB-PRIME MORTGAGE CRISIS

In the summer of 2007 a large number of sub-prime mortgage loans began to go sour and the defaults on CDOs and MBOs increased. Several hedge funds ran in to trouble and faced a capital shortfall on account of bets placed on sub-prime mortgages that went wrong. In June 2007 Bear Stearns pledged up to \$3.2 billion in loans to bail out one of the hedge funds it ran. It was the biggest rescue of a hedge fund since 1998 when a group of lenders made a \$3.6 billion loan to save the hedge fund known as Long Term Capital Management (LTCM). In 1998, the Federal Reserve Bank Chairman was sharply criticized for orchestrating the bail out of LTCM since it was a private hedge fund and not a publicly held financial institution. Critics argued that bail out of a hedge fund created moral hazard and encouraged risky behavior on the part of financial institutions.

THE BEAR TAKES A FALL

Despite its attempts to shore up its hedge funds, Bear Stearns continued to lose money. On Tuesday, March 12, 2008 Bear Stearns reported that it has \$17 billion in capital and it felt comfortable that it would be able to meet its obligations. Nevertheless it continued to face pressure from clients in Goldman Sachs, Morgan Stanley and Credit Suisse who felt nervous about Bear Stearns ability to meet its obligations. Trust begets trust in the banking business and the reverse is also true [2]. It was ultimately lack of trust in Bear Stearn's ability to meet its obligations that precipitated a proverbial run on the bank. By Thursday March 14th Bear Stearns cash had fallen to mere \$2 billion after several clients withdrew their funds from the bank. Late that evening Bear Stearns and the Securities and Exchange Commission told the Treasury and Federal Reserve Bank that Bear Stearns would have to file by bankruptcy by Friday morning if it did not receive liquidity assistance [3]. Over the weekend officials from the Federal Reserve Bank, The Treasury and JP Morgan devised a buyout of Bear Stearns so as to avoid a bankruptcy filing. The initial price offered by JP Morgan was \$2 per share. Even though the deal averted a bankruptcy filing by Bear Stearns the low valuation of Bear Shares that had closed on Friday at over \$26 per share, sent shock waves through financial markets. The offer was subsequently upwardly revised to \$10 per share but that was small consolation to Bear insiders and employees that owned over 60% of the company and lost most of their life savings. The Federal Reserve Bank and Treasury officials subsequently testified before the US. Senate Banking Committee that the government orchestrated buyout of Bear Stearns was a necessity, but the deal is still plagued by many of the same concerns that dogged the bailout of Long Term Capital Management.

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[4]

Home Ownership and The Subprime Mortgage Debacle: Lessons for the Future

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Abstract

With any type of careful analysis, the subprime mortgage (SPM) debacle should never have happened. There were so many mistakes made that it made the “Keystone Cops” look an orderly group. This paper analyzes what went wrong and how future financial programs might profit from the SPM errors.

Introduction

For many decades, prospective home buyers shopped and subsequently decided to buy or build personal residences contingent on suitable financing arrangements. Those arrangements were set up so that the probabilities for repayment were very high and, in fact, a very low percentage of defaults occurred. As a rule, individuals financed their purchases utilizing fixed rate mortgages with a loan amortization schedule of 15 to 30 years. However, there were other financing options that could be utilized by home buyers. FHA, VA, and conventional mortgages were readily available to those who could qualify for the loans. Then, with payments for 15 to 30 years, home buyers progressed from having very little equity in their homes to total and complete ownership of their homes.

If home buyers' economic position improved and they desired to “move up” to a nicer home, it was relatively easy to sell their homes to others who were coming up. After qualifying for financing for their new home, home ownership was transferred to the new buyer and the former owner moved into a nicer home. This type of financing was not “rocket science” but provided a very effective and efficient means of home ownership for a large percentage of the U. S. population. Additionally, home ownership contributed to the prosperity, stability, and well-being of the nation. Many responsible citizens believed that there was “no place like home” and worked very hard to achieve home ownership.

Congress supports home ownership in many direct and indirect ways. Income tax provisions generally allow deductions for home mortgage interest on a first and second home and property taxes which provide small subsidies for home ownership through reduced income taxes.

Also, in most instances in the past, profits from the sale of a principal residence could be deferred until a person passed away and then receive a “step-up” in basis at the decedent’s passing with no income tax due at all on the subsequent sale by the heirs in many cases. In those sales where a gain had to be recognized on the sale of a principal residence, the gain was generally taxed at capital gains rates which provided another tax benefit.

Now, I.R.C. Sec. 121(b) provides that if a principal residence is sold at a profit, up to \$500,000 in gain can be excluded from taxable income. The general rule is that if the taxpayer/s lived in the home for two years or more during the five years ending on the date of the sale or exchange, then a married couple can exclude up to \$500,000 in gain while a single individual can exclude only \$250,000. If there is gain over and above those figures, then the gain is a capital gain with its associated benefits.

The Veterans Administration set up favorable financing for military veterans. First-time home buyers received some very attractive financing terms. In summary, the Federal government and some states promoted home ownership in a variety of ways.

Previously, what was required to qualify for home purchase financing? Most lenders carefully checked some “C’s”—Credit, Cash-Flow, Collateral, Capacity, and Character. Credit reports were obtained, prior years’ tax returns were reviewed, employment and compensation were confirmed, personal balance sheets with supporting documentation were required, the property was appraised, and any other documentation necessary for the loan approval was acquired.

What was the essential and fundamental question that had to be answered positively before credit was granted? “Is there a high probability that the prospective borrower will be able to repay the loan in accordance with the amortization schedule?” If that very basic question could not be answered affirmatively, then the requested loan was generally denied. Those procedures were designed to help people rather than harm them.

With such a successful system in place for many decades, what caused the philosophy to change and create a global financial crisis which destroyed the dream of home ownership for some, caused Bear Stearns to collapse and be absorbed by J. P. Morgan Chase, claimed the end of professional careers for top CEO’s, and spread financial chaos around the globe? This paper will analyze some of the causes and effects of the subprime mortgage debacle and provide recommendations for future avoidance of similar problems.

A Brief History of Subprime Mortgages

What is a subprime mortgage? The prefix “sub” means under. A submarine cruises under the sea. A subpar performance is below par or standards. The subprime loan is one made to borrowers who are generally suffering with less than pristine credit. Personal bankruptcy, poor credit history, or other repayment difficulties may force a borrower to utilize a sub-prime lender. According to Federal Reserve Board Governor E. M. Gramlich: “Everything else being the same, borrowers with Fair Isaac & Co. (FICO) scores below 620 are viewed as higher risk and generally ineligible for prime loans unless they make significant downpayments.”¹

Why would a lender agree to a subprime mortgage knowing that there is a higher probability of default than would be present in a prime or conventional mortgage? Utilizing the law of large numbers, the answer to that question is that higher total interest rates and other fees were *supposed* to offset the larger total default rates and provide profitable operations. Ultimately, the subprime mortgage “chickens came

home to roost” and the lending practices proved to work inappropriately when compared to the “game plan.”

Three new laws really provided impetus to the subprime mortgage movement. *The Community Reinvestment Act of 1977*, with more liberal regulations subsequently, provided additional inducements to lend to potential subprime borrowers. *The Depository Institution Deregulation and Monetary Control Act of 1980* allowed lenders to charge higher interest rates to those with elevated credit risk. Finally, the *Alternative Mortgage Transaction Parity Act of 1982* authorized variable-rate loans and balloon payments.²

As a result of those changes, subprime mortgage originations really skyrocketed in the 1990's. In 1994, subprime mortgages constituted only 4.5% of total originations and amounted to a mere \$35 billion. In 1999, it had grown to 12.5% of total originations and increased to \$160 billion (more than 4.5 times the 1994 amount). The incredible jump occurred in 2003 when the amount ballooned to \$332 billion (a 1/3rd of a trillion dollars and almost a tenfold amplification over 1994).³

In that ten year period, it seems that virtually everyone was jumping on the subprime bandwagon. Boards of directors of financial institutions seemed to be saying: “Everyone else is doing it why can't we join them?” When I was a young boy, I used to tell my mother that everyone is doing it (whatever the activity might have been). Her response was: “Well, if everyone else jumped off the roof, would you?” She made her point very well and my argument was over. Someone should have asked those boards the same question that my mother asked me. The “subprime train wreck” is a financial catastrophe that never should have happened.

Today, the carnage of those subprime loans is still present and few are willing to speculate about how much more damage is to occur. The “subprime train wreck” is still going on with more “financial boxcars” crashing off of the track regularly.

It is ironic to note the way that FRB Governor Gramlich ended his speech in 2004. He said:

There are challenges for everybody. Rising to these challenges will ensure that continued subprime mortgage lending growth will generate even more social benefits than it *seems* to have already generated.⁴ (Emphasis mine)

Little did he realize that there would be many more “social problems” resulting from subprime mortgages than “social benefits.”

Perceived Social Benefits

Some would argue that the rationale for subprime mortgage lending is to provide home ownership to an underserved market. The philosophy goes that some minorities and other poor people should be in a position to own homes just like the more affluent. With just little relaxation of lending standards, virtually all who desire to own a home can do so. There will be higher interest rates and lending fees but the underserved market can lift itself up by its bootstraps and become happy homeowners.

For a while, it *seemed* like it was working according to the predetermined strategy. However, even if the interest rate is 25% APR, the effective rate becomes 0% APR if the borrower has no money and provides no cash flow. Everybody loses.

The grim reality of the subprime mortgage debacle is that many borrowers have lost their home, their self-esteem, and their credit rating. What seemed like a very laudable social endeavor has turned out to be a nightmare of grave proportions. It has achieved the exact opposite of its intended objectives

Who Is to Blame for the Subprime Mortgage Debacle?

There are a number of culprits in this case. Many are culpable and some do not even realize it. Borrowers signed contracts without understanding them fully. Mortgage lenders made loans with borrowers who were warm and breathing with a pulse but had virtually no possibility of repayment. Investment bankers bundled mortgages into securities and passed the buck. Ultimate investors made investments in the bundled securities based on AAA ratings by the ratings agencies. Government agencies promoted subprime securities. The subprime mortgage market is reminiscent of the card game of “Old Maid.” Ultimately, in that game, someone ended up with the old maid and lost the game. In like manner, someone (or some institution) ended up with the subprime mortgage investment and lost in the process.

How Did the Subprime Lending Scheme Last So Long?

The subprime mortgage system continued for quite a few years before it had a total collapse. How did that happen? The predominant reason for the *apparent success* of the subprime mortgage market was primarily tied to increasing real estate values. Some apparently felt that rising real estate values would remain into eternity. Guess what! Real estate values move like *all* investments on this earth. Those investments are guaranteed to do one of three possibilities: go up, go down, or remain the same.

There are “corrections” in markets where “irrational exuberance” overcomes rational decisions. The all-time high water mark was reached in the real estate market in the summer of 2005. A year later, in August, 2006, the market unraveled and began its collapse.⁵

A typical scenario functioned in the following way. A subprime borrower bought a home with a variable-rate mortgage (VRM) and virtually no money down. The borrower could just barely make the payments but was able to do so perhaps with some fees for late payments. At a later date, the VRM rate was reset to a higher payment but the borrower’s income level remained essentially the same. No problem. Why? The value of the home had also gone up and the borrower’s equity increased concurrently allowing him to borrow more money and continue making payments.

What caused this beautiful apple cart to stop rolling smoothly? When real estate prices began going down, home equity was reduced and the subprime borrower could not make payments. This resulted in default and foreclosure. Whoever owned the mortgage lost money and this became a snowball which joined other snowballs and drifted into an avalanche known as the “Subprime Mortgage Debacle.” There were numerous variations on the above scenario but the basic elements were essentially the same.

Subprime Borrowers

By definition, subprime borrowers are below prime borrowers. Some borrowers signed contracts with “interest only” provisions. Perhaps they could afford to pay the interest. However, could they ever afford the principal repayment and have ownership? Were there balloon payment provisions which they did not understand? What is meant by a “prepayment penalty”? What does an adjustable rate mortgage *actually*

mean for the future? Misunderstanding on any of these basic provisions may have provided disaster for any unsuspecting borrower.

To be knowledgeable about a contract, one must *read* it and *understand* it. Because a mortgage contract deals with the future, a potential borrower should project all possible future outcomes and determine whether any of those outcomes could have an adverse impact on the individual. Of course, some outcomes have a very remote probability of occurring and may be discounted to some degree. Others, such as adjustable rate resets or balloon payments, have a very high probability of occurring and should be evaluated very carefully.

Is it possible that some subprime borrowers do not have the capacity to understand the technical points of mortgages because they are products of a failed public education system? Or, do they have the capability of comprehending some nuances of the English language? Ah, but that is another story.

The bottom line is that some subprime borrowers are their own worst enemies. As Pogo used to say: “We have met the enemy and it is us.” A knowledgeable and educated borrower can avoid some of the pitfalls of a subprime mortgage. Another viable alternative would be to seek someone who is knowledgeable to assist in the loan negotiations.

Mortgage Originators

Many mortgage originators had one primary purpose in their business: get their fee and move on to the next potential borrower. Were they responsible for seeing that the loan was repaid? There was a giant disconnect between mortgage originators and ultimate collection of the debt. Federal Reserve Chairman Ben Bernanke stated: “Depending on the terms of the sale, when an originator sells a loan and its servicing rights, the risks (including, of course, any risks associated with poor underwriting) are largely passed on to the investors rather than being borne primarily by the company that originated the loan.”⁶

If the originators’ fees were placed in an escrow account and paid in installments as the loan was repaid, and stopped if it were not paid, some mortgages might not have been made. Also, if some material penalties were levied on the originators for loan nonpayment, then careful review of the potential borrower might have reduced the default rate for subprime mortgages. Other options which make it disadvantageous for loan originators to make shoddy loan decisions should be considered.

Another problem associated with subprime mortgage originators was to loosen underwriting standards. According to Ben Bernanke, Chairman of the Federal Reserve Board: “So-called risk-layering—combining weak borrower credit histories with other risk factors, such as incomplete income documentation or very high cumulative loan-to-value ratios—became more common.”⁷ Obviously, those deficiencies should be eliminated.

Bernanke also stated: “In addition, incentive structures that tied originator revenue to the number of loans closed made increasing loan volume, rather than ensuring quality, the objective of some lenders.”⁸ Regulatory agencies were “asleep at the switch” when these excesses were occurring.

In summary, some subprime mortgage originators played the same role that a fox would play when guarding a hen house. It was not a pretty picture and could be improved significantly.

Ratings Agencies

Ratings agencies deserve some denunciation for their role in the subprime mortgage crisis. It is hard to imagine a more speculative instrument than a subprime mortgage. Yet, these instruments received AAA ratings in some cases and should have been rated no higher than someplace in the B category. Many investors were lead like a sheep to the slaughter because they believed that AAA meant, in effect, that the investment was relatively safe.

In a recent example involving credit unions, one of the most risk-averse financial sectors in our economy, the following facts were revealed. There were five so-called “corporate credit unions” which do not deal with ultimate consumers but provide investment services and financing to “regular credit unions” which do deal routinely with ultimate credit union consumers. The five together reported “unrealized losses” of almost \$5.7 billion. How could that have happened? Bruce Fox, chief investment officer of Southwest Corporate FCU, stated that as of May, 1994, 94% of its mortgage securities were rated AAA. However, as of May, 2008, Southwest had to show unrealized losses of \$672 million from that securities group out of \$12.2 billion in assets. Fox indicated that they plan to hold those instruments “until they recover or until maturity.”⁹

In good faith, many sophisticated investors made investments in subprime mortgages based on high ratings only to discover subsequently that their decisions were less than desirable. Rating agencies have criteria to evaluate various investment opportunities. In light of the subprime mortgage crisis, is it possible that rating agencies need to review and update their evaluation criteria?

Lenders Holding Subprime Mortgages Now

Lenders who hold subprime mortgages now are often distraught over their losses. Will they be able to avoid recognizing unrealized losses on their subprime mortgages? An affirmative answer to that question is highly unlikely. However, there are some steps which may reduce expected losses to some degree. In his May 17, 2007 speech, Bernanke had the following positive suggestions:

The Board and other federal supervisory agencies have taken actions to encourage the banks and thrift institutions we supervise to work with borrowers who may be having trouble meeting their mortgage obligations. Often, loan workouts are in the interest of both parties. With effective loan restructuring, borrowers facing temporary economic setbacks may be able to work through their problems while staying in their homes, and lenders may be able to avoid the costs of foreclosure and the losses usually associated with selling a repossessed home.¹⁰

When one receives a “lemon,” the best option may be to make lemonade. Lemonade in this case may be a “workout” of the loan. The joint press release of the financial regulators stated that the “workout” may include “modifying loan terms, and/or moving borrowers from variable-rate loans to fixed-rate loans.”¹¹ A well structured “workout” may provide benefits to both parties of the loan.

Government Agencies

It is readily apparent from Gramlich’s comments (cited earlier in endnote 4) the Federal Reserve Board encouraged home ownership and the subprime mortgage system. Generally, it was only after the cattle were out and the damage was done that the Federal Reserve Board moved to shut the gate.

Chairman Bernanke summarized general procedures that financial regulators have at their disposal:

Broadly speaking, financial regulators have four types of tools to protect consumers and to promote safe and sound underwriting practices. First, they can require disclosures by lenders that help consumers make informed choices. Second, they can prohibit clearly abusive practices through appropriate rules. Third, they can offer principles-based guidance combined with supervisory oversight. Finally, regulators can take less formal steps, such as working with industry participants to establish and encourage best practices or supporting counseling and financial education for potential borrowers.¹²

Unfortunately, Bernanke may have been too broad in his comments with very little new information added and few substantive steps toward application.

Policies That May Prevent Future Financial Calamities

As a nation with an economy that is generally the envy of almost all people on the planet, we have allowed some “dumb” things to occur. Recently, we have had frauds involving Enron, WorldCom, Adelphia, HealthSouth, *et. al.*, ad nauseam. We have seen the junk bond scandal, the stock options fiasco, Long Term Capital Management go south, and other minor glitches in the most wonderful economic system that the world has ever experienced. Now, we have the subprime mortgage debacle. What can CPA’s and other business and financial advisors do to avoid the next economic crisis?

The answer to that question is probably “very little.” However, there are some lessons to be learned from the subprime mortgage debacle which may be helpful in future financial decisions:

1. If we are going to replace some successful financial procedure with something that is, untried and unproven with questionable rationale, we would do very well to evaluate any proposed investment with healthy skepticism. Actually, the subprime market (SPM) worked reasonably well for quite a while.

However, from 1994 through 2003 when subprime offerings increased by a factor of 10 during that 10 year period, the SPM became the “in thing” to do. Furthermore, when loan originators advertised that almost no documentation was needed for loan approval and what documentation was received was reviewed superficially at best, the seeds for unraveling were sown. Movers and shakers continued to push the envelope until almost all rational thinking was abandoned in the SPM. Elementary questions such as: “Can the principal and interest be repaid in accordance with the amortization schedule?” were not answered in a responsible and thoughtful manner. Basic questions should be answered appropriately before financial agreements are consummated.

2. The assumption that any market will go straight up indefinitely is very naïve. When the real estate market cratered and fell in 2006, it threw the SPM into a state of disarray. There were no equity increases to take care of the additional financial burden. The SPM crisis demonstrated that “corrections” are present in all markets and should be expected by sophisticated investors.
3. “Interest only” loans and other gimmicks in the SPM were DOA [dead on arrival] and should not have been allowed. Where were the regulators?
4. A four-letter word which is spelled with five letters, greed, will overtake rational thinking in short order if recognized checks and balances are essentially eliminated. Where loans are involved, there should be appropriate documentation showing that the criteria for the proposed loan has

been met. That same concept is generally true for most financial arrangements such as appropriate investments for an investor's risk tolerance criteria.

5. Adjustable rate mortgages can be viewed as sticks of dynamite with lighted fuses. Beware. They can blow up in your face! There should be some type of cap to prevent the debt from being overwhelming for the debtor. Any kind of debt which has some type of future adjustment (rate increase, balloon payment, or other change) should be considered cautiously and carefully.
6. An educated borrower is more likely to repay a loan than an ignorant one. Borrowers should understand all provisions in a loan agreement before signing the contract. In too many cases, SPM borrowers did not understand fully what they were agreeing to do. Common sense has become an uncommon attribute in many today and there should be understandable explanations for those deficiencies when appropriate.
7. Ratings, such as AAA, are not the end all, be all. You may need to do your own "due diligence" where there are large sums of money involved. It may also be desirable when relatively small sums of money are involved.
8. When gigantic firms such as Citigroup and Merrill Lynch as well as a whole host of other very large financial institutions are burned severely by the SPM, it is very regrettable. It is even more distressful that they, in turn, advise investors on how to make investments when they themselves have "lost their shirts" in the SPM. One must question the quality of advice that they provide. A small David may provide better advice than a giant Goliath. Investment advice and performance should be monitored constantly by the seasoned investor.
9. Mortgage originators originated many problems suffered in the SPM. In general, market forces and industry self-regulation provide adequate safeguards for financial consumers. However, in the SPM episode, those factors failed miserably. In that case, government regulation of some sort may be desirable. At any rate, the mortgage originators should be adequately licensed with a very strict code of ethics which is enforced.
10. Current state and federal regulators should be proactive and take action before a problem becomes completely unmanageable. The SPM crisis confirmed even the most laudable social goals can go awry if they are not handled appropriately with adequate supervision and oversight.

Summary and Conclusions

The SPM crisis damaged many people in its wake. It is simply inconceivable that our sophisticated system would allow procedures to deteriorate to such a low point that billions of dollars could be lost by financial institutions that claimed to be sagacious and thousands of borrowers lost virtually all that they had in the process. It was the worst of all financial worlds and could easily have been avoided completely if clearer thinking had come into the picture. If we can profit from the mistakes that were made in the SPM debacle, we may move forward with an even stronger economy and financial system.

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DOES EVA REALLY HELP LONG TERM STOCK PERFORMANCE?

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ABSTRACT

Economic Value Added (EVA) as a philosophy is not new. Many economics students have studied it as “economic profit” or the excess return to capital over a fair, required return for taking risk. Its use as a managerial performance measure, however, is relatively new. Industrial companies began adopting the method in the early 1980's. The purpose of the proposed study is to examine the long-term effects of adopting EVA as a performance metric by empirically examining the “long term” stock performance of adopter's of the practice relative to their performance prior to adopting the system. The results suggest that firms adopting EVA as a performance measure realize positive cumulative excess returns over the three-year period subsequent to adoption.

INTRODUCTION

Shareholders monitor managerial behavior so that managers act in a manner consistent with maximizing shareholder wealth. To that end, companies put into place systems of managerial performance incentives that help to better align the interests of managers with the interests of shareholders. These have generally taken the form of incentive compensations tied to an accounting measure for which a minimum acceptable standard is established. An incentive system of this type may be manipulated by managers acting on the goal of maximizing their incentive compensation to the exclusion of shareholder's value. The search for an effective, performance metric against which to judge management performance is one that should be of interest for shareholders and managers alike. To that end, Stern, Stewart and Company

developed a managerial performance incentive system that it markets as Economic Value Added or EVA¹ for short.

BRIEF DISCUSSION OF EVA LITERATURE

Economic Value Added is defined as the value generated by a company's operations net of the cost of the capital employed in generating that value. The mathematical definition of Economic Value Added according to Stewart (1994) is

$$EVA = NOPAT - k_a C \quad (1)$$

NOPAT is the firm's net operating profit after taxes calculated as $EBIT(1-T)$, k_a is the firm's overall cost of capital, and C is the dollar value of the capital employed by the company.

Since its introduction in the early 1980's as a performance metric, EVA has been praised, dissected, and challenged. [See Grant (1996), Dierks and Patel (1997), Lehn and Makhija (1996), and Ferguson and Leistikow (1998) for examples of articles supporting EVA as a performance measure and Dodd and Johns (1999), Kramer and Pushner (1997), Chen and Dodd (1998) and Jones and Lowry (2005, 2006, 2006(1)) for examples of articles challenging EVA's usefulness as a performance metric]

The purpose of this study is to examine the long-term performance of a company's stock subsequent to adopting EVA as a performance metric. If the assertion about EVA being a superior performance measure and contributing more to the creation of value for shareholders is true, then one would expect that the long term trend in adopter's stock returns would be positive.

DATA AND METHODOLOGY

The Stern Stewart website lists approximately 80 "EVA companies," but, as noted in Dodd and Johns (1999), "the population of U. S. EVA adopters is unknown and not publicly

¹EVA is a registered trademark of the Stern Stewart Company, a New York based consulting firm.

disclosed.” To obtain a listing of EVA adopters and their adoption dates, Stern Stewart was contacted and they provided a listing of 27 EVA adopters along with their EVA start dates. The Compustat database was accessed to obtain for each company data on month end stock price and the value of the S&P 500 for the period beginning 37 months prior to the firm’s EVA start date and ending 37 months after the start date. Prices were used to calculate monthly returns, and a portfolio of the EVA companies was constructed. Using a methodology similar to Brown and Warner (1980), the cumulative average abnormal return of the EVA portfolio was estimated.

The model for estimating expected returns subsequent to adoption was found by regressing the returns of the companies on the returns of the market for the 26 month period beginning at $t=-36$ and continuing to $t = -11$ prior to the adoption month of the EVA standard. The estimated equation was then used to predict the expected return for the 46 months period beginning at $t = -10$ and continuing to $t = +36$ subsequent to adoption of the standard. The difference between the actual and predicted return was then calculated as the abnormal return (AR) for each period according to equation 2 below.

$$AR_{it} = R_{it} - E(R_{it}) \quad (2)$$

The abnormal returns were then averaged across all securities for each month to formulate the monthly average abnormal return (AAR) as noted in equation 3 below..

$$AAR_t = \frac{\sum_{i=1}^N AR_{it}}{N} \quad (3)$$

The average abnormal returns were then accumulated over the event period from $t = -10$ to $t = +36$ to formulate a series of cumulative average abnormal returns (CAAR) as noted in equation 4 below.

$$CAAR_t = CAAR_{t-1} + AAR_t \quad (4)$$

This series of cumulative abnormal returns is then tested for significance during the event period; the results of the significance test graphically presented in Figure 1.

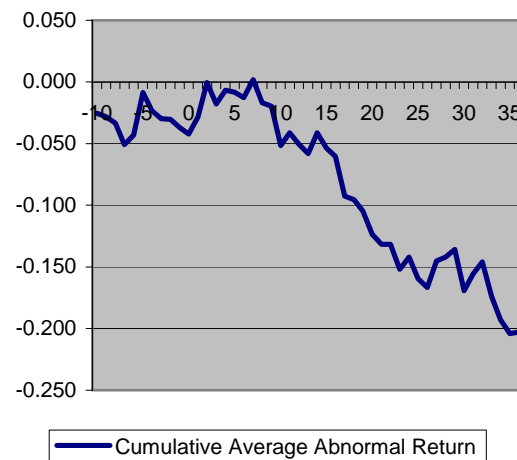


Figure 1

The graph illustrates that the firm's adopting EVA as a performance metric appear to experience a long-term negative impact subsequent to adoption. The negative cumulative abnormal returns become significant after approximately 21 months subsequent to adoption of EVA as a performance metric.

CONCLUSIONS AND IMPLICATIONS

Economic Value Added has been presented as one of the most important performance measures that a company can implement. While the measure does have some intuitive appeal in that it seems to suggest that managers should act more entrepreneurial, the evidence of its effectiveness in actually positively impacting share prices remains mixed. This study has indicated that firms adopting EVA actually experience negative cumulative abnormal returns over time subsequent to adoption. Perhaps, as suggested by Chen and Dodd (1998), the market prefers a performance measure that is independently "audited" to a performance measure that is

both somewhat difficult to understand and unaudited. If firms choose to adopt the EVA metric, they should be aware that it may not be as beneficial as perhaps it appears on first glance, and perhaps they would be well counseled to use it in conjunction with some other accepted and independently audited performance metric or metrics

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EVALUATING FORECASTS OF RATES OF RETURN: GEOMETRIC AND ARITHMETIC MEANS DUAL IT OUT

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ABSTRACT

Debate continues on the proper approach for forecasting rates of return. Generally, past performance of similar risk-class asset returns serves as the determinant for expected future returns. These forecasts inform strategies applicable to endowments, retirement and trust funds, and generally to any investment. Traditionally, arithmetic averages (means) have served as the historical metric. Argumentatively, using a geometric mean of historical performance may provide more reliable measure of expected returns. A dual approach blends the traditional methods using a weighted average of the two to overcome the inherent biases of the individual measures. This paper evaluates the three forecasting methods against realized returns to determine the efficacy of each.

INTRODUCTION

Calculating actual returns on investments relies on an arithmetic mean which generates accurate and unambiguous results. Using arithmetic means of historical returns as a forecast for the future, however, can be upwardly biased depending on the forecast period. Longer-termed forecasts benefit from the use of geometric means, however in the shorter time horizons, a downward bias may occur. Blume [1] explores the biases of both estimation methods and offers a weighted average approach that combines the two methods in a way that counteracts the inherent bias in each.

Work by others in finance that extends beyond common finance texts have explored this condition [2, 3, 4, 5] and interestingly, other disciplines face the same dilemma of choosing an appropriate metric [7, 8].

The purpose of this paper is to evaluate the efficacy of estimates using arithmetic, geometric, and averaged means when applied to specific data sets of market returns. In particular, data from the Dow Jones Industrial Average (DJIA), Standard and Poor's 500 index (S & P 500), and United States treasury securities (notes and bills) are of interest to continuing

research. Evaluating the accuracy of forecasts built on historical data for varying investment time horizons (1-, 5-, 10-, and 20-years) and errors can provide some guidance to future research in estimating rates of return. Of special interest to future research is the impact of varying investment strategies on realized returns when those strategies are dependent upon mean return forecasts.

DATA AND METHOD

Daily closing values for the various securities and indices will be used as the basis for forecast returns within each class of assets. For example, data from the DJIA spanning 1928 through 2007 will be included. Where daily values are unavailable for other assets, monthly or quarterly values will be employed.

Where periodic returns are less than yearly, the annual returns using the arithmetic mean (A^t) for time period “t” and periodic returns for the i^{th} period are given by:

$$A^t = \frac{1}{n} \sum_{i=1}^n (1 + r_i) \quad (1)$$

Similarly, annual returns for less than yearly periodic rates of return using the geometric mean for time period “t” (G^t) are given by

$$G^t = \sqrt[n]{\prod_{i=1}^n (1 + r_i)} - 1 \quad (2)$$

Equations (1) and (2) can be applied to multi-year calculations, as well, such that the arithmetic mean of a 10-year historical data set simply sums the to yearly annual returns and divides by 10. Similarly, the same 10 years of data can generate a geometric mean using (2) where $n = 1$ to 10.

Blume’s [1] formula, as adapted by Ross, *et al.* [6], suggests using a weighted average of the geometric and arithmetic means of annual values to generate an expected return (R^t), where

the weighting factors are determined as the proportion of the forecast period to the historical review period, such that,

$$R^t = \left\{ \left[\frac{T-1}{N-1} \right] * G^t + \left[\frac{N-T}{N-1} \right] * A^t \right\} \quad (3)$$

where T is the number of periods of historical data used and N is the forecast horizon [6].

Calculating forecasts using the three methods for the various investment horizons will be compared against the actual returns for those periods. Tests for differences and significance should provide insight into the efficiency of each.

RESULTS

To be determined.

CONCLUSIONS

To be determined.

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CRITICAL SUCCESS FACTORS IN THE MANAGEMENT OF A SERVICE-ORIENTED ARCHITECTURE (SOA) STRATEGY

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ABSTRACT

Service-Oriented Architecture (SOA) continues to achieve agility, efficiency and flexibility of core processes in business firms. The authors of the study analyze technical, procedural and business factors that contribute to effective management of SOA. Derived from an undergraduate research project survey and practitioner case studies of technology firms, the findings of the preliminary study disclose that business and procedural factors are more important in SOA strategy than functionality of technology, confirming earlier findings of the authors. The findings can help industry practitioners in confidently planning SOA strategy without confusion from the hype of technology firms. These findings as they are revised in a final study may be helpful to educators in information systems, as they consider further procedural and business emphasis of SOA and fruitfulness of research of SOA in information systems (IS) curriculum models that include IS 2006.

Keywords: Business Process Management (BPM), Information Systems (IS) Curriculum, Service-Oriented Architecture (SOA), Service-Oriented Computing (SOC), Service-Oriented Enterprise (SOE), Web Services

BACKGROUND

Service-Oriented Architecture (SOA) is a concept already defined in the practitioner literature:

“[an enabling] framework for aligning business process and information technology (Mehta, Lee and Shah, 2006) by integrating processes and information technology infrastructure as [loosely coupled and] secure, standardized components [functions] – services – that can be [accessed by business departments or business units], combined, and reformed to address changing business priorities (Bieberstein, Bose, Fiammante, Jones and Shah, 2006) [of the units and of the business firm]”.

Services deployed do discreet functions as component SOA services or a collection of functions as composite distributed services. They may be business services, as in the functions of processing a customer inquiry, or technical services, as in data warehousing, and services may integrate legacy infrastructures (Martin-Flatin and Lowe, 2007) interoperable with SOA in discoverable and publishable interfaces (Adams, Gisolfi, Snell and Varadan, 2002) for business departments. They may be flexible mash-up services in front-end interfaces to the back-ends of SOA that integrate business friendly Web 2.0 technologies (Taft, 2007). The goal of business firms in doing SOA is to be a Service-Oriented Enterprise (SOE) in integrating processes and services in larger intranet business unit-to-business unit and extranet firm-to-firm on-demand solutions.

Deployment of SOA is considered to be founded on business decisions of firms. Fundamental to the foundation is a business model that consists of the objectives and the core processes to achieve the objectives. Business enterprise architecture defines the design of detailed tasks of the business processes,

the business policies, as in management of metadata, and the information technologies included in an information technology infrastructure, based on the definition of what firms do as businesses (Lawler and Howell-Barber, 2007, p. 6). This infrastructure consists of the integration of applications, data bases, information, standards and platform technologies behind the processes. SOA consists of an enterprise architecture of services which is based on business objectives or a definition of business strategy.

Benefits of SOA continue to be cited in agility, efficiency and flexibility of business processes (Lawler and Howell-Barber, 2007, p. 4). Flexibility in processes as business models change because of competitor conditions, customer demands, global pressures, or even regulatory requirements can be beneficial to firms. The benefit of flexibility in both technical and business processes from plug and play interoperability of services and solutions of SOA can contribute exceptional functionality in the processes that may be considered by customers or partners to be better than or different from those of competitors. Time-to-market of new products may be an example of further benefits recognized by partners and customers (Koch, 2007). The benefits of services in an SOA can differentiate unique firm and customer propositions of value. These benefits of an SOA if not an SOE can differentiate business firms that desire discernable differentiation in their industry and are important to the firms (Information Week, 2008).

Because of the benefits and the importance of SOA, practitioner literature cites constant adoption of projects of SOA by business firms (Daniel, 2006 and Alter, 2007) that is confirmed by academic literature (Seethamraju, 2007). Currently 40% of projects are deployed as SOA in business firms (Amber Point Report, 2008).

Gartner forecasts 80% of projects to be based on SOA by 2008 (Gruman, 2006). IDC forecasts \$15 billion to be invested by business firms in software of SOA by 2009 (Linthicum, 2007). Winter Green indicates \$18 billion to be invested by business firms by 2012 (Hall, 2007). Clearly technology firms continue to market SOA to the business market (Tsai, Wei, Paul, Chung, Huang and Chen, 2007).

Business firms are challenged however in the dominant hype of technology firms marketing service and SOA solutions (Pieczkowski, 2007). Despite billion dollar investments, business firms in general have not benefited fully from services and SOA (Papazoglou and Van Den Heuvel, 2007). Literature in practitioner publications indicates that 70% of firms have met a few but not most of the benchmarks of SOA, and that 15% have met none of them (Babcock, 2007, September 17). Literature in practitioner publications further indicates only 5% of firms having met the benchmarks of an SOE (Retting, 2007, p. 7). Failure in expectations from the idea of services (Crosman, 2008, February 19) or of an SOE is not from frequent low benefit "low hanging fruit" homogeneous implementations of services at a department or a business unit level (Babcock, 2007, September 10). Failure is from infrequent high benefit heterogeneous high-throughput implementations and post-implementations of integrated services of SOA at a business firm level. The latter, forecasted to be implementations as late as 2013 (Crosman, 2008, February 11), lead to the real return-on-investment (ROI) of an SOE idealized by technology firms. Frustration is frequent in business firms filtering the hype of the technology firms so that they might control and manage projects of SOA (Bartholomew, 2007) on a path or a progression (LaJeunesse and Tzur, 2008) to an SOA. Literature in scholarly publications indicates implementation issues at business firm levels than project implementations at business unit low hanging fruit levels (Gallagher and Worrell, 2008). Methodology of managing SOA as a business strategy continues to be a concern for industry

managers and practitioners and for instructors in information systems that introduce SOA as a methodology to students.

INTRODUCTION TO STUDY

In this study, the authors analyze the methodology of managing SOA as a business strategy, based on earlier analyses of Web services and SOA (Anderson, Howell-Barber, Hill, Javed, Lawler and Li, 2005 & Lawler and Howell-Barber, 2007) conducted at business firms with industry practitioners of services and SOA. Findings from focus groups and surveys in the studies disclosed that business firms that lead projects in services or SOA with business considerations have more benefits in effectiveness from SOA than business firms that lead the projects with technical dimensions. Factors of business benefit driver, customer demand, and focus on integration of processes defined by business departments in the firms as examples have higher importance in managing SOA as a strategy than factors of platform technology of SOA defined by technology departments or technology firms. Methodology of SOA moreover has higher importance than the perceived technology of SOA. These findings are considered to be beneficial to manager practitioners in managing SOA as a business strategy.

Though the business dimensions of services found by the authors are defined by technology firms marketing SOA, projects of services and of SOA are done frequently from purely technical dimensions (Bell, deCesare, Iacovelli, Lycett and Merico, 2007) if not described in technical terminology of the technology firms (Dodds, 2008). Technology departments of business firms may focus moreover on services as low hanging fruit solutions than on an SOA strategy (Feig, 2007). They may not be even fully knowledgeable in the business strategy, which may not be shared by the business units of the business firms. The business departments and technology departments of the business firms may be limited by methodology that is not fast, flexible, incremental, innovative, nor iterative in release of services in an SOA strategy (Lawler and Howell-Barber, 2007, p. 16). To manage SOA as a business strategy, manager practitioners can benefit from a dynamic methodology that is focused more on business and procedural elements and less on the technical functionality of SOA.

The literature in services continues however in indicating a gap in further including procedural and business factors in the management of an SOA strategy (Marjanovic, 2004). Demand for including business enterprise goals into the technical strategy of projects (Cameron, 2007), such as those of SOA, is referenced in the literature. Is the infrastructure of the platform technology in the technical strategy integrating the practitioner strategic vision of the technology (Prahalad and Krishnan, 2002)? Management of SOA as a business strategy is imputed in this study to subordinate the technology hyped by the technology firms to the practitioner vision of the technology. To do this, manager practitioners and technologists have to be joined in learning a methodology new in strategizing SOA as a vision (Hurwitz, 2007) and in managing the technology firms to this vision (Rodier, 2008).

The methodology of managing SOA as business strategy, subordinating technology to the practitioner strategic vision of technology, is a discipline important in including in the curricula of information systems. The curriculum is developing students to be future practitioners and technologists of SOA in industry (Lim and Jong, 2006, p. 1). Though schools of information systems have initiated programs on SOA, they are frequently not including business process management (BPM) or methodology of SOA as a reengineering strategy. They may be integrating SOA as a technology, not as a methodology or a business strategy. They may be integrating non-agile methodologies, not hybrid non-agile and agile

methodologies of industry practices of SOA (Kohun, Wood and Laverty, 2007), so that students may not be learning the state-of-the-art of SOA.

The practices of industry on SOA may be input into the curriculum of information systems that might model the discipline of SOA (McAleer and Szakas, 2007, pp. 1-2). The importance of the methodology of SOA as a business strategy (Medjahed, Bouguettaya and Benatallah, 2007) is clear in the demand of industry for professionals experienced in the management of services and SOA and in procedural and process reengineering with SOA (Lee, Trauth and Farwell, 1995). The methodology of SOA as a business strategy, and not as a technical strategy, might inspire students in information systems and computer science to become practitioners of SOA (Lim and Jong, 2006, p. 2). Students might be more knowledgeable in the business, procedural and technical of SOA if instructors learned more of the program of SOA. They might be more marketable to industry if they learned business, procedural and technical facets in the management of SOA, factors of which are the focus of this study.

FOCUS OF STUDY

The focus of this study is to analyze factors that can contribute to effectiveness in the management of SOA as a strategy. The factors, consisting of business, procedural and technical in Table 1, are derived from in-depth analyses of industry programs and projects by the authors in earlier research of services (Anderson, Howell-Barber, Hill, Javed, Lawler and Li, 2005) and of SOA (Lawler and Howell-Barber, 2007, pp. 27-59) and are condensed from a disciplined methodology of managing SOA as a strategy (Lawler and Howell-Barber, 2007). These factors are also derived but filtered from the literature of technology firms and of business firms and from other industry literature. The goal of this study is to confirm the current importance or non-importance of business, procedural and technical factors individually and relatively to the management of an SOA strategy, in contrast to our earlier studies (Anderson, Howell-Barber, Hill, Javed, Lawler and Li, 2005 & Lawler and Howell-Barber, 2007). Few scholarly studies have examined the business and procedural factors of SOA in contrast to the technological factors and products often hyped by the technology firms. This study contributes findings that may be helpful to instructors in information systems in developing curricula on SOA and to practitioners investing in SOA as a strategy.

Table 1: Factors of Study

Factor Type	Description of Factor
Business Factors	
Agility, efficiency and flexibility benefits	Extent to which benefits of adjusting to business environments drive the program
Financial benefits	Extent to which benefits of increased revenues and / or decreased expenses drive the program
Business client participation	Extent to which business departments consent, contribute and furnish content and guidance to the program
Competitive, market and regulatory differentials	Extent to which competitive, market and regulatory first mover edge for the firm drives the program
Customer demand	Extent to which customer demand for enhanced service from technology drives the program
Culture of innovation	Extent to which innovation in business and technical practices is encouraged and facilitates the program

Organizational change management	Extent to which cultural change management is evident in helping business and technical staff embrace the program
Executive sponsorship	Extent to which senior managers in the firm articulate and evangelize the business criticality of SOA as a strategy and fund the program
Executive business leadership	Extent to which senior managers in the business units evangelize business criticality of SOA as a strategy
Executive technology leadership	Extent to which senior managers in the technology departments evangelize the technical and business criticality of SOA as a strategy
Strategic planning	Extent to which business strategy of SOA is articulated in the firm and is accepted by program staff
Enterprise architecture	Extent to which formal enterprise architecture contributes to initiation of the program and evolves with processes to an SOA
Focus on improvement of process	Extent to which improvement of business processes, process integration and service choreography are the goals of the program
Service orientation	Extent to which technical and business staff is receptive to principles of service orientation and SOA
Reusability of assets	Extent to which multiple services using software technologies is a goal of the program
Procedural Factors	
Control of program	Extent to which a formal function is evident for guiding and helping the firm in evolution to SOA
SOA center of competency	Extent to which a centralized team is evident for furnishing SOA expertise help to program staff
Responsibilities and roles	Extent to which responsibilities and roles of staff on the program are clearly defined for completing project tasks
Education and training	Extent to which formal skill training on services and SOA is evident for program staff
Knowledge exchange	Extent to which processes and procedures are evident for informing business and technical staff of progress of the program
Change management	Extent to which procedures are evident for ensuring optimal resolution of requests for changes in existing processes or services or of requests for new processes or services
Information management	Extent to which procedures are evident for ensuring data integrity and quality for technical and business functions
Common reference	Extent to which business and technical terminology is applied consistently by program staff
Naming conventions	Extent to which naming standards and service versioning are used by program staff
Procurement of technology	Extent to which a formal function is evident for furnishing quality hardware and software technology to the program in a cost effective and expeditious manner
Technology firm knowledge capture	Extent to which program staff captures knowledge from hardware and software technology firms in order to be independent of the firms
Risk management	Extent to which procedures are evident for mitigating failure or loss caused by SOA
Standards management	Extent to which program staff is cognizant of official standards, scope of implementation of the standards by technology firms and standard gap resolution techniques
Infrastructure architecture	Extent to which procedures are evident for guiding the evolution of technology in a strategy of SOA
Process and service deployment environment	Extent to which procedures are evident for furnishing software and tools to the development staff on the program
Process and service deployment techniques	Extent to which procedures are evident in order to ensure the highest quality of deployed technology throughout the program
Service catalog management	Extent to which procedures for managing a registry or a repository of processes and services are evident on the program
Service management and support	Extent to which procedures are evident for ensuring service availability and reusability and furnishing metrics on service support

Security management	Extent to which procedures are evident for safeguarding access to services
Continuous process improvement	Extent to which procedures are evident for iterative improvement of existing and new processes
Costing techniques	Extent to which techniques are evident for costing existing and future SOA product realization and support
Strategy management	Extent to which procedures are evident for evaluating and improving program strategy of SOA as required
Technical Factors	
Internal web services on project	Extent to which web services as simple projects contribute to the evolution of SOA
Internal process domain on project	Extent to which complex web services applications contribute to the evolution of SOA
Internal SOA domain on project	Extent to which standards compliant, internal and loosely coupled projects contribute to the evolution of SOA
External process domain on project	Extent to which external tightly coupled and security sensitive and trusted projects contribute to the evolution of SOA
External SOA domain on project	Extent to which external standards compliant, loosely coupled and security sensitive and trusted projects contribute to the evolution of SOA
Business process management software	Extent to which Web Services-Business Process Execution Language (WS-BPEL) software is included on the program
Data tools	Extent to which data tools supporting Extensible Markup Language (XML) are included on the program
Middleware	Extent to which an enterprise service bus (ESB) or traditional middleware technology is included on the program
Platform of key technology firms	Extent to which the platforms from key technology firms (e.g. BEA, IBM, and Microsoft) are included on the program
Platform specialty tools from platform technology firm	Extent to which specialty tools of the platform technology firms are included on the program
Proprietary technologies	Extent to which proprietary software is included on the program
Best-of-class tools	Extent to which specialty tools from pure play or third party technology firms are included on the program
XML standard	Extent to which XML is included on the program
Messaging standards	Extent to which technology supporting Simple Object Access Protocol (SOAP), SOAP Message Transmission Optimization Mechanism (MTOM) and SOAP with Attachments (SwA) or similar standards is included on the program
Service description and discovery standards	Extent to which technology supporting Universal Description, Discovery and Integration (UDDI), Web Services Description Language (WS-DL) and Web Services-Policy (WS-P) or similar standards is included on the program
Transaction standards	Extent to which technology supporting Web Services-Composite Application Framework (WS-CAF), Web Services-Choreography Description Language (WS-CDL) and Web Services-Transaction (WS-TX) or similar standards is included on the program
Security standards	Extent to which technology supporting Extensible Markup Language (XML) Encryption, XML Signature, Web Services-Federation (WS-F), Web Services-Security (WS-S) and WS-Security Policy (WS-SP) or similar standards is included on the program
User interface standards	Extent to which user interface tools or Web Services-Remote Portlets (WS-RP) are included on the program
Web services best practices	Extent to which Web Services-Interoperability (WS-I) is included on the program
Web services management standards	Extent to which Service Provisioning Markup Language (SPML) and Web Services-Distributed Management (WS-DM) are included on the program

Source: Lawler and Howell-Barber (2007), *Service-Oriented Architecture: SOA Strategy, Methodology, and Technology*, pp. 45-49.

These factors form the framework for the methodology of the study.

RESEARCH METHODOLOGY OF STUDY

“Undergraduate research is an inquiry or investigation conducted by an undergraduate [student] in collaboration with a faculty mentor that makes an original intellectual or creative contribution to the discipline” (Wenzel, 1997).

The research methodology of the study consisted of a top down literature survey of products of 21 technology firms that applied the products to programs of projects of SOA in business firms in 2007. Each of the 21 firms was chosen based on the apparent deployment of a diversity and maturity of complex, intermediate and simple internal and external projects of SOA that were on an apparent path to SOE because of the products. The survey was done from the literature of the technology firms but was filtered by other technology agnostic literature of leading consulting organizations. The survey evaluated the products applied to collective programs of projects based on business, procedural and technical factor importance in the implementation of the projects in 2007 in a perceived SOA strategy. The factors of the programs were evaluated on a seven-point scale of very high (7), high (6), somewhat high (5), low (4), somewhat low (3), very low (2), and not applicable (1) in importance. The survey was performed by a technology agnostic undergraduate student, in a *Service-Oriented Architecture (SOA) Strategy Independent Project Study*, at the Ivan G. Seidenberg School of Computer Science and Information Systems of Pace University, and the student was the second author of the study. The student performed the survey in the fall September 2007 – February 2008 semester.

(During the period of the survey, the student participated with the instructor of the Independent Project Study, also the principal author, at conferences and exhibitions in industry, including *SOA Executive Forum* and *SOA / Web Services on Wall Street*, lunch & learn seminars on SOA at the Seidenberg School, and SOA Webcasts by technology firms on SOA, which were requirements of the Study.)

Following the survey, the methodology of the study consisted of bottom up case studies of the products of 3 technology firms covered in the survey that similarly applied the products to programs of projects of SOA in the business firms in 2007. Each of the 3 technology firms were chosen based on highest deployment of the diversity and maturity of the projects of SOA of all of the 21 technology firms. The case studies evaluated the products applied to individual programs of projects based on business, procedural and technical factor importance in the implementation of the projects in 2007 in an SOA strategy and on the aforementioned seven-point scale of the survey. These programs of projects were evaluated in in-depth studies that as feasible included non-structured interactions at the business firms, in order to have filtered the hype of the technology firms. Internal documentation on processes was evaluated selectively at these firms. The case studies were performed by an experienced technology agnostic industry practitioner in process and services technologies. The practitioner performed the studies in relatively scholarly steps (Eisenhardt, 1989). The practitioner was the third author of this study. The case studies were performed in the spring February – May 2008 semester of the Study. The goal of the case studies was to confirm or not confirm the general findings from the literature survey.

(During the periods of the case studies and the literature survey, the student was mentored and the practitioner was supervised by the principal author.)

Finally, the methodology included statistical analysis of the findings from the case studies and the literature survey, which is being performed by the author of the study.

PRELIMINARY ANALYSIS – SURVEY OF 21 TECHNOLOGY FIRMS

(Descriptive and statistical interpretation of the findings from the survey of the technology firms is in progress.)

PRELIMINARY ANALYSIS – CASE STUDIES OF TECHNOLOGY FIRMS 1, 2 AND 3

The technology firms in Case Study 1, 2 and 3 are confidentially described as Firms 1, 2 and 3. These firms were deploying a commingled mix of products - application legacy adaption, business process management (BPM), configuration and deployment, data management, development, integration and service, knowledge management, management and monitoring, middleware and service bus, registry and repository, run time, security and testing tools - for programs of projects of SOA in Fortune 100 business firms in 2007. The products of these 3 technology firms were implemented largely in a mix of programs of internal business unit and firm process projects and external firm process projects that were the highest programs in intensity in SOA than the programs of the other 18 technology firms in the survey. The programs included 3 to 5 business firm projects for each of the 3 technology firms, and the benefits of the projects were indicated in the literature of the 3 technology firms to be business process improvement, conformance to regulatory changes, enhanced customer service, faster marketing of products and services, and increased industry market opportunity and share, mostly indistinguishable from the other firms in the survey. The descriptions of the Case Study technology firms are displayed in Table 2.

Table 2: Descriptive Summary of Case Study Technology Firms

Technology Firms	Firm 1	Firm 2	Firm 3
Business*	\$90 Million	\$100 Million	\$40 Million
Products			
Application Legacy Adaptation	x	x	
Business Process Management	x	x	x
Configuration and Deployment	x	x	x
Data Management	x		x
Development, Integration and Service	x	x	x
Knowledge Management	x		
Management and Monitoring	x	x	x
Middleware and Service Bus	x		x
Registry and Repository	x	x	
Run Time	x		x
Security	x		
Testing	x	x	
Programs of Projects			
Internal Process	x	x	x
External Process	x	x	x

Benefits			
Business Process Improvement	x	x	x
Conformance to Regulatory Requirements	x	x	x
Enhanced Customer Service	x	x	x
Faster Marketing of Products and Services	x	x	x
Increased Market Opportunity and Share	x	x	x

*2007 Sales of SOA

The programs of projects in technology Firm 1 focused on external and internal process projects in the business firms in 2007. The programs were driven by business benefits of *agility, efficiency and flexibility, competitive, market and regulatory differentials, customer demand, finance, and focus on improvement of processes*. *Executive business leadership, executive sponsorship and executive technology leadership* in the business firms were factors highly important in the implementation of the programs. The technology firm implemented methodology for *change management, education and training, process and service delivery environment and deployment techniques, and service catalog management and support* by instituting *centers of competency for SOA*. However *technology firm knowledge capture* was constrained in the business firms, as technology Firm 1 continued to mostly manage the programs, hindering the business firms in becoming independent of Firm 1. *Platform technology* of the firm was an enabler in the implemented programs of Firm 1. The implementation of SOA in the programs of Firm 1 was impacted more by business factors than by procedural and technical factors in findings of success.

Firm 2 focused on programs of external and internal process projects as in technology Firm 1. Business benefits of *agility, efficiency and flexibility, competitive, market and regulatory differentials, customer demand, finance, and focus on improvement of processes* were equivalent in technology Firm 2 as in Firm 1. However *executive business leadership and executive sponsorship* were factors less important than *executive technology leadership* of the technology departments of the business firms in the implementation of the programs. *Culture of innovation* in the business firms was less important in the programs than in Firm 1 or Firm 3. Firm 2 implemented limited methodologies in lower *control of program, in lower integrated process and service delivery environment, and in non-existent responsibilities and roles* of staff in the business firms, though Firm 2 instituted *centers of competency for SOA* that included *service catalog management and service management and support*. *Technology firm knowledge capture* was nevertheless not constrained in the business firms of Firm 2, as in Firm 1 or 3. *Executive technology leadership* of the programs in the business firms was independent of technology Firm 2. *Platform technology and platform specialty tools* of Firm 2 were enablers facilitating implementation of the programs. The implementation of the programs of Firm 2 was impacted more by business factors than by procedural and technical factors, but they were not as notable as in Firm 1 in the findings of success.

Firm 3 was focused on programs of external and internal process projects of SOA as in technology Firms 2 and 1. Business benefits of *agility, efficiency and flexibility, competitive and regulatory differentials, customer demand, finance, and improvement of processes* were equivalent in Firm 3 as in Firms 2 and 1. *Executive business leadership and executive sponsorship* from the business units in the business firms as in Firm 2 were less important than *executive technology leadership* of the technology departments in the

initiation and installation of the programs. *Reusability of assets* and *strategic planning* in technology Firm 3 were less important in the programs than in Firms 2 or 1. Methodologies were lacking noticeably in *change management*, *control of program*, *responsibilities and roles* of staff, *service catalog management*, *standards management*, *strategy management*, and *technology firm knowledge capture* in the business firms. They were lacking in *centers of competency for SOA* highlighted in the programs in Firms 2 and 1, as the *centers of competencies* were limited to the products of Firm 3 and were not the neutral programs of Firms 2 and 1. Though the projects of the programs were enabled by *education and training* in the *platform product technology* and *specialty tools* of Firm 3, the methodologies of Firm 3 were less important than the methodologies of Firms 2 and 1 and less important than its technologies and tools, which the technology departments of the business firms depended upon Firm 3 for continued installation, but which the technology departments managed independently of the business departments. The implementation of SOA in the programs of Firm 3, in contrast to Firms 2 and 1, was impacted inevitably more by technical factors than by procedural or business factors in the findings of success.

Implementation of the programs of projects of SOA in technology Firms 1, 2 and 3 indicate that business factors were more important than procedural and technical factors in aggregate findings of success. Procedural factors were however less important than technical factors in aggregate findings of success. Firms 1 and 2 indicated that business factors were more important than procedural and technical factors, which were noticeably higher in Firm 1 than in Firms 2 and 3. Firm 3 indicated that technical factors were more important than procedural and business factors, the latter of which were noticeably higher than in Firms 2 and 1. Findings indicated that *business leadership* and *executive sponsorship* in the business units of the business firms were considerations impacting the higher or lesser importance of technical factors of the programs of these technology firms.

ANALYSIS SUMMARY

(Statistical interpretation of the findings from the case studies and the survey of the technology firms are in progress.)

PRELIMINARY IMPLICATIONS OF STUDY

Preliminary findings of business and procedural factors having higher importance than technical factors emphasize the implication of the importance of business leadership on programs of projects of information systems and SOA. Managers in business have to lead the programs of projects of information systems, so that the technology of SOA is not foremost to fundamental business models (Feld, 2007). Managers in the business firms, and in the technology units of the firms, frequently do not lead in business process improvement of business models (Shay, 2007), in innovation of technology, nor in integration of technology and business (Carter, 2008), though the literature in practitioner and scholarly sources indicates the necessity. The goal of managers has to be to enhance internal if not external processes relentlessly in the integration of SOA throughout the firms. Manager practitioners might be educated further on the business proposition of information systems (Rettig, 2007, p. 8) and SOA if not the technology, and instructors in information systems might begin to enhance in the interim the content of courses in the curricula in schools of information systems, so that students might be educated further in the interdependence of SOA and its proposition as a strategy.

Importance of improving the curricula in schools of information systems in the business proposition of SOA as a strategy is another preliminary implementation of the study. Literature indicates the complexity of design and the discomfort of instructors in improving courses in information systems, so that they are current with industry methods and practices of firms (Cameron, 2007). Though instructors may be in committees confronting continued and further evaluation of practices in industry, students in information systems may not in the interim be learning current hybrid methodologies and practices current in industry that improve upon the systems development life cycle (SDLC), including marketable program management methodologies as they are relevant to SOA as a strategy. The instructors and the students may not be learning the methodologies, organizational practices or processes that matter in industry investment of technology (McAleer and Szakas, 2007, p. 4). They may not be learning technology as business technologists, but as programmers or technologists that are not as in demand by business firms as business technologists (Raths, 2007).

Instructors might begin to initiate improvement in SOA by incrementally integrating such practices into current curricula of information systems or in a new curriculum on SOA, referencing the IS 2006 curriculum model (McGann, Frost, Matta and Huang, 2007) so that undergraduate students might be learning the proposition of SOA as business, culture, methodology and research in tandem with the technology. It is important that industry practices on SOA not be integrated into a couple of courses, but in a cumulative curriculum of courses. Schools of information systems might furnish grant incentives to instructors to prepare such curriculum on SOA, and technology firms might furnish grants (Ericson, 2007). Grants might include process modeling software, such as IBM INNOV8 Simulator, to the instructors, in order to provide the business proposition of SOA as a strategy.

Importance of including students in an experiential project of research in industry is a final implication of the preliminary study. In this study, a senior undergraduate student in information systems initiated the research of technology firms marketing SOA, though such researchers are frequently graduate students (Reif, Clarke and Choi, 2007). Literature indicates increased learning of researcher students leading to the likelihood of graduate study (Prince, Felder and Brent, 2007), if not increased learning of instructor researchers (Sama, 2007) leading to innovation in curricula (Karukstis, 2007). Learning of instructor researchers might be further increased in methodologies and technologies of SOA if the research is in partnership with the business firms or the technology firms. Manager practitioners of the firms might be hosted at consortiums in schools of information systems and might inform on practices and technologies of SOA, or be informed of high potential students, or they might be invited to join councils in the schools and might inform instructors and researchers on the currency of the curricula on SOA (Hoffman, 2008) and on positions in information systems at the firms. Research might lead to internships or positions of undergraduate students at the firms. In short, integrating senior, junior or sophomore students in the research of instructors might lead undergraduate students sooner to positions in the field of information systems if not to tangible responsibilities as the next generation of business technologists.

LIMITATIONS AND OPPORTUNITIES IN RESEARCH

Once the final analysis and final implications are completed by the author in a revised report, the study may be continued in a direct and expanded survey of business firms that have completed programs of projects of SOA that are closer in completion in an SOE, which may dissipate concerns as to the generalizability of the findings of the study. The feasibility of such study is constrained by the few

business firms experienced in services (Gosain, 2007) in an SOE strategy. Though experienced in services in an SOA strategy, they are largely only on a journey in an SOE strategy (Ozair, 2008). Study could be done of the few firms in expanded in-depth case studies of an industry, but confidentiality of the strategies in the firms may inhibit the researcher. The instructor plans to introduce a new program of study on SOA at the Ivan G. Seidenberg School of Computer Science and Information Systems of Pace University, in which further research on SOA might be done by groups of students in field internships with financial firms on Wall Street, with whom the school is a frequent incubator on studies. The program is introduced in the previous Table 2. This research may be an interim solution in the study of SOA, with findings that may improve upon this study.

CONCLUSION

The preliminary findings of the study continue to confirm the earlier findings of the authors in the higher importance of business and procedural factors in the management of SOA strategy. Technical functionality is found to be less important than the procedural and business factors of the strategy. The importance of a bona fide program management methodology on SOA is also indicated in this study. These findings contribute input to practitioners designing SOA strategy. This methodology integrating the business and procedural factors and the technical factors may be input into the curricula of instructors in schools of information systems. The authors will conclude the final findings and will continue to research SOA as industry matures in strategy, and they will suggest ideas for educators and practitioners in new and timely studies.

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CURRICULUM RECOMMENDATIONS FOR INFORMATION TECHNOLOGY RELATED DEGREES

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ABSTRACT

In order to determine the current products/technologies used in industry with regards to web and applications development, networking, operating systems, database, enterprise resource planning (ERP) systems and customer relationship management (CRM) systems, a survey of 350 IT managers/CIOs (Chief Information Officers) was conducted. The results of the survey are reported and analyzed. Based on the findings of the survey, curriculum recommendations for IT-related programs are made in the paper.

INTRODUCTION

Enrollments in Information Technology (IT)-related academic programs have declined significantly in recent years [6] [8] [9]. Several studies have investigated potential causes of the enrollment decline, attributing it most often to factors such as curriculum problems [1] [6] [7], issues that influence students to choose (or not choose) an IT-related major [12] [13], lack of availability of accurate information about the IT industry and related employment opportunities to high school students [4], and offshore outsourcing of IT jobs [10] [11].

The U.S. Department of Labor predicts that employment demand for IT-related professionals will grow much faster than the average for all occupations through the year 2016. For example, the Bureau of Labor Statistics projects that the number of jobs will increase 16% from 2006 to 2016 for the occupation entitled “computer and information systems managers”, 37% for “computer scientists and database administrators”, and 53% for “network systems and data communications analysts” [2] [3]. It is also estimated that the United States will have only half of the qualified graduates needed to meet the rapidly increasing demand for IT professionals through 2012 because of the declining number of student enrollments [5].

The purpose of this paper is to determine the current products/technologies used in industry with regards to web and applications development, networking, operating systems, database, enterprise resource planning (ERP) systems and customer relationship management (CRM) systems. The approach of this study is to conduct a survey of IT managers to identify the products/technologies their organizations currently use in order to determine their applicability to curriculum development in IT related programs. IT related degree programs that are more adept at meeting the needs of industry will be more likely to survive and will be better positioned to recruit students. Therefore, the authors will use the results of the survey to make curriculum recommendations to IT related programs.

METHODOLOGY

The primary purpose of this study is to identify what products/technologies are used in industry in order to determine their applicability to curriculum development in IT related programs. To this end, a survey was designed and administered to IT managers.

The items in the survey were created by examining current empirical studies. In addition, several demographic questions were added to the survey to gather information about the respondents and their respective organizations. The IT managers and CIOs (Chief Information Officers) that participated in the survey were identified through an email list from a respected online survey company.

A pilot study was conducted to test the questionnaire. The survey was administered to faculty, students and IT staff at the authors' university. Approximately thirty people participated in the pilot study. Feedback was gathered, leading to an improved version of the survey that was used in the data collection.

The survey was web-based and administered via email by a reputable online survey company. The survey was administered to 391 IT managers/CIOs. Of these, 350 responses were complete enough to use for analysis.

DATA ANALYSIS

Demographics of Respondents

Responses were received from IT managers in all but five states in the U.S. Twenty-eight percent (28%) of respondents were in organizations with annual gross revenue of over \$1 billion and 30% were in organizations with over 10,000 employees. Sixteen percent (16%) of organizations had annual gross revenue under \$50 million and 12% had fewer than 100 employees. Ninety-four percent (94%) of respondents stated that their organizations employed a full-time IT staff and 44% said that the number of IT employees exceeded 100.

The respondents represented a cross-section of industries. Table 1 provides an overview of the characteristics of the respondents and their organizations with regards to the industry to which they belong. The greatest concentration of respondents (19%) were in an organization in the IT industry.

Results

Demand for IT Workers, Sources for IT Workers and Outsourcing

Table 2 lists the areas of demand for IT workers cited by respondents within their organization and Table 3 lists the sources they use to acquire new IT staff. Respondents could select more than one response for areas of demand for IT workers and sources for finding IT workers. The most common areas of demand cited by respondents for full-time entry-level IT employees were IT help desk (70%), networking (56%) and programming (55%). The most common sources cited for finding entry-level IT workers were the web and internships. The average salary for an entry-level worker was about \$43K based on respondents answers for the question related to salary.

Table 1: Characteristics of respondents and their organizations

Industry	% of Respondents
IT	19
Education	11
Health care related	10
Government/Military	8
Manufacturing	8
Financial	6
Other	6
Computer technology vendor	5
Consulting (not in IT)	4
Insurance	4
Retail	4
Telecommunications	3
Transportation	3
Non-Profit	2
Utilities	2
Other	10

Table 2: Areas of Demand for Entry-Level IT Workers

Area	% of Respondents
Clerical/Data Entry	29
Database Area	44
IT Help Desk	70
Networking	56
Programming	55
Systems Analysis & Design	48
Web Design & Development	46
Other	9

Table 3: Sources Used to Acquire Entry-Level IT Staff

Source	% of Respondents
Co-op	13%
Instructors' recommendations	6%
Internships	39%
IT department office	34%
Newspapers	37%
Relatives/friends	24%
School's career planning office	24%
Web	48%
Other	15%

Respondents were fairly optimistic about the job market next year – 28% of respondents said that the job market would be better next year while 49% said it would stay the same. 43% of respondents say that their organizations outsource IT operations. Of those that outsource, 54% outsource less than a quarter of the IT operations and only 3% outsource more than three-quarters of the IT operations.

Web and Applications Development

Seventy-one percent (71%) of respondent's organizations host their own web sites entirely, 13% host their own web sites partially, while 10% outsource their web sites entirely. 47% of respondent's organizations conduct e-commerce on their web sites.

Thirty-eight percent (38%) of respondents build applications in-house. The remaining respondents buy off-the-shelf applications, then customize or buy customized applications. Table 4 lists the programming languages used by organizations that build software applications. Respondents could choose more than one programming language in response to this question.

Table 4: Programming Languages

Programming Language	% of Respondents
C	19
C#	26
C++	48
COBOL	27
J#	8
Java	66
Visual Basic	55
Other	25

Networking and Operating Systems

Ninety percent (90%) of respondent's organizations had their own network administration staff while the remainder outsourced network administration. Table 5 lists the network operating systems in use in the respondent's organizations. Respondents could choose more than one network operating system. Table 6 lists the operating systems in use in the respondent's organizations. Again, respondents could choose more than one operating system. 81% of respondent's organizations handle network security in-house, 4% outsource it and the remaining respondent's claim their organizations do a combination of both.

Table 5: Network Operating Systems

Network Operating System	% of Respondents
Linux	41
Novell NetWare	20
Sun Solaris	29
Unix	46
Windows NT	27
Windows 2000	38
Windows XP	58
Windows Server 2003	57
Other	5

Table 6: Operating Systems

Operating System	% of Respondents
Linux	19
Mac OS X	20
Windows	94
UNIX	23
Other	1

Database, ERP and CRM

Table 7 lists the database management systems (DBMS) in use in the respondent's organizations. Respondents could choose more than one DBMS. 37% of respondent's organizations use an enterprise resource planning (ERP) system while 14% plan to use one in the future. Of the 37% that use one, Table 8 lists the ERP that is in use. Respondents could choose more than one ERP. The departments that primarily use the ERP system are accounting, finance and human resources. 40% of respondent's organizations use a customer relationship management (CRM) system while 16% plan to use one in the future. Of the 40% that use one, Table 9 lists the CRM that is in use. Respondents could choose more than one CRM. The departments that primarily use the CRM system are customer support, sales, marketing and human resources.

Table 7: Database Management Systems

DBMS	% of Respondents
Access	43
DB/2	24
MySQL	24
Oracle	58
SQL Server	66
Sybase	14
Other	7

Table 8: Enterprise Resource Planning Systems

ERP	% of Respondents
Baan	3
Oracle	45
PeopleSoft / J.D. Edwards	42
SAP	31
Other	12

Table 9: Customer Relationship Management Systems

CRM	% of Respondents
ACT	4
Oracle	23
PeopleSoft	18
SAP	13
Siebel	9
Other	19

CURRICULUM RECOMMENDATIONS

With regard to job placement, the findings indicate that IT help desk positions are the most likely jobs for entry-level workers, according to Table 2. This suggests that educators may need to manage student expectations about the nature of entry-level positions (and the associated salaries). As part of this process, IT educators should also help students understand the important role that entry-level positions play in further developing the personal, interpersonal, technical and organizational/managerial skills that lead to career growth.

The next two most likely entry-level jobs are in the area of networking and programming (see Table 2). This suggests that IT related programs need to have options that allow students to prepare for careers in these areas such as specializations, emphasis areas or tracks. In addition, students need to be advised that these are areas of opportunity upon graduation. Java (66%) and Visual Basic (55%) appear to be the two most frequently cited programming languages by respondents whose organizations do in-house development (see Table 4). Therefore, if an option to specialize in a programming language exists, the languages should include Java or Visual Basic. Windows XP, Windows Server 2003 and Unix are the most frequently cited network operating systems in use, according to Table 5. These should be among the network operating systems taught in a curriculum with a network specialization.

Respondents use the web (48%) and internships (39%) to find new IT employees (see Table 3). Educators need to advise students that internships are a valuable way to find a permanent job. Internships provide the student with an opportunity to interview the company and the company with a way to interview the prospective employee without committing to a permanent position. IT-related programs might consider internships as an optional or required part of the curriculum.

SQL Server (66%) is the most frequently cited DBMS in use at respondents organizations followed by Oracle (58%), as illustrated by Table 7. However, Oracle is the most frequently cited ERP system (45%) and CRM system (23%), according to Table 8. Therefore, either using SQL Server or Oracle in a data management course in an IT curriculum is acceptable.

Based on the findings of this study:

1. Students can expect to find entry-level jobs in the areas of help-desk, networking or programming
2. Internships play an important role in securing entry-level IT jobs
3. The technologies that are in use in the organizations surveyed are Java, Visual Basic, Windows XP, Windows Server 2003, Unix, SQL Server and Oracle.

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An Undergraduate Course in Data Warehousing

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Abstract

The data warehousing field has matured significantly over the past twenty years and data warehouses, which provide the foundation for business intelligence, have become ingrained in corporate America and throughout the scientific community. Data warehousing courses are beginning to emerge in academe, but universities must do more to prepare students for exciting career opportunities not only as producers of data warehouses, but also as competent consumers. This paper describes an undergraduate data warehousing course at Radford University to share our course objectives, provide a model to encourage others to develop similar courses, and to further shape the requirements for data warehousing courses at the undergraduate level.

1 Introduction

As a former member of the Query Processing team at Red Brick Systems, the pioneering data warehouse company founded by Ralph Kimball, the author has closely followed the data warehousing field for the past twenty years. During that time corporate America's perception of data warehousing has evolved from an esoteric pursuit of a few top companies to a competitive advantage and finally to a competitive necessity supporting a wide range of business intelligence applications.

Slazinski, who describes an undergraduate data warehousing course at Purdue [26], claims the data warehousing market has reached 28 billion dollars. While developing a graduate data warehousing and data mining course, Fang and Tuladhar [8] found roughly 900 data warehousing job openings posted on a popular IT job-search website. Murray and Guimaraes [23] acknowledge the pressure to expand the database curriculum and recognize the need to incorporate data warehousing while Dietrich, Urban, and Haag [7] have responded to rapid advances in the field by developing techniques to assess advanced database courses at the undergraduate level. The University of Winnipeg offers four courses in databases including a data warehousing course described by McFadyen [21].

The field of data warehousing has matured sufficiently to support rigorous study at the undergraduate level and the demand for data warehousing professionals is growing. However, it is not enough for our universities to prepare students to develop and maintain data warehouses, we must also prepare students to be competent consumers. Further discussion and additional research is needed to shape the requirements for teaching data warehousing at the undergraduate level. This paper contributes to the requirements definition process by describing various aspects of an undergraduate data warehousing course at Radford University including the course objectives, resources, lecture topics, and assignments. The paper discusses the lessons that have been learned thus far by providing student feedback, recommendations, and future directions for the course. Finally, this paper presents a model to encourage others to develop similar courses.

2 Course Context

The Information Technology department at Radford University offers Bachelor of Science degrees in Computer Science (CS) and Information Systems (IS). Students must choose from one

of seven concentrations; four in the CS program and three in the IS program. Each concentration includes three courses in the area of specialization. The database concentration includes an introductory course (Database I), an advanced course (Database II), and a course on Data Warehousing, Data Mining, and Reporting. This paper primarily describes the data warehousing portion of the third course. Database I is the only prerequisite for the data warehousing course which makes the course attractive to IS majors looking for a technical elective that is not based on software engineering. Consequently, the content of the course must balance the business focus of the IS students with the more theoretical interests of the CS students.

The purpose of a data warehouse is to help organizations make better decisions and one of the primary themes throughout the course is the business value of data. Within this context, all of the course topics are presented from three perspectives: (1) an engineer designing and developing a warehouse, (2) a business or data analyst, and (3) an executive decision maker. The success of a data warehouse depends on how well the warehouse supports the end user. Consequently, the CS students are encouraged to focus on the needs of the business to improve their effectiveness as engineers and the IS students are encouraged to focus on the technical details to become more effective consumers and stronger advocates of the warehouse.

The course is primarily based on resources from Ralph Kimball and his associates at the Kimball Group [20]. However, Bill Inmon [10] is considered the father of the data warehouse while Kimball is considered the father of the data mart. Although Kimball's view of the data warehouse as a conglomerate of data marts across the enterprise built on a foundation of conformed dimensions is more practical for large organizations than a single, centralized data warehouse, Inmon and Kimball are largely in agreement [11]. Another key distinction between the two is Kimball's insistence on the dimensional model, a main focus of the course, whereas Inmon favors storing data in 3rd normal form.

2.1 Course Objectives

The data warehousing portion of the course is organized around the following three objectives:

- Ability to design, evaluate, and develop a dimensional data warehouse:
 - Dimensional modeling and star schemas
 - Aggregation
 - Physical schema
 - Extract, Transform, and Load (ETL) process
- Ability to effectively utilize and employ a data warehouse to solve problems
 - Use OLAP applications effectively
 - Understand the limitations of SQL
 - Understand the relationship between data mining, data warehousing, and business intelligence
- Ability to identify and appreciate the complexities of data warehousing:
 - Scale of a data warehousing project
 - Importance of data quality and traceability
 - Political sensitivities and other practical considerations

These objectives will be discussed when the main topics and the assignments are presented in section 3.

2.2 Resources

Although several books have been written on data warehousing, most of the books are directed at practitioners. Kimball's *Data Warehousing Toolkit* [18], the classic text on dimensional data

warehousing, describes data models for 14 applications from retail, inventory, and procurement to order management and customer relationship management. While studying example schemas is an effective way to learn dimensional modeling, and Kimball masterfully chooses applications that highlight key concepts, such as slowly changing dimensions and the additivity of measures, the book is organized around the applications, rather than the concepts, which limits the book's usefulness within the context of a university course.

Consequently, while several text books are recommended, including Kimball's *Data Warehousing Toolkit* [18], *Lifecycle Toolkit* [19], and *ETL Toolkit* [17], along with Olson's book on data quality [24] and Adamson's book on mastering aggregates [1], the primary resource for the course is the Kimball Group website [20] which provides over 120 articles, design tips, webinars, and other online materials describing every aspect of data warehousing. Once the students grasp the big picture, Kimball's articles and design tips provide in-depth coverage of specific topics and these materials are easily referenced throughout the course.

Additional online materials are incorporated into the course including articles by Greenfield [9] and Demarest [6] regarding the political considerations surrounding data warehouses and research papers on aggregate computation [5] and maintenance [3].

2.2.1 Tools

The data warehousing portion of the courses uses two tools: Oracle Warehouse Builder (OWB) [25], the ETL and Metadata Management tool from Oracle, and the Mondrian OLAP server [22]. OWB is an expensive, enterprise class tool, but Oracle's educational license makes the package affordable. The Mondrian OLAP server is open source and freely available.

2.2.2 Server Infrastructure

All three courses in the database concentration are based on the Oracle database. The data warehousing course uses two databases on separate physical servers. The first database supports the Database I and Database II courses and serves as the operational system for the data warehousing course. The second database is used exclusively by the third course and serves as the data warehouse repository. Having two databases on two physically distinct servers gives the students a better feel for an enterprise environment. However, the course could certainly use two database instances running on a single server or even one database instance using separate schemas and/or accounts.

3 Course Organization

This section describes the main topics covered in the course along with an overview of the assignments and exams.

3.1 Dimensional Modeling

The primary objective for the course is to develop proficiency with dimensional modeling and the implementation of Star schemas in a relational database. The dimensional model is a logical design technique that separates facts (measures) into a separate table surrounded by dimensions containing rich attributes that provide the context for evaluating the facts.

According to Kimball [18] [14], “The goal of a data warehouse is to publish the ‘right’ data and make it easily accessible to decision-makers.” A well-designed dimensional model captures the performance measures and descriptive attributes of a business which makes the model intuitive to business users because the database is structured based on the way users think about the business. “Dimensional models are critical to enabling the business to leverage the organization’s valuable information assets.”

The dimensional model also affords students valuable experience with de-normalization. Fact tables are normalized to the 3rd normal form, but dimension tables are typically *de-normalized* in 2nd normal form. After one or two database classes the student’s urge to normalize data models has been ingrained and automatized. Consequently, students struggle with de-normalization and they must fight their compulsion to snowflake their dimension tables. This same effect was reported by Slazinski [26]. However, once the students have mastered the Star schema and they are comfortable with de-normalization they have acquired another tool in their arsenal of data modeling techniques and they have gained a deeper understanding of how and when to apply normalization.

The course begins with an overview of the fundamentals of dimensional modeling and spends the first two or three weeks examining data models from various applications, much like Kimball’s *Data Warehouse Toolkit* [18]. Once the student’s are comfortable with the Star schema they are introduced to more advanced dimensional modeling techniques like managing slowly changing dimensions.

3.2 Aggregation

“The single most dramatic way to affect performance in a large data warehouse is to provide a proper set of aggregate (summary) records that coexist with the primary base records” [13]. Materialized aggregate views precompute data at various levels of summarization. For example, a retail warehouse typically records each order line in a Sales fact table. The Sales table is a base table that contains the most atomic level of detail. A series of aggregate views might be created to summarize the sales data by month, quarter, and year. When data is rolled up into a summary table the size of the summary table shrinks vertically and horizontally with respect to the lower level table. Consequently, when an aggregate view may be used to answer a query the performance of the query increases considerably.

Aggregates must be chosen wisely because they consume disk space and often require maintenance, even recomputation, each time new data is loaded into the warehouse. The DBAs who are responsible for selecting the aggregates to be materialized must be aware of *sparsity failure* whereby the aggregate table is actually larger than the base table [12]. Two tools make aggregates easier to use and easier to manage. The first is the Red Brick Vista Advisor [5] which helps warehouse administrators manage aggregates by monitoring query usage patterns and recommending the most useful aggregates.

The second is the Aggregate Navigator [12] which allows users to write their queries against the base tables and the Aggregate Navigator rewrites the queries to use the best aggregate view. The Aggregate Navigator makes the warehouse more accessible because end users do not have to keep up with all the views. Aggregate views may be added, removed, or modified and the end user receives the full benefit of the aggregates without writing a single query to access a view. In [13], Kimball describes four design requirements for developing an aggregate environment capable of exploiting the full power of aggregate navigation.

3.3 ETL Process

The Extract, Transform, and Load (ETL) process consumes over seventy percent of the time and effort spent developing and maintaining a data warehouse. Consequently, it is important for students to appreciate the complexities of the process. Kimball decomposes the ETL process into 38 subsystems and he and Joe Caserta have written an entire book on the ETL process [17]. By studying the ETL process, which encompasses a subset of Universal Data Integration (UDI), students gain insight into the bigger issues of data and application integration.

The ETL process, which extracts data from the operational systems, transforms the data from the source systems into a consistent and coherent data set that is ready to present to the end user, and loads the data into the warehouse, is responsible for two critical properties of the warehouse: quality and traceability. When organizations are basing strategic business decisions on the information contained in the data warehouse, the quality of the data is of utmost importance. Olson's *Data Quality* book [24] provides extensive and thorough coverage of how to assess the quality of data and improve its accuracy.

The Audit dimension [16], which records where each piece of data comes from and exactly how it was transformed, is becoming increasingly important as organizations are forced to meet emerging compliance standards. Students must appreciate the importance of auditing the data and the ETL processes involved in migrating the data into the warehouse.

Students should be aware of the load window and reporting requirements that constrain the nightly ETL process, especially for global organizations that demand 24 x 7 access to the warehouse. It is also important to study techniques to improve load performance such as staging the load, disabling constraints during the load, and dropping and recreating indexes, since these techniques are largely irrelevant in an OLTP system.

Data warehouses are complex systems that cost many organizations millions of dollars annually to build and maintain. This has created an entire industry that produces expensive tools to support the data warehouse. Consequently, every organization is forced to choose between building and buying the tools needed to implement the ETL process. Instructors must also face this dilemma. Should the students use tools, like Oracle Warehouse Builder (OWB) [25], to implement an ETL process or do they benefit more from developing a hand-coded system? As discussed in section 5, there are pros and cons both ways. The primary benefit to using commercial tools is that all of the metadata from the ETL process is captured and managed. ETL tools also hide many details from the user such as which operations are being performed on data files and which are performed within the staging database. While this is helpful to practitioners, this layer of abstraction obscures the student's view and hinders their understanding.

This course has required students to use OWB to complete an ETL assignment. However, OWB is a complex application with a steep learning curve that has caused many problems for the students and the instructor. Consequently, the author plans to revise the assignment in favor of hand-coding a simple ETL process. Students who want to learn and use Oracle Warehouse Builder will be allowed to implement some aspect of their project with OWB.

3.4 Physical Schema

The physical schema of a data warehouse presents many challenging design decisions. The use of partitions is very important for rolling off data to conserve disk space. A partition is a logical structure used to segment data. A partition is defined by specifying the range of data that the partition will hold. Data files are associated with a partition such that all of the data within

the range of the partition is stored in the data files allocated to the partition. A partition may be dropped with a single DDL statement thereby deleting all of the data in the partition from the warehouse. Fact tables are often partitioned by date such that data may be rolled off after a certain period of time. An organization may want to store 13 months of data to enable yearly comparisons. To support this requirement the warehouse administrator might partition the fact table by months. A new monthly partition is created at the start of each month and at the end of the 13th month the first partition is dropped before the new partition is added thereby maintaining a 13-month window of data.

Some databases allow partitions to be loaded offline which allows users to access the online partitions while the offline partition is being loaded. Oracle allows partitions to be merged and split so a daily partition may be loaded offline and then merged with the partition for the current month.

As discussed in section 3.2, aggregate views play an important role in the warehouse, especially as the primary mechanism to improve query performance. However, aggregates typically consume a large percentage of the disk space allocated to the warehouse. Consequently, aggregates must be chosen wisely. Data striping, whereby aggregates are materialized at every other level of a hierarchy, allows the warehouse administrator to balance the tradeoff between computation and storage. If a query requests data from a materialized layer the data is returned with a single disk read, but if a query requests data from a layer that is not materialized the requested data is computed from the data at the next lower materialized layer. Consider a hierarchy along the time dimension consisting of day, week, month, quarter, and year. The most detailed data at the daily level should always be stored in a base table. The summary data may be striped by precomputing aggregates for month and year. If a query requests quarterly totals or averages the data is computed by summing or averaging the data in the monthly aggregate.

Although most commercial query optimizers will apply multiple indexes when performing a star join it is valuable to study multi-dimensional indexes. When considering high performance data warehouses that contain terabytes, or even petabytes of data, the physical schema can present some of the most interesting challenges.

3.5 OLAP

On-Line Analytical Processing (OLAP) is synonymous with drilling up, down, and across to slice and dice data. The concept of slicing and dicing is typically presented in an introductory lecture that illustrates a data set as a three-dimensional cube. The students are quick to grasp the concept as the visual model is sliced and diced. OLAP tools and capabilities should be presented within the context of business intelligence. Several vendors have online demos that show how their OLAP tools may be used to analyze a data set. The author often uses the Desktop Intelligence demo from Business Objects [2] to motivate how data warehouses support Decision Support Systems (DSS) and other business intelligence applications. The Desktop Intelligence demo includes screen shots of an executive dashboard with key performance indicators (PKI).

This course has also used the open source Mondrian OLAP Server [22] to demonstrate an OLAP tool accessing one of the example models. The author is considering an OLAP lab and one or two assignments at the beginning of the course to help students better understand the Star schema.

Students should be clear on the tradeoffs between multi-dimensional OLAP (MOLAP), which stores data cubes as multi-dimensional arrays in main memory, versus Relational OLAP, which stores data cubes in a relational database, versus Hybrid OLAP (HOLAP), which stores data

cubes in main memory with the ability to drill through to the database if additional detail is needed.

3.6 Warehouse Lifecycle

The last lecture on data warehousing discusses the overall lifecycle of the warehouse from marshalling support to managing the project and selecting the applications to be delivered first. A fair amount of time is spent on the politics of the data warehouse to increase awareness and help the students understand the political issues along with the risks and dangers inherent in a data warehousing project. Greenfield [9] and Demarest [6] provide excellent discussions of the politics surrounding data warehousing and data warehouse projects. Practical guidelines are discussed such as starting small with a single data mart and building a business case based on return on investment. Kimball's *Data Warehouse Lifecycle Toolkit* [19] is the definitive guide to the data warehouse lifecycle

3.7 Assignments

The data warehousing portion of the course consists of five assignments plus a project described below. Each assignment focuses on a specific topic: dimensional modeling, aggregation, physical schema, ETL, and OLAP, but all of the assignments are based on the same application such that when combined the assignments constitute a complete data warehouse application. It is important for all of the students to be familiar with the application domain so they may focus exclusively on the learning objectives. An example application might analyze student performance based on a number of factors such as where the students live (dorm, apartment, home) and their study habits. The application could be motivated by suggesting that the Provost might use such a system to help students who are struggling and to proactively identify students at risk. It is helpful to describe the operational system that will be used to collect the data. A student performance application might provide a simple interface that allows each student to record how they spend their time in 15-minute increments (e.g., attending class, eating, sleeping, studying).

The assignments require each student to write a two to three page essay describing their designs (e.g., design a Star schema with one fact table and at least three dimensions other than Date and Time of Day). Because the course has been designed in part to attract IS students, hardcore programming is not required. However, the students must specify their designs at a sufficient level of detail to fully understand the concepts. Therefore, the assignments often require the students to include SQL and snippets of pseudo code in their essays.

Although we all want to encourage creativity and we would like our students to solve open ended design problems, the design assignments must be structured around a very specific set of questions to guide the students through the relevant details. Using a standard set of questions across the lectures, assignments, and exams helps to set expectations and increase retention.

3.7.1 Using the Warehouse

To evaluate the student's ability to utilize and employ a data warehouse in a problem solving situation, the OLAP assignment presents the students with a data warehouse and a set of questions to be answered based on the contents of the warehouse. For example, given a retail warehouse with sales data collected over a period of time (e.g., a week or month) the students might be asked to explain why total revenue fell below expectations. To complete the assignment

students must drill into the details to discover that the sales from a particular region or city were low which explains why actual revenue fell short. This assignment may be done with SQL or with an OLAP query tool. The assignment may be made more challenging by adding a second fact table that records the sales forecast. Students must drill across the two fact tables to compare actual revenue with forecasted revenue.

3.7.2 ETL Assignment

Slazinski [26] notes how the data warehousing course at Purdue generates source materials for other courses. We have taken the opposite approach. Students in the first database course typically develop a retail application, such as a shopping cart for an online store, complete with customers, products, and orders. The Database I course devotes one or two lectures to introducing data warehousing. The author has developed a PL/SQL package that extracts all of the orders, customers, and products from the student projects and loads the data into a data warehouse along with a dimension that records each of the student's stores. Each student executes the ETL package to populate a single data warehouse. In a previous assignment the students design a simple set of reports based on their OLTP schema. Once the data warehouse has been populated the students rewrite their reports for the data warehouse to experience the difference between a transactional data model and a dimensional model. The introductory students benefit from a deeper experience with data warehousing and the data warehousing students benefit from having a fully populated warehouse to study and explore. In addition, the PL/SQL package gives the students an example of a simplified ETL process.

3.7.3 Class Project

At the beginning of the semester the students are asked to pick a domain that interests them. Many students pick sports, especially college basketball and professional football because they want to predict the winners in the NCAA Men's basketball tournament or they want to improve their NFL fantasy football team. Other students pick domains, such as insurance or printing, that are related to their current employment. The students do not need to know a lot of details about the domain, but the domain must interest them enough that they are willing to go deep as they develop their project.

After each of the five homework assignments has been completed and discussed in the class the students must complete a similar project assignment for their chosen domain. The project requires the students to define a normalized schema for their source system, design a Star schema with at least two fact tables, define two aggregate views, define the physical schema, and define the ETL process between their operational system and the warehouse. Like the homework assignments described above, the students write a two to three page essay for each project assignment. However, the project may require some implementation or award extra credit for implementing some aspect of the system.

The final project requires a single document that pulls everything together. The final paper is weighted higher than the other project assignments and students are encouraged to apply everything they have learned to improve the sections from their earlier assignments. The final paper makes a nice addition to the student's portfolio and in some cases the students present their paper to their employers as a proposal.

Because the students choose domains that interest them they often get caught up in their domain and lose sight of the project objectives. Consequently, it is important to break the project into parts and provide feedback throughout the course to keep the students on track.

3.8 Exams

The course originally included two exams during the semester plus a final exam. The first exam covered dimensional modeling, aggregation, and the physical schema. The second exam included topics from the first exam but focused on ETL, OLAP, and Reporting. The final exam was cumulative but focused on data mining. Although data warehousing and data mining complement each other, it seems more logical to break the class into two distinct parts with equally weighted exams following each part. Eliminating the second exam has the additional benefit of saving a week of instruction that would otherwise be spent reviewing for the exam, taking the exam, and reviewing exam solutions. The next iteration of the course will be taught with two exams, a mid-term and a final exam covering: (1) Data Warehousing and Reporting, and (2) Data Mining.

Fifty percent of the data warehousing exam is based on a design problem while the other half of the exam covers conceptual questions. The design problem describes an application and provides the students with a sketch of a Star schema. The design problem draws from the standard questions that have been used throughout the lectures and homework assignments to assess how well the students are able to apply what they have learned. The students are asked to fill in details of the schema, such as identifying the measures in the fact table and identifying and justifying the best fact table grain for the application. The students may also be asked to design an aggregate schema that satisfies a particular type of analysis. Given a basic description of an operational system the students might discuss some aspects of the ETL system. Questions like, "What additional views are needed to complete this schema and why?" allow the instructor to cover advanced topics, like the implementation of dimensions that play multiple roles, without being too obvious. However, the design questions must be specific and they should come from a standard set of questions that are familiar to the students.

One of the design problems was based on an article from Inc. Magazine describing how Zipcar [27], the world's largest car sharing service, increased annual revenue from 2 million to 100 million dollars [4]. The students were given a copy of the article a week prior to the exam. This particular article provided enough detail about various decisions to present a simple data warehouse and ask the students to describe how the data may have been mined and analyzed. The students gained confidence knowing they could take an article about a real company and identify what data was captured and what analysis was done to significantly improve the business. Basing design problems on profiles of real companies ties the course back to the business value of data and reminds the students how critical a data warehouse can be to the success of an organization.

4 Student Feedback

In an effort to continually improve the course the students are given an extra credit assignment in which they may earn additional points based on the value of their feedback. The assignment is structured around several specific questions along with general comments about the course.

The biggest challenges reported by the students were disassociating from OLTP systems, understanding the dimensional model, designing a Star schema from scratch, and becoming comfortable with de-normalization. On the surface a data warehouse looks like any other database and at the beginning of the course the students experienced a good deal of interference from the transactional systems they had studied previously. Students also had difficulty defining boundaries around dimensions because all of the data seemed related. Slazinski found the concept of

de-normalization to be the “single biggest challenge facing the students” [26]. The struggle to overcome the urge to normalize cannot be underestimated.

All of the students agreed that constructing models in class was the most helpful aspect of the course. Overall the students want more examples. Several students requested examples of data transformations to illustrate the differences between operations that should be performed on data files versus operations best performed in a relational database. One student even suggested exporting example data from a legacy system. Most students agreed that the standard questions, along with the examples discussed in class, helped them recognize patterns.

Some of the students did not care for Kimball’s articles. They felt the articles were difficult to follow, the details were often sketchy, and some of the articles spent too much time promoting the Kimball Group. One student even claimed that the articles put too much pressure on him because he was driven to understand every last detail. This student felt that by trying so hard to understand the details he missed the big picture. He also reported that the class discussions helped him understand the articles and he often got more out of the articles when he reread them after class. It is important to clarify expectations around the articles and to manage the reading load carefully. Even when the expectations are well defined the better students will set high standards for themselves and read more than the assigned material. It is helpful to provide these students with a list of recommended articles in addition to the required reading.

Two articles emerged as clear favorites: Fundamental Grains [15] and the discussion on a “family of schemas” in Aggregate Navigation With (Almost) No Metadata [13]. Many students felt the articles would be a great resource in the future.

Several students mentioned the need to refresh general database techniques. The first project assignment is helpful in this respect as the students must describe the operational system(s) that will feed their data warehouse. Most students felt the project was essential to mastering the material.

A few students commented on the ETL process and OLAP. One student suggested that looking at system tables may help students better understand metadata. With respect to OLAP the students want less lecture and more hands-on experience. The next iteration of the course will include an OLAP lab.

Although most students felt the dimensional model was the most interesting aspect of the course, a few students who gravitated more towards administering a database than developing applications reported that the physical schema was the most interesting part of class and they felt they needed to work through the low level details before they fully understood the concepts.

5 Recommendations

When presenting design solutions questions are extremely important to frame and structure the material and to improve retention. Each modeling topic is introduced with a standard set of questions. For example, there are three fundamental fact table grains: transaction, periodic snapshot, and accumulating snapshot. When reviewing a particular model the questions about the grain of the fact table include:

- What is the grain of the fact table? Why?
- Why is this grain appropriate for this application?

The questions are used to evaluate the models discussed in class and the same questions are used on homework assignments and exams. The students felt these questions helped them to better understand the models and retain the key concepts.

The students unanimously felt the examples were the most helpful material covered in class. Planning out 3 - 5 examples and referring back to the examples throughout the semester increased retention because the students were able to recall how a concept was applied in an example. Database courses typically require substantial effort to develop course materials and data warehousing courses are no different.

Oracle Warehouse Builder offers many advantages to students. First, given the high price tag, this may be a student's only opportunity to use the tool. Second, the students gain valuable experience working with a graphical programming interface. Third, the complexity of the tool helps students appreciate the complexity and scope of the ETL process and data warehouses in general. Finally, developing some proficiency with OWB will most certainly increase the student's marketability.

However, OWB has considerable drawbacks. First, the learning curve is steep. Second, the tool is overkill for a class project. Third, OWB hides many details of the ETL process. Overall, students probably learn more from a hand-coded project. However, some students may want to use OWB as part of their project. If the students are going to use OWB they should start early and allow sufficient time to overcome the learning curve. OWB can be used throughout the course to explore existing warehouses, develop a new warehouse, and develop an ETL process. Most of the online help provided by the tool and the information available on the Internet focuses on the functionality provided by the tool. The instructor and the students have found few good examples of how to perform basic tasks (e.g., create an aggregate summary table). Consequently, labs and tutorials that offer a cookbook of solutions would be especially helpful for those students who wish to tackle OWB.

Although the class was specifically designed to avoid hardcore programming, it is important for the students to specify their designs in SQL and pseudo code. This is especially true when defining aggregate summary tables and developing an ETL process. The devil is in the details. Even if the students do not produce correct queries, just the experience of thinking the problem through to that level is beneficial.

Many students expect to join the dimension tables to each other; a reasonable expectation given the students background and experience with transactional systems. Therefore, explicitly showing an ER diagram to illustrate that the dimension tables only join to the fact table and walking through query execution to illustrate how the dimensions act as indexes into the fact tables reinforces the relationships between the tables and helps students to visualize how the schema supports drilling up, down, and across.

Finally, although some of the students did not care for Kimball's articles, the articles provide a practical side of data warehousing that is not typically found in a text book. Providing discussion questions with the articles helps to set expectations and focus the students on the salient details.

6 Future Directions

The author is considering the following changes to the course: (1) reposition OLAP at the beginning of the class, and (2) drop Oracle Warehouse Builder.

OLAP is currently covered at the end of the data warehouse portion of the class because it is logical to discuss data warehouse applications after the students understand how to build the warehouse. In addition, OLAP provides a nice segue to reporting. In its current placement within the course the students are quick to pick up the concepts and the discussion quickly

shifts to the limitations of SQL to motivate the need for reporting writers and query tools. Given the difficulty that students have understanding the dimensional model the author is going to introduce OLAP early in the next iteration of the class along with one or two assignments that require the students to use the Mondrian OLAP tool to explore some of the example data warehouses. This should help the students understand the dimensional model and how it is used. This will also introduce the concept of business intelligence early in the course which should help to motivate the need for data warehouses and reinforce the main themes of the course.

Students have struggled with Oracle Warehouse Builder in other classes and our experience in the data warehouse class has been no different. OWB is a complex tool with a steep learning curve and it hides many relevant details that students need to see and experience. Therefore, the course will no longer require an assignment involving OWB. The ETL assignment will be revised to design, and possibly implement, a hand-coded solution. Students who are interested in OWB will be allowed to implement a portion of their class project with OWB.

7 Conclusion

The Internet enabled one-to-one marketing which drove the desire to capture every aspect of customer behavior. It is not enough to know what items are in a customer's shopping cart; marketing demands to know when items are placed in the cart and when they are removed to better understand the factors that influence customer behavior. New advances in electronic commerce and other online services will continue to drive the demand for data, information, and knowledge. Databases will continue to grow in importance as our demands for information increase and the pressure to expand the database curriculum will continue to mount as new database technologies emerge to meet the demands.

Data warehouses form the foundation for mission critical applications that guide strategic business decisions. Consequently, universities must offer more courses to prepare students for exciting career opportunities developing, maintaining, and consuming data warehouses. This paper has described an undergraduate data warehouse course at Radford University to continue the process of defining requirements for data warehousing courses and to provide a model that will hopefully encourage others to develop similar courses.

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DATA VALIDATION

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ABSTRACT

Data validity is an important attribute of the quality of data. Invalid data can invalidate the findings of the research. The results generated from the data without validating that data can be incorrect and inaccurate. Data validation is very necessary before performing any analysis on the data. So, the researchers developed the system to check data validity based on the inherent and acquired properties of the data. The system can check several things including invalid data type, invalid values based on the type, and out of range values. The system can provide useful information about validation problems related to data objects in a data file. The system will be useful to perform the time consuming and tedious task of validating data, especially for large data files. Thus, the system will be useful for researchers, data managers, and analysts.

INTRODUCTION

Whether it is an educational or business research project, high quality of data is important for producing correct and statistically valid results. Validity is one of the important attributes of quality data. In the context of this paper, data validation is the process of explicitly checking inherent and acquired properties of data. Software using incorrect format or type would result in execution errors causing premature termination of processing. This would cause a significant loss of processing time. Incorrect and incomplete data values would cause incorrect results and subsequently incorrect conclusions. So, complete, consistent, and correct data is essential for research projects. Thus, validity of data becomes the important first step in these projects. In this paper, the researchers would like to focus on validity of the data, and developed the computerized system to check the data validity [2][6][11][15].

CONCEPTUAL FRAMEWORK

Data object can be considered as an abstract object defined by a four tuple (A, N, V, T) where A represents the address of an object in the address space of the computer system, N represents the name of an object in the name space of the software system, V represents the value of an object, and T represents the type of an object. The realization of an object means the determination of all these four entities in the context of the computer system. So, validation can be considered as the process to validate (to check the correctness of) all these four entities. However, data analysis performs analysis on data values. So in the context of data analysis, we will consider only two entities, value and type. Thus, data validation becomes the process of checking the correctness of the value and type of a data object. Type becomes an inherent property of a data object, and user specified properties become acquired properties of a data object.

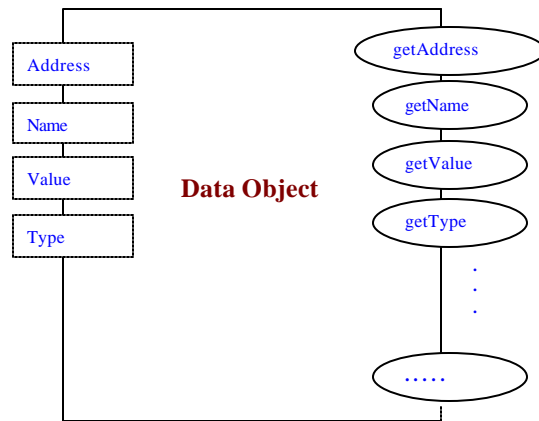


Figure 1. Model of a Data Object

To illustrate the concept, consider the example: If data object is integer type, then a set of integer values (min .. max) and five operations (+, -, *, /, and mod) are its inherent properties. However, if that data object represents age of teenagers in terms of year, then two of its acquired or specified properties could be that its minimum and maximum values are 13 and 17. In the process of validations of such a data object, its inherent property of type integer and acquired property having values in the range of 13 to 17 need to be validated.

Another acquired property of a data object could be the specified length of the values assigned to that data object. The length of the data values can not exceed the specified length, or in some cases data values must have the exact same length, even though higher length is allowed according to the data object's inherent property. A common example of such type is string. We need to check such acquired properties of the data objects.

Format of the data object could also be an acquired property. Many times, format for a data object is specified to enter data. For example, if the data object named "date" has a specific format, say "dd-mm-yyyy", then the data entered for that data object is valid only if it is in the given format even though the other formats of date may represent the same date. Additionally, if the responses for the data object are specified, then the value of the data object is valid only if it is one of the responses specified for that data object. Thus, several required properties can be specified for a data object to validate the data file [7][8][11][15][16][17][18].

DATA VALIDATION SYSTEM

Using the concepts and ideas explained above, the researchers developed the computerized data validation system. The system validates data set by checking inherent and acquired properties of data objects specified by the user. Data set is a collection of data objects. It is realized using text file, referred to as data-file. A data-file is a collection of data-lines. Data-line is a collection of data-fields. Each data-field holds a data object. So the data validation process becomes validation of a data-file. The validation of a data-file is reduced to the validation of data-fields. The model and implementation of the data validation system is explained below.

SYSTEM MODEL

The system model is essentially composed of three modules: User Interface Module, Processing Module, and Output Module.

User Interface Module

The user interface module contains the mouse and keyboard event handlers to collect information from the users regarding the total number of fields in the data-file and specifications about each fields such as field type, length, minimum and maximum values allowed for the data.

Processing Module

The processing module consists of several submodules, each one responsible for processing specific tasks, such as accessing the values of each data-field, processing the user specified properties of the data-fields, and checking if these properties are satisfied by the data objects.

Output Module

The output module is responsible for tasks such as displaying messages along with the data-field and data-line whenever the property of a data-field is not satisfied by its data object, as well as saving the results created by the processing module in an output file [2][3][7][10] [14].

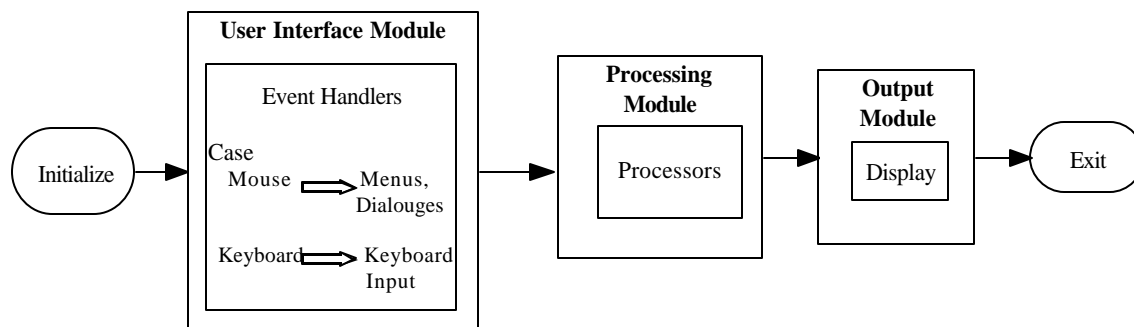


Figure 2. Procedural Architecture of the System Model

IMPLEMENTATION

A prototype of the system is implemented in the Windows environment. The graphic user interface is menu driven, and implemented as menus, using the current GUI techniques. User dialogues are implemented to collect user input as needed.

The heart of the system is the processing module that is implemented by the main processor. The processor consists of several subprocessors that are responsible for specific tasks such as processing user inputs, processing data, and performing necessary computations by applying data validation rules.

Output module is implemented by the display procedures using data aware controls. It displays the appropriate error messages about validation problem along with field and the data-line number in the user friendly format [1][3][4] [5] [9] [12][13][14].

TESTING

The testing of this system was done on more than one data set. The following screen shots show a typical user session with a data file, Main Menu, user dialogues, data-field specifications, and results of data validation. A small data-file with few data-lines was selected for easy understanding of the whole process that covers many categories of data validation.

```
"SSN" "YR"  
"1234567899" 2001  
"123456789" "X"  
"950128843" 2002  
"95013063" 2003  
"950130889" 2004  
"950134851" 2000  
"950134851" 2008  
"950134851" 2010
```

Figure 3. Screen Shot of “Data-File”

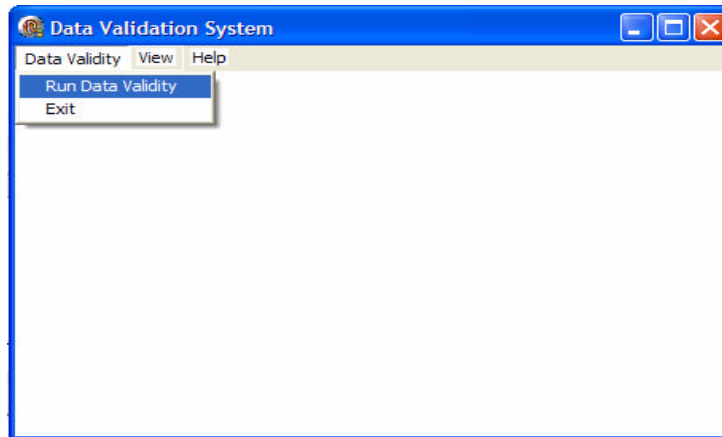


Figure 4. Screen Shot of “Main Menu”

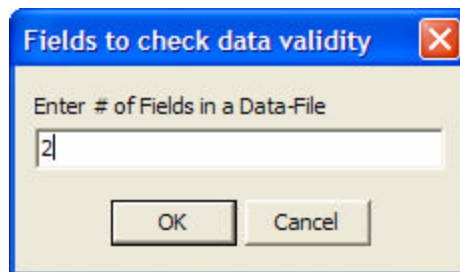


Figure 5. Screen Shot of “User Dialogue 1”

The screenshot shows a window titled "FieldSpecifications" with a blue title bar. The main content area has a light beige background and is titled "Field Specifications" in a large, bold, dark red font. Below this, the instruction "Enter Specifications for a Data-Field:" is displayed in green. The form contains four rows of input fields: "Type of a Field" with a dropdown menu showing "string"; "Length of a Field" with a text box containing "9"; "Minimum of a Field" with an empty text box and the label "Only for Integer or Real numbers"; and "Maximum of a Field" with an empty text box and the label "Only for Integer or Real numbers". At the bottom, there are two buttons: "Next Field" and "Finish". Below the buttons, the text "Current Field Number : 1" and "Total Number of Fields in a Data File : 2" is shown in blue.

Figure 6. Screen Shot of “Field Specifications”

The screenshot shows the same "FieldSpecifications" window. The "Type of a Field" dropdown menu now shows "integer". The "Length of a Field" text box contains "4". The "Minimum of a Field" text box contains "2001" and the "Maximum of a Field" text box contains "2008". The "Current Field Number : 2" and "Total Number of Fields in a Data File : 2" text at the bottom is now in blue.

Figure 7. Screen Shot of “Field Specifications”

The error file that reports errors in the data-file after running the data validation system is shown below:

```
"SSN"  
  ^ Length Incorrect  
"SSN" "YR"  
  ^ Type Incorrect  
Fields Do Not Match: Error In Line#:    1  
  
"1234567899"  
  ^ Length Incorrect  
Fields Do Not Match: Error In Line#:    2  
  
"123456789" "X"  
  ^ Type Incorrect  
Fields Do Not Match: Error In Line#:    3  
  
Correct Line#      4  
  
"95013063"  
  ^ Length Incorrect  
Fields Do Not Match: Error In Line#:    5  
Correct Line#      6  
  
"950134851" 2000  
  ^ Value Out Of Range  
Fields Do Not Match: Error In Line#:    7  
  
Correct Line#      8  
  
"950134851" 2010  
  ^ Value Out Of Range  
Fields Do Not Match: Error In Line#:    9
```

Figure 8. Screen Shot of “Results of Data Validation”

CONCLUSION

The data validation system is necessary for researchers, database administrators and analysts as valid data is important to get the correct and reliable results from the data. The task of data validation could be enormous and time consuming to do manually, especially for a large data file. Manual validation may not be as accurate as the automated process. The data validation system can provide useful information about validation problems in a data set. The system does data validation by checking the inherent and acquired properties of the data objects. The system can check several things including invalid data type, invalid values based on the type, and out of range values. The system is standalone, user friendly, menu driven and easy to use without any specific technical knowledge. The system is going to be an invaluable tool in data analysis.

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Modeling Access Rights Using the CRUD Security Cube: A Database
Proof-of-Concept Example

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Modeling Access Rights Using the CRUD Security Cube: A Database Proof-of-Concept Example

INTRODUCTION

Defining access rights is a challenge in many settings. Since a database often serves as the foundation for information systems, proper specifications at the database level can ensure that proper access rights exist within the system. How do organizations set and maintain user and group access rights to information systems in general and within databases specifically? Turnover, promotions, job and task shifts are just a few of the situations that arise in maintaining an up-to-date set of security and access rights for users and groups within organizations today. This paper describes a database implementation of access rights using the CRUD Security Cube (Lunsford & Collins, 2008).

Access Rights

Although the nature of an access right varies from system to system, most contemporary systems provide some mechanism for managing access to resources. Access rights, also known as permissions or privileges, define the types of access that a user or group has to a securable object. In many systems, access rights apply to either users or groups. In Unix systems, access rights apply to an object's owner, a group, and the world (December, 2008). In Windows systems using the NT File System (NTFS), access rights apply to users and groups (Melber, 2006). The targets resources for access rights include directories and files, devices, executables, as well as other objects (Changing Access Security on Securable Objects, 2008). Common access types include full

control, modify, read & execute, read, and write under NTFS (Melber, 2006; Eckel, 2007) and read, write, and execute under Unix (December, 2008). NTFS offers advanced mechanisms for access rights, including inheritance and the ability to deny access (Melber, 2006; Mullins, 2006; Eckel, 2007). Additionally, under NTFS the specification of access rights is either explicit or inherited. Finally, NTFS provides the ability to deny a user or group any particular access type.

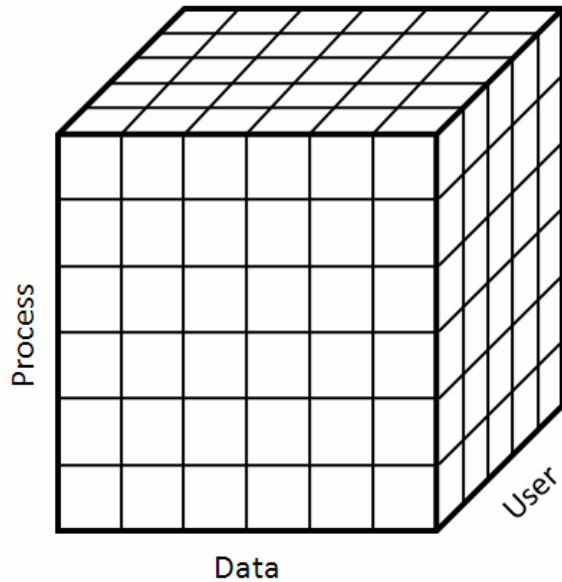
THE CRUD SECURITY CUBE

The traditional CRUD matrix provides a method for identifying the types of access system processes have to data objects. The CRUD Security Cube adds a user/group dimension to the CRUD matrix (Lunsford & Collins, 2008). This dimension documents the access rights for users or groups to processes and data. Analysts may use the CRUD Security Cube to specify security for information systems, including any setting where the user employs specific programs to access data objects.

A Database Example

The CRUD matrix assists database administrators in mapping out usage access for databases within an organization. Working from CRUD Security Cube extension, this paper develops a database proof-of-case by working through a simplified database example. First we examine the data model used for the case as well as the simplified MS Access database used in the paper. Next, we examine the use of the CRUD Security Cube in our specific example. Lastly, we detail how one can use information from the database to update a database's access rights and privileges automatically using code with Structured Query Language (SQL) calls embedded within the code.

FIGURE 1: CRUD SECURITY CUBE



Implementation

Figure 2 depicts the process employed to implement a system to establish access rights automatically based on a CRUD Security Cube.

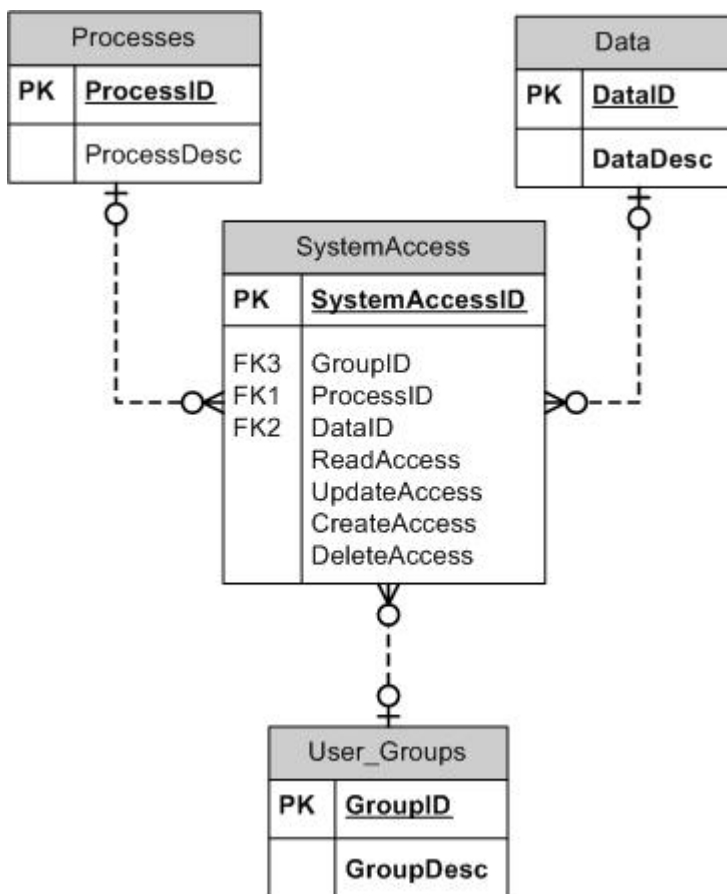
FIGURE 2: PROCESS OVERVIEW



The Case Design

Essentially a database model storing data, processes, and group information is developed. Figure 3 illustrates the entity relationship model for our simplified example.

FIGURE 3: CRUD SECURITY CUBE DATA MODEL



As you can see from the ER Model, the System Access Interaction table would contain the information with respect to creating, reading, updating, and deleting of

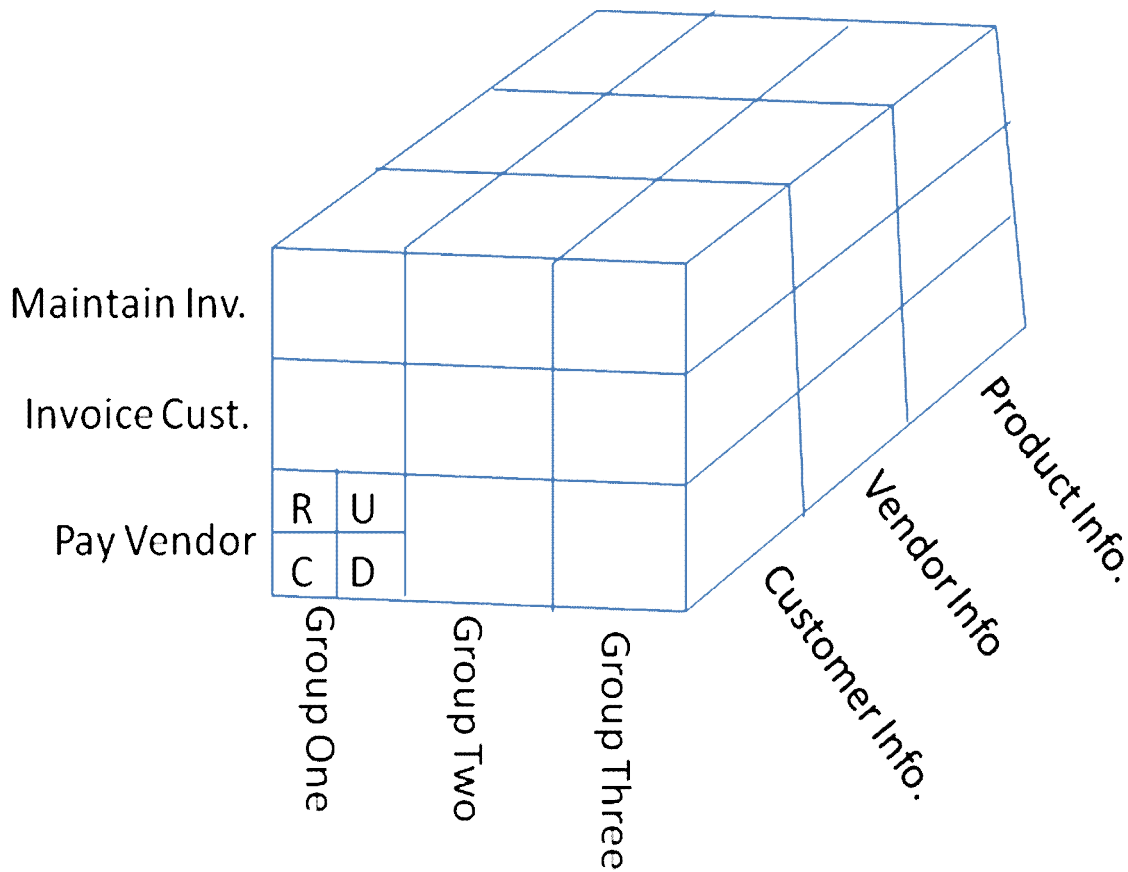
information with respect to specific processes. The information modeled in the ER model is then used to generate an MS Access database filled with information for this example. Figure 4 depicts the groups, processes, and data objects employed in this example.

FIGURE 4: GROUPS, PROCESSES, AND DATA OBJECTS

Groups	Processes	Data
Group One	Maintain Inventory	Customer Information
Group Two	Invoice Customer	Vendor Information
Group Three	Pay Vendor	Product Information

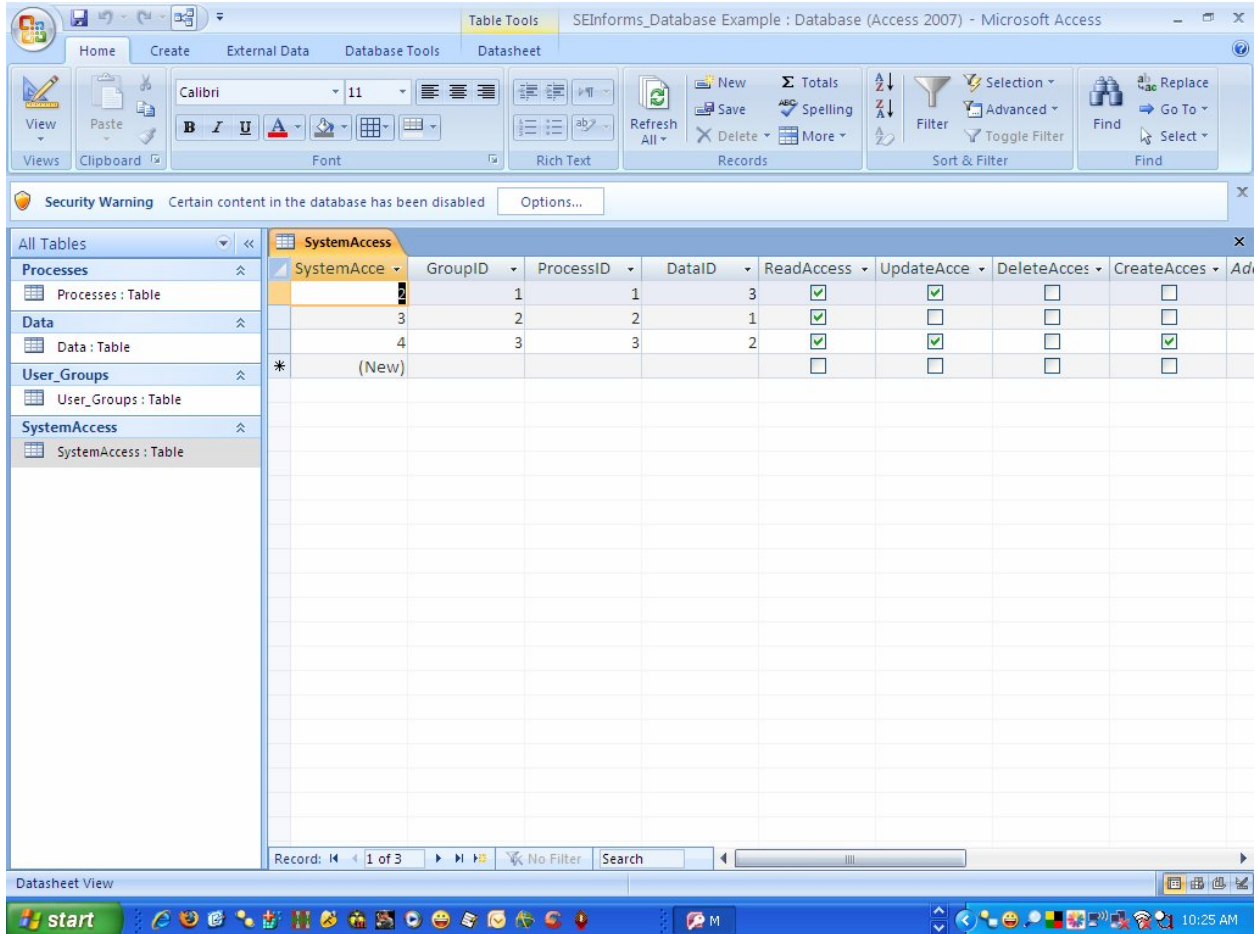
Figure 5 depicts the CRUD Security Cube representation of this data.

FIGURE 5: SAMPLE DATA IN A CRUD SECURITY CUBE REPRESENTATION



As you can see from the cube representation above, the cube allows a database administrator to break down individual access rights by group, within a process, for specific data. This information can then be entered into a database and updated as needed. Once the database is updated with the information a program can be written to pull the data and settings from the database and update the security and access rights for groups and users automatically. A snapshot of the system access table would look similar to Figure 5.

FIGURE 5: MICROSOFT ACCESS IMPLEMENTATION



Using this system access table presented in figure 5, the groups or users documented access and security privileges could be extracted and updated in a separate database using Oracle, SQLSever, MySQL, or just about any other SQL-based DBMS on the market today.

Extensions to this research

Extensions to this research could include additional proof-of-case scenarios that show the versatility of this approach to apply to any type of information system access rights' settings. In this paper we have shown a proof-of-concept example of how the CRUD security cube could be implemented within a database management systems environment. The approach proposed in this paper could be used to automate the setting of security and accessibility settings for objects with respect to data within individual processes and with respect to groups or individuals of an organization.

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SOCIAL NETWORKING AND PRIVACY: THE DICHOTOMY

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ABSTRACT

Millions of people use social networking sites daily to communicate with others. The protection of their personal information has raised many concerns about privacy. This paper discusses the actual privacy statements of several social networking sites and reports on their adherence to the five globally accepted fair practices for privacy policies.

INTRODUCTION

In today's technologically savvy society, the use of the Internet for social networking has become more and more popular for communication among friends, business partners, and many other individuals. These sites are especially popular among young adults and teenagers.

Social networks basically consist of nodes (people) and ties (connections or relationships between and among those people). Specifically, Turban et. al. define social networks as places "where people create their own space, or home page, on which they write blogs (web logs), post pictures, videos or music, share ideas, and link to other Web locations they find interesting" [11, p. 822].

Overall, the public nature of information shared on social networking sites has raised legitimate concerns for privacy issues. This paper provides some background about social networks, and then it focuses to examine one particular area of privacy, namely the privacy policies posted on several targeted social networking web sites.

BACKGROUND

The dawn of social networks has just passed its milestone 10th year. SixDegrees.com is credited as the first site recognizable as a social network. It began in 1997 and had a rather short life when, in 2000, it failed to sustain itself as a business and thus closed [2].

The next social networking wave began in 1999 with LifeJournal, AsianAvenue, and BlackPlanet. A few new sites appeared in 2000 through 2002. Then in 2003 several social networking sites, including MySpace and LinkedIn launched. In 2005 Yahoo! 360, YouTube, and Facebook (the high school networks) were a few of the more popular social networking sites that began. Finally in 2006, Windows Live Spaces, MyChurch, Facebook (corporate network) and Facebook (everyone) were launched [2].

The popularity of social networks is growing at a very rapid rate globally. For example, in a scant two years, MySpace gained over fifty million members [3]. Online profiles for users typically contain a myriad of personal information, including name (or pseudonym), age (or birthday), hometown, interests, "about me," and photographs. They can also include religion, ethnicity, and any other identifying

information about the person. All this information is willingly and knowingly uploaded by the individual member. The visibility of a user's profile information varies by web site and at the discretion of the user. As members, users are urged to identify other persons in the system with whom they have a relationship, defined loosely with various categories such as Friends, Contacts, Followers, or Fans [2]. Research from the Pew Internet & American Life Project states that 91 % of teens in the United States who use social networking sites do so to connect and socialize with their friends, and 49% of users say they do so to make new friends [8]. Overall, social networks create differentiation by structural differences regarding visibility and access [2].

The visibility and access to personal information, characteristic of social networking web sites, raises the issue of privacy. As millions turn to these sites for social relationships, serious concerns about privacy have emerged. Some of these areas include identity theft, attraction of sexual predators, governmental data collection, marketers' use of information, college admission use, school usage, and employer or future employer utilization of information from these sites. For example, schools have disciplined students who make derogatory statements about teachers or show pictures of inappropriate student behavior. Beyond these consequences, students may be putting their reputations and their future careers in jeopardy. Many wonder how a generation so Internet savvy can be so naïve concerning the issue of their privacy [6].

Marketers can gather personal information from social networking sites and use it for purposes beyond that which the social network user intended. For instance, the personal information can be used for commercial purposes [1]. The threat of sexual predators online already has some facts to substantiate the claim. In Connecticut, police reported that several girls had been sexually assaulted by men that they met on a social networking site [3]. Survey data has shown that a complete stranger has contacted 43% of teens on social networking sites. Also 31% of the teens reported having individuals listed as friends on their social networking profile despite the fact that they had never personally met them [8]. This could be a potentially fatal danger for unsuspecting youths.

Employers are using social networks to gather both insights about prospective employees and to learn about or monitor existing employees. Inappropriate words and pictures on a social network, if viewed by a prospective employer, can portray an image of a candidate that is less than desirable and thereby affect his or her chances of being offered a job. Of course time spent in social networking while at work can lead to a decrease in employee productivity. If the social networking is being done for business purposes, this should be limited to certain employees and have a time limit per day for instance. Corporate sales have been claimed to increase through social networking. If the purpose of the social networking is to exchange professional information, then corporate secrets must be protected with clear guidelines concerning this issue. Overall, corporate policies addressing all aspects of social networking by employees will help to improve the effectiveness of using such sites [9].

And finally, it has been recognized that social networks need privacy policies that provide the same social privacy protection online that is found offline, given that most offline social transactions do not leave a trace [5]. The importance of this issue cannot be overlooked or overstated.

RESEARCH METHOD

The number of online social networks is in the hundreds. Since this is a pilot study, the sample analyzed for this paper includes only a few of the most notable social networking sites rated by popularity. Specifically, to be chosen for review, the sites had to have at least 10,000,000 registered users, have open registration, and not be primarily based in countries outside the United States. The overall list of social

networking sites was obtained from Wikipedia in April 2008 and contained 118 web sites [12]. After narrowing the sites, seven privacy statements were analyzed. These social networking sites are the most popular, and thus their privacy practices are assumed to give valuable insight about the actual privacy afforded most social networking users.

The globally recognized components essential for an effective online privacy policy are Notice, Choice, Access, Security, and Enforcement. Since these are the globally accepted primary fair practices, compliance with them will be the focus of this study. Each one of these elements provides a dimension of privacy protection for the user. Specifically, the five areas are defined below.

Notice informs the user what information is gathered, how it is used, and whether the site shares the information with others.

Choice declares whether the user is allowed a voice in the amount of information gathered and how that information may be used.

Access deals with providing the user a means to review collected data and correct it if needed.

Security refers to how information is safeguarded, along with other issues relating to integrity of information and to the site's computer related practices.

Enforcement relates to consequences imposed for breach of the fair practice elements [7][4][10].

RESULTS AND DISCUSSION

Each element of the fair practices, recognized universally as essential to a privacy policy, was evaluated for the social networking sites that comprise the pilot sample. The specific sites analyzed and their number of registered users are in Table 1 below.

TABLE 1: SOCIAL NETWORKING WEB SITES IN PILOT SAMPLE

Name	Registered Users
Classmates.com	40,000,000
Facebook	97,800,000
Imeem	16,000,000
LinkedIn	20,000,000
MySpace	110,000,000
Tagged.com	30,000,000
WindowsLiveSpaces	40,000,000

Of these, it can be seen that Facebook and MySpace are extremely popular social networking sites. Overall, each social networking site had a privacy statement link on its home page. Regarding Notice, each one told the user what online information was collected and how that information was used. Table 2 below gives the items commonly listed as collected in the privacy policies.

TABLE 2: COMMONLY COLLECTED INFORMATION

Name
Address
Phone Number
e-Mail Address
IP Address
Credit Card Number
Site uses information to make a user personal profile
Site tracks information about pages the user visits

Classmates.com and Windows Live Spaces collected all of these items. The social networking site, imeem.com, declared collection of the fewest number of items, specifically address, e-mail address, and IP address. Four of the sites asked for one’s birthday, and another one asked directly for one’s age. Notice of other information collected on one or more social networking sites included gender, marital status, community affiliations, hobbies, schools, lifestyle, eye color, personality type, social security number, driver’s license number, sports, food, and TV shows. If a user gives all this information, certainly a revealing personal profile can be established, and a generous measure of privacy lost even to the point of possible informational use for identity theft. It is also prudent to point out that all sites, except LinkedIn, stated that information was collected in the “such as” format, and thus disclosure of types of information was not exhaustive. Some sites just chose to reveal more of what was collected than others did. Only Classmates.com specifically stated that the user was no longer anonymous since information was publicly displayed and could appear in search engines. MySpace.com, Windows Live Spaces, and Classmates.com also gave Notice that they can supplement information given by the user with information received from third parties. Facebook.com declared that it may collect information from other sources such as newspapers, blogs, and instant messaging.

All of the sites told the user how their information is shared. As expected, all sites stated that information was shared in response to requests from the law. All except imeem.com stated sharing with partners, and all but Classmates.com declared sharing in order to protect the site and its interests. Furthermore, four social networking sites, specifically Classmates.com, imeem.com, Tagged.com, and LinkedIn.com, stated that no individually identifiable information is shared with any third party. Finally, all sites discussed privacy relating to children. They either declared compliance with the Children’s Online Privacy Protection Act or stated that the site does not knowingly collect information from children. One site, Classmates.com, declared both.

The issue of Choice was somewhat difficult to discern in some of the privacy policies. This element deals with whether a user has a “say” in how their information is used. No social networking site declared total user control of their personal information. This issue could be classified as a “partial say” when it only provides an opt-out choice regarding e-mail promotions, e-mail address sharing, or how the site communicates with the user. Only MySpace.com declared an opt-out of information collection by other companies. And imeem.com did not directly address the issue of Choice.

In aggregate, the coverage of the element of Choice was rather discouraging. When addressed in the privacy policy, it really only provided the user with a “partial say” to opt-out of very limited areas that basically involved business communication and promotion. And although MySpace.com declared an opt-out choice for collection of information by other companies, nothing was addressed on any of the social networking sites to stop the selling of personal profile information to outside companies. Some

information was mandated in order to use the respective site, and this somewhat negates the issue of Choice other than the option to not use the site.

By the very nature of social networking sites, the user has Access to view the information collected and stored about him or her. Additionally, the member has an online means of correcting inaccuracies in the information collected about him or her. One site, Facebook.com, additionally stated that changed information might exist in backup copies for a reasonable time although the exact length of that time was not declared.

Three of the social networking web sites clearly stated that they could not guarantee 100% Security, and four included a statement that reasonably ensured security and integrity of information collected by appropriate industry practices. However, little elaboration of provisions with specific details was given. One item that all sites did declare was the use of “cookies,” with five sites stating persistent “cookies” were placed. All but one site, LinkedIn.com, told users that their browser could be set to reject “cookies.” Third party “cookies” were allowed for placement by all of the social networking sites. Finally, there was very spotty information about storage and transmission of information, a vitally important area by the very nature of social networks. Only Facebook.com and imeem.com declared storage of information on a secure server. Five web sites, excluding MySpace.com and Tagged.com, stated the use of Secure Socket Layers (SSL) to transmit information.

And finally the element of Enforcement is reported. The social networking sites, Classmates.com, Facebook.com, Windows Live Spaces, and LinkedIn.com, acknowledged enforcement by self-regulation and by use of TRUSTe, an independent, non-profit organization, as recourse for unresolved issues regarding privacy practices. In actuality, however, all web sites can be held to their posted privacy statement, whether it specifically mentions Enforcement or not.

In summary, web sites need to pay attention to all five elements of fair practices for privacy statements. For social networking web sites this presents a dichotomy because of the very nature of information sharing done to establish relationships via these web sites. From this pilot study of assessment of the actual privacy statements currently in use, some social networks protect privacy better than others do. Users beware definitely holds true. There are choices as to which social network to join. A strong message concerning the importance of privacy would be sent if users become informed and choose those social networking web sites that offer the best protection of their privacy.

CONCLUSION

There is no way around the issue of privacy when personal information about people is at the center of social networking sites. This pilot study regarding privacy statements and their adherence to the globally accepted fair practices, namely Notice, Choice, Access, Security, and Enforcement, focuses the spotlight on what these sites are currently doing to meet the standards. All the social networking sites reviewed could improve their respective privacy statements to achieve full compliance to the five standards.

Privacy must be addressed in a satisfactory manner to protect those using the social networking web sites. The concept of privacy and its protection is a challenging legal issue today for these sites. As technology pushes the envelope, much is to be learned and defined in the future relating to social network visibility, access to personal information and the protection of privacy while using social networking web sites.

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Tips and Tricks for using Office 2007

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ABSTRACT

This will be a panel discussion led by three faculty, but it will include a great deal of audience participation as each shares respective experiences of using and teaching students with the new versions of Word, Excel, PowerPoint and Access in Microsoft Office 2007 Suite. The intent is to provide useful information (tips and tricks) for those who are currently using these products, while at the same time providing information for those who are just making the transition as well as those who are deciding whether to make the transition or not.

SESSION DESCRIPTION

Many who have adopted the new Microsoft Office 2007 packages have initially found the transition to be difficult because so many things have changed in how the user gets to what he or she wants to do. Hence this has not been a pleasant experience for experienced Excel users. Also Office 2007 has new capabilities that were not in previous versions. The session will focus on providing information about how to perform tasks in Office 2007 along with its strengths and weaknesses. This will be an open forum led by individuals with experience using the 2007 versions of Word, Excel, PowerPoint and Access. The panelists will present their experiences and members of the audience will also be encouraged to ask questions and to contribute their experiences as well.

OFFICE 2007

Office 2007 has been redesigned. No more menus and submenus with hidden dialog boxes. Commands are now more visible on tabs and contextual tabs appear as needed. The tasks that existed in 2003 are still there, however learning the new navigation may take awhile causing frustration and limited productivity until the new ways are learned. The new features of Themes, SmartArt, and enhancement of other commands certainly will be beneficial to many but others feel former good features like the wizards are greatly missed. Microsoft Access is perhaps one of the most impacted components of Office 2007 both from an aesthetic and a functional point of view since not much in Access 2007 has remained the same. To some, it is the one application where 2007 is well worth the change from 2003.

The panelists will discuss features they have found to be useful and how to get to them. And discuss some of the frustrations of features that they feel do not function as well.

A CROSS-CULTURAL INVESTIGATION OF CONSUMER MEDIA CHOICE

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ABSTRACT

Information Communication Technology (ICT) continues to expand, creating new ways to communicate and conduct business. Consumers have more choices than ever before. They can conduct business at any time and any place using a traditional brick-and-mortar store, a land-line telephone, an Internet connection over a PC or a mobile (cell) telephone. A survey was conducted on 195 individual consumers in China and US. There were several significant results showing that the consumers' security concerns, privacy perceptions, innovativeness, individual characteristics, culture dimensions and tasks types played an important role in their decision to use certain media. The results also show significant differences in consumers' media choice in the two cultural settings. The findings provide practitioners specific information to identify and target groups of consumers who have a strong preference for specific commerce media.

INTRODUCTION

Information Communication Technology (ICT) continues to expand, creating new ways to communicate and conduct business. Many studies have examined why people select one communication medium over another (Daft and Lengel, 1986; Lee, 1994). Previous research has conducted experiments to compare face-to-face communication with telephones, e-mail, postal mail, and fax machines. Today, the average person has several choices when it comes to communicating or conducting business. While there is always the option of dealing with someone face-to-face, one can also e-mail, fax, write a letter, call on the telephone or call on a mobile phone or Blackberry.

Research articles have been written on the reasons people select a particular form of communication medium over another. Several factors have been found in prior literature as determinants of people's media choice. Some researchers suggest that the amount of richness inherent in a medium is the reason people select it. Most people agree that face-to-face is the richest medium, since people not only hear the message, but also receive other signals in the form of facial expressions, tone and body language. Some say that the task or urgency is the primary determinant. Straub (1998) determined that workers, who needed to communicate information immediately, chose an electronic method such as email since it also kept a record of time and history of conversation. Other factors that have been suggested are the user's social environment and the fit between the task and the medium. In addition, the theoretical relationship between individual characteristics and intention to use certain types of technology has been discussed in many social, psychological, management and MIS studies. Besides, consumer innovativeness, security and privacy perceptions are also viewed as important factors affecting media choice.

Consumers now have more choices than ever before. They can conduct business at any time and any place using a traditional brick-and-mortar store, a land-line telephone, an Internet connection over a PC or a mobile (cell) telephone. Consumers own personal characteristics seem to influence their choice of media. Comparative studies suggest a relationship between culture and technology use (Straub, 1994; Carlson et al., 1999). In an increasingly global world, many practitioners are also faced with the challenge of offering usable and useful applications to the local users (Khaslavsky, 1998). Numerous factors contribute to international differences among people and businesses, including a country's

physical and demographic factors (e.g., infrastructure, economic situation, language) and cultural aspects (e.g., value, norm) (Ford et al, 2003). Cultural aspects influence the typical ways in which technology applications are used within a country, above and beyond the tangible factors (Zakaria and Stanton, 2003). Given the above background, this research project seeks to investigate the following questions:

- *What are the factors affecting an individual's choice of media in a business environment?*
- *Does consumer media choice vary in different cultures?*

THEORETICAL DEVELOPMENT

Previous research has been performed in several areas of media choice. Daft and Lengel proposed in 1986 that organizations must process information to perform tasks. They identified two information contingencies: 1) uncertainty meaning the absence of information and 2) equivocality meaning ambiguity, confusion and lack of understanding. Communication media is measured by its capacity to process rich information. The richest method is face-to-face followed by telephone, personal documents such as a letter addressed to you personally, and impersonal written documents. Richness differences are based on the medium's capacity for immediate feedback, the number of cues and channels utilized, personalization, and language variety. Lee (1994) proposed that e-mail has the attributes that would allow it to be a rich medium. King (1997) performed a longitudinal study of MBA students and found they preferred to use face-to-face, group meetings and telephone over newer technologies such as email, voice mail, fax or answering machine. She also found that the student's preference was associated with the amount of prior skill and usage the student had with the new technology. Furthermore, she determined that as usage of a new medium increased, usage of the older medium decreased. Table 1 summarizes key studies in media choice and lists the variables that were investigated.

Table 1: Empirical Studies of Media Selection

Variable	Article
Individual differences	Trevino, Lengel, Bodensteiner, Gerloff, Muir (1990a)
Perceived attitudes and behavior of communication partners	Fulk, Schmitz, Ryu (1995)
Geographic dispersion	Trevino, Lengel, and Daft (1987) Steinfield and Fulk (1986)
Media experience	Rice, Kraut, Cool, and Fish (1994) King (1997)
Task	Steinfield (1985), Rice (1992), Donabedian (1998)
Media richness	Schmitz and Fulk (1991), Markus (1994), Rice (1992)
Message equivocality	Daft, Lengel, and Trevino (1987)
Environmental task complexity	Culnan (1983)
Ease of use	Culnan (1984) Adams, Nelson, and Todd (1992)

Based on prior literature, we selected six major factors which are frequently cited in media choice research and proposed the following research model:

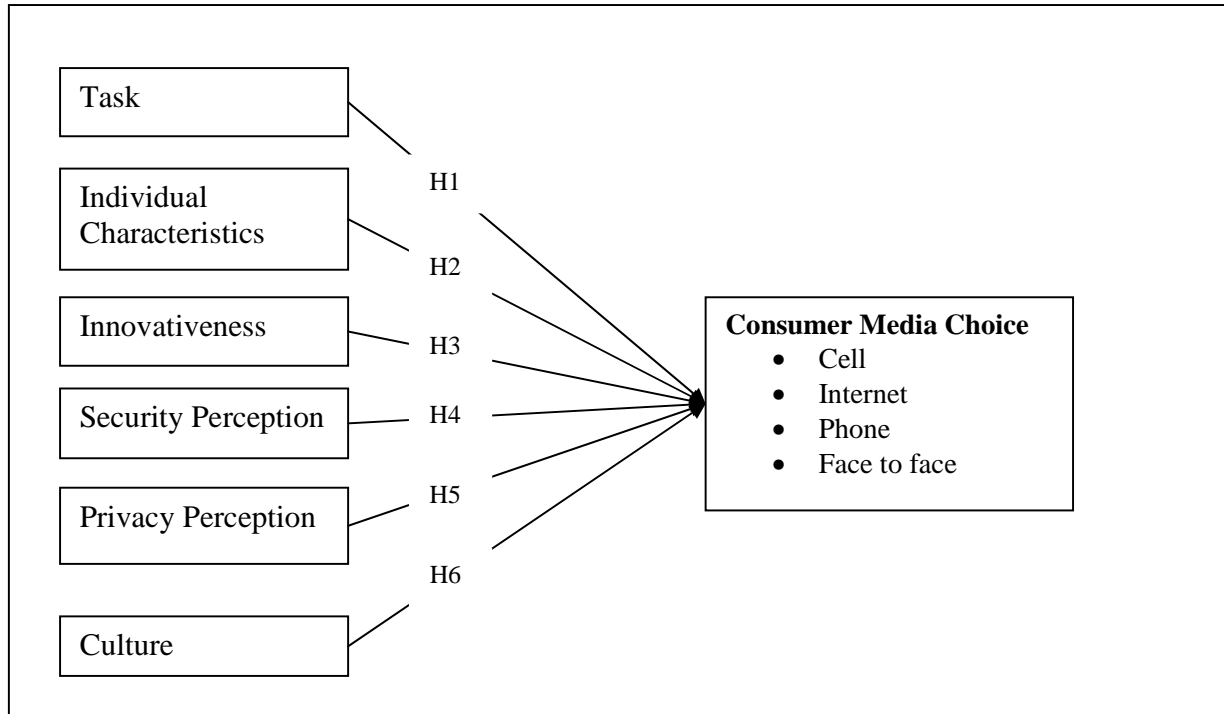


Figure 1:Proposed Research Model

Task Types

In previous research, Daft and Lengel (1986), has treated task type as a dichotomous variable, in which task was characterized based on two variables, uncertainty and equivocality. These two characteristics have been cited by most previous studies on media choice. However, almost all previous studies have focused on the organizational information processing tasks. There are very few studies focused on an individual users’ media choice when they are conducting business and related activities. This paper categorizes the task into five categories: Social Communication, Commerce, Entertainment, Information Search, and Banking. This categorization of tasks was influenced by the study of Chau et al. (2002) on online consumer behaviors. This classification has been previously applied in many technology adoption and diffusion studies. Each of the following task types would have different characteristics in terms of uncertainty and equivocality.

- Social communication: This task identifies that the individual consumers use different media to meet new people, to join a chat room, to influence a group, and to join a group.
- Commerce: This type of task includes activities such as buying/selling goods or services, to make money, and to advertise via different media.

- Entertainment: Entertainment is composed of a range of activities including listening to music; watching a movie; getting ring tones and logos; playing games and chatting via different business methods.
- Information Search: This category includes people adopting different media to look for information related to educational, employment, product, life and work needs.
- Banking: The banking category includes such tasks as making payments and getting financial services that could be conducted through different types of media.

The following hypothesis is offered.

Hypothesis 1: Task is associated with consumer media choice

Individual characteristics

Proliferating media choices and specialized target markets have led to an increased focus on linking media and target market characteristics (Cannon, 1993). The knowledge of the relative concentration of target markets in each medium as well as audience motives and preferences, will undeniably drive media planners to effective media strategies. (Yoon and Kim, 2001). The theoretical relationships between individual characteristics and intention to use certain types of technology has been discussed in many social, psychological, management and MIS studies. Previous IS research suggests that individual differences affect the type and extent of technology use (e.g., Bhappu et al, 1997; Benbasat et al, 1993). These differences are likely to extend beyond interacting with computers to using media in general (Chidambaram, 2001). The customer's characteristics that are investigated in this study include: age, gender, and educational background.

Hypothesis 2: Individual characteristic is associated with consumer media choice

Innovativeness

Consumer innovativeness has been used to study adoption behavior of new products and services (Wood and Swait, 2002). Innovativeness is often identified as a personality construct (Hirschman, 1980; Venkatraman and Price, 1990; Wood and Swait, 2002) and has been employed to predict consumer innovative tendencies to adopt a wide variety of technological innovations. The Citrin et al. (2000) study finds that innovativeness predicts consumer adoption of Internet shopping. Furthermore, recent studies on consumer adoption of wireless application protocol (WAP) indicate that personal innovativeness can predict adoption of M-commerce (Hung et al., 2003). Therefore, we propose:

Hypothesis 3: Innovativeness is associated with consumer media choice

Security

Security has an important bearing on intention to adopt a particular information technology. Security refers to "the policies, procedures, and technical measures used to prevent unauthorized access, alteration, theft, or physical damage" (Laudon and Laudon, 2003). Salisbury et al (2001) define perceived web security as the extent to which one believes that the World Wide Web is secure for transmitting sensitive information. With regards to security concerns of online consumers, consumer perceptions of unsatisfactory security on the Internet continue to exist even when vendors undertake security enforcement mechanisms (Miyazaki and Fernandez, 2001; Zellweger, 1997). Udo (2001) indicates that security concern is one of the main reasons users do not purchase over the Web. In the mobile context,

failing to provide a secure system will significantly dampen consumer adoption rates (Ghosh and Swaminatha, 2001). Therefore, we believe security perceptions play important role in consumers' decision to use certain type of media when they conduct business activities.

Hypothesis 4: Security perception is associated with consumer media choice

Privacy

Warren and Brandeis (1890) defined privacy as “the right of an individual to be let alone”, which is the definition that many authors still recognize (Stahl, 2004). Dutta and Macrohan (2002) distinguished the concept of privacy and security. They indicate that “privacy” deals with the degree of control and that entity, whether a person or organization, has over information about itself, while the “security” deals with vulnerability to unauthorized access to content. The privacy of consumer information that is collected for commercial purposes is seen as a distinct consumer right from both legal and ethical perspectives. In addition, the secure storage and transmission of consumer information is seen as an integral step in maintaining privacy (Miyazaki and Fernandez, 2001). Websites require personal information from users for purposes such as membership, newsletter subscription, feedback forms, order forms, etc. Consumers have worried for years about how personal data is used by government and more recently, by business (Udo, 2001). Besides, the growing body of consumer-oriented internet research that is focusing on privacy and security related issues (Milne, 2002) suggests that these issues may play a significant role in developing of online retailing (Miyazaki and Fernandez, 2001).

Hypothesis 5: Privacy perception is associated with consumer media choice

Culture

There have been numerous efforts to identify human cultures and cultural differences in many fields, ranging from anthropology to cross-cultural psychology (Hofstede 1980). Hofstede defines culture as “the collective programming of the mind which distinguishes the members of one group from people from another.” Culture can be conceptualized as a set of significant variables that informs the responses of individuals in that culture to new ideas, practices, and technologies, including mobile data services (Choi et al, 2005). In cultural research, culture is always viewed as a collective phenomenon. People learn patterns of thinking, feeling, and potential acting from living within a defined social environment, normally typified by country. As such, culture represents “mental programming” which partially predetermines a person's behavior. Individual consumer tastes and purchasing patterns are thus partly determined by the collective values of their local community. Negative and positive consumer reactions become more understandable and predictable when a person's cultural context is taken into account (Chau et al, 2002). Comparative studies suggest a relationship between culture and technology use (Straub, 1994; Carlson et al., 1999). Rowe and Stuck (1999) applied Hofstede's five cultural dimensions to their studies on medium choice, in which they confirmed that media choice is associated with different cultural values.

Hypothesis 6: Culture is associated with consumer media choice

RESEARCH METHOD

This study is aimed at identifying the key determinants of a customer's choice of different commerce media in two different cultural contexts: China and United States. The survey method was utilized for this

research study. Based on appropriate tasks representing appropriate levels of task characteristics, we created 10 task scenarios that cued respondents with five commerce related tasks.

Measures

The items used to measure consumers' media choice under certain task scenarios were simple statements for which the participants were asked to indicate their likelihood to use a certain medium on a seven-point Likert scale, (checking 1 for strong dislike, 7 for strong like and a higher number indicating stronger liking). Others measures were generated from literature review on media choice, technology acceptance, and innovation adoption. There were also some measures taken from an MIS survey instrument on the AIS would website.

Pretest

The survey instrument was tested on several experienced mobile/electronic commerce users who were college students in the city where the questionnaires were to be distributed later. The aim of this pilot survey was to test the feasibility of the instrument and gain qualitative feedback from the respondents. Based on this feedback, changes were made to improve the layout of the survey form and the phrasing of some survey questions.

Pilot study

A pilot study was conducted at one big university in the United States. Sixteen respondents (students and faculty) were asked to complete a questionnaire. At the same time, the questionnaire was distributed to 14 international students outside the USA. The respondents gave verbal and written feedback upon completion of the survey. They were asked to make notes on the surveys of items that were unclear. Minor changes were made to the questionnaire from this feedback.

Data Collection

The revised questionnaires were distributed in a major southern university in the US. A total of 89 respondents filled the survey in the US sample. The English version questionnaire was subsequently translated into Chinese-Mainland version for data collection. The Chinese version questionnaire was distributed through an email list by one of the investigators to people in several large cities in China. One hundred and nine responses were collected from the Chinese sample. After removing bad data, finally we ended up with 89 responses from the US and 106 from China.

DATA ANALYSIS AND DISCUSSION

Reliability

Measure reliability was assessed using internal consistency scores, calculated by the composite reliability scores (Werts et al. 1974). Internal consistencies of all variables are considered acceptable since they exceed .70. Reliability tests show that all constructs were reasonably reliable except for security concerns. The detailed results are displayed in Table 2.

Table2: Reliability

VARIABLE	RELIABILITY (α)
Innovativeness	0.7726
Privacy perceptions	0.8173
Security concerns	0.5326
Cultural Dimension	0.7078
Media Choice	
Likelihood to use cell phone	0.7945
Likelihood to use land telephone	0.8706
Likelihood to use high speed Internet	0.7831
Likelihood to use face-to-face	0.8250
Total	0.8453

Confirmatory Factor Analysis

Construct validity focuses on the extent to which data exhibit evidence of convergent validity, discriminate validity, and method effects; it is often examined using the general confirmatory factor analysis model (Bryne, 1998). For confirmatory analysis, we used LISREL 8. We did not employ individual characteristic and culture factor in the factor analysis because there are several categorical variables under these two factors. The analysis indicated privacy perception, security concern and innovativeness factors all had reasonable fit.

Hypothesis Tests

The MANOVA test shows that there are significant differences of likelihood to use different media among various tasks: social events, information search, shopping, entertainment, and banking. The significance level is 0.000 in this test. Therefore, the hypothesis 1 is supported.

We found there are differences among people’s media choice in two gender groups. Comparing to female consumers, male consumers are more likely to use internet and face-to-face method to perform tasks. The results also show that people less than 25 are more likely to use cell phone, internet, and face-to-face to perform tasks compared to people older than 25 years. The tests for different income groups showed that people who have lower income (less than \$1000 per month) like to use cell phone and land line phone to perform tasks while people who have higher income (more than \$1000 per month) are more likely to use the internet and face-to-face method for business activities. These results validate hypothesis 2.

We found that innovativeness only has an impact on people’s choice to use internet to perform various commerce related tasks. The p-value for the regression from innovativeness on likelihood of people’s choice to use internet is 0.004. This supports hypothesis 3.

The results show that security issues have significant impacts on the likelihood of people’s choice to use cell phone and face-to-face method to perform tasks. We found that there is negative impact on people’s likelihood to use cell phone while there is positive impact people’s likelihood to use face-to-face. The significant values for these two regressions are 0.076 and 0.084. Given the higher p values, hypothesis 4 is only partially supported.

Regressions results show that privacy issues have significant impacts on the likelihood of people's choice to use internet and face-to-face method to perform tasks. There are both positive impacts on likelihood to use internet and face-to-face methods to perform commerce tasks. The significant values for these two regressions are 0.044 on the choice of internet and 0.000 on the choice for face-to-face. Accordingly, hypothesis 5 is supported.

An independent samples test with US and Chinese samples shows that there are significance difference between an individual's media choice when performing a specific task. The US people are more likely to use cell phone for social activities, but Chinese people like to use landline phone and the internet. The Chinese are more likely to use the internet to search information. There is no difference among people's media choice for entertainment between the two countries. The Chinese people are more likely to use cell phone, landline phone and face-to-face media for banking tasks while the US consumers prefer internet banking. Some of these differences can be explained by Hofstede's cultural dimensions, but not all. Compared to the US, China has higher levels of uncertainty avoidance and power distance. China also rates higher on collectivism and lower on individualism. Phones (land line or mobile) and face-to-face communication allow for greater social interaction than the Internet, thus preferred in china. Our findings thus provide significant support for hypothesis 6.

CONCLUSION, LIMITATION, AND FUTURE RESEARCH

The contribution of this study for practitioners is to help business vendors identify and target groups of consumers who have a strong preference for specific media, especially the emerging technologies. The idea of whether certain media should be provided to all customers for all products and services is too expensive and formidable for developing effective marketing strategies. Corporations continue to evaluate how individual products and services should be offered for specific consumer groups based on their individual characteristics (Frolick and Chen, 2004). Our study provides evidence that various factors need to be considered to focus on target consumers in two different cultures. It would help companies in preparing strategies for different consumers according to their choice to perform various tasks with certain media. Furthermore, the results are applicable to companies considering overseas expansion. A better understanding of how cultural distance may affect consumer evaluation of different media can uncover ways to localize a global interface. Knowing customer preferences would help fine tune aspects of customer relationship management and market segmentation strategies.

Our study yielded meaningful results; however, some limitations need to be noted. The validity of our results depends on the attributes of the surveyed subjects. We used student data to inform our analysis. The student samples are not completely representative of all users. However, students are more open to the kind of innovations found in mobile phone services and are the first to adopt such innovations. In addition, the generalizability and detailed analysis of the results may be limited by the sample size. Thus future works may focus on larger sample sizes from representative consumer bases.

There are several future research directions to pursue. For example, a more detailed and micro level examination of the factors affecting customer media choice would reveal more practical information for marketing professional and researchers. An insightful examination of the reasons for low preference for certain technology-based media may spur research and development in improving these media. Other interesting work would be welcome in the cultural context. While we provided a starting point for cultural differences, a carefully planned research agenda could be initiated to examine various cultural nuances in a host of different countries.

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**HEALTHCARE TECHNOLOGIES: EVALUATION AND USE OF COMPUTERIZED
PATIENT MEDICAL RECORDS AND OTHER TECHNOLOGY**

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ABSTRACT

Information Technology has a very important role in the delivery of quick, high quality healthcare services. This paper will look at some current and possible future uses of Information Technology in the healthcare environment as well as some of the associated pros and cons that result from their implementation. This paper will examine Strategic Healthcare Decision Support Structures/Systems (SHDS), Knowledge Management (KM), Computerized Physician Order Entry (CPOE) and Computerized Patient Medical Records (CPMR).

INTRODUCTION: BACKGROUND AND COMPLEXITY

Information Technology (IT) allows companies to create, process, analyze, store, protect, retrieve, and communicate information. When applied to Health Care, IT can enhance patient and hospital safety, improve efficiency and effectiveness and raise equity.

The establishment of Medicare and Medicaid in 1965 made the Federal Government the health care industry's largest consumer and changed the mission of hospitals from charity-care institutions into business organizations concerned with revenue. The reason for the transformation is because prior to 1965 all patients either paid for their services or an insurer covered the cost of healthcare. After the introduction of Medicare and Medicaid, the federal government became responsible for millions of citizens who previously could not afford healthcare insurance or were not able to obtain coverage. What this did to the healthcare industry was in effect make the federal government their customer. In the period from 1965 to 1983 the federal government noticed a sharp increase in national healthcare expenditures. Regulations such as the diagnosis-related grouping (DRG) reimbursement scheme for Medicare and Medicaid patients in 1983 were enacted by the government as a means of containing the rising costs of healthcare (Menon & Lee, 2000). Prior to 1983, hospitals were reimbursed for services on a cost-plus basis. What this means is that the hospital is reimbursed by the federal government the exact amount that it cost the hospital to perform a procedure plus a percentage. The DRG reimbursement scheme groups all procedures into over 500 different groups and then places a weight on each type of procedure. The hospital is reimbursed a flat fee based on an average derived from the weight assigned to a procedure and the cost of procedures that fall within a particular DRG. Changing regulations, Medicare, Medicaid, changing payment schemes and Health Maintenance Organizations have forced the health care industry to become more cost conscience and thus seek mechanisms to improve efficiencies. As a result, spending on Information Technology to improve efficiency has increased dramatically. IT was first introduced to health care to support business functions, primarily accounting and finance, however, they are increasingly finding their way to the "Point of Care", where physicians, nurses, and other care givers meet with the patient.

The formation of Health Maintenance Organizations has forced the healthcare industry to seek more efficient methods. Spending on information technology and other mechanisms of improving efficiency has increased dramatically. Information technology first began to be used into healthcare primarily for non-clinical purposes. Hospitals invested in mainframes in the 1970's when software applications in use were primarily accounting and financial (Menon & Lee, 2000).

PHYSICIANS VERSUS HOSPITALS

While the described changes have contributed significantly to the difficulty of managing in the modern health care environment, the complexity is more deeply rooted than these recent changes. Physicians and hospital administrators have been educated with different philosophical approaches. Physicians are taught in Medical School that nothing is more important than the physician and his/her patient and that nothing should jeopardize or interfere with the physician's determination of an appropriate protocol and the resulting care. Administrators are typically trained in Business schools and are taught that nothing should interfere with the survival and well-being of the business. Therefore, any physician's decision which requires additional expenditures for the hospital places physicians and administrators in conflict. For example; a decision to prolong the length of stay of a patient may be seen as an important precautionary measure to the physician, while administration would consider this decision detrimental to profit and therefore one which should require sufficient justification.

Physicians are decision makers who are autonomous, independent patient advocates and identify themselves with a profession. Administrators are managers who collaborate and participate as a part of an organization and identify themselves with the organization.(Epperson and Barakat, 2004)

An excerpt from research conducted by Thomas L. Lincoln and Carl Builder at the University of Illinois in 1999 best describes the relationship between Physicians and hospitals:

Physicians in the US, just like farmers in the past, have been an independent lot, many, if not most, have chosen the profession because it offered freedom of judgment and freedom of action. As late as the mid 1980's in the US (and still in parts of our south), physicians could be described as a loosely structured tribal culture, socially (but not electronically) networked, who marketed a basket of services to patients who did not pay for these services directly. The bulk of patients' bills were paid for by insurance companies through contracts made largely with business enterprises, who were paid by the government using various programs, often relying on these same insurance entities. (A significant number of the poor were left out, but were presumably served in some manner by charity and teaching institutions and hospitals with non-profit tax agreements). Most doctors worked from independent offices near benignly supportive healthcare facilities. These hospitals organized and controlled an astonishing and ever growing array of equipment and support services, but behaved in a largely hands-off manner toward their accredited staff, who, in a symbiotic fashion peculiar to the US, were responsible for the hospital's income, but did not work for them.

As noted by many, these arrangements generated open loops without controls that favored ever increasing billable activities (Lincoln & Builder, 1999, p. 8). Information Technology offers a unique opportunity to improve efficiency as well as patient care.

CURRENT USES OF INFORMATION TECHNOLOGY

Healthcare is a major industry in all developed countries where thousands of millions of dollars are spent each year and many millions of people are directly or indirectly employed. As a consequence, modern healthcare systems are extremely complex. This imposes constant

demands for information at virtually all levels of the healthcare system, including decision making, policy development, short-term and long-term planning, budget forecast and planning, management, research and development, and most importantly patient care and clinical services (Egan & Liu, 1994). In 1979, delegates from the International Federation for Information Processing (IFIP) concluded that information technology in itself would not solve the problems that faced healthcare but that “the key [was] not so much the technological capability [of information systems], but technological performance [of the computer systems] conjoined with medical, nursing, and administrative staff’s perceived need to improve the effectiveness of their components of Health Care” (Ball, 2003, p. 4). Healthcare organizations have had to re-engineer the structure of their organization so that they could take full advantage of the increased efficiency brought about through the use of IT tools (Abidi, 2001). The first step is to evaluate what data they already had available from day-to-day operations. Healthcare enterprises [are] ‘data rich’ as they generate massive amounts of data, such as medical records, clinical trial data, hospitals records, administrative reports, benchmarking findings, and so on (Abidi, 2001). The key is using this information to help the organization make informed decisions that will increase the quality and efficiency of patient care while reducing the costs of performing the procedures that make this care possible. Hospitals have “learned” to convert “raw materials” or input factors such as medical equipment, IT technology, and labor into a certain level of service or patient care (Menon & Lee, 2000).

Today, hospitals in the US are increasingly focused on technology-enabled clinical improvement, to control costs and respond to demands for quality care (Ball, 2003). Effective information management and communication of data require that healthcare systems install computer networks both within and between various healthcare institutions, particularly between urban and rural healthcare institutions (Egan & Liu, 1994). Healthcare professionals have always been quick to adopt focused applications based on (or augmented by) computation which offer evident diagnostic and therapeutic advantage such as CAT scanners, sound activated imaging, and laparoscopy, even where virtuoso coordination between professionals and their instrument packages has been demanded (Lincoln & Builder, 1999). Advances in IT in the healthcare area has led to the introduction of systems such as order entry systems and Community Health Information Networks (CHINs) which directly affect the production of healthcare services (Menon & Lee, 2000). An underlying aim of the information access [available today] is to allow increased communications and information exchange on an intra-hospital, inter-hospital and associated clinics basis (Egan & Liu, 1994). Many healthcare establishments now operate heterogeneous IT environments with equipment ranging from stand-alone PCs to minicomputers and mainframe installations (Beuscart-Zephir et al, 1997). “[These accomplishments increase the] ...ability for remote clinicians to consult with diagnostic imaging specialists and other specialist clinicians [which] greatly improves the accuracy and speed of patient diagnosis, uses resources more effectively and efficiently, which leads to a positive impact on patient care while minimizing healthcare costs” (Egan & Liu, 1994, p. 2).

STRATEGIC HEALTHCARE DECISION SUPPORT SYSTEMS

Effective delivery of healthcare depends on the organization’s ability to deliver appropriate, value-added services to critical decision centers of the organization so that the center can take the most appropriate course of action based on the information provided (Abidi, 2001). This school of thought is known as knowledge management. Knowledge management in healthcare can be regarded as the confluence of formal methodologies and techniques to facilitate the creation, identification, acquisition, development, preservation, dissemination, and finally the utilization of the various facets of a healthcare enterprise’s knowledge assets (Abidi, 2001). One computer system that has had a dramatic affect on the efficiency of healthcare

organizations and is part of the knowledge management process is the strategic healthcare decision support system (SHDS). The SHDS can best be defined as a suite of knowledge/data-driven, strategic, decision-support services derived from both healthcare data and the health enterprise's knowledge bases (the past experiences of employees), with the objective to improve the delivery of quality healthcare services (Abidi, 2001). Typical SHDS can perform functions such as trend analysis of reimbursement percentages of insurance carriers, patient length of stay, ER turnaround time, drug usage, increase of elective procedures after a marketing campaign; SHDS also can perform benchmarking and budget variance reporting, etc (Abidi, 2001).

CURRENT IT AT THE "POINT OF CARE": COMPUTERIZED PHYSICIAN ORDER ENTRY

Another computer system that is currently in its infancy, but is proving to be a valuable asset to healthcare is computerized physician order entry (CPOE). Computerized physician order entry has become a priority since the publication of the article 'To err is human' in the National Academy of Sciences Institute of Medicine in November 1999. This article highlighted the staggering number of complications and sentinel events (an unfavorable occurrence in a clinical setting that can have possible life altering effects due to clinician error), and stated that a large majority of these events were due to patients having multiple physicians that did not know what the other physicians were prescribing (To Err Is Human, 1999). The CPOE system allows physicians to electronically enter their orders into the health information system and then sign their orders using an electronic physician signature (Ball, 2003). The CPOE system displays all physician orders for a patient and allows clinical personnel to read the order of each of the patient's physicians clearly, thus avoiding the possibility of administering medication to the patient that would interact with other prescribed medications and could cause a sentinel event (Ball, 2003). Another advantage to CPOE is that it creates a paperwork trail that can be used in evaluating and trending clinical outcomes in order to improve overall quality in the healthcare system (Ball, 2003). CPOE is a relatively new technology and currently has not had widespread implementation at healthcare institutions across the country. A 2001 study reported that only 16% of healthcare organizations had CPOE up and running in 2001, but 67% planned to add CPOE in the next few years (Ball, 2003).

FUTURE IT AT THE "POINT OF CARE": COMPUTERIZED PATIENT MEDICAL RECORDS

Thomas J. Watson, Chairman of IBM, assured the world in 1945 that "there is [a] world market for 15 computers" (Kaku, 1998, p.6)." In 1977, Ken Olson, President of Digital, said that "there is no reason to... have a computer at home" (Kaku, 1998, p.6). These two statements are great illustrations of what visionaries of the past thought about the usefulness of computer information technology. In more recent times it should be noted that more human knowledge has been created in the last decade of the 20th century than in all previous human history (Kaku, 1998). The future of healthcare appears to be a bright one. The healthcare environment is currently experiencing increased emphasis on the prevention and early detection of disease, primary care, intermittent healthcare services provided by medical centers, home care, and continuity of care (Tsiknakis et al, 2002). One of the instruments that is currently being developed to aid in the efficient and effective delivery of healthcare is the computerized patient medical record (CPMR). The CPMR or non-paper medical record can be either scanned text, patient data entered into a generic form, or fully coded data (van Ginniken, 2002). The record could be used in only one department of a hospital or health care clinic, or it could be used across multiple health care facilities (van Ginniken, 2002).

ARCHITECTURE OF CPMRS

There are several different architecture types for CPMRs. Before discussing the different architecture types of the CPMR, it is important to understand what the architecture of a computer system is. "An [computer system] architecture is a formal description of an IT system, organized in a way that supports reasoning about the structural properties of the system. It defines the components or building blocks that make up the overall information system, and provides a plan from which products can be procured and systems developed, that will work together to implement the overall system" (Tsiknakis et al, 2002, p. 7). The architecture of a CPMR system may be composed of various types of computer hardware and software. Hardware can include, but is not limited to Servers, PC workstations, Document imaging equipment, Data Warehouses, etc. The network of a CPMR can be made up of various networking media such as fiber optics, CAT-5 twisted-pair cable, coaxial cable, wireless networking technologies, etc. The data formats for CPMRs can vary tremendously. The CPMR can be in the form of scanned images or text files, or it can be fully coded using SEQUEL coding or other web-enabled languages such as XML (extensible markup language). There are certain technological requirements for the CPMR that are defined by user needs and specifications. These specifications were documented by the Professionals and Citizens Network for Integrated Care (PICNIC, 2002) and are the following:

round the clock availability; provision of fast responses even at high workload periods (therefore, workload balancing and redirection be considered); restricted access to information; easy maintenance (remotely in some cases-automatic notification in place); low usage cost; role-based access to information; secure communication of information; activity monitoring; access to reliable, and up-to-date information; native user interface; support direct access to multimedia clinical data communication; scalable (new IT systems should be easily incorporated...); support for standardized coding (semantic unification is a real need); customizable user interface (both adaptive and adaptable to the expertise level of the end user—allow for the isolation and identification of clinical significant information); and highly available(i.e. across various networks and platforms) (Taken from PICNIC web page).

CONCLUSION

The healthcare industry has evolved into an industry that is powered by sophisticated knowledge and information resources. Information Technology has been an instrumental tool for ensuring the reduction of overall costs while efficiently maintaining quality patient care. These gains would not have been possible without the technological advances in computer systems that have enabled integrated multi-level health information systems that are being used today. Current systems such as the strategic healthcare decision support systems will continue to help managers make educated decisions, while new systems such as computerized physician order entry and computerized patient medical records will aid clinicians in assuring quality patient care while minimizing waste.

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REDUCING THE INFORMATION TECHNOLOGY SECURITY RISK IN MEDICAL SUPPLY CHAINS

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ABSTRACT

With medical information increasingly being shared electronically, the likelihood of increased information security incidents, such as hacking and worm attacks, rises dramatically. It is well-known that managers of organizations do not know either how much money to spend to mitigate information-security attacks, or in what matter to spend it, much less what to do when several organizations are connected in tandem or a so-called supply chain.

This paper utilizes an approach developed previously by one of the authors to minimize risk for a single organization and shows how to extend it to organizations connected in a supply chain. Questions of equity are then addressed such as how the increased cost of risk mitigation should be allocated to members of the chain.

INTRODUCTION

Medical information is increasingly being shared electronically among health care providers, customers, insurance firms, and online health services, and the instances of such sharing seem to be escalating rapidly. For example, Google is now offering personal health records to the public, and more than two dozen institutions have announced that they are partners with Google Health, including CVS, Walgreens, the American Heart Association, Quest Diagnostics, Beth Israel Deaconess Medical Center, and the Cleveland Clinic [8]. In a second (and different) type of example of electronic access, hospitals and individual doctors make their computers accessible to drug companies and other suppliers. In a third paradigm, telemedicine, medical information can be transferred via the Internet or other networks for the purpose of consulting. Such electronic access can be both real time (synchronous) or store-and-forward (asynchronous); real-time telemedicine can be as complex as robotic surgery. Medical specialties deemed conducive to synchronous consultation include psychiatry, family practice, internal medicine, rehabilitation, cardiology, pediatrics, obstetrics, gynecology, neurology, and pharmacy, although not all such applications will always involve computers [11]. (Currently, many involve video conferencing.)

Much technological progress has been made in providing security such as firewalls and antivirus software not just in medicine, but in both the non-medical public and private sectors. Yet in the face of increasing numbers and magnitudes of IT security threats, security managers do not know how best to allocate available funds – or in many cases even the level of the expenditures needed. Furthermore, evidence exists that there is often no correlation between increased spending on such initiatives and actual improvements to the overall security record [1]. In short, although there is no shortage of security standards and research, managers generally have no proven and reliable methodology for measuring the effectiveness of their security initiatives or for assessing the monetary value of their efforts. The

managerial situation is exacerbated when organizations connected in a chain result in additional attacks upon one another, often because a weaker member (security-wise) is connected to the others. Moreover, it is not clear how the significant costs of mitigating IT security costs should be borne by the various members of the chain, particularly when the risk is lower for a weaker member.

This paper first reviews the literature regarding risk mitigation for a single organization. Then work is presented which shows how the single-organization case may be extended to supply chain scenarios. Finally, several supply chain configurations are outlined for which the analysis and results will be provided at the meeting.

MODELING RISK IN A SINGLE FIRM

There is substantial research on the general topic of IT risk, including applications of systems risk [10], economic models [6][7], game theory [2], and value at risk [7]. Rakes, Rees, and Deane [9] have developed a risk-based solution methodology that determines risk for a given set of managerial security choices. Deane, Rees, and Rakes [3] then extended this work by embedding that methodology within a genetic algorithm controller, thereby providing an optimization capability. For a specified budget, with this approach, managers can now make optimal (or near-optimal) security choices to minimize risk to their organization.

The Need for Fuzziness

There is an additional concern making the modeling of risk in an organization difficult – the inability to express threats, countermeasure performance, and asset impacts with precision or crispness. Managers often admit that they have no proven and reliable methodology for measuring the effectiveness of their security initiatives or collecting data needed for making strategic decisions and assessing the monetary value of their efforts. Fittingly, the U.S. Department of Homeland Security recently named a lack of real-world data on risk factors as one of the most pressing information security research problems [12].

The Rakes, Rees, Deane [9] and Deane, Rees, Rakes [3] papers both address this managerial concern of uncertainty. They do this by not merely using expected (unitary) values for threats, asset costs, and countermeasure effectiveness. Rather they model each of these with fuzzy sets [4][5][13]. They calculate the overall organizational risk as a fuzzy set by using the alpha-cut method of combining fuzzy sets. The genetic algorithm then calculates the centroid of the system risk, and attempts to minimize that value by selecting alternative security controls. The result is the optimal (or near optimal) set of security controls for management to implement, given a specified budget level.

Supply Chain Exacerbation

To date, no work has been done to minimize IT security risk *in a supply chain* either with or without the inclusion of fuzzy risk. The presentation at the SEINFORMS conference will detail how these calculations should be performed for the more general case of threats, asset costs, and countermeasures represented by fuzzy sets.

HIGH-LEVEL ANALYSIS

IT-security, risk models for the different simple supply chains shown in Figure 1 will be built. The chain in Figure 1a is the simplest case where two organizations are connected to each other, one “downstream” and the other “upstream.” A simple example of this might be a single drug supplier connected to a

doctor's office or to a hospital. Figure 2 indicates how the downstream organization can infect the upstream entity. In Figure 1b, three suppliers are connected to one doctor or hospital. In the third case, three organizations are connected in tandem; this case might represent a supplier to a drug company, the drug company itself, and a hospital – all connected in series. Admittedly, these models are simplifications of the connections that do and will occur in practice, but the purpose here is to provide high-level insight and a first step into the basic behavior of IT security in supply chains.

Once these models have been built, the investigation of supply chains can begin. There are a plethora of research issues, ranging from whom to include as chain partners, to how to control the chain to minimize risk, to how one defines equity in the realm of supply-chain security.

Stated differently, this stream of research will be important as it will provide insights, previously unknown, as to how each firm in a chain should act to secure itself from IT threats. It will also furnish results as to how other firms in the chain can be affected by a single organization's behavior, and whether the costs of providing the security to all are proportional to the benefits enjoyed by each.

Findings will be presented in Myrtle Beach at the meeting in October.

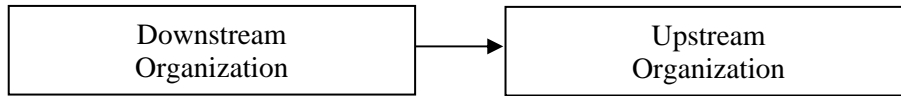


Figure 1a. One downstream organization and one upstream organization.

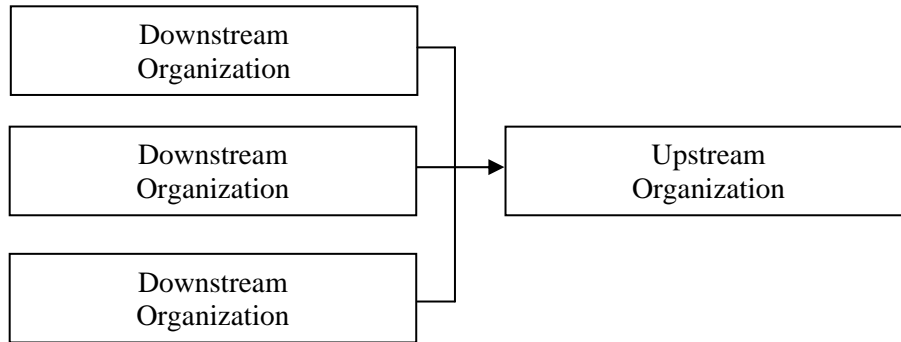


Figure 1b. Three downstream organizations and one upstream organization.

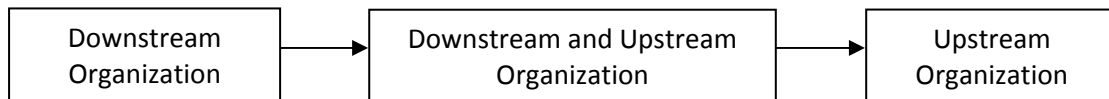


Figure 1c. Three organizations connected in tandem.

Figure 1. Three different configurations of supply chains to be examined.

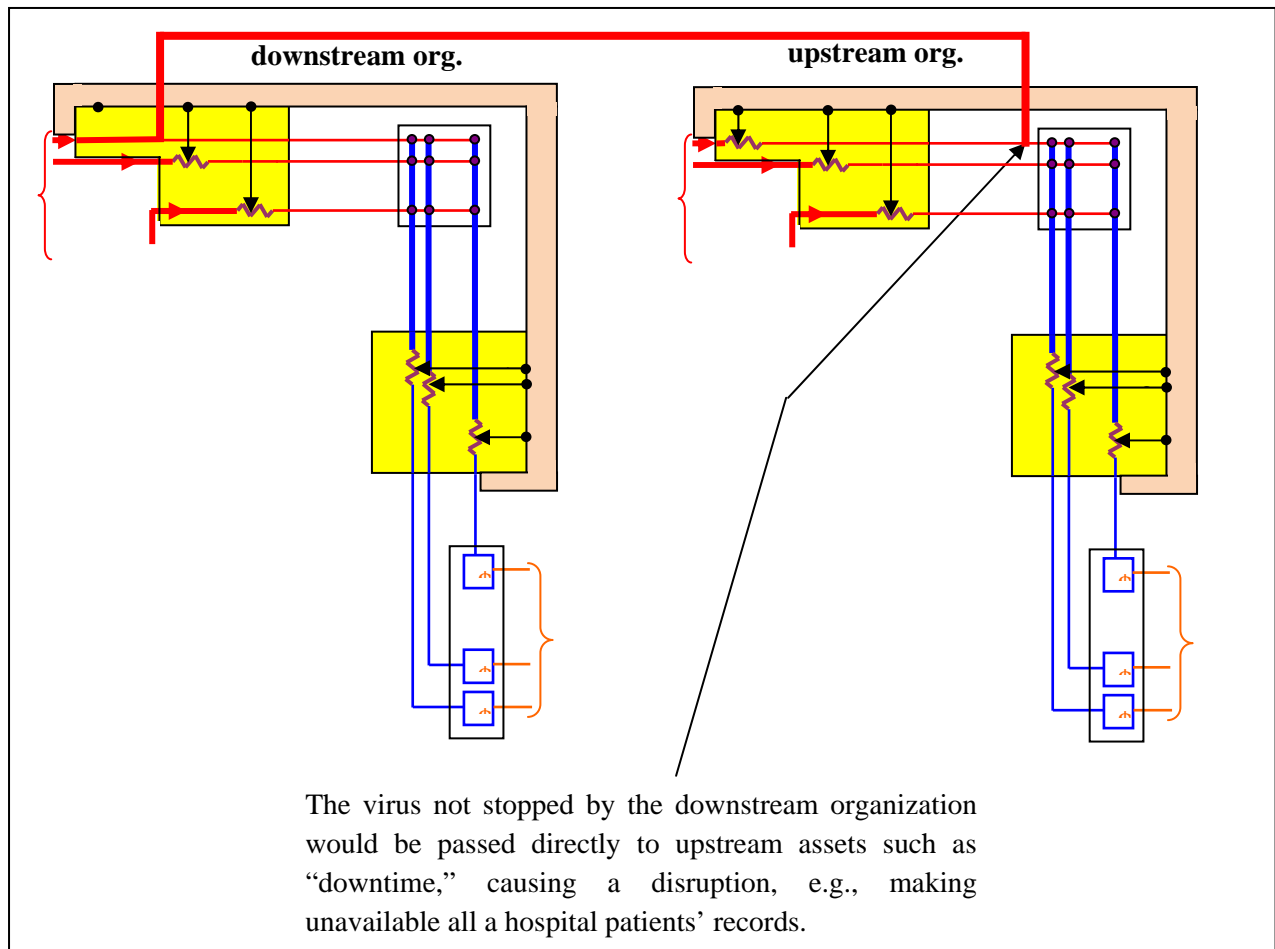


Figure 2. An example of a mechanism whereby one organization passes a virus to a supply-chain partner.

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Comparing Job Expectations of Chinese and American College Students

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Abstract

China is one of the fastest growing economies in world. Most of its growth has come as a result of an explosion of business activity, both internally and as a result of multinational investment. As such, the competition for the best and brightest talent being graduated from universities in China has become intense. Organizations need to understand those factors which will attract and retain competent employees. Are Chinese students different from those graduating from U.S. universities? How might such differences, if they exist, affect the HRM function of Chinese organizations? The present study shows that several significant differences exist between Chinese and U.S. college students.

Introduction

The phenomenon known as “globalization” refers to the increasing integration of economies around the world. Competition and specialization promote market efficiency that allows people and economies to concentrate on what they do best. Markets alone do not guarantee that benefits derived from improved efficiency are common to all. The effectiveness of multinational corporations in such an environment requires new strategies be implemented and policies established that can procure, integrate and maintain an appropriate workforce. Success in this area depends in large part on the congruence between their employees’ job expectations and organizational realities.

Extensive research examining gender differences on job orientation or work values has been conducted during the last half-century (Herzberg, et.al. [1957]; Centers and Bugental [1966]; Brief, et.al. [1977]; Neil and Snizek [1987]; Loscocco [1989]).

Studying job orientations at the international level has also garnered its share of interest (deVaus and McAllister [1991]; Mahmoud [1996]; Elizur [2001]; Frankel, et.al. [2006]).

Since 1972, a number of studies have utilized a job orientation survey instrument developed by Manhardt (1972). Studying recent college graduates who had just joined a major insurance company, Manhardt found significant differences between males and females out of a total of twenty-five job characteristics. Several additional studies have used the Manhardt instrument (Bartol [1976]; Brenner and Tomkiewicz [1979]; Bartol and Manhardt [1979]; Brenner and Tomkiewicz [1982]; Beutell and Brenner [1986]; Tomkiewicz et.al. [1994]; Tomkiewicz et.al. [1997]).

The focus of the present study is China, which many observers believe is a highly attractive country, for

several reasons. The goal of this paper is to initiate the studying of job expectations possessed by China's newly emerging college educated knowledge workers. These expectations will then be compared to a comparable sample of American students in order to ascertain what differences, if any, American business organizations might expect to find as they recruit and try to retain employees in business undertakings in China. Eventually, our hope is to compare job expectations from newly emerging countries in different parts of the world. In a previous (published) paper, Poland was the subject of a study investigating job expectations. (Tomkiewicz, et.al.,2006). In addition, a paper, in press, looked at the job expectations of Russian students.

Why China?

China's dynamic economy has one of the highest sustained growth rates in the 20th century. It has also gone through profound institutional and structural changes. (United States Department of Agriculture, 2004)

For example, according to the (Chinese) Ministry of Education, "China will see 2.8 million college graduates hit the job market in the summer of 2004, an increase of 680,000 over the same time last year, and by 2005, the number is expected to reach a record 3.4 million." (China Daily, 2004) Even with such large numbers of college graduates "the war for talent never ends. Middle managers in China? Good luck finding them, let alone keeping them. They're well-educated and hard-working: Trouble is, every company wants them." (McGregor and Hamm, 2008, p.34) However, even with an expanding economy, the increase in college graduates has led some experts to warn that "university graduates need to reduce their expectations and design reasonable career development plans to meet the tight new employment situation." (China Daily, 2003) Thus, while it may seem on the one hand that a plethora of knowledge workers exists, hiring the brightest and best and, perhaps more importantly, keeping them for an extended period of time, appears to be the greatest challenge faced by multinationals. For example, Ketter (2008, p. 16), in a survey of employees in China found that 25% of the respondents had already had 3 or more jobs and 20% of them planned to leave their present positions in the coming year. Shao (2007, p.17) points out that as a result of China's continued growth, there is an "ongoing war" to attract and keep key talent and organizations need to understand what motivates employees to stay for any extended period of time with one employer. Prieur (2007, p. 20) believes that the most pressing challenges facing HR professionals is to provide the necessary expertise and strategic insights to meet the needs of businesses in China's cultural environment.

Methodology

Chinese university students were asked to rate 25 job characteristics according to their importance to the rater on a 5-point scale (5 = Very Important, 1 = Not Important) in the same manner as had previously been done by Manhardt (1972). There were 101 Chinese university business students surveyed. Of this number, 94 usable forms were obtained. Also surveyed was a sample of American business students from an eastern university. A total of 209 students were surveyed which resulted in 182 usable forms. While sex is not one of the variables examined in this study, in the Chinese sample there were 47 males and 47 females. The average age of the entire Chinese sample was 22.4 years. The American sample consisted of 64 females and 118 males. The average age of the entire American sample was, coincidentally, 22.4 years.

Results

Mean scores were calculated for each of the twenty-five items on the questionnaire and these were rank ordered separately for Chinese students and American students. [See Table 1.] The Spearman Rank Correlation Coefficient between the rank orders of Chinese students and American students was 0.62 ($p \leq 0.01$), indicating that the order of importance which Chinese students and American students placed on job characteristics was similar.

Significant differences for nationality were tested using the statistical procedure MANOVA. [See Table 2.] The model was significant (Wilks lambda = 0.58; $p \leq 0.0001$). Univariate analysis showed significant differences ($p \leq 0.01$) on 10 of 25 items (Items: 2, 3, 4, 5, 6, 10, 13, 17, 18, 25). American students were higher on 8 of the 10 items. Chinese students were higher only on items 3 and 10. Standard deviations of the 25 items were compared. Examining standard deviations of the entire sample over the 25 items showed an average standard deviation for American students of 0.91 while Chinese students had an average standard deviation of 1.01. Using a paired t-test showed significant difference between American and Chinese students ($p < 0.001$), indicating that the American sample was significantly more homogenous than the Chinese sample.

Intrinsic and Extrinsic perspectives of the survey items.

Dichotomizing the 25 items into intrinsic and extrinsic characteristics yielded 13 intrinsic factors (items 1, 2, 3, 4, 7, 8, 9, 15, 16, 18, 21, 24, 25) and 12 extrinsic factors (items 5, 6, 10, 11, 12, 13, 14, 17, 19, 20, 22, 23). Differences in job orientation, whether intrinsic and/or extrinsic are an important component in determining organizational strategies in attracting and retaining employees (Herzberg et al. 1957; Loscocco 1989; Brief, Rose, and Aldag 1977; Neil and Snizek 1987; Centers and Bugental 1966; deVaus and McAllister 1991; Mahmoud 1996; Elizur 2001). The cause of intrinsic motivation is a need or incentive that takes place within the individual and is directly related to the task (e.g., sense of achievement). Extrinsic motivation is caused by an event or stimulus that happens outside the individual and are related to external circumstances (e.g., salary).

Multiple analysis of variance (MANOVA) was performed on both subsets (intrinsic and extrinsic characteristics). The intrinsic model was significant (Wilks lambda = 0.68; $p \leq 0.0001$). Univariate analysis showed significant differences on 6 of the 13 items. Of these, American students had the higher score on 4 of the 6 items. Chinese students had the higher score on items 3 and 24.

The extrinsic model was also significant (Wilks lambda = 0.82; $p \leq 0.0001$). Univariate analysis showed significant differences on 5 of the 12 items. Of these, American students had the higher score on 4 of the 5 items. Chinese students had the higher score on item 10.

Conclusions and Discussions

The Chinese students in this study indicated that three job characteristics were significantly more important to them than to American students. These Chinese students wanted a job that allowed for the continued development of their skills and knowledge, they desired to work with congenial associates, and they wanted a job that permitted them to develop their own methods. While job security and high income were not unimportant, they counted for significantly less importance for the Chinese students than for the American sample. In fact, it might be said of these respondents that the American sample expected more of most items than their Chinese peers. American students were higher on 16 of the 25 items (with significant differences on 8 of 10 statistically different items).

One way to look at Chinese versus American student job expectations might be to examine what both groups think are most important and what they think are least important. American students ranked as their top 3 items, respectively, a job that provides a sense of accomplishment, a job that provides security and the ability to earn a high income. Two of their top three items are extrinsic factors. Chinese students,

on the other hand, had as their top 3 items, respectively, continued development of skills and knowledge, permits the development of your own methods and a provides a sense of accomplishment (tied). All three items are intrinsic factors.

When examining the least important items listed by the respondents, the American sample ranked, starting at the least important, a regular work routine, responsibility for taking risks, requires originality and permits working with congenial associates (tied). Two items are considered intrinsic and two are extrinsic. The Chinese sample ranked, starting at the least important, requires supervising others, requires meeting and speaking with many other people, and makes use of specific educational background. The two least desired expectations are both extrinsic factors.

While the present paper does not have as its goal the correlation of the measured job expectations with Hofstede's Model of Cultural Dimensions, the results do parallel to a certain extent his categories of Individualism (IDV) and long-term orientation (LTO). The former dimension indicates a preference for taking care of one's self. The United States is classified in this dimension and the American sample appears to reflect this tendency by the importance placed on high income and job security. On the other hand, the dimension of long-term orientations deals with thrift and perseverance and seems to be indicated by the Chinese sample's importance placed on continued development of skills and development their own methods of doing work.

As greater numbers of organizations continue their globalizing efforts, with China representing one of the most important development targets, understanding the needs and expectations of prospective employees must rank at the highest levels of importance. Such knowledge can provide organizations who use it a competitive advantage not bound only to monetary expenditures. Awareness of job characteristics valued by workers might enable organizations to avoid mistakes of underestimating and under-developing the full extent of human resource management tools that can be used in creating a working climate that encourages both performance and retention.

Table 1: Job Expectation Questionnaire

	China			USA		
	Mean	SD	Rank	Mean	SD	Rank
Q1	3.74	0.98	13	3.49	0.79	22
Q2	3.40	1.24	23	3.90*	0.82	10
Q3	4.56	0.77	1	4.04*	0.88	8
Q4	3.79	1.07	9	4.24*	0.93	5
Q5	3.94	0.92	7	4.40*	0.92	2
Q6	4.00	0.83	6	4.27*	0.98	3
Q7	3.79	0.93	9	3.64	0.92	16
Q8	3.42	0.97	22	3.47	0.77	24
Q9	3.74	0.92	13	3.53	0.80	20
Q10	3.86	1.01	8	3.49*	0.85	22
Q11	3.63	1.15	17	3.76	0.93	12
Q12	3.58	1.04	18	3.71	0.83	14
Q13	3.78	0.87	12	4.27*	0.89	3
Q14	4.06	0.90	4	4.19	0.88	6
Q15	3.79	1.06	9	3.72	0.97	13
Q16	4.04	0.94	5	4.10	0.88	7
Q17	3.19	1.18	25	3.57*	0.96	18
Q18	3.68	1.04	15	4.00*	0.88	9
Q19	3.58	1.07	18	3.63	0.98	17
Q20	3.53	1.07	20	3.54	0.99	19
Q21	3.68	1.09	15	3.69	0.97	15
Q22	3.50	1.05	21	3.35	1.11	25
Q23	3.31	1.13	24	3.51	0.91	21
Q24	4.13	0.90	2	3.80	0.89	11

Q25 4.13 1.12 2 4.49* 0.96 1

* $p \leq 0.01$ (or better)

JOB EXPECTATION QUESTIONNAIRE

Please indicate how important each of the following items are to you in a job, with '1' being unimportant and '5' being important.

How important is it to you to have a job which:

Q1-requires originality

Q2-makes use of your specific educational background

Q3-encourages continued development of knowledge and skills

Q4-is respected by other people

Q5-provides job security

Q6-provides the opportunity to earn a high income

Q7-makes a social contribution by work you do

Q8-gives you the responsibility for taking risks

Q9-requires working on problems of central importance to the organization

Q10-involves working with congenial associates

Q11-provides ample leisure time off the job

Q12-provides change and variety in duties and activities

Q13-provides comfortable working conditions

Q14-permits advancement to high administrative responsibility

Q15-permits working independently

Q16-rewards good performance with recognition

Q17-requires supervising others

Q18-is intellectually stimulating

Q19-satisfies your cultural and aesthetic interests

Q20-has clear-cut rules and procedures to follow

Q21-permits you to work for superiors you admire and respect

Q22-permits a regular routine in time and place of work

Q23-requires meeting and speaking with many other people

Q24-permits you to develop your own methods of doing work

Q25-provides a feeling of accomplishment

References

References will be provided upon request.

AN EXAMINATION OF ENTREPRENEURIAL PERSONALITY FACTORS IN A BRAZILIAN STUDENT POPULATION

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ABSTRACT

The current study examined gender differences among Brazilian undergraduate students based on personality variables previously shown to be correlated with entrepreneurship. It also examined the degree to which said personality variables correlated with entrepreneurial intentions. Findings indicated limited gender differences. While all three items about future entrepreneurial intentions were significantly correlated with one another, fewer significant correlations were found between the personality traits and future intentions.

INTRODUCTION

Entrepreneurship is viewed by many countries as a powerful source of economic growth and innovation. The Global Entrepreneurship Monitor research group generally classifies countries as either high-income or middle-income in terms of economic strength and potential. The entrepreneurial goal in high-income countries, like the U.S., is to continually encourage competition, innovation, and growth. In contrast, middle-income countries, like Brazil, are trying to develop the necessary infrastructure to better promote the development of entrepreneurial ventures. Some of these aspects include greater access to venture capital, stronger property rights, fewer governmental regulations, and more exposure to educational programs and entrepreneurial opportunities (Moy, Luk & Wright, 2003). As noted in the Global Entrepreneurship Monitor's *2005 Executive Report*, these environmental differences generally allow entrepreneurs in high-income countries to focus more on opportunities while entrepreneurs from middle-income countries tend to be more necessity-driven due to adverse market conditions (Minniti, Allen & Langowitz, 2006).

Brazil is in the midst of an economic shift, particularly since the early 1990s, and is moving away from a traditional reliance on large state-controlled businesses to a greater emphasis on small and medium-sized enterprises. While high-income countries often feature a more established small business sector, many middle-income countries are becoming an attractive market for early stage entrepreneurial activities (Minniti, Allen & Langowitz, 2006). In addition, the level of business development is less pronounced between the various income level groups in these countries, indicating that individuals with fewer resources still have a positive view of entrepreneurship. Research also shows that many young adults, particularly 25 – 34 year olds, are interested in entrepreneurship and business ownership.

Brazilian Entrepreneurship Education

Brazil has been slow to adopt educational change. As indicated in a 2003 Global Entrepreneurship Monitor report entitled *Entrepreneurship in Brazil*, the Brazilian educational system generally “does not foster entrepreneurship” (p. 15). However, officials have recognized this deficiency and are working to better introduce entrepreneurship at all educational levels. A primary objective of reform is to intensify and enhance entrepreneurship education programs in order to adopt a more entrepreneurial culture that encourages business ownership and less reliance on traditional jobs in the public service sector.

Some of the various obstacles currently restricting entrepreneurship in Brazil include a scarcity of venture capital, high unemployment rates, bureaucratic business policies, and an undeveloped infrastructure. Nevertheless, Brazil consistently ranks among the top ten entrepreneurial countries in the world and plays a critically important role in the global economy. According to the 2003 Global Entrepreneurship Monitor report, Brazil has a high number of young people with an interest in entrepreneurship, particularly individuals with a higher educational attainment (Schlemm, Greco, Feller & Horochovski, 2004). This interest combined with the size and potential of the Brazilian marketplace can offer ample entrepreneurial opportunities. More emphasis on entrepreneurship education can help individuals better recognize these opportunities and grow the national economy through entrepreneurial activity.

Despite indications that women are becoming a stronger entrepreneurial force in Brazil, the 2005 *Report on Women and Entrepreneurship* from the Global Entrepreneurship Monitor indicates that globally men are twice as likely to engage in entrepreneurial activities as women. This finding, combined with the traditionally masculine culture within South America, would cause one to believe that gender may play a role in the development of entrepreneurial attributes in Brazilian students.

Personality and Entrepreneurship

Management research has made extensive use of psychological personality variables as predictors for constructs such as leadership, organizational behavior, and entrepreneurship.

Prior research has examined numerous personality constructs in the field of entrepreneurship. McClelland (1961) and Collins, Hanges & Locke (2004) asserted that need for achievement is a strong entrepreneurial trait, and Gasse (1985) and Hansemark (2003) found that entrepreneurs often possess a greater internal locus of control than the general population. Higher self-efficacy has also been associated with entrepreneurship and business creation (Krueger & Brazeal, 1994; Erickson, 2002; Frazier & Niehm, 2006). In addition, research has suggested that entrepreneurs have a high level of self-esteem and confidence (Robinson, 1987), demonstrate greater initiative and innovation (Bateman & Grant, 1993; Stewart, Watson, Carland & Carland, 1999), and possess a more positive attitude toward risk and independence (Douglas & Shepherd, 2002; McMullen & Shepherd, 2006).

Obviously there are numerous personality constructs that have been shown to have potential for predicting either entrepreneurship or entrepreneurship success. The current paper will examine five of these.

Self Efficacy. Bandura's (1997) construct of self efficacy is defined as people's judgments of their capabilities to execute necessary behaviors to successfully achieve desired ends. It is not necessarily concerned with the skills or abilities one has, but rather with perceptions of what one can do with the skills and abilities one possesses. Self efficacy has both theoretical and practical implications for entrepreneurs because initiating a new venture requires the belief that one has the knowledge, skills, and abilities necessary to be successful. Entrepreneurial self efficacy has been found to significantly relate to both entrepreneurial intentions (Kickul and D'Intino, 2005) and new venture creation (Frazier & Niehm, 2006).

Creativity/Ingenuity. Creativity has been described as the generation of novel and appropriate solutions to open-ended problems in any domain of human activity (Amabile, 1997). In a business context, this can occur along the dimensions of new businesses, new products, new processes, new markets, and new ways of acquiring resources. Ko and Butler (2007) posit that creativity is important to entrepreneurial behavior because it is linked with identification of opportunities that lead to new firms (and, in some cases, even new industries).

Risk Tolerance. A third characteristic frequently associated with entrepreneurs is the propensity for risk-taking. Risk taking, both personal and financial, is a traditional aspect of the definition of entrepreneurial activity (McClelland, 1961; entrepreneur, n.d.). Researchers have reported significant associations between risk tolerance and entrepreneurship (Chattopadhyay and Ghosh, 2002), and Stewart and Roth (2001) concluded that risk-tolerant individuals are more likely to choose entrepreneurial careers versus risk-avoidant individuals who are likely to choose traditional, organizational employment.

Locus of Control. As a construct, locus of control is associated with how individuals perceive environments, events, and the causes of these circumstances (Rotter, 1966). Individuals with an internal locus of control believe they are able to control what happens in their lives, whereas individuals with an external locus of control attribute life events to factors outside of their control such as fate, luck, or powerful others. Both Robinson et al. (1991) and Hansemark (2003) concluded that entrepreneurs had higher internal control expectations than do non-entrepreneurs.

Openness to Experience. Recent research has stated that a major motivation of entrepreneurs is to be creative and to create something larger than themselves (Engle, Mah, & Sadri, 1997). Openness to Experience is a personality construct characterized by someone who is intellectually curious and tends to seek new experiences and explore novel ideas; someone high on Openness can be described as creative, innovative, imaginative, reflective, and untraditional. (Zhao and Seibert, 2006).

The Current Study

The current study is multi-faceted in its aim. First it will test for gender-based differences in personality variables previously shown to be correlated with entrepreneurship. Secondly it will examine the degree to which said personality variables correlate with entrepreneurial intentions in this sample of Brazilian students.

METHODOLOGY

Participants

Participants were 99 students enrolled at three Brazilian universities (39 male, 60 female) who ranged in age from 17 to 48 years old, with an average age of 21 years.

Procedure

At the start of the fall 2007 semester, faculty teaching undergraduate courses at multiple universities in Brazil received a letter requesting their voluntary participation. The stated purpose of the study was to study entrepreneurial attitudes that might exist across cultures. Faculty members have been asked to request that their students complete an 88-item anonymous online survey. Survey completion is entirely voluntary and no identifying information was recorded.

Measures

We measured the personality constructs of self efficacy, creativity/ingenuity, risk tolerance, locus of control, and openness to experience using short multi-item scales available online from the International Personality Item Pool (<http://ipip.ori.org/>; Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, Gough, 2006). In addition to this our survey asked respondents to report on their future entrepreneurial intentions via three questions rated on five point likert-type scales. Participants answered: (1) Would you like to own a small business one day? (2) How prepared to you currently feel to own a small business? and (3) How likely is it that you will start your own business one day?

RESULTS

Table 1 provides the descriptive statistics for all of the variables of interest – the three future intention survey items and the scores for the five personality constructs. Each of these is broken down by gender.

Table 2 shows the results of the ANOVA testing for differences based upon gender with regard to the personality variables. Contrary to expectations, absolutely no differences existed between male and female students with regard to the personality variables of interest. Only one significant difference related to gender emerged – male students indicated that they felt significantly “more prepared to own a small business” than did their female counterparts ($F(96) = 5.96, p < .05$).

Table 1. Means and Standard Deviations for All Survey Items

		N	Mean	Std. Deviation	Std. Error	Min	Max
Would you like to own a small business one day?	Male	39	3.92	1.061	.170	1	5
	Female	59	3.81	1.444	.188	1	5
How prepared do you currently feel to own a small business?	Male	39	3.03	1.203	.193	1	5
	Female	59	2.44	1.134	.148	1	5
How likely is it that you will start your own small business one day?	Male	39	3.23	1.012	.162	1	5
	Female	59	3.15	1.387	.181	1	5
Self Efficacy	Male	39	31.45	4.538	.727	22	44
	Female	60	30.65	4.597	.593	20	39
Creativity/Ingenuity	Male	39	28.98	3.82	.612	20	36
	Female	60	27.83	4.06	.524	17	37
Risk Tolerance	Male	39	25.88	5.622	.900	15	38
	Female	60	27.27	4.741	.612	17	42
Locus of Control	Male	39	16.13	3.481	.557	9	22
	Female	60	16.90	3.824	.494	9	25
Openness to Experience	Male	39	29.97	3.944	.631	22	39
	Female	60	29.75	4.588	.592	19	42

Due to the fact that male and female students did not differ significantly with regard to the personality attributes, the correlation analyses were conducted on the sample as a whole. As would be expected, all three items about future entrepreneurial intentions were significantly correlated with one another. However, with regard to relationships between the personality traits and future intentions, fewer significant correlations were found than had been anticipated. None of the personality traits considered were found to correlate with “wanting to own a small business one day;” however, Creativity/Ingenuity and Openness to Experience were both found to correlate significantly with feeling “prepared to own a small business” and with being “likely to start one’s own small business one day.” Table 3 shows the inter-correlations for all variables considered.

DISCUSSION & FUTURE RESEARCH

The current study examined the degree to which personality constructs previously shown as associated with entrepreneurship would also be found to be related to entrepreneurial intentions. Although findings were not fully as expected, they are still highly informative.

Although most previous research examining the role of personality traits in relation to entrepreneurship have focused upon those actually engaging in entrepreneurial behavior versus those who are not, our study examined future intentions toward entrepreneurial activities. The theory of planned behavior argues that intention is an antecedent to behavior (Ajzen, 1991), however intentions do not always lead to future behavior. As such, it is quite plausible that

although our sample expressed strong future intentions, these may not come to fruition. Prior studies have shown that intentions play a crucial role in understanding the entrepreneurial process (Krueger, 1993; Krueger & Brazeal, 1994). A positive entrepreneurial experience can impact intentions (Krueger, 1993), and entrepreneurial characteristics can be learned and often vary according to personal characteristics and experiences (Krueger & Brazeal, 1994). As such, opportunities to strengthen the factors associated with intention should be sought within Brazil.

Table 2. ANOVA Comparing Male & Female Brazilian Students' Personality Constructs

		Sum of Squares	df	Mean Square	F	Sig.
Would you like to own a small business one day?	Between Groups	.282	1	.282	.165	.685
	Within Groups	163.718	96	1.705		
How prepared do you currently feel to own a small business?	Between Groups	8.034	1	8.034	5.955	.017
	Within Groups	129.517	96	1.349		
How likely is it that you will start your own small business one day?	Between Groups	.144	1	.144	.092	.763
	Within Groups	150.550	96	1.568		
Self Efficacy	Between Groups	15.079	1	15.079	.721	.398
	Within Groups	2029.047	97	20.918		
Creativity/Ingenuity	Between Groups	31.120	1	31.120	1.977	.163
	Within Groups	1526.506	97	15.737		
Risk Tolerance	Between Groups	45.147	1	45.147	1.733	.191
	Within Groups	2527.464	97	26.056		
Locus of Control	Between Groups	14.079	1	14.079	1.032	.312
	Within Groups	1323.259	97	13.642		
Openness to Experience	Between Groups	1.190	1	1.190	.063	.802
	Within Groups	1832.724	97	18.894		

Table 3. Correlations Between Personality and Future Entrepreneurial Intentions.

	Would you like to own a small business one day?	How likely is it that you will start your own small business one day?	How prepared do you currently feel to own a small business?	Self Efficacy	Creativity & Ingenuity	Risk Avoidance	Locus of Control	Openness to Experience
Would you like to own a small business one day?	1	.576**	.409**	.011	.153	.125	.032	.084
How likely is it that you will start your own small business one day?		1	.402**	.083	.275**	.107	.129	.213*
How prepared do you currently feel to own a small business?			1	.187	.330**	.059	.104	.227*
Self Efficacy				1	.508**	.302**	-.023	.494**
Creativity & Ingenuity					1	.168	.029	.673**
Risk Avoidance						1	.334**	.316**
Locus of Control							1	.159
Openness to Experience								1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The current study has implications for the training of individuals interested in entrepreneurship. Although personality traits are relatively stable over time, many of the behaviors associated with these variables can be acquired with practice and effort. Brazil has been classified in prior studies as a country in the take-off stage of entrepreneurial development (Jones, 2000), with an education system that does not emphasize the importance of entrepreneurship, but rather the pursuit of more formal jobs in large companies (Schlemm, Greco, Feller & Horochovski, 2004). The educational arena is therefore one in which entrepreneurship needs to receive more attention. Our findings indicate that both male and female students want to start their own businesses, but males feel greater levels of preparation at this time. Education designed to promote the behaviors associated with the attainment of small business ownership might be very beneficial to the individual wishing to pursue an entrepreneurial career. Past research has shown that educational programs can positively impact the development of entrepreneurial attitudes (Florin, Karri & Rossiter, 2007), and provide students with a more complete entrepreneurial skill set (Gatewood, Shavers, Powers & Gartner, 2002).

In our study no significant differences were found with regard to desire for owning a small business one day and likelihood for doing so. Both men and women appear to see this as a comparably viable career path. These findings are highly consistent with those of Jones (2000), who found that Brazilian male and female entrepreneurs had similar dispositions and did not differ with regard to entrepreneurial growth plans. He concluded that cultural differences could over-ride socialized sex-conditioning. It appears that as Brazil evolves economically, providing access to role models of entrepreneurship, education related to entrepreneurship, and increased opportunities for business ownership, young women's attitudes may very well supersede the traditional masculine sex-conditioning found in their respective cultures. Our results are consistent with findings published in the 2006 Global Entrepreneurship Monitor's *Executive Report* which found less of a gender gap in middle-income countries.

Both Creativity and Openness to Experience were found to be related to our sample's future intentions. Creativity and a willingness to try new things are at the core of many definitions of entrepreneurship (e.g., Shane & Venkataraman, 2000), and founding a new venture is likely to require one to explore new or novel ideas, use creativity to solve novel problems, and take an innovative approach to products, business methods, or strategies (Zhao & Seibert, 2006).

When we possess a better understanding of the relationship between personality and entrepreneurial intention, we have the potential to contribute in applied areas related to entrepreneurship. Previous research (Zhao & Seibert, 2006) has provided evidence that personality is associated with entrepreneurial status. As such, using what we glean of students' personalities and professed future intentions could be beneficial in the context of career counseling to determine who is likely to be attracted to, selected in, and remain in an entrepreneurial career distinct from a general interest in business and management. This information could allow individuals to better match themselves to the challenges and rewards offered by an entrepreneurial occupation.

Brazil has made great strides in recent years with regard to its entrepreneurial initiatives. It currently plays a critically economic role in its region, and while it still has work to do in strengthening its overall business infrastructure, the results of our study indicate that a new

generation of educated professionals are interested in pursuing entrepreneurial opportunities. This move toward entrepreneurship not only will benefit the individuals involved, but also society in general, which benefits enormously from entrepreneurial activity.

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DOES PROCEDURAL JUSTICE RESEARCH EXPLAIN CHINA'S CIVIL UNREST?

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ABSTRACT

We investigate current perceptions of Chinese farmers who were displaced by the government's land-use reallocation process. Each year there are more than 50,000 incidents of social unrest in China and a substantial proportion of the unrests are due to perceived injustices in the land-use reallocation process. Survey data is collected from a sample of 250 former farmers who lost their rights to farm the land because of the government's takeover of agricultural land in order to support the needs of the country's industrial economy. We analyze the survey data to assess the procedural justice implications of China's land use policies.

INTRODUCTION

Toward the end of the 1990's, the Chinese government saw the need to move toward a more market responsive economy. This resulted in the implementation of laws reflecting a shift in policy toward the creation of efficient land markets [8]. However, as Lichtenberg and Chengri [6] discuss, the results of such land use policies are a rewarding of land conversion at the expense of traditional farming. China's "Rural Land Contracting Law" of 2003 defined property rights and spelled out policies intended to protect farmers and their investments. In practice, however, land reallocation policies used by village governments often ignore this law.

Land reallocation processes have resulted in economically disadvantaged ex-farmers who are part of the newly created social burden that China's Federal government will need to contend with in the years to come. The negative outcome of land reallocation and the citizen response to it has come from both the displaced farmers and those witnessing the takeover process. Farmers have precipitated thousands of protest gatherings each year [9] and reporting of these protests has been publicly presented by the media. For example, Wang [10] recently headlined a Shanghai newspaper article with "Land giveaways returning to haunt local officials." The article details illegal activities taken by local government officials toward personal short term profits by taking farmers off of the land that would have provided them with lifetime employment.

The social unrest by displaced farmers became coupled with the 2008 Summer Olympics that were recently held in Beijing. Because China had hoped to generate global goodwill by hosting the Olympic Games, the farmer unrest situation was particularly damaging [4]. During the run up to the Olympics, there was deregulation of the international news gathering services and the Chinese government allowed international news agencies access to rural issues such as the abuse of land reallocation. Therefore, failure to address and monitor peasant and farmer issues created not only social unrest, but some loss of goodwill worldwide.

CURRENT RESEARCH FOCUS

In this current research, a survey of Chinese farmers who had lost the use of their land is used to gain insights into why Chinese farmers nationwide are responding negatively to land reallocation. We investigate possible implications for government policy change and improvement within the context of existing “procedural justice” research, which is briefly summarized here.

An overview of procedural justice research is presented by Machura[7] who states that “violations of elementary procedural justice criteria contribute to a breakdown of state authority.” Importantly for this current research and its implications, Krehbiel and Cropanzano [5] found that the emotions of anger and frustration are the highest when an unfavorable outcome occurs because of an unfair procedure. These violations of elementary procedural justice concepts can be seen when an individual’s input into the process itself is limited. Houlden, LaTour, Walker, and Thibaut [3] note that their respondents felt process control was more important than control of the actual outcome. Research by Cohen [1] indicates that input to the decision process does not enhance justice perceptions if personal interest bias by a decision maker is seen to influence distribution of the resource. Hence, self-interested administrators are seen as detrimental to an outcome that might otherwise be seen as acceptable by the recipient.

We feel that the procedural justice research findings of, for example, Greenberg and Colquitt [2] could help Chinese policy makers more fully understand the importance of “justice” in the implementation of its policies. We propose two research hypotheses related to the topic of procedural justice in the context of the farmer unrest problem in China.

Hypothesis 1. Chinese farmers’ opinions of the land reallocation process are positively related to the amount of input farmers have in the process.

Hypothesis 2. Chinese farmers’ opinions of the changes in their standards of living following land reallocation are positively related to the amount of input farmers have in the process.

The City of Hefei, the location of farmers surveyed in this study, has seven regions, each with separate governing bodies and village organizations. Therefore, the method of land allocation used by each region could vary considerably from one region to the next. As such, farmer satisfaction with the land allocation process might vary considerably across regions. Therefore, we propose two additional hypotheses.

Hypothesis 3. Chinese farmers’ opinions of the land reallocation process are higher in regions where farmers have the most input into the process.

Hypothesis 4. Chinese farmers’ opinions of the improvements in their standards of living are higher in regions where farmers have the most input into the process.

These four hypotheses will be tested using data collected from the survey that was administered to farmers living in the City of Hefei, Province of Anhui, who had recently lost their use of the land. The survey was conducted with the assistance of the Bureau of National Land Administration of the City of Hefei. Surveyors either stopped someone on the road or visited the household. All of those surveyed were at least 16 years old. The respondent was the individual in each family who was the most familiar with their land loss situation. There were 250 surveys administered and carried out. Of those carried out, 217 surveys were usable (93.5%).

RESULTS

Full results of the hypothesis investigations will be presented at the conference meeting. In this paper, we only provide some of the more interesting demographic results. It was found that, before losing their land, 43% of the surveyed farmers worked full-time on farms and, in large part, reported no other substantial skill sets besides farm work. Eighty-four percent of respondents were of working age (16 - 59 years old). At the time of the survey, which was after the loss of their land use, 65% responded that they currently had no job or were doing part-time odd jobs and felt little or no job stability. Nine percent were working in local enterprises and 5% had found factory work in outside areas. Seven percent of those who were currently working had been assigned to jobs by the government; the balance found work by some other means independent of the government. All land that had been taken away was being used for some type of new construction such as real estate development (35%), factory construction (15%), infrastructure construction (15%), and other construction (35%).

Next we look at a few of the survey items related to the procedural process. One question asked "Whose opinions were used when making decisions concerning reallocation payments?" Fifty-four percent of respondents responded "nobody" while 10% responded "villagers" (meaning the farmers themselves). Forty-seven percent indicated that the actual monetary value of distribution amounts to farmers for giving up land use rights were not made known. Looking at the actual distribution of compensation, 51% agreed with the statement "the majority went to local government organizations and only a small amount went to farmers." Regarding the amount of money distributed to farmers in compensation for land loss, the average was reported to be 10,290 yuan (about \$1,500). The survey found that 76% of farmers who received this money used it for living expenses, 81% no longer had a major source of income, 54% had retirement concerns, and 60% had high medical costs. The implication is that the payment and money allocation from the government was not sufficient to meet expenses in the face of lost employment.

DISCUSSION

Our preliminary investigation of the survey responses presents an image of farmers who, overall, had very limited input into the land re-allocation process, saw money destined for them filtered off at the township government level by a system that they did not understand and was never clearly explained to them. Further, the large majority of these farmers reported being worse off economically after they lost their land and their farming employment. These findings are supported by the procedural justice research that was referenced earlier in this paper.

Our initial findings indicate that the application of procedural justice tenets should help the Chinese Federal government more fully accomplish the land reallocation process by emphasizing the need for individual farmer input to the system; for example, use public announcements for distribution information and make sure money is not inappropriately filtered out by village administrators. Such changes could get to the heart of the farmer unrest situation and bring acceptable results to the Federal government in Beijing.

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A COMPARATIVE ANALYSIS OF ETHNOCENTRICITY IN THE MIDDLE EAST

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ABSTRACT

This paper explores the effect of ethnocentrism on the shaping of consumers habits in the Middle East. It compares the effect of cultural values on the consumer behavior in an area, which is rich in both the economic wealth of people and their diversity – belonging to different ethnic groups. Businesses need to understand the effect of the culture in shaping consumer habits. Studying the effect of ethnocentrism on the consumer habits is one way of investigating buyer behavior and market segmentation. The analysis builds on the initial results reported in exploratory surveys of consumers in Lebanon and Kuwait (Ziemnowicz, et al 2007 and Bahhouth et al 2008). Consumer market segments that exist among Middle East consumers are examined by the similarities and dissimilarities between people of two countries in the Middle East.

INTRODUCTION

Lifestyles are an expression of an individual's self-concept. It is the total image people have of themselves, which is a result of how people were socialized in their culture. Papadopoulos and Heslop (1993) discussed the effects of a product's country of origin on buyers' perceptions. Roth & Romeo (1992) as well as Kaynak et. al (1998) asserted that consumers have significantly different country images or general perceptions about products made in different countries. Shimp & Sharma (1987), in discussing the consumer's lifestyle, highlighted the concept of ethnocentrism, which represents people's beliefs about the appropriateness and even the morality of purchasing a particular product or service. Ethnocentric consumers favor local products as they deem that products from their own country are the best (Klien, et al., 1998). It influences consumers' behavior when they believe that their national interest is being threatened (Sharma et al, 1995; Shimp & Sharma, 1987). The greater the consumers attach a higher value for products that are made in their home country compared to other countries, the greater is their ethnocentric tendency (Huddleston et al, 2001). In this paper, the concepts related to consumer lifestyle, ethnocentrism and their effect on consumer behavior in the Middle East are investigated. Presenting a comparative perspective of Lebanon and Kuwait as developing nations provides a context for understanding lifestyle behavior in that region.

LITERATURE REVIEW

Westfall (1962) claimed that a successful marketing model lies in the researchers' ability to come up with variables that distinguish people's performance. These variables are more than just demographic and socioeconomic characteristics. Wells (1975) argued that demographic profiles have not been deemed sufficient because they lack richness and often need to be supplemented with additional data. Social class adds more depth to demographics, but often needs to be supplemented in order to obtain meaningful insights into consumers' characteristics. "Lifestyle segmentation" has been a useful concept for marketing and advertising planning purposes (Wells and Tigert, 1977; Kaynak and Kara, 1996). Lifestyles are an expression of an individual's self-concept. It is the total image people have of themselves, which is a result of how people were socialized in their culture. Hawkins, et al, (2004) argued that consumers exhibit unique lifestyles, which are labeled career oriented individuals. Lifestyles produce needs and desires that ultimately affect the decision making of each consumer. They added that feelings and emotions are very important in consumer purchase decisions and have an effect on the analysis of product attributes. Knowledge of the lifestyle of target customers provides businesses with a variety of ideas for the development of advertising strategies (Perreault and McCarthy, 2006). The ultimate objective of these strategies is to persuade people to assume behavior patterns that are typical of their lifestyles. The consequence of adopting these patterns will motivate them to purchase different types of products or services (Gonzalez and Bello, 2003).

The relevance of ethnocentricity becomes a critical issue when one considers the increasing trend toward free trade and the high pace at which national economies are turning global. In coping with these challenges, U.S. businesses had to go global to remain competent. Nowadays, U.S. businesses are targeting global consumers, whom they need to reach and maintain. Understanding these consumers and knowing their lifestyles become a necessity. Businesses need to understand the effect of culture in shaping consumer habits. People are required to make purchase decisions almost every day (Arnould, et al 2004). Studying the effect of ethnocentrism on the consumer habits is one way of investigating buyer behavior and market segmentation. Some Middle East Countries such as Countries of the Cooperation Council for the Arab States of the Gulf (CCASG) are drawing the attention of most businesses. They are wealthy nations with oil revenues exceeding 600 billion dollars (Barrel's Price \$50), and a currency reserve of 1.6 trillion US Dollars, which represents 25% of the global currency reserve (USD 6.3 trillions) and exceeds that of China's reserve, which is USD 1.4 trillions (Look East, 2007). Knowing the consumers' habit of these nations would be no doubt an interesting subject.

Kesic and Prii-Rajh (2003) have associated lifestyle with the way people live and spend their time and money. Lindquist and Sirgy (2003) assert that lifestyle summarizes a collection of individual characteristics and behavior. These characteristics are socio-cultural variables such as age, gender, ethnicity, social group and religion. Psychographics is one of the main instruments used to analyze and measure lifestyles. It focuses on knowing the characteristics of consumers that affect their buying decisions (Lindquist& Sirgy, 2003). Psychographics also provides a mechanism to investigate the attitudes, interests and opinions (AIO) of targeted consumers. These preferences are highly important because they allow the prediction of consumer behavior (Gonzalez and Bello, 2002).

LEBANON AND KUWAIT: COUNTRIES IN THE MIDDLE EAST

Lebanon is roughly a 150 mile coastline at the center of the Eastern Mediterranean Sea, with Israel bordering it to the South and Syria to the East and North. Despite its small area of 3,344 miles² of charm and diversity, it has a broadly estimated population of 3.8 million inhabitants placing it among those countries with the highest population density in the world. Approximately a third of the population is under the age of twenty and the present growth rate of 1.2% is the lowest in the region. Emigrants scattered throughout the globe number more than four times the residents (Al Khalil, 1996), who are also composed of numerous foreign nationals, immigrants or long term residents (Dar Al Nahar, 1995).

Lebanon is synonymous to ethnic and religious diversity with relative freedom of maneuver and autonomy. Eighteen different religious communities of the three monotheist i.e. religions are officially recognized by law and are very active culturally, politically and economically – though Judaism has become less apparent culturally and politically lately, while still active as an economic force. Because of its location at the intersection of the three main continents of the Old World, the Lebanese “mixing pot” has been enriched with numerous cultural contributions from the many invasions, incursions, immigrations and interactions this land has witnessed over the centuries. Any notion of racial, ethnic or even cultural unity – or purity – is thus excluded and openness to the “different” is common. Having the reputation of the land of refuge, hospitality and relative freedom exceptional in the area for the numerous persecuted communities of the Middle East seeking sanctuary, Lebanon experiences a constantly growing influx of different peoples and cultures. The society’s Arabic identity is very peculiar, notably due to its high level of “westernization” and liberalism added to a very typical national cachet. The literacy rate of 90% is one of the highest in the Arab world; it is even higher among the youths more than half of whom educated privately (The OBG, 2005). While staunchly attached to their independence for which they have fought and still struggle to preserve, the Lebanese remain actively engaged in global cultural and intellectual interchanges notably with the surrounding Near East, Arabic, French and Anglo-American cultures (Fauvel, 1975).

Kuwait is an oil rich country, bordering the Persian Gulf, between Iraq and Saudi Arabia. It is relatively a small country with an area of 6,880 square miles. It has crude oil reserves of about 96 billion barrels, which represent almost 10% of world reserves. Petroleum industry represents nearly half of its GDP, 95% of export revenues, and 80% of the government income. Kuwait is a highly industrialized country with a GDP of US\$ 88.7 billion and a per capita income of US\$ 29,566, which is the second highest in the Middle East and the highest in the Arab world. Kuwait’s current population is around 3 million people of whom one third are local or citizens. The foreign population consists mainly of Egyptians, Indian, Pakistani, Filipino, Sri Lankan, and people from other nations, such as Europe and North America. Kuwaitis are predominantly Muslim who represent 99% of Kuwait’s population of whom 65% are Sunni and 35% Shiite Muslims. Kuwait’s official language is Arabic, though only roughly half the country speaks the language primarily, as most of the foreigners speak their nation’s language such as Hindi, Urdu, or Filipino.

Kuwait is a country of social contrasts. Western restaurants such as McDonald's and KFC are found side by side next to the traditional Arabic restaurants. Despite their wealth, Kuwaitis remain faithful to their traditions; religion and family are the center of their focus. Islam is the state's religion, which guides everyday life activities, social or political. Moreover, Islam is a religion based on respect and tolerance. Most Kuwaitis have large families and they respect elderly people. Furthermore, they are known for their hospitality and contributions. Gender separation is still a part of their traditions, where women and men are gathered separately during social activities such as parties or dinners.

Research Methodology

The research methodology used in this paper is based on a model developed Shimp and Sharma (1987). The "CETSCALE measure", is a tool in consumer research for measuring ethnocentricity. It consists of 17 items scored on a seven-point Likert-type format and represents an accepted means of measuring consumer ethnocentrism across cultures/nations. In a study among four developed nations (France, Germany, Japan, and the USA), Netemeyer et al. (1991) reported alpha levels ranging from 0.91 to 0.95, which provides a strong support to the validity and internal consistency of the measure. They recommended the use of this measure in other nations.

Data Collection

As an explanatory study, CETSCALE measure along with the psychographic and demographic variables of consumer behavior were used to test consumer's ethnocentricity (Luque-Martinez, Ibanez-Zapata, & del Barrio-Garcia, 2000). The sample study was made of two parts. The first part consisted of 91 individuals selected from the two main parts of Beirut, the capital city of Lebanon. The second part consisted of 150 individuals selected from the capital city Kuwait, which accounts for 95% of the country's population. A non-probabilistic sampling methodology was used to collect data. The data was collected through self-administered questionnaires using a drop-off/pick-up method. The drop-off/pick-up is a data-gathering method that incorporates the advantages of both personal interviews and self-administered questionnaires (Stover, R. V., and W. J. Stone, 1978; Imperia, G., O'Guinn, T. C. & MacAdams, E. A. 1985.). Respondents were randomly contacted and asked to complete the questionnaire at their own convenience.

DATA ANALYSIS

The reliability analysis of the 37 activities, AIO statements produced a Cronbach's alpha coefficient of 0.9094, which is highly significant. A study with a coefficient 0.65 or better is considered reliable (Girden, 2001).

A factor analysis using Varimax rotations was carried in two steps and only factors with an Eigenvalue greater than 1.00 were retained. In step one, the analysis of AIO statements was conducted to study lifestyle of Lebanese consumers. The analysis produced four factors, which explained 29.755 percent of the total variance. In the second step, the analysis of AIO statements was conducted to study the lifestyle of Kuwaiti consumers. The analysis produced two factors,

which explained 27.12 percent of the total variance. Table 1 summarizes the factor loading of consumers of both countries.

Table 1: Factor Analysis of AIO Statements (Varimax Rotation)

Factors and Characteristics	Factor Loading	% of Variance Explained
Lebanon		
Factor 1: Self-Reliance and Leadership	0.59	4.711
Factor 2: Nurturing and Family Orientation	0.796	9.656
Factor 3: Health and Optimism	0.77	8.293
Factor 4: Household Oriented and Industrious	0.59	7.095
Total cumulative variance		29.755
Kuwait		
Factor 1: Self-Reliance and Leadership	.60	14.78
Factor 2: Nurturing and Family Orientation	.66	12.34
Total cumulative variance		27.12

Table 1 includes only those AIO statements that have a factor loading of greater than 0.5 on their respective factors. The first factor loadings show statements that reflect a positive self-image. They explained 4.711% of the total variance of Lebanese consumers, while they explained 14.78% of the Kuwaiti consumers. The second factor “Nurturing and Family Orientation” factor explained 9.656% of the total variance of Lebanese consumers, while it explained 12.34% of Kuwaiti consumers. The third factor, explained 8.293% of variance of Lebanese consumers, while it was insignificant among Kuwaiti consumers. The fourth factor “Household Oriented and Industrious” explained 7.095% of the variance of Lebanese consumers, while it was insignificant among Kuwaiti consumers.

Four factors explained 29.755% of the variance of Lebanese consumers. They reveal certain basic characteristics of the Lebanese people. The Lebanese consumers believe that they are community leaders. They are family oriented and are deeply concerned with the well being of their children. They care for their children and teach them good habits. The Lebanese consumers are health conscious and are likely to do things by themselves and are willing to learn new ways of doing things. While as for Kuwaiti consumers, two factors were significant. These two factors explained 27.12% of the variance. They reveal certain basic characteristics of the Kuwaiti people. The Kuwaiti consumers believe that they are self-esteemed. They appreciate their families and are concerned with the well being of their children. They care for their children and their children’s education.

Ethnocentrism

To measure consumer ethnocentrism the 17- item CETSCALE developed by Shimp and Sharma (1987) was used. Tables 2 and 3 show the result of the reliability analysis of these 17 items of both consumers. The Cronbach’s Alpha coefficient of items reported was above 0.91, which is

considered a reasonably high reliability coefficient. Based on this, it can be assumed that all 17 items used are measuring the same construct (ethnocentrism) and, therefore, a summative measure can be used to represent the ethnocentrism score of the respondents. The results of the ethnocentric analysis are shown in Tables 2 and 3 below. The following is table 2 which reflects the ethnocentricity of Lebanese consumers:

TABLE 2: Ethnocentrism – Lebanese Consumers

Item No.	Item ¹	Reliability ²	Mean Score
1	Lebanese people should always buy products made in Lebanon instead of imports	.933	5.08
2	Only those products that are unavailable in Lebanon should be imported	.933	5.30
3	Buy Lebanese made products and keep Lebanese working	.933	6.01
4	Lebanese products, first, last, and foremost	.932	4.85
5	Purchasing foreign-made products is un-Lebanese	.936	3.24
6	It is not right to purchase foreign products, because it puts Lebanese out of jobs	.929	3.85
7	A real Lebanese should always buy Lebanese made products	.930	3.90
8	We should purchase products manufactured in Lebanon instead of letting other countries get rich on us	.929	4.98
9	It is always best to purchase Lebanese products	.930	4.57
10	There should be very little trading or purchasing of goods from other countries unless of necessity	.929	4.44
11	Lebanese should not buy foreign products because this hurts business and causes unemployment	.931	3.96
12	Curbs should be put on all imports	.929	4.27
13	It may cost me in the long-run but I prefer to support Lebanese products	.932	4.96
14	Foreigners should not be allowed to put their products on our markets	.930	2.95
15	Foreign products should be taxed heavily to reduce their entry into Lebanon	.932	4.47
16	We should buy from foreign countries only those products that we cannot obtain within our own country.	.931	4.94
17	Consumers who purchase products made in other countries are responsible for putting their fellow Lebanese out of work.	.928	3.62

¹ Response format is 7-point Likert-type scale (strongly agree = 7, strongly disagree = 1)

² Calculated using Cronbach's Alpha (Alpha if item deleted).

Table 2 shows that the highest scoring factor was Item 3 and it indicates buying Lebanese products keeps Lebanese working. High scores were reported in most of the items. Items 1, 2, 4, 8, 9, 10, 12, 15, and 16 had scores above 4.0. This indicates that the Lebanese consumers have preference to local products and they view imports as a negative factor that hurts the economy.

Imports are perceived as benefiting the exporting countries and contributing to unemployment in Lebanon. However, the Lebanese consumer is not against foreign products. Item 14 had the lowest score (2.95), which states that foreigners should not be allowed to put their products in the market. This represents that the Lebanese consumer is not against imports but they intrinsically prefer local products.

The mean score on the CETSCALE is 4.44, which is high. The Lebanese consumer appears to accept imports if local products are not available. The Lebanese consumers do not put the blame on imported goods (items 11 and 17 had scores below 4) for high unemployment or a bad economy. This reflects the unique characteristics of Lebanese people. Even though they prefer to consume local products, but they are receptive to the imported goods if the need arises.

Table 3: Ethnocentrism – Kuwaiti Consumers

Item No.	Item ¹	Reliability ²	Mean Score
1	Kuwaitis should always buy products made in Kuwait instead of imports	.913	3.11
2	Only those products that are unavailable in Kuwait should be imported	.931	2.30
3	Buy Kuwaiti-made products and keep Kuwaitis working	.934	4.01
4	Kuwaiti products, first, last, and foremost	.932	3.85
5	Purchasing foreign-made products is un-Kuwaiti	.918	2.24
6	It is not right to purchase foreign products, because it puts Kuwaitis out of jobs	.919	3.55
7	A real Kuwaiti should always buy Kuwaiti made products	.931	3.05
8	We should purchase products manufactured in Kuwait instead of letting other countries get rich at our expense	.920	3.78
9	It is always best to purchase Kuwaiti products	.934	3.57
10	There should be very little trading or purchasing of goods from other countries unless it is necessary	.969	2.34
11	Kuwaitis should not buy foreign products because this hurts business and causes unemployment	.941	2.88
12	Curbs should be put on all imports	.922	1.99
13	It may cost me in the long-run but I prefer to support Kuwaiti products	.943	4.99
14	Foreigners should not be allowed to put their products on our markets	.910	1.55
15	Foreign products should be taxed heavily to reduce their entry into Kuwait	.937	2.27
16	We should buy from foreign countries only those products that we cannot obtain within our own country.	.930	4.86
17	Consumers who purchase products made in other countries are responsible for putting their fellow Kuwaitis out of work.	.922	3.03

¹ Response format is 7-point Likert-type scale (strongly agree = 7, strongly disagree = 1)

² Calculated using Cronbach's Alpha (Alpha if item deleted).

Table 3 shows that the highest scoring factor was Item 13 and it indicates Kuwaitis like to support their local products even if it will cost them more. High scores were reported in three items, which are 3, 13, and 16. This indicates that the Kuwaiti consumers are socially responsible people willing to pay more to support the local product. Imports are not perceived negatively as reflected with the low scores reflected in items 10, 11, 12, and 14. In general, Kuwaiti consumers are not against foreign products. Item 14 had the lowest score (1.55), which states that foreigners should not be allowed to put their products in the market.

The mean score on the CETSCALE is 2.92, which is relatively low. This shows that the Kuwaitis are not biased consumers and they tend to make objective buying decisions. The Kuwaiti consumers buy imported as well as local products when available. The Kuwaiti consumers don't put the blame on imported goods (items 11 and 17 had scores of almost 3) for high unemployment or a bad economy. This reflects a unique characteristic of Kuwaiti people.

CONCLUSIONS

Although the present study is exploratory, the findings highlight that the lifestyle dimension of Middle Eastern consumers influences their buying habits, which reflects their ethnocentric tendencies. This study has a significant impact because it shows that such information is important to marketing professionals in developing their strategies that will properly position their products in the right place. The fact that two factors – “Self reliance and leadership” and “Nurturing and family orientation” - were identified as important lifestyles dimension among both Lebanese and Kuwaitis reflect some common features among the consumers of the Middle East countries. While Lebanese consumers showed two more factors which were household oriented and health concern.

Examining at the CETSCALE measure of ethnocentricity, the Lebanese consumers' mean score was high meaning they accept imports if local products are not available. On the other hand, Kuwaiti consumers mean score 2.92, which is relatively low. This shows that Kuwaitis are less ethnocentric than the Lebanese people. They buy both imported and local products.

This study also shows that the Lebanese and Kuwaiti people share some common characteristics such as self-esteem and family values, but they differ with respect to other factors.

The study showed the unique cultural structure of the Lebanese and Kuwait people. Businesses have to properly position their products in the right place, which reflects the need of designing strategies targeting different market segments. This would let us wonder about the people of the other nations of Middle East. Do they have the same characteristics as those of the Lebanese and Kuwaiti people? The above dimensions provide evidence that more analysis on the specifics of lifestyles is needed in making marketing strategies. Consumers specific include information such as their geographical distribution, economical condition and age. Understanding the consumers' lifestyles and ethnocentric behavior, successful marketing will result, which promote growth and profitability.

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**The Reality of Strategic Planning:
Epiphany or Evolution?**

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The Reality of Strategic Planning: Epiphany or Evolution?

Abstract

The concept of strategic planning is often presented as an epiphany instead of an evolution. While strategic planning should explore the ethereal, it must also deal with reality. This paper approaches strategic planning from a practitioner's perspective. We first present strategic planning as an evolution, both from a theoretical point of view and how managements actually practice it. The evolution as a theoretical concept will be presented first. We will then look at some of the reasons strategic planning may deviate from its theoretical underpinnings, by looking at problems managers face in its implementation. We conclude with a framework that illustrates the strategic planning process as it attempts to deal with reality.

Introduction

Strategic planning is not a new concept in management circles, having come into favor in the mid-1960s (Mintzberg 1993). Before there was strategic planning, there was long-range planning and, before that, companies presumably survived with only informal planning processes. Founders of early organizations directly managed the business and kept their plans in their minds. They did not need formal plans because the businesses were small and executives could convey their goals and strategies directly to their employees. Even today, studies find that some small businesses use informal planning approaches (Meers and Robertson 2007).

The increase in size and complexity of businesses made it necessary to have a more formal process for developing and disseminating the strategies of an organization (Chandler 1977). Consequently, strategic planning arose as a normal part of managing an organization. While the concept of strategic planning is widely accepted as a theoretical concept, in practice, it has not been as effective (Mintzberg 1993). Is this a problem with the concept itself or with the quality of the implementation programs?

Part of the problem is that the concept of strategic planning is often presented as an epiphany instead of an evolution. While strategic planning should explore the ethereal, it must also deal with reality. This paper approaches strategic planning from a practitioner's perspective. It presents strategic planning as an evolution, both in theory practice. The evolution as a theoretical concept will be presented first. This discussion will be followed by reasons strategic planning deviates from its theoretical underpinnings, by looking at problems managers face in its implementation. We conclude with a framework that illustrates the strategic planning process as it attempts to deal with reality.

Phases of the Strategic Plan Evolution

To the practitioner, strategic planning appears to have followed several stages in its evolution as a concept and as a program within an organization. These phases include:

- The stand-alone strategic plan
- The link with the business plan

- The development of the vision and mission
- The identification of critical success factors
- The provisions for the unplanned.

The following discussion provides an overview for each of these stages.

The stand-alone strategic plan

Some portray strategic planning as a greenfield process in which top management conceives the strategic plan and then passes it down to the lower levels of the organization to implement. These plans included a great number of goals and objectives but little in the way of action plans to accomplish those objectives. In some cases, enlightened companies extended the objectives downward in the organization to include key functional areas, such as sales and operations. In this version, the strategic plan was a document to be revered internally, and shown to visitors, as an important contribution, but not to be disturbed by the humdrum of normal business practices. It rested peacefully until its time for renewal. Figure 1 shows this version of the strategic plan.

Strategic and Business Planning Hierarchy

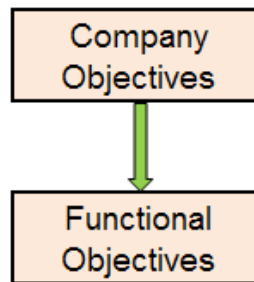


Figure 1. The Stand-Alone Strategic Planning Process

The link with the business plan

Even before the advent of strategic plans, most companies of any size prepared annual, or business, plans with particular emphasis on sales forecasts and expense budgets. These were the working documents used to measure actual performance. Because of their rigidity – the inability to be changed during the fiscal year – they usually became less useful as time passed.

Enlightened companies decided it made sense to link the strategic plans and the business plans. This link demonstrated the idea that the strategic plan could provide direction to the business plan. In order to do this, the strategic plan expanded to include the action plans included in the business plans. Figure 2 shows this version of the strategic plan.

This expanded view also required that functional areas, such as marketing, operations, accounting and finance also develop their own objectives and action plans that would fit within

the framework of the corporate objectives and action plans. While this was a logical extension of the strategic planning scope, it is still not a reality in many businesses.

Something was missing in many of the strategic plans. Some advocates decided that there was a need for an overriding sense of direction or core purpose that would provide continuity to the plan. That something turned into visions and missions.

Strategic and Business Planning Hierarchy

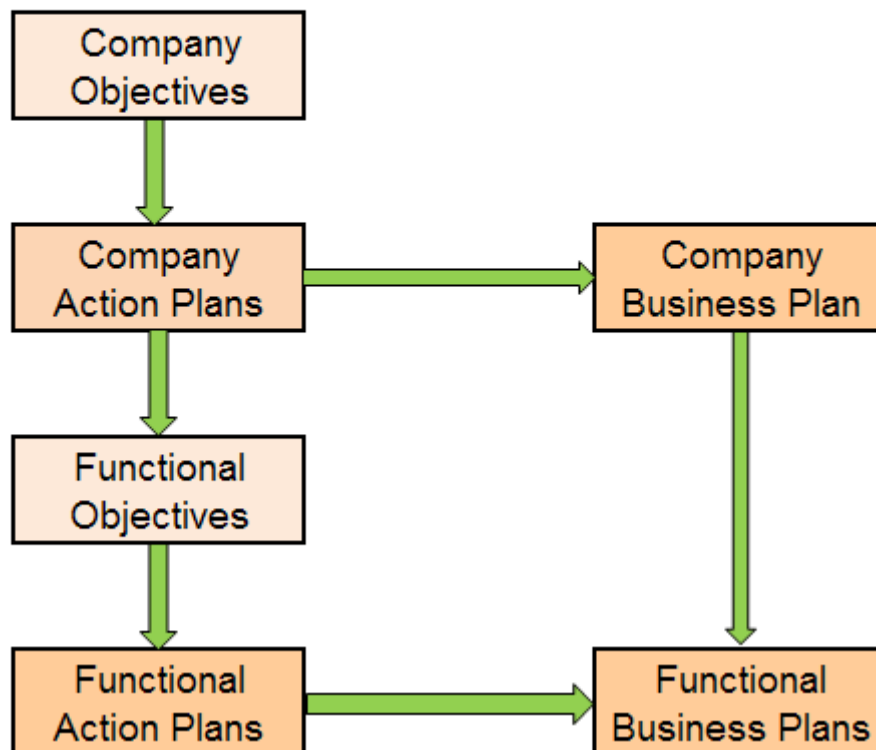


Figure 2. Linking the Strategic Plan with the Business Plan

The development of the vision and mission

As companies were trying to make the strategic plans more meaningful by linking them with the business plans, management theorists explored the idea of adding vision and mission statements. These statements would demonstrate the core ideas that would guide the organization over an extended period of time and serve to add both direction and constraints for the strategic planning process.

Many executives agree that their businesses should include vision and mission statements and dutifully schedule an all-day meeting to “develop our vision and mission.” While commendable, it is not likely that company management will “discover” its purpose in a single meeting.

There still seems to be some confusion about the difference between vision and mission. Which comes first? Which should be the more general statement? How specific should the mission be? Should it include history or just be forward-looking? Should it be short enough for employees to commit it to memory? These and other questions seem to fascinate scholars, but sometimes annoy practitioners.

Figure 3 shows the strategic planning process to include vision and mission statements. In this figure, we depict the vision as being more general than the mission statement. The mission statement then, is more precise in describing the specific directions of the organization and serves as the tangible link with the strategic plan.

Being realistic also means recognizing that vision and mission statements must be tempered if they are to have real meaning. Company founders often provide such strong leadership that their personal values find root in the company's vision. Examples include J. C. Penney, Sam Walton, Ray Kroc, Dave Thomas, and Bill Gates. These leaders had a vision that found permanence in the strategic planning of the business. Their successors must deal with how to preserve that vision or adapt it to changing conditions.

In practice, vision and mission statements are becoming less visible on company websites. They may be embedded in the company's culture, but companies use more tangible displays of the company's mission and vision, such as products or programs that the company is sponsoring.

In theory, the vision and mission statements provide direction to the strategic planning process and may even impose constraints concerning product lines, geographic areas, level of vertical integration, and the like. In practice, it appears that the strategic plan may often be a means of modifying the mission statement to fit the plan.

One prominent CEO warns, "Companies that become slaves to the short term are the ones most likely to fail in this age of globalization, just-in-time outsourcing, rapid technological change, and empowered consumers. You cannot simply create solutions for your customers week by week. You have to prepare for what they will need in five or ten years from now, too, and that takes research, effort, and scenario planning. You also must have the mettle to stick with your vision." (Eskew 2007)

Strategic and Business Planning Hierarchy

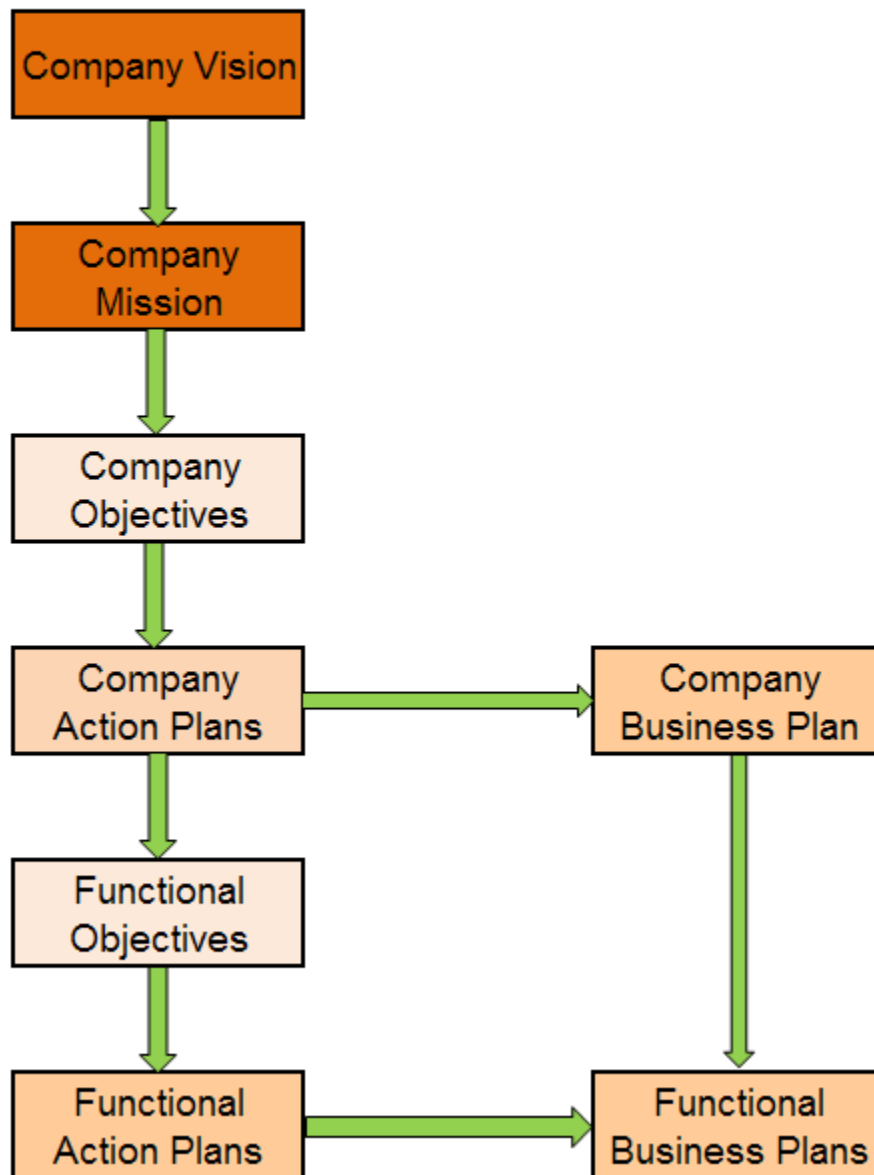


Figure 3. Vision and Mission Added to the Planning Process

Figure 3 shows the strategic planning process as management theorists often describe it. It is a top-down process in which executives develop the objectives that will fulfill the vision and mission of the company. They send these objectives down to the various functional managers, along with the identity of selected action plans that will achieve the objectives. The executives also send the strategic plan to the business plan developers, usually the accounting and finance

departments. The functional managers – marketing, operations, engineering, and human resources – then prepare their own strategic and business plans that fit within the constraints provided by the strategic plan and the business planners.

While the concept of strategic planning includes the idea of feedback and collaboration in the planning process, time constraints often make this difficult because, no matter when the planning cycle starts, there is always a rush to get the plans completed by the deadline date. This may mean that objections go unheard, differences in plans do not get reconciled and last minute events – even those of considerable importance – do not get included. Planning is enough of a chore; but replanning or changing plans is burdensome.

The identification of critical success factors

Before leaving our description of the strategic planning process, we would like to add a branch of the planning process that writers rarely mention and only a few organizations actually practice. That is the identification of the critical success factors (CSFs) necessary for the organization to successfully meet its strategic and business objectives. John Rockart is credited with being the first to use the term “critical success factor” in his article about how to improve reporting key information to top executives. He defined CSFs as “... the few key areas where ‘things must go right’ for the business to flourish... As a result, the critical success factors are areas of activity that should receive constant and careful attention from management” (Rockart, 1979, p.85).

Strategic and business plans include a number of objectives and action items. While it is desirable to achieve all of the objectives identified, the CSFs are those few objectives that are essential and therefore, must be achieved. Figure 4 shows this addition.

Strategic and Business Planning Hierarchy

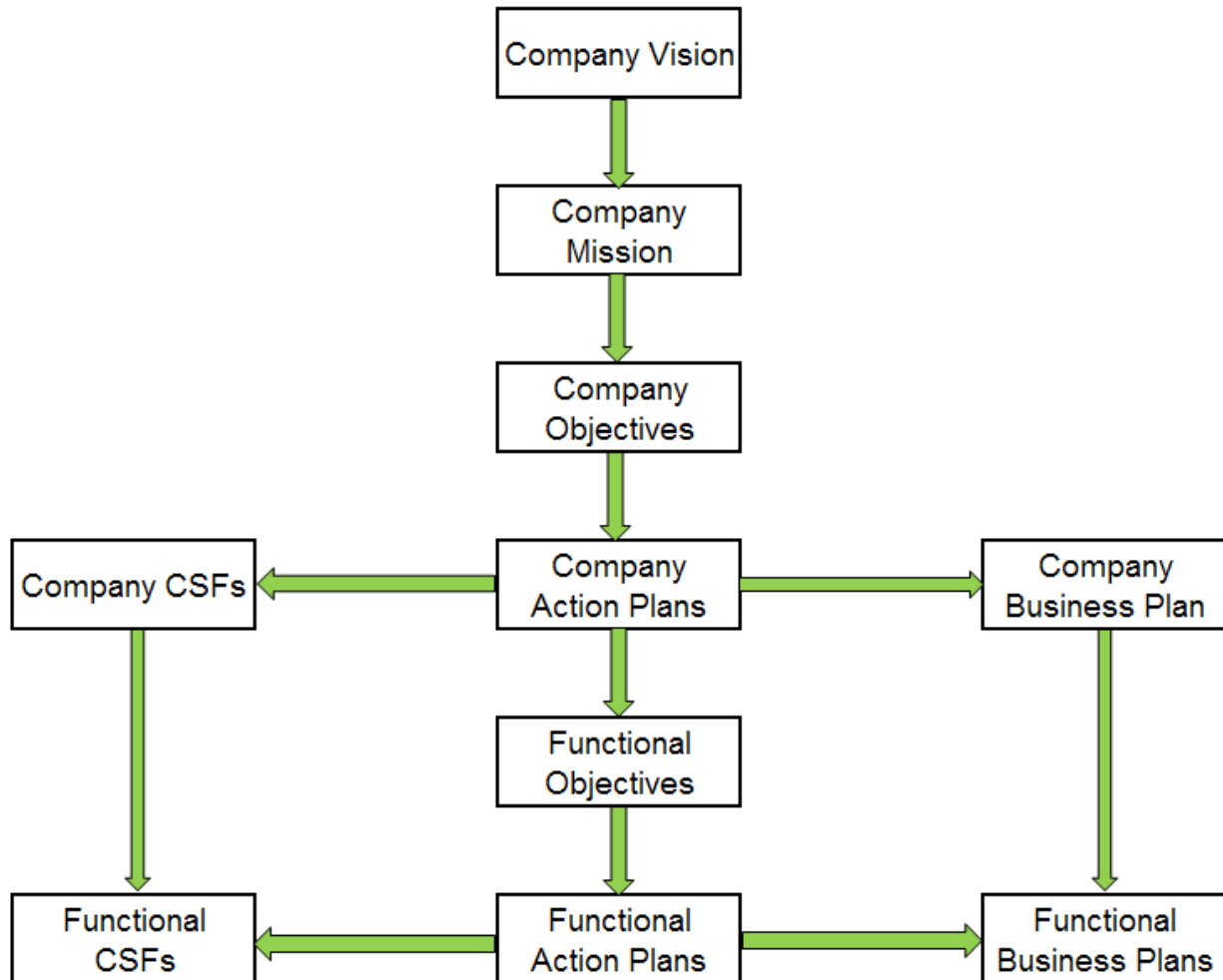


Figure 4. Adding Critical Success Factors (CSFs) to the Strategic Planning Process

Figure 4 shows this progression in the planning process and includes cross-functional relationships that seek commitment and collaboration among the various functions of the organization. However, it lacks the feedback loop that suggests that strategic planning is an interactive, and iterative, process. Figure 5 captures the need for interaction among the strategic plan elements.

Strategic and Business Planning Hierarchy

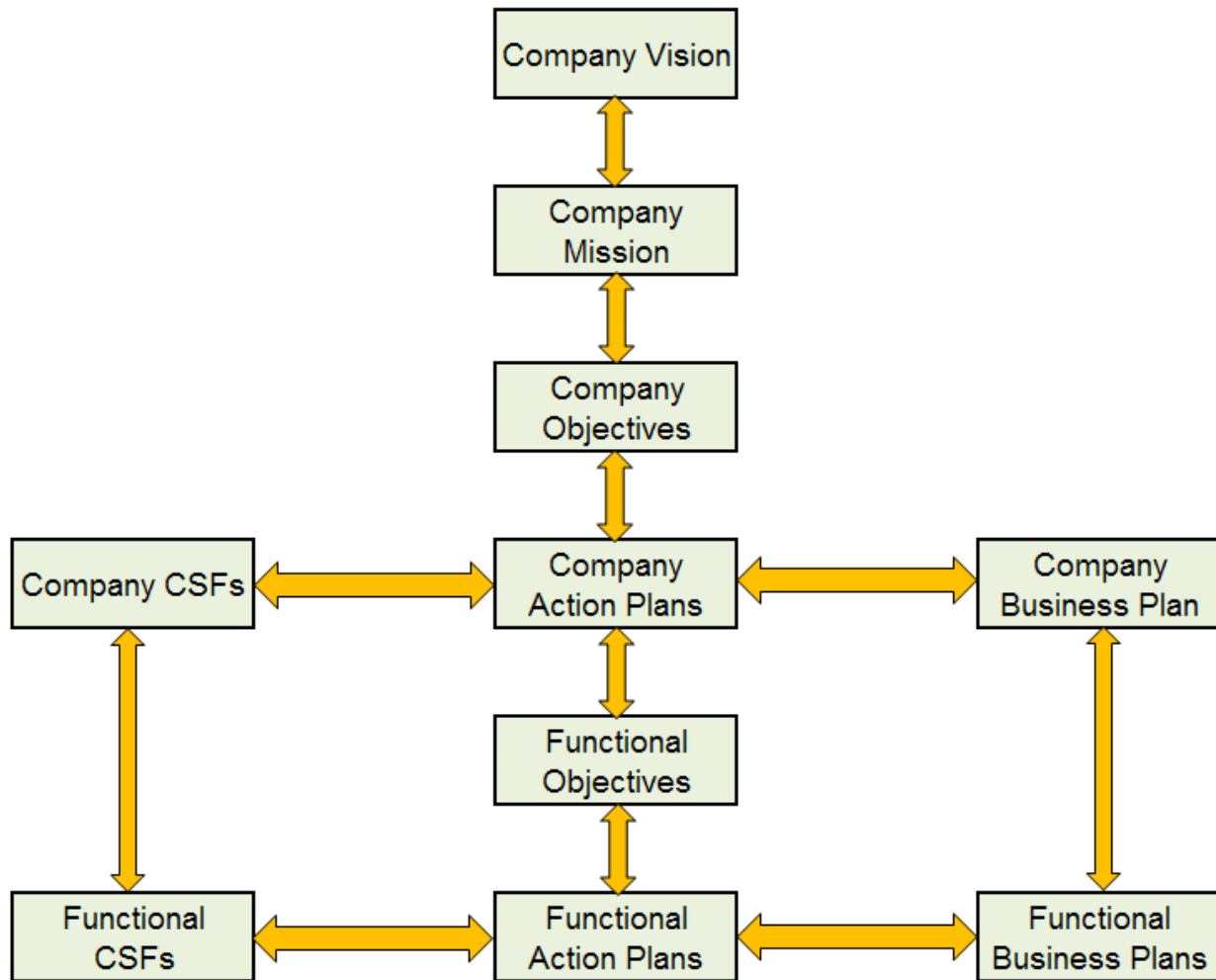


Figure 5. Interaction among strategic plan elements

The diagrams shown above represent a strategic planning system that should, but does not always, work. In a recent article, Kaplan and Norton (2008) point out that companies often have difficulty successfully integrating strategy and operations. As a remedy, they emphasize the need for a closed-loop management system to link strategy and operations consisting of the following phases: (1) develop the strategy, (2) translate the strategy into objectives and initiatives, (3) plan operations at the functional level, (4) monitor and earn, (5) test and adapt the strategy.

Why Has Strategic Planning Not Been Successful?

Despite the logic of the model shown above, organizations are still having difficulty in their strategic planning. Why? Is it the system or the execution? Or is it some combination of both? In the next section, we overview six core areas that help explain why strategic planning has not been the complete success that management theorists believed possible. The areas point out that 1) the business environment is always changing, 2) there is an obsession with control on the part of management, 3) there are too many options to pick from, 4) coordination between departments is a problem, 5) it is often difficult to identify performance problems from environmental problems, and 6) too often, the planning department dictates the heart of the strategic plan.

The business environment is always changing. This observation of course is nothing new. What is interesting though is that each generation of management theorists believe that their generation was turbulent while the previous generation was stable (Mintzberg 1993). This line of thinking has been going on since the 1960s, when Drucker clearly elaborated on it in his book *The Age of Discontinuity* (Drucker 1969). In reality, turbulence, or the constant of change, has always existed to some degree, and will continue to exist. Thus, any claims by a contemporary writer that this generation (and the ones that follow) is ever changing, should be greeted with a sigh and a resigned “yes, we have heard that one before”.

One item that makes change so prevalent is that organizations exist in an open environment, subject to forces outside of itself. Consequently, there is an obvious need to consider open system effects and some planning approaches address this dilemma – Porter’s Five Forces Model, SWOT analysis, and Drucker’s planning gap.

Another paradox of the changing business environment is that plans have a definite life span but the organization goes on in a continuous fashion. As a result, plans are static but actual results are dynamic. The obvious conclusion herein is that just as the business environment changes, mechanisms need to be in place to allow adjustments in the plans as well.

Management has an obsession with control. Management wants exclusive control of the planning process (Mintzberg 1993). This is ironic, since we have just said that the environment is turbulent and therefore, cannot be totally controlled. Nonetheless, planners want to define goals and action plans over which the organization can exercise control.

One of the symptoms of this obsession with control is the source of the planning goals. Is it the planners (often top management), or the line managers? For example, many managers faced a dilemma related to management by objectives (MBO). In theory, MBO sounds good, line managers and their superiors work together to come up with operational goals. However, what often happens is that the line manager is told what their bottom line profits should be by the end of the fiscal period, and it is up to them to “figure out” how to hit that goal. The input from line management then, is not setting the goal, but managing to reach the goal that has been set for them.

This dilemma illustrates the need to align strategic plans (company) with supply chain goals (across companies). It is difficult enough to align the planning process within a company; to do it across multiple companies appears almost insurmountable.

Another dilemma with this obsession with control is that lower level managers often have inadequate time to complete the planning process. The planning process usually has a target completion date that is often “set” by top management. This in itself is not a bad thing. However, line managers often rush into setting budget forecasts since they spend the bulk of their time managing their units. Inevitably, the groups at the end of the process feel squeezed and may not have the time to link with the rest of the plans set by top management.

To compensate a little for this quest for control, some theorists and practitioners advocate contingency planning. However, even this wise approach gives an air of indecisiveness that planners do not like. Even contingency planning can get tedious. For example, we could plan for 20% higher and 20% lower. But is 20% right, or should it be 25%? This type of thinking creates a desire for point targets instead of a true range of possibilities. Point targets (one number) are seldom correct; therefore, it appears that the targets should cover a reasonable range.

One other response to releasing a bit of control is the practice of scenario planning. This type of planning allows for a range of possibilities, but is often aimed at planning for crisis events. For example, oil companies plan for interruptions of oil in case a war breaks out in a region of the world. This type of planning is good and should be advocated, but its focus is more on a range of potential events, as opposed to a range of potential outcome targets, such as sales, expenses, and profit margins.

There are too many options from which to pick. One of the byproducts of this information age is that there are too many choices to make (Schwartz 2004). For line managers, this results in analysis that is often time consuming and out of their reach since there is just not enough time to consider every alternative available. Consequently, operating managers are willing to accept first feasible solutions and since they are not able to search for the optimum solution. Herbert Simon (1997) noticed this dilemma and coined the term satisficing, to indicate the best solution within the time constraints. Satisficing is fine, as long as a viable alternatives is not overlooked.

The abundance of data collected leads to an abundance of information. We all know information hides the meaning of the data – if there is time to interpret it. Unfortunately, a vast amount of uninterpreted information exists. As a result, organizations have a mix of data, information, knowledge and wisdom. Often, because of time constraints, it is more convenient to use whatever is in the most usable form even though it may not be the most relevant.

Coordination between departments is a problem. As we mentioned above, upper level managers often set goals that lower level managers must attain. The so-called input from lower level managers is the assurance that they can be flexible in managing their operation – provided they meet the goals that have been set for them. This situation creates a conflict between the upper and lower levels of the organization. The need to do a better job of managing the

interfaces between departments (see previous figures) is necessary. These interfaces require aligning objectives, actions and timing.

For example, department managers may not agree with each other on strategies, especially at the lower levels of the organization. The classic example is the division that often exists between the marketing department and the production department. Marketing managers have the goal of introducing new products with various features. Production managers must contain costs, usually with standard production runs that require a consistent product over a period of time, in other words, as few new products as possible. Production and accounting managers often have conflicting goals in the area of inventory levels. Production departments require an abundance of raw materials and components in order to keep production lines moving. The accounting department must show inventory levels that are as low as possible. Such differences can be resolved only when departments agree to exist as components of the system, not the system itself.

It is often difficult to identify performance problems from environmental problems. Many organizations lack a mechanism for adjusting for changes in their plans. As a result, this lack of replanning capability may result in some confusion as to whether there is a performance problem, or an outside factor at work that is beyond the control of the line manager. Something as simple as bad weather can throw a performance budget off (for example, a loss of sales and subsequent bottom-line profits). Under these circumstances, it is a mistake to hold the manager accountable to the original plan.

Of course, if the problem is a performance issue, then the situation must be addressed. However, adjustments to goals should reflect outside factors, not internal failures. Two questions emerge at this point: 1) how do you decide if actual conditions have changed enough to change the plan, and 2) at what point is it meaningless to continue to compare actual results with the plan?

Too many strategic plans are largely done by the planning department. Although the planning department, or the “planners,” has an important role in preparing strategic plans, they should not be the ones who make the critical decisions upon which plans rest. Planners should develop planning systems and provide input, but the line managers who have the responsibility to achieve the plan objectives should be the ones to make the final decisions. Too often, operating managers abdicate this decision-making responsibility, or it is delegated to planners by top management.

One executive emphasizes the need to involve the operating employees. “Building the future is really about building the present. Yes, you must be able to see where you want to go, but you will never get there if you spend too much time only looking toward it. Instead, the decisions you make and the people you work with today are what will get you to where you need to be - never lose touch with them. And to build the present, a business leader must be careful to stay close to the front line - the people who deal with your customers and markets.” (Levy 2007)

Gunn and Williams (2007) also caution about an extreme dependence on strategic tools and frameworks as a generic solution, instead of fitting the tools to the situation.

In light of the above discussion, companies need a realistic approach to strategic planning. This approach must adjust for changes that occur during the life of the plan. The following section addresses this issue.

The Need for Reality

At the risk of oversimplification, the root cause of strategic planning failures appears to be that the plans do not adequately reflect reality. Mintzberg (1985) distinguished between the intended strategy (plan) and the realized strategy (actual). He proposed that realized strategy resulted from a combination of intended strategy and emergent strategy – “patterns or consistencies realized despite, or in the absence of, intentions”. Nonoka and Toyama (2007) present strategic management as distributed practical wisdom, or phronesis. They claim, “Strategy is not created from the logical analysis of environment and a firm’s resources... Strategy emerges from practice”. Lengenick-Hall and Wolff (1998) describe three types of strategies that require facing reality – capability logic, guerilla logic, and complexity logic. They defined these strategies in terms of the dominant logic supporting each strategy. Capability logic is the premise that “firms seek to develop and implement strategies that will create a sustainable competitive advantage.” Guerrilla logic “is shaped by the emerging research into high-velocity firms and industries embroiled in not only extremely competitive but intentionally disruptive interactions.” Complexity logic “links strategic success with the natural consequences of understanding, shaping, and moving with the paradoxical forces that shape organizational systems.” They compared the three approaches on a number of factors that reflected the need to be realistic.

Before we can show how strategic planning should reflect reality, we must first describe what we mean by reality. In the next section, we outline four groups that encompass the major activities of an organization.

Categories of Operations

There are three major categories of activities in a business. The first are normal ongoing operations – the bulk of the business activities. This type of operation involves transforming inputs, such as steel and wood, into products. It also involves transforming inputs into service outputs; often, the input is a person to whom a business provides the service. In most organizations, the ongoing operations are what the company considers its primary business and around which they build their strategic plans.

However, there are two other major types of operations for almost every organization. The first is improving operations, in which the company uses planned programs to make improvements in its ongoing operations. These improving programs can be either incremental or radical. Incremental improvements represent a continuing flow of improvements that involve a large number of employees. Each improvement may not be major; however, the cumulative effect can be significant. Programs such as Total Quality Management (TQM) and Just-in-Time (JIT) represent incremental improvement efforts. Radical improvements are major in scope and often

pose a disruptive effect on the ongoing operations. Lean manufacturing is an example of a program that may provide considerable benefit but is often disruptive to the normal operations of a company.

The other major category of operations is problem-solving activities. These can also be divided into two groups – routine problem solving and crisis management. The first involves the normal kind of actions to correct a reoccurring problem, such as late deliveries or invoice errors. Employees within the company can usually resolve these problems within the framework of their normal workday. Crisis management is a different story. A crisis occurs because of a major unexpected event, such as a toy recall because of lead paint or a fire that destroys a manufacturing plant. Often, this type of event requires outside, expert help.

As a result, strategic plans can never be completely oriented toward desired goals; they must consider the actual situation as it exists. Organizations must start from where they are; not just from where they would like to be.

Approaching Reality

How do organizations consider reality in their strategic planning? One widely used approach is to use the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. This should be done within the framework of the closed and open system environments. The closed system considers internal operating factors that are largely within the control of the organization – the strengths and weaknesses. The open system considers external factors that are largely not within the control of the organization – the opportunities and threats. Some of the external factors to consider include (1) actions by competitors, (2) technology developments, (3) trends in society tastes and mores, (4) government legislation and controls, (5) general economic conditions, and (6) global environmental perspectives. The closed system considers what an organization can do; the open system considers what an organization must do.

Another approach to strategic planning that forces an organization to deal with reality was outlined by Peter Drucker in his book *Managing for Results*. He posed the question “What will happen if we do nothing?” In most cases, conditions will deteriorate if a company does nothing; therefore, they have to face the need to do something and that is to plan some strategic actions that will carry them to their desired levels of performance.

The Reality of Strategic Planning

Figures 6, 7 and 8 attempt to portray how strategic planning fits within the framework of an organization’s activities. We will describe three cycles of strategic planning and illustrate how actual experiences can be reflected in an organization’s strategic plan over an extended period. In these scenarios, we try to show that strategic planning is a dynamic process, where the approach to planning varies as conditions change. Huy and Mintzberg (2003) call this evolution the “rhythm of change,” and describe it as follows:

“Today's obsession with change focuses on that which is imposed dramatically from the top." This view should be tempered, however, by the realization that effective organizational change often emerges inadvertently or develops in a more orderly fashion. Dramatic change is

frequently initiated in times of crisis or of great opportunity when power is concentrated and there is great slack to be leveraged. Systematic change is slower, less ambitious, more focused and more carefully constructed and sequenced. Organic change seems to rise from the ranks without being formally managed. Dramatic change alone can be just drama, systematic change by itself can be deadening and organizational change without the other two can be chaotic, they must be combined or sequenced and paced over time creating a rhythm of change.”

Time period One

Very few companies begin their existence by developing a strategic plan. Most operate for a period of time before they get around to preparing their first strategic plan. While those looking for funding to start a business have to develop a business plan, in actual practice, such plans probably focus more on how to repay the loan than on strategic issues. It follows that most companies should include their past performance in developing their strategic objectives and action plans. While they may entertain objectives that represent new thinking, it is likely that the strategic plan is heavily influenced by their past experiences.

In Figure 6, moving from left to right shows the transition from business plans (sometimes called annual plans) to actual results, and then to the preparation of the first strategic plan. From top to bottom, Figure 6 shows the influence of program plans, the traditional business plan (with detailed forecasts and budgets), plans to deal with routine problems, and contingency plans (not all companies will have contingency plans). In the figure, the boldness of the border is intended to show that the annual plan is the most likely to be developed, program plans next, and contingency plans the least likely to be formally prepared, at least in the beginning. The diagram also attempts to show the influence of each of these areas on the strategic plan by the boldness of the arrows leading to the strategic plan. Of course, there must be room for new corporate objectives in the strategic plan, shown as the center block in the diagram. These may or may not be the result of actual experiences.

The actual results for each of the four activities will have an effect on the strategic plan. In addition, the horizontal dashed lines leading to the right indicate that the actual results for each activity area will also have an influence on subsequent individual activity plans. This can be seen more clearly in Figure 8, which shows the continuation of the planning process into Period Two.

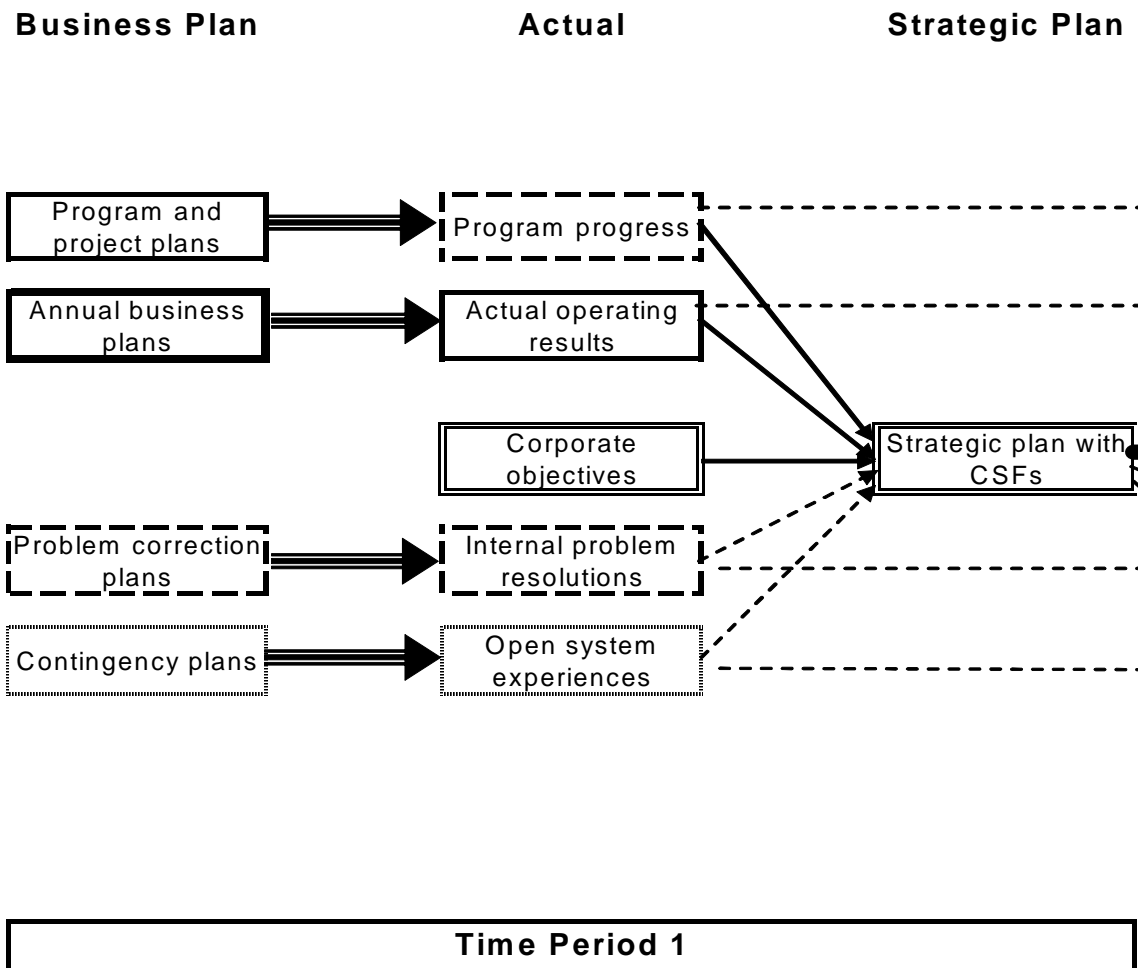


Figure 6. First Time Strategic Planning

Time Period Two

As time passes, actual results almost always differ from the original plan. If the differences are small, the strategic plan remains relatively intact. If the differences are large, the strategic plan becomes suspect. In Figure 7, we indicate that differences arise from either the business plan or one of the program plans. The normal operations may be experiencing less than anticipated results for some reason. For example, it may be that in actual practice, a manufacturing department needs more training before cost savings can be realized. Deviations could also occur on the program side. Or, the actual results of an outsourcing program may not be achieving its target objectives. Perhaps the lower cost of manufacturing the item overseas has been offset by rising oil prices, a resource needed to bring the completed product to the marketplace. It is likely that the program will be modified to change the outsourcing program and this change will become a part of the succeeding strategic plan.

Figure 7 shows on the left, the Strategic Plan developed in Period One. The components of the figure are the same as for Figure 6, except they reflect the events of the first period. The bold

irregular line in the center conveys the idea that things start out as expected during the early part of the period. However, as actual results begin to stray from the plan, as described in the previous paragraph, the path begins to stray, somewhat unsteadily, the effect of unexpected variances from plan. The straight lines for the problem-solving and contingency plans reflect no unexpected events of any consequence. The displacement of the corporate objectives block slightly upwards indicates that they have been influenced by events. All of these factors converge to be included in the strategic plan for Period Two.

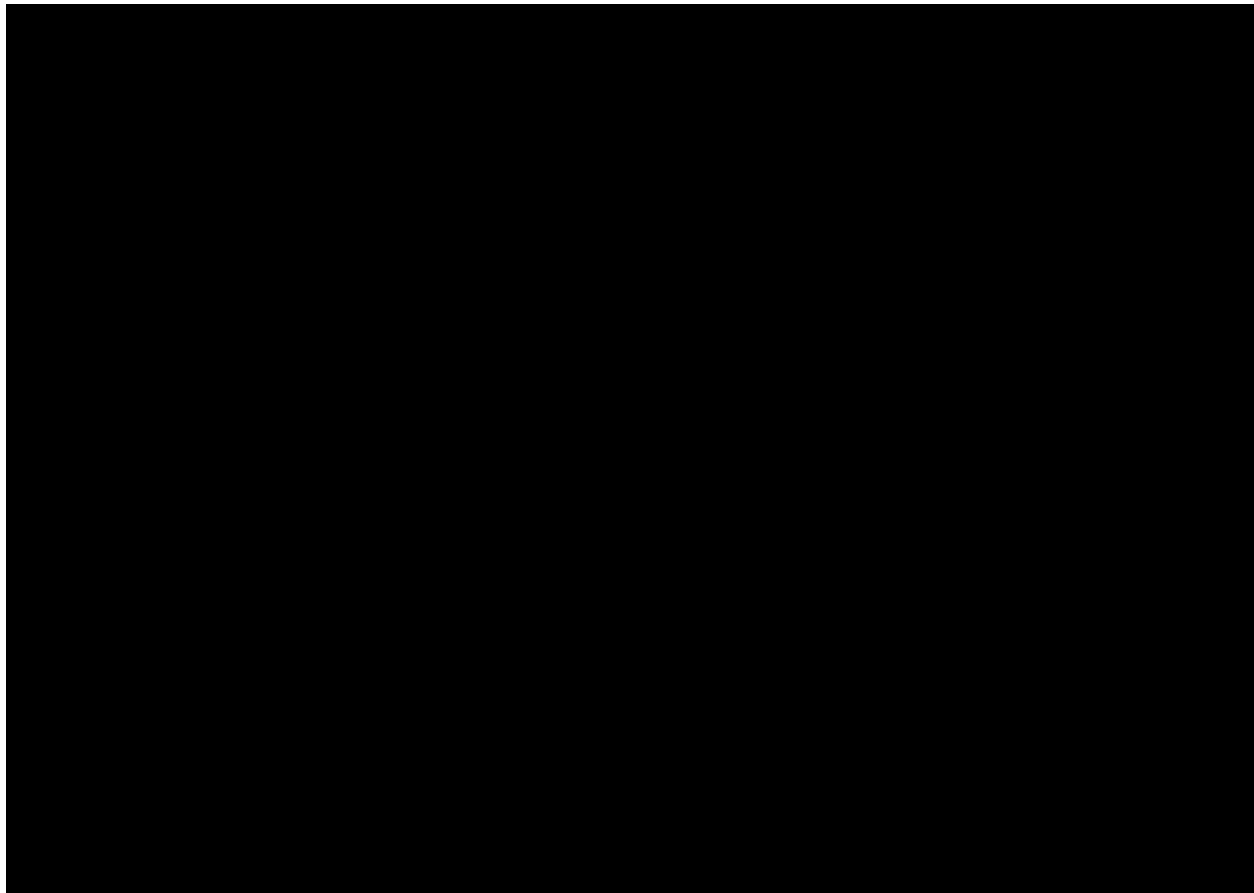


Figure 7. Strategic Planning for Period 2

Time Period Three

Figure 8 is a continuation of Figure 7. In a subsequent period, other changes could arise. While ongoing operations proceed according to plan, a competitor introduces a new product and sales drop dramatically in one of the key product lines. This may have been anticipated in a contingency plan and it may not have been. Contingency planning often seems to be an exercise in futility. How many contingencies do you plan for? Which contingencies do you plan for? It is difficult to quantify certain contingency outcomes such as the effect of a competitor's new product. How much of the market will it attract? Will its effect be short-term or will it capture an increased share of the market over the long-term? At any rate, it is a factor to consider in the

next strategic plan. Another unexpected event could be a governmental directive mandating the reduction of the use of hazardous materials.

As the strategic planning process moves from left to right, on along the time horizon, there will probably be an increased recognition of the effect of open system factors, reflected in an increased effort to do contingency planning that anticipates the expected changes. We have indicated the increasing likelihood of contingency and problem-solving planning by making the arrows bolder that are leading from these activities to the strategic plan.

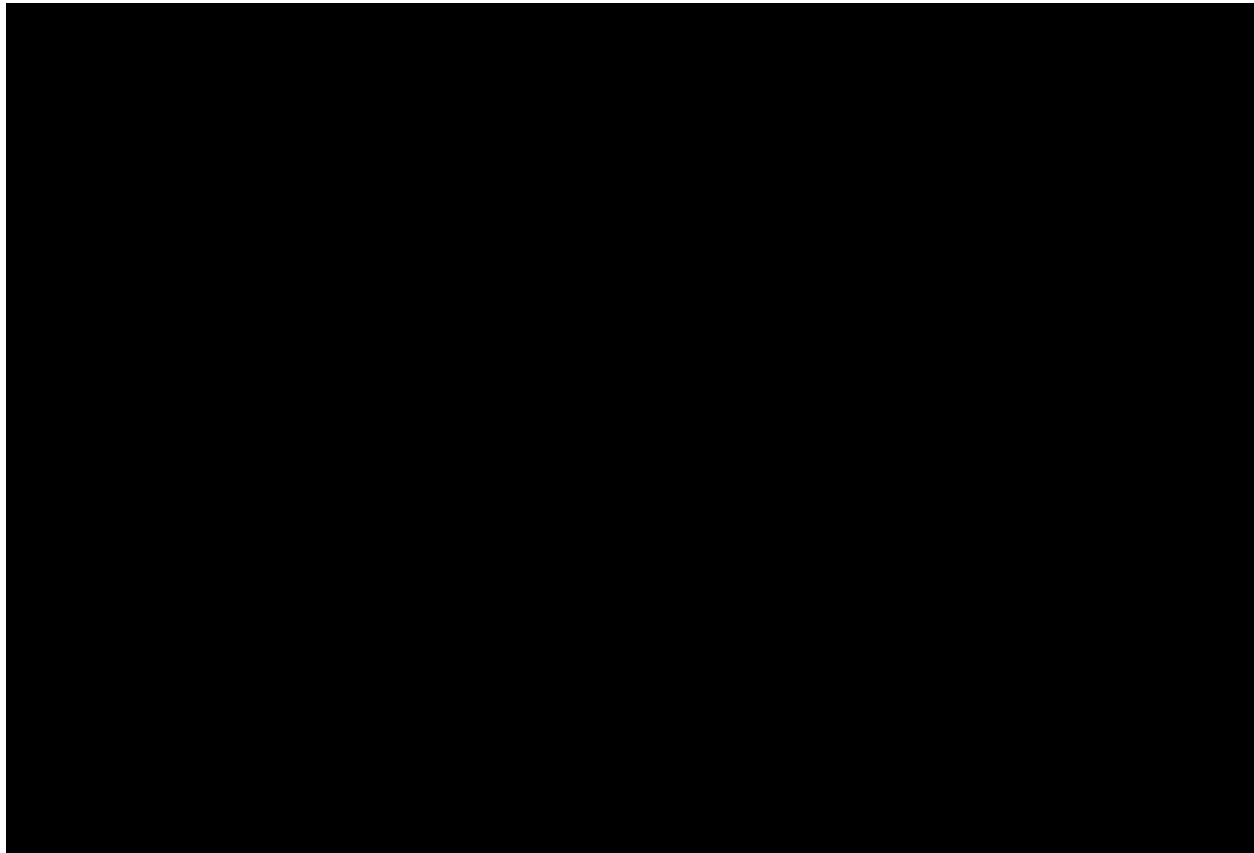


Figure 8. Strategic Planning for Period Three

Conclusions

The strategic planning process continues to evolve, both conceptually and in practice. One approach suggests that the Five Forces, Core Competence and Game Theory models of strategy deal with “clear industry boundaries, predictable competition, or a knowable future” (Brown & Eisenhardt, 1998, p. 7). They conclude that strategy needs a new strategy, which they call “competing on the edge.” This approach assumes that industries change rapidly and unpredictably and, therefore, managing change is the central strategic challenge. The authors go on to describe a strategic plan as a rough roadmap, budgetary guideline, and rallying point, not as a straitjacket the limited managers from adapting to the real future that unfolded.

Gavetti and Rivkin (2008) try to strike a balance between deliberate, emergent, and analogical approaches to finding the best strategy. Their research suggests that all of the approaches have their place and that they all work, just under different circumstances and at different times in an industry's development. "Managers should try things out, learn from experience, adjust, and gradually craft a strategy."

Kaplan and Norton (2008) propose, "Companies have always found it hard to balance pressing operational concerns with long-term strategic priorities. The tension is critical: World-class processes won't lead to success without the right strategic direction, and the best strategy in the world will get nowhere without strong operations to execute it." They propose a five-stage approach to aligning strategy and operations, with emphasis on the need to provide feedback from actual results to the planning process.

The task of strategic planning becomes more difficult because of the increased complexity of the open system environment in which most organizations operate. We listed some of the difficulties in implementing strategic plans earlier in this paper. Many of them relate more to administration and relationship management than to the inadequacy of the theory used. There appears to be enough theory; the problem seems more in the selection and implementation of those theories. Perhaps it is now time to put more emphasis on the practice of the theory.

We believe that it would help if companies would view the strategic planning process as a continuous horizontal dynamic process instead of a hierarchical vertical discrete process. While there must be input from top management, it should be tempered with reality. As Singer (2008) points out "It is more important than ever to remember that strategy operates at a systemic level and that the intellectual framework for strategic thinking flows from a holistic perspective that is more art than analysis."

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STRATEGIES FOR SUCCESSFUL CRISIS MANAGEMENT

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Abstract

The recent Enron scandal and the September 11th terrorist attacks on U.S. citizens have demonstrated the vulnerability of people and organizations when crises occur. While these are extreme examples, both cases illustrate how managers used reactive strategies for dealing with rapidly evolving crises. In our complex and turbulent world, organizations will continue to confront a variety of threats and crises stemming from many separate internal and external sources. As the environment grows more technologically complex, the potential for crises will dramatically increase, and the crises confronting organizations will also occur more frequently. Historically, business crises were usually thought of as important but isolated events affecting primarily large organizations. Strategies need to be developed for proper decision making before, during and after a crisis occurs.

STRATEGIES FOR SUCCESSFUL CRISIS MANAGEMENT

The recent Enron scandal and the September 11th terrorist attacks on U.S. citizens have demonstrated the vulnerability of people and organizations when crises occur. While these are extreme examples, both cases illustrate how managers used reactive strategies for dealing with rapidly evolving crises because they were not prepared with a crisis management plan.

We live in a very dynamic and turbulent global environment where the potential for crises has dramatically increased. Unfortunately, too many organizations wait for a crisis to occur before developing a crisis management plan. Research studies indicate that 80% of companies failing to develop a crisis management plan go out of business within two years of experiencing a major disaster. Although businesses deal with crises and disasters daily, less than 60% of the Fortune 500 industrial companies have established operational crisis management plans (Brown, 1993).

Some managers of this group believe the issue of preparing for a crisis event is not a priority. These managers present the following arguments:

- They believe that, in their business/industry, a crisis won't happen.
- They believe that a well-managed business does not require a crisis management plan.
- They reason their insurance is protection against a crisis.
- They assert that crisis readiness requirements exceed their business resources.
- They state that their business current problems are their main concern not unforeseen crisis situations.

While these arguments are understandable they do not provide the real preparation necessary to manage a crisis.

Too frequently managers believe that the chances of a crisis occurring are so slim that the extra effort to plan for them is unnecessary. The truth is that crisis management has always been a critical activity in organizations, one that is often ignored. In our complex world, organizations will continue to confront a variety of threats and crises stemming from many separate internal and external sources. As the environment grows more technologically complex, the crises confronting organizations will also occur more frequently. In effect, the coping ability of managers is of vital importance. Crises are a way of life in business, and no industry is immune. Historically, business crises were usually thought of as important but isolated events affecting primarily large organizations. However, experience has demonstrated that, eventually, all organizations will in some way be affected by a crisis situation, and no one is excluded.

PERSPECTIVES ON CRISIS

Understanding the makeup of a crisis is crucial to the development of any proper and timely response. In business, as in life, there are many varieties of crises. Some of them may present opportunities for the business to change directions and achieve new goals. Other crises may present very ugly and difficult circumstances that require quick responses. Such crises can be viewed from two perspectives: the "festering" view and the "abrupt" view.

The festering crisis may be best described as an evolving episode arising from incremental decisions, neglect, or denial. An unresolved disagreement or a decision causing anger or protest often inflames this type of crisis

The abrupt crisis, on the other hand, is best described as an event that takes management by total surprise, such as episodes of workplace violence, or the recent anthrax scare are examples of an abrupt crisis.

CRISIS IDENTIFICATION

Organizational crisis management is a process by which managers try to identify, assess and predict potential crises in order to prevent or minimize the effects of their occurrence. Businesses are confronted with many types of crises. Major crisis events can be classified into five categories – organizational, internal threats, external threats, natural disasters, and technological. All of them have festering and abrupt characteristics. Table #1 summarizes the crisis types, definitions, and the possible events.

Table # 1 – Crisis classification and definition framework summary

Categories	Definitions	Crisis Events
1. Organizational	These types of events have the potential to disrupt an organization's day-to-day operations.	Serious industrial accidents, product malfunctions, loss of key records due to fire, systems breakdowns, or terrorist attacks
2. Internal Threats	These crises often originate from operational crises and can result in negative public perceptions.	These consist of corporate espionage, management corruption, embezzlement, and theft. Some examples are employee, and product recalls, and employee violence in the work place.
3. External Threats	These events refer to wrongful acts committed by an individual or organization	Government investigation resulting in is an example. Miscommunication can create other problems. Consumer lawsuits, terrorists attacks, poor publicity about events such as boycotts, product sabotage, and negative media coverage can affect a company's profitability
4. Natural Disasters	These are caused by an act of God.	They include floods, tornadoes and earthquakes.
5. Technology	These are events that have potential impact on the company's technology system and operations.	Computer systems breakdowns, invasion by hacker, Virus or computer systems invasion by intruder

Table #1 is not all-inclusive; nevertheless, the perspective it provides can guide decision-making. Contained in each of these categories are more complex problems that managers may fail to recognize even though they may see the crisis itself. Probing the content of the definitions in Table #1 reveals four fundamental problems that form the foundation for each of the five categories. Before any crisis planning can be completed, managers must understand how these problems influence the crisis management planning and execution process. Figure # 1 illustrates the interrelationships among the four problems facing managers.

This understanding provides a framework for developing better alternatives and solutions to the crisis. The four fundamental problems include political, organizational, communication, and business. Each one of these problems has a systemic impact on the development and implementation of crisis management planning. Understanding the characteristics of the four and how they interface with the planning process are essential. The following discussion provides this understanding:

- **Political problems:** These refer to large differences in the ideological understanding among employees regarding what is a significant crisis threat and how it can alter business operations. These differences also involve winning acceptance of those affected by the crisis planning itself and management decisions that negatively affect their available resources as a result of the commitment to crisis preparation. Political problems force managers to persuade, negotiate, and influence different groups in the organization regarding the need to identify crisis problems and establish appropriate plans to respond if a crisis occurs.
- **Organizational problems:** The ability of an organization to respond quickly in a crisis, as a function of its culture, configuration, and communication strategies, is critical. Organizing the management structure so that it can respond to a crisis is not an easy task. The structural flexibility of an organization provides opportunities to fashion crisis management planning strategies that are in its best interest. It involves identifying the possible vulnerabilities and developing appropriate management structures that can quickly address the impending or existing crisis. Establishing a planning and communication structure that gives managers a blueprint and the tools to deal with potential crises is essential. This requires allocating the proper resources, such as people, materials, money, and logistical support, to meet the potential needs of a crisis. Building systems that identify potential and an impending crisis or crises is a defensive maneuver

that will also help managers deal with other organizational issues. This is often exemplified in the establishment of internal control systems that address financial and information control issues. The internal control system should be structured so that it will automatically notify managers of vulnerabilities. For example, festering crises can be identified by the appearance of accounting irregularities. Early detection can lead to intervention and resolution, avoiding a full crisis.

- **Communication problems:** Dealing with various audiences such as employees, customers, suppliers, and other publics is important to sustaining any organization. However, in many cases, the immediacy of a crisis event has been either lost or misrepresented by many managers. Careful analysis and construction of the proper messages to the various publics are crucially important to the successful management of a crisis. When communicating, timing is everything. It has been proven that communication about a crisis ultimately determines the organization's future success or failure. An organization must create a communication strategy for information and designate appropriate staff. Those charged with handling the crisis communication tasks need to be knowledgeable about the various methods that are available to best convey timely messages to the appropriate publics. For example, employees and customers are special audiences that must be notified at the very first opportunity. The approach must be honest and candid, yet not careless with classified or confidential information. Proper timely information allows publics to remain loyal to the organization. The time to begin crisis communication is when there is no crisis. This will allow organizational managers to establish the proper connection frameworks and procedures. Furthermore, this helps to create a reservoir of goodwill. Managers must have appropriate communication systems to respond quickly, truthfully, and to make it right.
- **Business problems:** All efforts in an organization should be focused on realizing a continuous program or strategy to satisfy customers, even if a crisis occurs. Organizations that become paralyzed due to a crisis, face serious management problems. Managers must develop viable business strategies to prevent, manage, or turn a crisis into an opportunity. The business of an organization is continuity in its operations and therefore, managers must establish continuity planning as part of their normal management process. The business continuity planning designates key people to function in critical roles. It also determines both financial and human resources necessary to carry out the plans authorized by the key crisis management leaders. During many crisis situations many activities, such as bill paying, resources acquisition and day-to-day business operations, must continue in order to sustain the survival of the business. This is just one component of crisis management, which itself is part of the organization's strategic management process.

These four problems require managers to adopt a coordinated and integrated effort that harnesses all the necessary resources and appropriate competencies to develop a plan of action. The resulting crisis management portfolio will help prepare the organization for potential incidents.

CRISIS PREPARATION AND MANAGEMENT FUNCTIONS

There are two major ways for managers to view the resolution of a crisis. They can 1.) ignore the warning signs and react to the crisis or 2.) they can prepare themselves to prevent or manage a crisis. The decision path of the first choice has undefined outcomes while the second decision path provides many more opportunities to manage the crisis. Taking a pro-active approach may even avert the crisis completely. Figure # 1 illustrates and compares the stages that exist in crisis management process.

Figure # 1 - CRISIS MANAGEMENT PROCESS – TWO MODELS

Figure # 1 – Crisis Management Process – Two Models

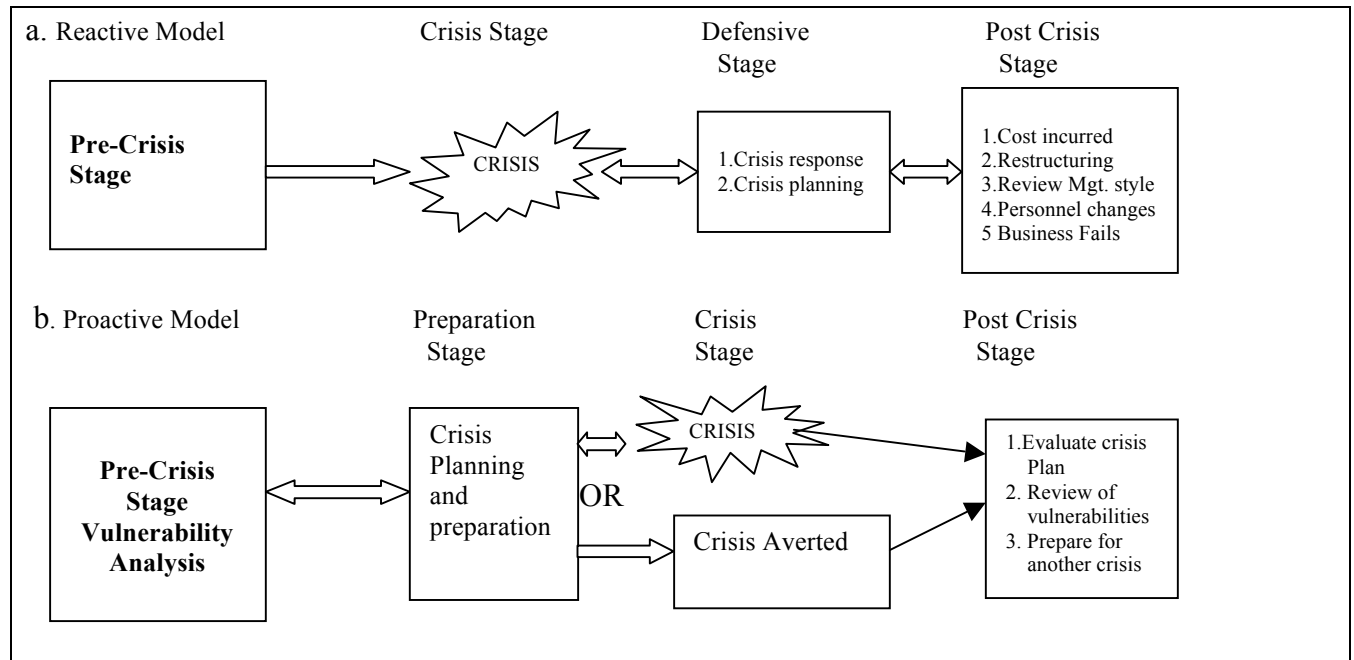


Figure # 1 illustrates and summarizes the stages that exist in crisis situations. In the reactive model the decisions about planning occur during and after the event(s) have already occurred. In the proactive model the managers have already anticipated some form of crises. They have completed a vulnerability analysis, which has helped them develop a plan to deal with crises eventually. The consequences of each management decision are significant. The managers have to weigh the difference between the investments in planning for a crisis versus the losses that result from failure to plan for a crisis. This decision is integrally linked to an understanding of the types of crisis that exist.

Figure # 1 shows the decision path managers can take when dealing with crises. The first path is a reactive model where the decisions about planning occur during and after the event(s) have already occurred. The second path traces the pro-active model where managers have already anticipated some form of crises events. Under this scenario managers complete a risk assessment, which helps in developing a plan and contingencies to deal with the crises. The consequences of choosing one of these paths are significant. Managers have to weigh the difference between the investments in planning for a crisis versus the potential costs that result from failure to plan. This choice is integrally linked to an understanding of the types of crisis that exist.

Crisis Management Functions

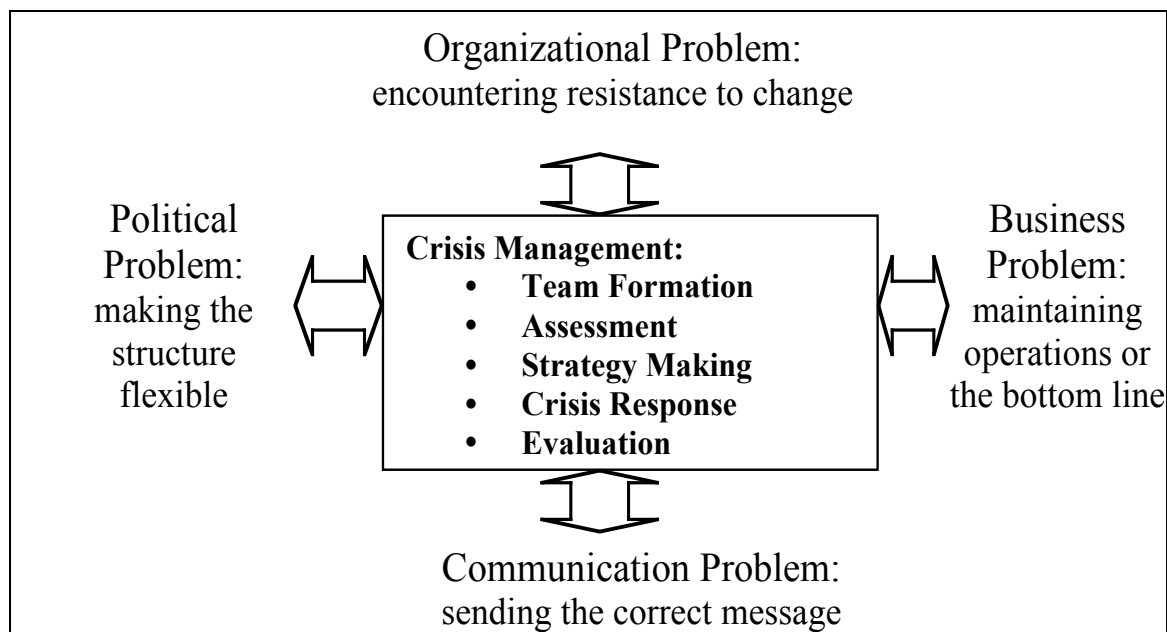
Crisis management encompasses five functions: team formation, assessment, strategy making, crisis response and evaluation. Understanding how the four problems interface and affect the business operation provides the knowledge base for proper direction and leadership.

Crisis management requires managers to engage in active leadership that gives employees the proper direction and resources to complete their jobs.

An effective crisis management plan establishes protocols for addressing the logistics needed to deal with a crisis. Typically these are the elements and resources that are commonly needed in all situations. Examples include supplies and emergency back up equipment. Having these resources in place leaves managers better able to supervise the content aspect of the crisis.

The four functions discussed above operate within each of the systemic problems faced by an organization. The four problems that were discussed earlier affect all levels of the organization. To address their impact, managers should have a perspective on when, how, and to what extent the problems alter the organization. Figure # 2 summarizes the relationships that exist among the four problems and the planning process.

Figure # 2 – Organizational Problems Influencing Crisis Management
The Managerial Response



An organization can have all the resources, plans, and contingency arrangements; however, if it does not promote a crisis management culture and attitude, all the efforts to prevent and manage a potential crisis are wasted. It is a continuous process of persuading stakeholders to recognize the vulnerabilities that exist and identify alternatives that will best resolve the issues.

Management must address the politics of denial or partial remission through insurance policies or other quick fix remedies. An organization should plan on how to use limited resources to achieve multiple goals. For example, efficient planning and coordination of human and physical resources contribute significantly to producing the desired results, instead of blindly following the “reactive path,” as shown in Figure # 1.

IMPLICATIONS FOR MANAGEMENT

While there is no absolute panacea for crisis prevention, concentrating on the following areas will go a long way in helping prevent crises before they emerge: 1) forming a crisis management team, 2) knowing how to detect pre-crisis symptoms and conduct vulnerability analysis, 3) developing a very good communication mechanism within the organization, 4) training personnel to be vigilant, prepared, and responsive, 5) remaining flexible to meet the changing environments, as well as 6) having a continuous evaluation process.

1. **Form a crisis management team:** The purpose of the crisis management team is to plan for potential crisis events and to manage those events should they occur. As strategy makers the team develops alternatives and appropriate decisions for dealing with crisis situations. These processes must be a very fluid process as external and internal environments change rapidly. The team should consist of key representatives of the organization, such as operations, marketing, and accounting. In addition, the top executive or business owner should be a part of this team. If the team is new, it may be worthwhile to consult with experts who can provide the team with a framework for operation. This planning may be done through consultants who can schedule training sessions for the core members of the team. While the size of the team depends on the particular type of organization, any more than ten members can become onerous. The crisis management team should meet at least twice a year. This schedule will help them work on developing a crisis management plan. This plan outlines how the organization will respond to crisis events and who will be in charge of managing various aspects of the crisis.
2. **Vulnerability analysis:** This analysis is one of the most important steps in developing the crisis management plan. It is a process of identifying and gathering information about the most significant vulnerabilities in the business. It also requires prioritizing them to ensure that management is addressing their potentiality. For example, all commercial watercraft and airlines are prepared and equipped to respond to emergencies. A business that plans for crisis unique to its industry becomes better prepared to manage the crisis should it occur. Crisis preparation and planning should be an ongoing activity requiring management and employees always be vigilant.
3. **Communication system:** Communicating during and after a crisis is crucial to successful crisis management. Regardless of the efforts that an organization makes to prevent a crisis, eventually it will have to face a crisis. The strategy on how to communicate during and after a crisis is an extremely important decision and setting and agreeing on a strategy for communication is essential to successful management of the crisis. An indispensable element of the communication process is the selection of a proper spokesperson. This person should be well trained in communicating the correct message at the correct time and to the correct audience. In some cases, hiring a consultant to assist in developing a proper responsive communication system may be necessary.
4. **Training of employees:** Offering both formal and informal training to management and employees is an important ingredient in the crisis management. The more knowledge an employee has about the warning signs of a potential crisis, the easier it will be to identify the crisis and deal with it immediately. It must be remembered that it is much less costly to deal with a problem before it occurs than to have to address a full-blown crisis and its aftermath. Appropriate training is part of proper planning and preparedness.
5. **Flexibility:** In managing a crisis, the decision-makers must not be locked into rigid plans. Responding to a crisis requires managers to be flexible and capable of making competent impromptu decisions as events emerge.
6. **Establish an evaluation mechanism:** Crises are not enjoyable situations; thus, everything possible needs to be done to prevent their recurrence or the occurrence of another type of crisis. Questions in the pre-crisis stage include what could happen and how it can be prevented? If the organization has already experienced a crisis, then there is an opportunity to assess what occurred and compare it to what was planned for in the crisis management portfolio. If a crisis has not yet occurred, then it is imperative that specific evaluative criteria be included in the crisis management plan. Feedback from proper analysis is essential. Along with activating the crisis management team, accurate and timely communication is critical. Questions in the

post-crisis stage include what happened, why it happened, and what could have been done to prevent it? The recovery stage consists of getting operations back to normal, as well as preparing for the next crisis. Efforts should be devoted to reexamine vulnerabilities or threats and to repeat a SWOT analysis. It is a process of continual improvement. This strategy does not guarantee prevention of future crisis, but it presents management alternatives and incremental improvements in dealing with crises.

CONCLUSION

A crisis becomes a very visible turning point in the life of an organization. The manner in which the crisis is handled can make or break a business. The political, organizational, communication, and business problems that confront an organization before, during, and after a crisis all pose major challenges for the managers. How they analyze and respond to these issues may determine the outcome of the crisis. Having a well thought out crisis management plan with trained staff that knows how to implement it will be one major step towards bringing crisis situations to a successful conclusion. Every organization may encounter a problem that can turn into a crisis. Unfortunately, many organizations do not perceive the need to plan for a crisis. The best-prepared managers will survive and may even prosper during a crisis. Managers must change their thinking about crises. Having a crisis management plan in place that involves every function and every employee of the organization will pay major dividends when the inevitable crisis hits. While all crises cannot be prevented, they can certainly be better managed.

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LONG-RANGE PLANNING TECHNIQUES IN THE UNITED KINGDOM

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ABSTRACT

This study reports the results of a survey of small businesses in the United Kingdom to determine the tools, and techniques, and approaches to planning they utilize. The intent is to develop a profile for small firms in the United Kingdom with respect to their strategic planning processes.

INTRODUCTION

1

Small business emerged as a field of study in its own right only recently. Today, there is a growing awareness of the crucial role of these companies in creating new jobs and promoting economic development. There have been four streams of research and writing about these firms. The first attempts to determine whether small businesses focus on operational, as opposed to strategic, planning. Unfortunately, mixed findings have resulted from this research. In a separate stream of research the emphasis has been on the performance of small firms, with particular emphasis on the relationship between planning and performance. Numerous articles have emphasized the importance of planning for small businesses. They contend that good planning is a key to their success (Barton and Hounsell, 1994) and a major contributor to profitability (Kargar and Parnell, 1996; Ryans, 1997). A study by Masurel and Smit (2000) concluded that planning firms are more profitable than the non-planning firms.

Closely linked to this line of research are studies addressing the impact of formalized plans on performance. According to some, firms with structured planning processes are more thorough and detailed, and their performance - as measured by growth of sales - is significantly higher (Lyles et al., 1993). Others reported no significant relationship between formal planning and return on equity or return on assets. Yet they argued that simply engaging in a long-term planning process is beneficial to these firms as it leads to an improved understanding of the business (Lyles et al., 1995).

Finally, some attention has been devoted to the planning tools and techniques used by small businesses. In their study of the planning practices of these firms, Rue and Ibrahim (1996) reported the results of a survey of 128 businesses. However, this study focused on family-owned businesses - typically a subset of small firms. Furthermore, rather than focusing on one industry - thus ensuring a greater homogeneity among the companies - it included firms from several industries.

Despite these research efforts and the growing importance of small companies in the economies of many countries, there is surprisingly little empirical work that has examined the techniques, tools, and approaches to planning that are actually being used by these businesses. The present study is designed to partially fill this gap in the literature by reporting the results of a survey of small businesses in the United Kingdom. The intent is to develop a profile for small firms in the United Kingdom with respect to their strategic planning processes.

METHODOLOGY

Data were collected as part of a larger study of strategic planning in small businesses. A total of 930 small manufacturing firms operating in the Cumbria area of the United Kingdom were randomly selected.

Consistent with previous writing on the subject, the sample was restricted to a single industry in a particular region since firms in the same industry within the same region execute their activities under similar influence from environmental conditions and complexity (Robinson and Pearce, 1988; Wolff and Pett, 2000).

Data collection was conducted via a mail questionnaire of the chief executives of these firms. Each respondent was sent a copy of the research instrument accompanied with a letter explaining the project and assuring respondents of the confidentiality of their answers. A first mailing and one follow-up generated 287 useable responses. Since 37 questionnaires were returned as undelivered and 3 responses were unusable, this resulted in a net overall response rate of 32 percent. Although there is no universally accepted criterion for delineating small firms, the number of employees (500 employees or fewer) was selected as the key indicator of firm size following previous studies (see, e.g., Moini, 1995; Wolff and Pett, 2000).

Respondents were asked to indicate their present position with the company (e.g., CEO, Managing Director, Chair of the Board), in what year the company was founded, the number of full-time employees, the type of ownership of the business, and who founded the company. In addition, they were requested to indicate whether their company prepares a written long-range plan and, if so, the time period covered in these plans.

Following the convention used in previous research (Rue & Ibrahim 1996), those with written plans were asked whether they attempt to identify and analyze any of nine external factors (see Table 2). They were then asked if their plan includes quantified objectives for any of seven areas (see Table 3). Those with a growth strategy were asked whether they develop plans and budgets for any of nine areas (see Table 4). Additional items requested information on the types of pro forma statements which are developed; whether outside consultants assist in formulating these plans; whether computers are employed in the planning process; and how frequently performance is evaluated and whether, as a result, the plans are reviewed and revised.

RESULTS

Among the respondents, 272 hold the title of Managing Director, 14 are CEOs, and 30 chair their boards of directors. Eighty-four percent are private companies, 61.5 percent were founded within the last 30 years, and 39 percent were founded by the respondents or their fathers. The median number of employees was 32, and the median age of the firms was 31.

Table 1 - Time Period Covered in Plans

Time Period	Frequency	Percentage ^a
One year	32	11.1
Two years	17	6.9
Three years	79	27.5

Four years	42	14.6
Five years	72	25.1
Over 5 years	5	1.7
No written plans	40	13.9

^aTotal percentage is not 100 due to rounding.

Written Plans

Table 1 shows that the great majority of the firms in the sample (86.1%) do prepare some type of written plan. More than two-thirds prepare plans extending three or more years into the future. All those with plans extending longer than five years specified they had an exit strategy in mind. Brief comments indicated that this strategy was chosen due to lack of capital, the owner's age or health concerns, or children who were not interested in the business.

A. Premises

Premising refers to the consideration of forces outside of the immediate operating environment of the firm. Environmental scanning is the means by which managers can perceive and cope with external events and trends (Miller & Toulouse, 1998). Researchers report that such activities contribute significantly to firm performance (Venkatraman and Prescott, 1990).

Table 2 - Premises Contained in Written Plans

Premise	Frequency	Percentage
Population/demographic trends	49	19.8
National political developments	137	55.5
International political developments	126	51.0
Personal family incomes	44	17.8
Social/cultural trends	48	19.4
Non-product technological breakthroughs	31	12.6
Labor-management relations	76	30.8
National economic trends	139	56.3
International economic trends	133	53.8
No premises identified	15	6.1

As shown in Table 2, 15 of the firms that develop written plans (6.1%) do not attempt to identify any premises during the planning process. The most frequently used premises relate to national and international economic and political developments and trends. This is probably due to the availability and

accessibility of related information. Furthermore, these managers can easily envision a relationship between these events and their businesses.

**B.
Objectives**

Planning can only be a useful managerial function if objectives are properly chosen. Without concrete objectives, the entire planning activity can easily turn into a futile exercise. Objectives provide benchmarks for evaluating progress and represent a managerial commitment to achieving certain results. Companies whose managers set objectives typically outperform those that do not (Thompson and Strickland, 2003). Many firms today are striving to attain multiple objectives as opposed to a single one. When choosing multiple objectives, the strategist must be careful to ensure that the different objectives are compatible. Whenever possible, quantified objectives are desirable.

The great majority (89.1%) of those who attest to having a written plan establish quantified objectives. Table 3 shows that sales are assigned the highest priority, probably because they are foremost in the minds of the managers. Indeed, this measure was specified by every company that prepares quantified objectives.

Table 3 - Objectives Stipulated in Written Plans

Objective	Frequency	Percentage
Sales	220	89.1
Earnings	71	28.7
Return on investment	63	25.5
Capital growth	66	26.7
Market share	61	24.7
Sales/earnings ratio	47	19.0
International expansion	166	67.2
No objectives are established	27	10.9

C. Growth

Eighty-six percent indicated that they pursue a growth strategy. In today's world, many executives view growth as the best path to survival and higher earnings. This is a very seductive strategy; it is exciting and ego-enhancing and is viewed as an indication of success. This strategy is especially important to the survival of small firms. They must formulate and implement growth strategies to avoid decline and enhance their ability to remain competitive (Poza, 1989). On the other hand, growth, if rapid, can be difficult to sustain (Willard *et al.*, 1992), and the firm's systems and processes may not be adequate (Forbrum and Wally, 1989).

Table 4 - Approaches for Implementing Growth Strategies

Approach	Frequency	Percentage
Hiring and training of key management personnel	86	34.8
Plant expansion	92	37.2
New product development	79	32.0
Managerial succession	38	15.4
Corporate acquisitions	41	16.6
Equipment acquisitions	117	47.4
Research and development	66	26.7
Advertising	79	32.0
Expanding international markets	160	64.8
No plans	32	13.0

Table 4 shows that almost two-thirds of these companies wish to expand their international markets and almost one-half prepare plans and budgets for equipment acquisitions. It is interesting that corporate acquisitions are considered by only 16.6 percent. Although they are difficult to forecast, it has been shown that those who grow through acquisitions generally outperform those that do so through internal means (Sharma, 1998). Succession plans are developed by approximately fifteen percent of these companies. Finally, among those who reported that their strategy is one of growth, thirteen percent failed to develop any specific plans and budgets to carry out this strategy.

D. Financial Analyses

One of the dangers associated with growth stems from the financial mechanisms which are involved in the growth process. The problems caused by the interaction of cash flow and growth have perplexed managers for years. Their dilemma is a balancing process that requires accurate forecasts. Once the forecasts for future expenditures and perhaps growth are completed, they must be evaluated to determine if they are financially sound. At the same time, enterprising managers realize that leverage (debt) can be used to balance the risk between the owners and creditors and is a valuable tool when a project yields a higher rate of return than the cost of capital.

Table 5- Pro Forma Financial Statements Used in Planning

Financial Statement	Frequency	Percentage
Balance Sheet	122	50.2
Cash Flow Analysis	131	53.9
Income Statement	166	68.3
None	81	31.7

Although the financial aspects of business planning can be quite complex, they should culminate in the preparation of pro forma statements. Respondents were asked if they prepared pro forma balance sheets, income statements, and cash flow analyses as integral parts of their plan. Four companies did not respond to this question. Table 5 shows that approximately two-thirds of those that develop written plans prepare these statements. The concern for profit is reflected in the fact that more firms prepare a pro forma income statement than a balance sheet or cash flow analysis.

Planning Tools

A. Outside Consultants

This study sought information as to whether consultants are engaged to assist in the planning process. Ten firms did not respond to this question. Table 6 shows that almost two-thirds do not use the services of consultants in their planning process. This is not surprising since the great majority of smaller businesses are probably reluctant to use outside resources. Consulting companies (mostly auditing firms, human resource specialists, tax consultants, and international trade specialists) are the single largest source. Free lance individuals, primarily business planners, are used by fewer firms.

Table 6 - The Use of Consultants in Long-Range Planning

Source of Consultants	Frequency	Percentage
Consulting Firms	68	28.7
Free Lance Individuals	22	9.3
None	155	65.4

B. Computers

Among those with written plans, 79 (32.6%) use a computer on a regular basis to assist in planning. Five companies did not respond to this question. Brief comments describing their use were solicited. The most widely used applications are related to financial and sales forecasting as well as financial control. They assist in making decisions concerning sales, financing, inventory, production, and advertising. The specific techniques include spreadsheets and trend analysis; pro forma models and return on investment simulations are employed by only 5 (2%) of the firms.

Evaluation

Because planning is a continuous process, plans should be periodically reviewed and revised. However, very little is known about how company performance is evaluated in many small firms (Sharma, Chrisman and Chua, 1997). The respondents were asked if their company periodically conducts a formal performance evaluation and if the plans are reviewed and revised as a consequence of this evaluation. Three companies did not respond to this question, and some reported more than one frequency. In these cases, only the most frequent review period was recorded. It is evident from Table 7 that quarterly and annual reviews are the most popular and are conducted by almost three-quarters of these firms. Interestingly, only 21 (8.6%) firms did not periodically evaluate overall performance. Eighty-one percent of those who conduct these evaluations indicated that the plans are then reviewed and revised.

Table 7 - Frequency of Review and Revision of Long-Range Plans

Frequency of Review and Revision	Frequency	Percentage^a
Weekly or Less	7	2.9
Monthly	17	7.0
Quarterly	88	36.1
Semi-Annually	21	8.6
Annually	90	36.9
Never	21	8.6

^aTotal percentage is not 100 due to rounding.

DISCUSSION AND CONCLUSION

This study's results are important for several reasons. They indicate that the planning practices of smaller businesses in the United Kingdom may be more sophisticated than generally perceived. Eighty-six percent of the responding companies reported that they do prepare some type of written long-range plan, and 80.2 percent of these prepare plans covering three or more years into the future. This finding is consistent with results reported by previous researchers (Dreux, 1990; Moscatello, 1990). This, in itself, demonstrates that many of today's small businesses have moved beyond day-to-day managing and are planning well into the future. One possible explanation for this finding is that, compared to businesses in other industries, manufacturing requires more lead time and more "up-front" costs and, therefore, a long-term relationship with buyers. These factors alone necessitate a long-term view and therefore provide the rationale for developing written and long-term plans.

Another important point is that all but 15 of these firms identify at least one external factor that serves as input to their plans. National and international political and economic trends are examined by many of these firms. All but 27 of those who develop a written plan establish quantified objectives. Adding further encouragement is the fact that many of the plans being prepared by these small businesses contain some fairly sophisticated elements beyond simply setting objectives for sales. For example, one-fourth set objectives for capital growth and market share. Eighty-one percent reported setting more than one objective. This is supported by previous research on larger firms in several major industries which found that most businesses pursue multiple quantitative objectives (Shetty, 1979; Schneider, 1990).

The preponderance of these businesses pursues a growth strategy and most of them prepare specific plans to implement it. Two-thirds develop some type of pro forma financial statement, one-third seek the services of consultants in their planning process, and one-third use on a regular basis a computer to assist in the planning process. More than 90 percent conduct a periodic evaluation of their performance to detect differences between planned and actual performance, and 81 percent revise their plans as a consequence of these evaluations.

On the negative side, only one-half of these firms develop pro forma balance sheets and cash flow analyses. In this study almost one-third are actively hiring and training key managers, yet only 15 percent prepare any type of succession scheme in their written plans. This has been one of the most pervasive problems in small companies. This low percentage is supported by other studies that report the inability or unwillingness of the owners of small enterprises to plan their succession (Seymour, 1993; Welsch, 1993).

This study's findings call to attention additional areas of concern. Less than 20 percent included population/demographic trends, personal family incomes, social/cultural trends, and non-product technological breakthroughs in their written premises, while labor/management relations are considered by less than one-third. It is interesting to note that while 86 percent stated that they are pursuing a growth strategy, only 87 percent of these companies develop specific plans and budgets to implement this strategy. Another interesting finding relates to the small proportion that does not retain any consultants. This is quite surprising given the rapidly changing technological advances and the complexity of laws and regulations affecting business. Another issue concerns plans that extend beyond five years; less than two percent have such a long-term horizon. Finally, almost two-thirds did not utilize a computer to assist in their planning. This is not surprising since researchers have found that smaller firms do not have the necessary expertise, the financial resources, and the required software and hardware (Peterson, 1996; Coleman, 2005). However, the importance of these tools will inevitably increase with growing business complexity and the necessity to gain and sustain a competitive advantage.

This study is not without limitations. Future extensions should give thought to replicating it using different populations. For example, firms in other regions of the U.K. should be surveyed. An additional caveat concerns the generalizability of the results. A study such as this one focuses on many firms in one industry - manufacturing - thus ensuring a greater homogeneity among the companies. However, it opens a line of inquiry on whether these results are valid across other industries. Thus another study which is devoted to other industries would be a fruitful endeavor. Another cautionary note concerns the possibility of bias in the data provided by the companies in the sample. Although this cannot be completely ruled out, self-report measures are indispensable in organizational research (Gupta and Beehr, 1982).

Although this study provides many important insights, the results raise additional research questions that merit further study. For example, to what extent do the planning practices of these businesses differ from those of large firms? Another interesting issue concerns the relationship between planning and performance. Another question that arises from this research pertains to succession plans. Given the importance of this issue, future in-depth studies should provide possible explanations for the absence of

such plans in the vast majority of these businesses. Finally, a comparison of U.K. firms with their counterparts in other countries would be an interesting future research avenue.

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SUBSTITUTES FOR LEADERSHIP AND JOB SATISFACTION REVISITED

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ABSTRACT

The purpose of this paper was to revisit the relationship between substitutes for leadership and job satisfaction. The results of our analysis indicate a significant relationship exists. Furthermore, our results indicate that five of the seven substitutes for leadership examined can have an influence on an individual's job satisfaction.

INTRODUCTION

This paper examines the relationship between selected substitutes for leadership (Kerr & Jermier, 1978) and the concept of job satisfaction. Previous research on leadership substitutes focused on identifying and explaining the basic effects of substitutes for leadership on various forms of leadership (Keller, 2006; Fuller, Morrison, Jones, Bridger, & Brown, 1999). In this study, we extend the inquiry into substitutes for leadership by examining potential links between leadership substitutes and job satisfaction. In this preliminary analysis, the focus was only on the potential for a main effects model (a substitutes only model) of the relationship between substitutes for leadership and job satisfaction.

SUBSTITUTES FOR LEADERSHIP

The path-goal theory of leadership argues that the role of a leader is to identify for subordinates those behaviors which are most likely to result in the attainment of desirable goals (e.g., high levels of performance and increased satisfaction). Having defined appropriate behaviors, the leader then engages in actions (behaviors) which will reduce or eliminate barriers to goal achievement. The relationship between leader behavior and subordinate motivation (path-goal instrumentality) can be moderated or influenced by the characteristics of subordinates and the structure of the environment. In a path-goal sense, the successful leader is the one who matches his or her behavior to the requirements of the situation and to the characteristics of his or her subordinates.

In general, the concept of substitutes for leadership represents an extension of the path-goal theory of leadership (Evans, 1970; House, 1971). The concept sought to identify specific factors or forces, which when present at high levels, act to interrupt the link between the behaviors of a leader and subordinate expectancies regarding desired outcomes. The central thesis of the substitutes for leadership construct is a belief that behaviors associated with traditional hierarchical leadership may not be important determinants of subordinate performance, commitment, and satisfaction in all cases.

Essentially, Kerr and Jermier (1978) argued that there are a series of characteristics which have the potential to either neutralize or substitute for the effects of leader behavior. The characteristics are three types: individual, task, and organizational characteristics. Individual characteristics suggested as potential substitutes included ability, experience, training and knowledge, need for independence, professionalism, and indifference towards rewards. Task characteristics identified as potential substitutes included unambiguous and routine tasks, methodologically invariant tasks, task provided feedback, and intrinsically satisfying tasks. Organizational characteristics proposed as potential substitutes included the level of formality, inflexibility,

highly active advisory and staff functions, closely knit and cohesive work groups, lack of leader control over rewards, and spatial distance between leader and subordinates (Kerr & Jermier, 1978).

The key difference between traditional theories of leadership such as path-goal theory and the concept of substitutes for leadership is the idea that in certain situations, leader behaviors may be unnecessary. Although the concept of substitutes for leadership could be enormously appealing from a management perspective, the research evidence indicates mixed support for the substitutes construct. The initial work of Kerr and Jermier (1978) reported that intrinsically satisfying work and task provided feedback were substitutes for supportive leader behavior when predicting organizational commitment. The authors also found that routine tasks, organizational formality, intrinsic satisfaction, and task feedback significantly reduced subordinate perceptions of role ambiguity. However, these potential substitutes did not significantly reduce the effectiveness of leader task and consideration behaviors that were intended to clarify subordinate roles. In addition, Howell and Dorfman (1981) reported that only the level of organizational formality could be considered a "strong" substitute for instrumental leader behavior when predicting subordinate job satisfaction and commitment.

The conceptualization, the operationalization, and the testing of the substitutes construct have been debated from the beginning. Dionne, Yammarino, Howell, and Villa (2005) provide a comprehensive review of the issues. Podsakoff, MacKenzie, and Bommer (1996) conducted a meta-analysis of the relationships between substitutes for leadership and employee attitudes (job satisfaction), role perceptions, and performance. Their findings showed that the combination of substitutes and leader behaviors account for the majority on the variance in employee attitudes. Despite the debate, the concept continues to attract scholarly interest. For example, Keller (2006) examined transformational leadership, initiating structure, and selected substitutes for leadership as predictors of performance. He found that subordinate ability and intrinsically satisfying task predicted speed to market in research and development projects.

JOB SATISFACTION

Job satisfaction has been defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences (Locke, 1976, p. 1300)." Job satisfaction is a global attitude that individuals maintain about their jobs based on perceptions of their jobs (Reilly, Chatham, & Caldwell, 1991). Studying job satisfaction aids in the understanding of those perceptions and their ultimate consequences. These investigations may help managers understand how employees form the attitudes that affect their job satisfaction (DeBats, 1982; Smith, Kendall, & Hulin, 1969; Weiss, Dawis, England, & Lofquist, 1967).

Substantial attention has been given to the relationship between organizational commitment and job satisfaction. There have been several studies that questioned the causal ordering of these variables (e.g., Bateman & Strasser, 1984; Williams & Hazer, 1986; Curry, Wakefield, Price, & Mueller, 1986; Glisson & Durick, 1988; Huang & Hsiao, 2007). In a meta-analysis, Tett and Meyer (1993) reported that satisfaction and commitment contribute uniquely to turnover. Kacmar, Carlson, and Brymer (1999) found that the relationship between job satisfaction and organizational commitment was positive and statistically significant. However, Kacmar et al. (1999) reported that the links for affiliation, exchange, and identification commitment with job satisfaction were not significant. Whereas, Huang and Hsiao (2007) suggest that a reciprocal model explains the relationship. In an examination of performance of virtual workers, Golden and Veiga (2008) found that high quality superior subordinate relationships lead to higher levels of commitment and job satisfaction and performance for those who worked extensively in a virtual mode. In another study of the relationship between job attitudes and performance, Riketta (2008) confirms the existence of a small but significant effect for attitudes (such as job satisfaction) on performance. Previous research has reported a positive relationship between substitutes for leadership and job satisfaction (e.g., Pool, 1997; Jernigan, 1990).

METHOD

The sample for this study consisted of employees working in a large southern city. Respondents included the following groups: employees of the headquarters staff of a division of a multinational company, employees of regional production plants from two national consumer products corporations, employees of a multinational chemical firm, and employees of a regional financial services company. Questionnaires along with cover letters and addressed, postage-paid return envelopes were distributed through company mail to 640 potential study participants. Completed questionnaires were mailed directly to the researchers. Usable responses were received from 354 individuals for a response rate of 55 percent.

Demographic characteristics of the research subjects are summarized in Table 1. The mean age for the sample was 36 years, with 66 percent being male, 77 percent being white, and 22 percent being non-white. The education levels were as follows: (40 percent) college graduates, (11 percent) graduate degrees, (29 percent) completed some college, and (19 percent) high school graduates or less. The mean tenure with the current employer was 8 years, in the current job was 4.5 years, and with the supervisor was 2.3 years.

Table 1
Sample Characteristics

Total number of usable responses	354
Non-managers	252
Managers	102
Gender:	
Male	234
Female	117
Education:	
High School or less	69
Some College	104
College Graduate	141
Graduate Degree	40
Race/Ethnicity	
Non-white	79
White	272
Mean Age	36
Mean Job Tenure (years)	4.5
Mean Length of Employment (years)	8
Mean Tenure with Supervisor (years)	2.3

Measures, Variables, and Methodology

The following are the variables whose relationship was studied.

Dependent Variable: Job Satisfaction

Independent Variables: Substitutes for Leadership

Individual Characteristics

1. Ability, Experience, Training & Knowledge
2. Professional Orientation

Task Characteristics

3. Unambiguous, Routine, Methodologically Invariant Task
4. Task Provided Feedback
5. Intrinsically Satisfying Task

Organizational Characteristics

6. Organizational Formality
7. Close-knit, Cohesive Work Group

Substitutes for leadership were measured with the Leadership Substitutes Scale by Kerr and Jermier (1978). Thirty-two items were selected from the scale. Seven point scales ranging from 1 strongly disagree to 7 strongly agree was used. Data were collected for seven potential substitutes. Two individual characteristics were measured: ability, experience, training, and knowledge (3 items, alpha; .75) and professional orientation (3 items, alpha; .60). Three task characteristics were measured: unambiguous, routine, methodologically invariant task (6 items, alpha; .67), task provided feedback (3 items, alpha; .57), and intrinsically satisfying task (3 items, alpha; .51). Two organizational characteristics were measured: organizational formality (9 items, alpha; .83) and close-knit, cohesive work group (5 items, alpha; .70). An item for an individual characteristic was: "Because of my ability, experience, training, or job knowledge, I have the competence to act independently of my immediate supervisor." An item for a task characteristic was: "There is really only one correct way to perform most of my tasks." An item for an organizational characteristic was: "In this organization, performance appraisals are based on written standards."

Job satisfaction was measured using the Index of Job Satisfaction developed by Brayfield and Rothe (Cook, Hepworth, Wall, & Warr, 1981). The index consists of eighteen items of which half are reverse scored (alpha = .87). Originally formulated with a 5 point agree-disagree scale, the index was modified to a 7-point (very strongly agree to very strongly disagree) scale in order to make it consistent with the other measures employed in this study. Sample items from the index include: "My job is like a hobby to me," "I am often bored with my job (R)," and "I find real enjoyment in my work."

The research question was tested using multiple regression analysis. Some of the alphas reported for the Substitutes for Leadership Scale are problematic. However, since this was a pilot study, all items were retained in the analysis.

Results and Discussion

The results of the analysis of the data are included in Table 2. Five of the seven leadership substitutes included in the analysis were significant. Only the two substitutes classified as individual characteristics were not significant. As suggested by previous research, our results indicate a mostly positive relationship between leadership substitutes and job satisfaction. This study suggest that individuals who perceive their work as intrinsically satisfying are significantly more satisfied with their jobs (beta = .466, $p = .000$) than individuals who do not express such a belief. Similarly, individuals who perceive their organizational work environment as comparatively high in formality also express higher job satisfaction (beta = .141, $p = .008$). Individuals who characterize their jobs as routine and those who characterize their immediate work group as close-knit and cohesive express significantly less satisfaction with their job (beta = -.157, $p = .004$; beta = -.224, $p = .000$) than other respondents. In the context of the substitutes for leadership concept, an intrinsically satisfying task and organizational formality could be categorized as leadership "enhancers" in that they act to increase satisfaction with the supervisor. Conversely, a routine task and a close knit, cohesive work group would be characterized as leadership neutralizers in that the perceived existence of such substitutes could act to decrease satisfaction with the job.

Table 2
Regression Results
Selected Substitutes for Leadership Regressed on Job Satisfaction

	Standardized Coefficients		
	Beta	t	Sig.
Dependent Variable: Job Satisfaction			
Individual Characteristics:			
Ability, Experience, Training and Knowledge	-.013	-.279	.781
Professional Orientation	-.001	-.025	.980
Task Characteristics:			
Unambiguous, Routine, Methodologically Invariant Task	-.157	-2.865	.004
Task Provided Feedback	.181	3.587	.000
Intrinsically Satisfying Task	.466	9.100	.000
Organizational Characteristics:			
Organizational Formality	.141	2.680	.008
Close-knit, Cohesive Work Group	-.106	-2.236	.026

The effect found for intrinsically satisfying task was predicted by the long stream of work in the area of satisfaction and motivation such as Herzberg. Likewise, organizational formality creates a stronger sense of consistency between what the individual may hear from their supervisor and the information provided by the organization such as through policies and procedures. In the case of the close-knit, cohesive work group, research on the strength of group norms provides a possible explanation. For example, in a cohesive group or team, the group could provide the support subordinates may expect leaders to provide in other settings.

The results of this preliminary study suggest that substitutes for leadership may impact both the potential for leader effectiveness as well as subordinates' satisfaction with the job. Furthermore, in today's environment of continuing emphasis on empowerment, and the emergence of autonomous work groups and teams, managers may want to use the existence of substitutes for leadership to their advantage. Effectively manipulating the environment in order to take advantage of leadership substitutes can free up the manager to do other things. While it might be acceptable to take advantage of positive leadership substitutes and enhancers, leaders should minimize or avoid situations involving leadership neutralizers. The result reported here for close-knit, cohesive work group is an example of such a situation. It is widely understood and accepted that group norms can at times run contrary to the interests of the organization. In this study, the existence of a close-knit, cohesive work group reduced employees' satisfaction with their supervisor. This result could act as a barrier to leader communication with the group that translates into increased expressions of dissatisfaction with the organization. Managers and leaders may be obligated to act to reduce group cohesion in order to avoid such potential problems.

The limitations of this study include the cross sectional design and common method variance issues. We also did not examine the impact of leadership style on the relationships examined in this pilot study. Future research could include an examination of leadership variables.

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ELEMENTS OF ENTREPRENEURIAL SUCCESS

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Abstract

This paper proposes an analytical framework to help entrepreneurs understand the need to adapt and change their management perspective over the normal growth phases of a business. Our observations confirm that as businesses grow, there are normal phases of business growth. Within those phases, the entrepreneur faces different challenges and the managerial focus changes as the company grows. Product, customer, and product delivery initially consume the entrepreneurs during the startup phase. The management process is informal and for many entrepreneurs the satisfaction level is highest during the startup phase. During the growth phase of the business, management processes and procedures must be developed and formalized. At this equilibrium point, entrepreneurs must commit to management process and delegation or risk losing their businesses. It is at this equilibrium point that many entrepreneurs decide to sell and start another venture.

Introduction

There is a constant debate regarding the true nature of a “successful entrepreneur”. Research has focused on identifying common characteristics shared by entrepreneurs who have started successful new ventures. Most entrepreneurship textbooks and scholarly publications focus on the “entrepreneurial perspective”, the creation and financing of new ventures, or the management of new ventures. While entrepreneurial businesses exhibit great commonality during their startup phase, the relationship between the textbook content and the critical points found in scholarly publications lack a continuous thread linking successful entrepreneurial startups as they mature.

Hirich and Peters define entrepreneurship as “the process of creating something new and assuming the risk and rewards”. They further indicate that “in almost all definitions of entrepreneurship, there is agreement that we are talking about a kind of social and economic behavior that includes: (1) initiative, (2) a mechanism to turn resources and situations to practical account, (3) the acceptance of risk of failure”. While these definitions build a common foundation for most entrepreneurial activities, they fail to explain why as businesses mature these characteristics alone are insufficient to explain long-term viability. To better understand the workings of a true entrepreneurial business, 24 new venture businesses were selected for review over an extended period of time. All of the businesses were founded since 1985 and are located in similar socio-economic regions. The businesses represent a diversity of industry segments ranging from metal fabrication to sign service. Every attempt was made to maintain a homogeneous sample given a non-laboratory setting.

Analysis of the data indicates that during the normal changes associated with product life cycle, and the corresponding maturation of these businesses, management processes needed to be modified and the focus of the entrepreneur must embrace these modifications if the business is to prosper and survive. The need for this management refocus seems to be the agent that generates eventual discontent and lack of interest by many entrepreneurs. Each new venture began with a focus on product, customer, product delivery, and management process during their startup phase. Most of the companies devoted maximum effort on product, customer, and product delivery and market with minimal effort on the development of management processes for the company. During this first phase, the startup phase, entrepreneurs were most satisfied and content with the work environment. As the companies moved from phase one to the second phase, or the “growth phase”, management had to shift its primary focus to the management process. During this growth phase of entrepreneurial development, an “equilibrium point” was reached. At this point, the focus on product, customer, and product delivery was equal to the need for management expertise regarding process improvement.

If the high level of satisfaction and achievement associated with entrepreneurial business endeavors is to be maintained, the entrepreneur must decide whether to assume greater management responsibilities, secure expert management assistance (and relinquish some control), or slow/halt the growth of business. It is at this equilibrium point where many entrepreneurs decide to sell and start new businesses. (This fact helps explain why the average entrepreneur will initiate and develop seven companies during a career) Failures of entrepreneurial business occur in phase three, the maturity phase, if the founders do not refocus on more traditional management needs.

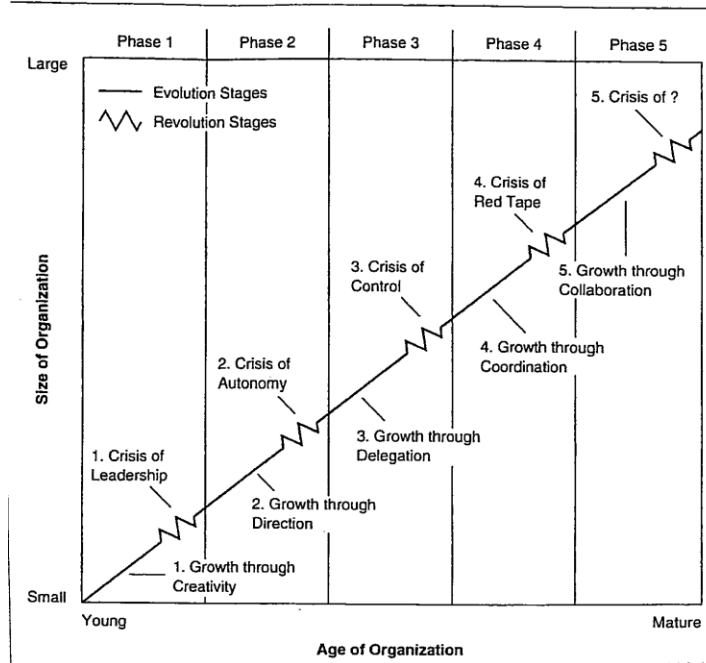
This article will present our observations supporting the above mentioned conclusions. It will describe the relative importance of the four managerial foci during the three phases of normal entrepreneurial growth. A figure depicting these relationships will be presented with detailed explanations regarding the driving managerial focus observed in each phase.

THREE PHASES OF ENTREPRENEURIAL GROWTH

Many other authors have developed models for examining the growth of businesses over a period of time based on different phases of growth (Greiner, 1972; Churchill & Lewis, 1983). Greiner proposed a model of growth whereby companies move through five stages of growth starting from a young company to a mature one (See Exhibit I). The periods of growth are characterized by evolutionary growth periods followed by revolutionary periods, leading to the next phase of growth. During these revolutionary periods of time, management practices are changed to meet the needs of the growing company. This model uses the dimensions of company size (characterized primarily by sales) and years of existence as its analytical framework.

EXHIBIT I

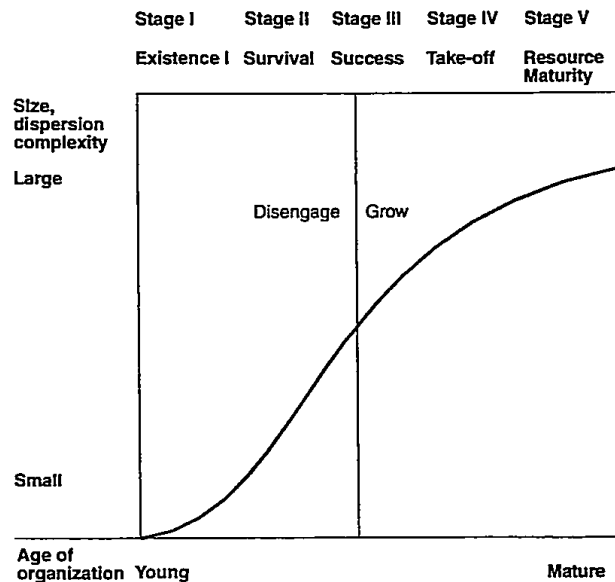
The Five Phases of Growth.



Churchill & Lewis developed a five phase of growth model that would apply more specifically to a “small business” (See Exhibit II). This model also uses the dimension of company size and years of existence as its analytical framework. When measuring company size, this model uses a number of factors besides sales volume such as diversity of product lines, complexity, and rate of technological change.

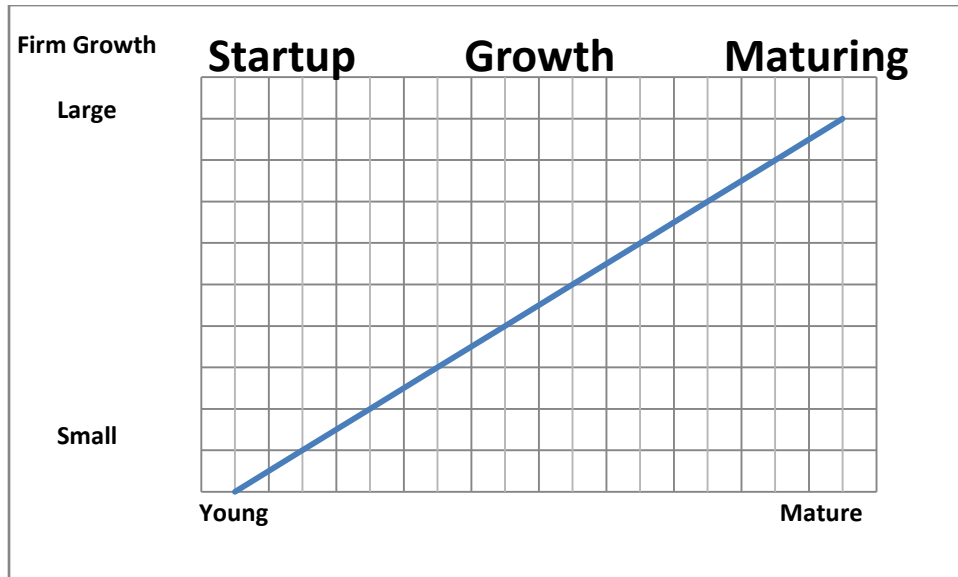
EXHIBIT II

Growth Stages



To develop a better framework for analyzing a small business in relation to entrepreneurial satisfaction, we relied upon a combination of experience, the above models and a number of other models from our literature search. The framework developed is a three phase growth model (See Exhibit III). The Phases are characterized by the organizational focus on company product, customer, product delivery, and managerial processes.

EXHIBIT III – Growth Phases



We also developed the three phases to reflect a better alignment with how entrepreneurs develop management processes during the three phases of growth. We summarized the managerial factors characterizing each of the phases on the chart below (See Exhibit IV), and describe them further in more detail.

EXHIBIT IV

Organizational Focus For Each Phase of Growth

Organizational Focus	Startup Phase	Growth	Maturing
<i>Product Focus</i>	Developing and Refining	Quality and Consistency	Maintaining
<i>Customer Focus</i>	Development of New Customers	Mixed with Development of New and Service of Existing Customers	Service of Existing Customers
<i>Product Delivery and Support Systems</i>	Developing and Reactive Driven	Development of Capacity and Product Consistency	Well Defined and Organized
<i>Management Processes and Systems</i>	Informal and Reactive	More Formal and Developing	Well Defined

Phase 1: Startup Phase

During the startup phase of the businesses, the entrepreneurs that we observed focused primarily on product, customer, and product delivery. While the development of management processes and infrastructure was important, it was not the driving force during the startup phase. Survival of the business was the paramount focus and product, customer, and delivery were essential components of that focus. We observed the following managerial focus by the entrepreneurs during this phase:

Product Development and Support – The entrepreneurs spent significant time redefining their products to make them marketable to a defined customer base. Often times, the initial product did not satisfy customer needs and the entrepreneurs made the necessary product modifications in order to attract the new customers. This refining of the product was a driving force during the startup phase and the entrepreneurs' satisfaction levels were higher because of it.

Customer Development and Support – During the startup phase, demand for their products was relatively low with few customers. The entrepreneurs spent a significant amount of time developing customer base during the startup phase. Keeping customers happy was paramount, and entrepreneurs interacted regularly with customers. Most customer problems were solved by the entrepreneurs. This interaction with customers was an important factor in driving the startup phase of the businesses. Most entrepreneurs enjoyed this interaction with customers and developed solid and lasting relationships with customers.

Product Delivery and Support System – During the startup phase, the businesses observed developed basic product delivery systems. These systems could handle demand if orders occurred on a level basis. However, in most cases, product demand during the startup phase was volatile and a large order could create a serious backlog in the production process. The businesses observed were driven by a reactive product delivery system. The capacity to produce and deliver products was more a function of entrepreneurial will and determination than proactive planning. Entrepreneurs spent a significant amount of time developing the product delivery systems during the startup phase.

Management Process and Systems – Product refinement, customer development, and product delivery were all driving forces during the startup phase and correspondingly demanded significant amounts of the entrepreneurs' time and effort during the startup phase. The focus on management process was reactive and not proactive. Few formal management processes were in place. Most entrepreneurs relied upon a basic accounting system for information and control purposes. Entrepreneurs met daily with managers and employees so decisions could be made quickly with little formality. The financial focus was not planning based, but reactive to the cash flow needs of the businesses. The process of managing labor was informal and entrepreneurs had significant interaction with employees.

Phase 2: Growth Phase

Once businesses moved into the growth phase, survival was no longer the paramount goal. The shift to sustainability and profitability changed the managerial focus. Managerial process and infrastructure became more important and demanded more of the entrepreneurs' time and effort. Less time was spent on product, customer development, and product delivery. We observed the following managerial focus by the entrepreneurs during this phase:

Product Development and Support – The entrepreneurs no longer spent significant amounts of time redefining products. Products and products lines were established and the focus during the growth phase was on product quality and consistency as well as customer support. Product support was delegated and performed by an increasing number of support staff. Entrepreneurs

were involved in the development of new product lines, but this no longer had the focus as it did during the startup phase.

Customer Development and Support – Demand for products during the growth phase became more predictable and consistent. Yearly increases were planned so that new customer development diminished in importance and support of existing customers became the focus. The entrepreneurs spent less time interacting with customers, and delegated responsibility for sales to other and customer support to managers.

Product Delivery and Support System – Companies built infrastructure and support systems during the growth phase to meet the increasing demand for product. Companies were better able to manage demand but that required a proactive approach by management with long term planning and budgeting. Oversight of product delivery was delegated and overall management of company became more of the focus.

Management Process and Systems – During the growth phase, the development of management process and systems became essential to sustaining growth. The focus on management changed from being reactive to being more proactive. Entrepreneurs spent more time away from product, customer development, and product delivery. Instead they spent more time managing people and process. Meetings with managers and employees changed from a daily basis to weekly or longer periods of time. Decisions no longer could be processes immediately and had to move through layers of management. The financial focus became profit based, requiring the use of more planning tools such as budgets and pro-forma financial statements.

Phase 3: Maturing Phase

Once businesses moved into the maturing growth phase, long term growth and profitability become the paramount goal. The companies were large enough that they had adopted decentralized management systems. We observed the following managerial focus by the entrepreneurs during this phase:

Product Development and Support – Product lines had matured and the focus was on protecting and increasing market share. Reacting to competitors drove product changes and new product decisions. The focus on R&D was more formal and delegated to a department and skilled individuals within the organization. Product delivery had become logistic driven and process oriented.

Customer Development and Support – Demand for products during the maturing phase became very predictable and consistent. Maintaining market share drove customer development and the support systems for existing customers were well defined.

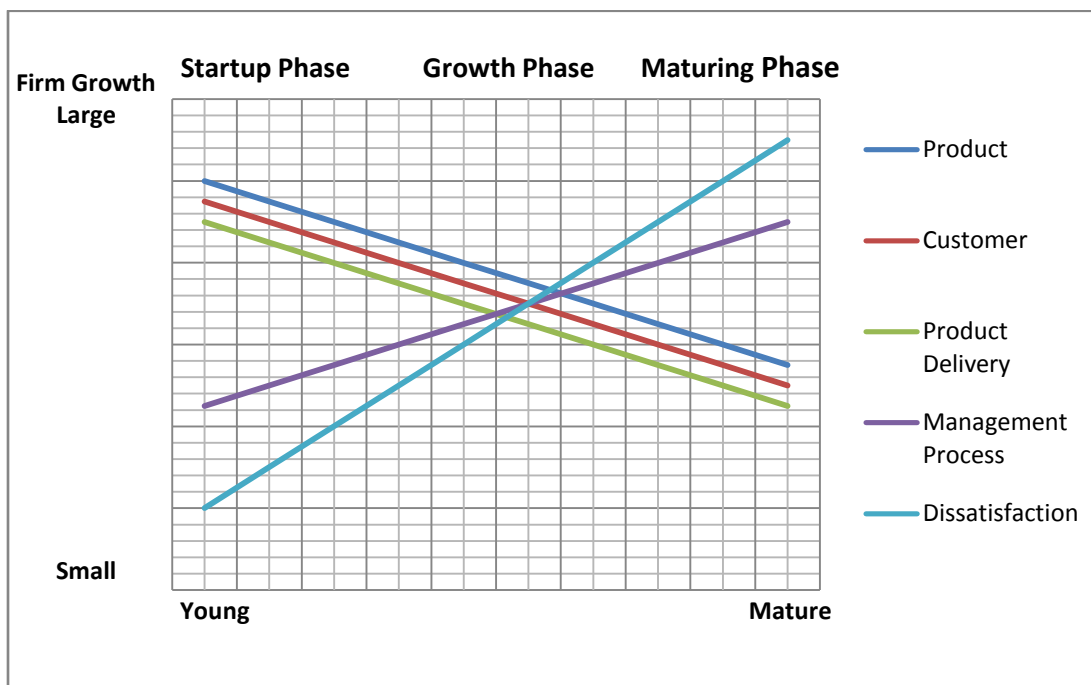
Product Delivery and Support System – Infrastructure and support was well developed with a corresponding ability to meet customer demand. Capacity was more than adequate and well planned in advance. Processes and procedures focused on efficiency and consistency.

Management Process and Systems – During the maturing phase, the management processes and systems were well developed. The management process was formal with multiple layers of management. Upper level managers oversaw the overall process and seldom met with lower level management and staff.

ENTREPRENEURIAL EQUILIBRIUM POINT

We observed that the organizational focus on company product, customer, product delivery, and managerial processes changed as the companies grew. More specifically, was the observation that the managerial focus of entrepreneurs changed over the same period of time. Initially, entrepreneurs focused more on product, customer, and product delivery than in building managing processes and procedures. As the companies grew, more time was spent on developing management processes by the entrepreneurs. In addition, as the managerial focus changed, the dissatisfaction level of many of the entrepreneurs also rose. At some point during the growth phase, the focus on product, customer and product delivery intersected with the focus on management process to reach an “equilibrium point”. Entrepreneurial dissatisfaction also intersected at this point, as the distaste for managerial process reached a boiling point for many of the entrepreneurs. This equilibrium point is displayed graphically below (See Exhibit IV).

EXHIBIT IV – Equilibrium Point



This equilibrium point is a critical point where the entrepreneur must make a decision. If they want the company to continue to grow, more time must be dedicated to developing management processes and delegating operations to others. If the entrepreneur can recognize and accept this change in focus, the company can continue its growth to maturity. If the entrepreneur cannot be satisfied with this changing role, then he or she should consider selling the business. Without the commitment to building the management processes, the company may not survive.

CONCLUSION

Our observations confirm that entrepreneurial businesses move through normal phases of business growth. Within those phases, the entrepreneur faces different challenges and the managerial focus changes as the company grows. Product, customer, and product delivery initially consume the

entrepreneur during the startup phase. The management process is informal and for many entrepreneurs the satisfaction level is highest during the startup phase. During the growth phase of the business, management processes and procedures must be developed and formalized. At this equilibrium point, entrepreneurs must commit to management process and delegation or risk losing their businesses. It is at this equilibrium point that many entrepreneurs decide to sell and start another venture.

For further study, we plan to develop a questionnaire to help entrepreneurs recognize growth phases and their overall satisfaction level. This will give entrepreneurs a better understanding regarding the actions that will enhance the success of their businesses. In addition, we plan to accumulate more quantitative data for further analysis and validation of the observation and conclusions made in this paper.

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**THE USE OF FORMALIZED RATING SYSTEMS IN
EARLY-STAGE
ANGEL INVESTMENT SCREENING**

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THE USE OF FORMALIZED RATING SYSTEMS IN EARLY-STAGE ANGEL INVESTMENT SCREENING

ABSTRACT

We examined the formal screening process of thirty-one Angel Investment Groups. Within our sample, over eighty percent of the Angel Investment Groups used a committee of members to perform the initial screening of submitted business plans, while the remaining relied upon the managing partner or senior director to perform the initial screening. Of the Angel Investment Groups that use a screening committee, approximately half also employed a formal scoring system. With respect to the important dimensions used in the scoring systems, the quality/experience of the management team and the competitive advantage of the firm's product or service, including strength of intellectual property protection, were consistently the most common dimensions seen in the scoring systems examined.

INTRODUCTION

Numerous researchers have offered empirically derived lists of criteria reported by equity investors to be most critical to their successful decision making [30, pp. 1051-1056] [24, pp. 119-128] [23, pp. 123-137] [33, pp. 323-346] [21]. Unfortunately the vast majority of empirical efforts in both the venture capital and technology contexts have been conducted in an *ex-post* manner, well-after the decision has been made. As Zacharakis & Meyer (1998) point out, such approaches which rely on expert self-introspection, are prone to recall and post hoc rationalization biases. Using hindsight, successful innovators, investors, and entrepreneurs will create a contemporaneous impression of what led to a successful technology development, rather than remembering the actual sequence of confusing and non-obvious events [6, pp. 147-168] [3, pp. 314-321]. Other common problems of *ex-post* studies are survivor selection bias where only successful technology transfers are investigated or discussed [14, pp. 1097-1120] [29, pp. 154-170], and memory decay where the technology developer or equity investor simply can't remember the important decision points from the past [5, pp. 354-359] [10, pp. 301-331].

Inevitably these biases result in fairly obvious factors, such as "having a superior product," "being aware of market demand," or "leveraging skills from a firm's core competence," as being associated with successful technology development [8]. As such, this line of research has done little in providing early, *ex-ante* predictive models of future technological and entrepreneurial success.

While much of the *ex-post* technology commercialization research is somewhat tautological in nature (i.e., superior products have greater market success), this research has provided the foundation for developing various scoring systems for early technology review. For example, in most structured approaches to technology development, such as the well-known Stage-Gate model [7] [8], the PACE process [22], and a number of Stage-Gate variations that have a more technological orientation [13] [12, pp. 29-33] [1, pp. 267-295] there is typically an early stage technology review process where a proposed technology is formally evaluated on criteria such as market attractiveness, future competitiveness, and technical merit.

Similar formal reviews are made by equity investors when reviewing early stage technology-based business plans and by granting agencies when reviewing Small Business Innovation Research (SBIR/STTR), R&D and other grant proposals (Cooper 1998) [1, pp.267-295] [26, pp.77-94] [20, pp.139-148] [16, pp.673-684].

Many of these early stage assessments now involve some type of multidimensional scoring sheet or rating process [9, pp.21-27]. In fact, within the past decade there has been a stream of complex technology readiness check-lists or calibrated scoring models designed for early stage, or “fuzzy” front-end assessments [25] [19, pp. 2-35] [18, pp.369-384].

This study explores the use of formal scoring systems for early stage, pre-due diligence screening of potential equity investments by Angel Investment Groups.

EARLY-STAGE EQUITY INVESTMENT

Angel Investment Groups are formal networks of SEC defined “accredited investors.” The *Venture Support Systems Project: Angel Investors* (2000) notes, “Angel investing is the major source of funding for the seed (\$25,000-\$500,000) and start-up phases (\$500,000 - \$3,000,000)”, (2000: 9). Similarly, the Angel Capital Association notes, “Angel investing bridges “the gap between individual (family and friends) and institutional venture capital rounds” (2002: 1) While estimates of the total annual equity funding from angels varies dramatically, it is generally agreed that angel investment in early-stage investments exceeds formal venture capital funding, with the majority of angel investment in “pre-revenue firms.” For example, research by Wong (2002) found that 69% of his sample of angel funded firms was firms in “pre-revenue” phases of development.

The second source of early stage, pre-revenue funding is from “Early-Stage Venture Capital Funds”. Early-Stage Venture Capital Funds are professionally managed funds that typically target early stage investments. Since the “dot-com” crash, the majority of large venture capital investments have focused on the later “expansion” stage, with approximately 15% to 20% of venture capital investments still targeted toward early stage firms. The process for investment reviews differs somewhat between Angel Groups and Early-Stage Venture Capital Funds.

Angel Investment Groups typically follow a formal process of evaluating and selecting deals (e.g., [27, pp.331-336]). First, business plans (or detailed executive summaries) are presented to a screening committee of members. This screening committee either informally, or by using a formal rating sheet, screens potential investment candidate firms. The selected candidate firms are then invited to a meeting of the Angel Investment Group for a formal presentation. After the presentation, a vote is taken to determine level of investment interest and commitments. If there is general interest to fund the presenting firm, the Angel Investment Group performs a “due diligence” process on the firm, and then a final agreement of valuation and investment terms (formalized in a “term” sheet) is reached.

A professional managed Early-Stage Venture Capital Fund typically involves a slightly different approach, with a managing partner of the fund championing a particular investment during the process. This might involve a preliminary due diligence process. Afterward, a vote is typically taken among all the managing partners, after which the final detailed due diligence process is undertaken. Many times an Early-Stage Venture Capital group will find and fund their investments by being a member of an Angel Investment Group. While the decision process between Angel Investment Groups and Early-Stage Venture Capital Funds differs slightly, they both involve two important decision processes: the initial screening of potential deals and the due diligence process.

EMPIRICAL STUDY

A list of one hundred forty-two U.S.-based Angel Investment Groups was obtained from Angel Capital Association web-page. An electronic questionnaire was sent to seventy randomly selected Angel Investment Groups asking for: a) a description of their pre-due diligence screening process of business

plans, b) whether or not a formal rating or scoring process was used for their initial screening of business plans, c) if a formal scoring system was employed then a copy of the scoring sheet was obtained, and d) if a formal system was not used, what was the general criteria that was used to screen business plans. The study was conducted during early 2008.

A total of thirty-one usable responses were obtained, for a response rate of 44.28%. In almost every case the respondent was the senior director or managing partner of the Angel Investment Group.

Within our sample, 80.1% (n=25) of the Angel Investment Groups used a committee of members to perform the initial screening of submitted business plans, while the remaining 19.9% (n=6) of the sample relied upon the managing partner or senior director to perform the initial screening (see Table 1).

TABLE 1: SCREENING PROCESS AND SCORING	
	Sample (N=31)
Screening Committee Decision	25
Scoring System with No Weightings	11
Scoring System with Weightings	2
No Scoring System	12
Individual Manager Decision	6

Of the Angel Investment Groups that use a screening committee, approximately 52% (n=13) also employed a formal scoring system. Here we define a formal scoring system as a Likert-style numerical rating scheme on multiple dimensions. Of these, however, only two groups used a scoring system that also employed a weighting system reflecting the importance for the various dimensions. In a weighted scoring system, for example, a ranking of “5” on “management team” might be weighted differently than a ranking of “5” on “intellectual property.”

Eight of the committee-based screening processes employed the 4-star ranking system used in the “Angelsoft” software program. In fact, within our sample, the “Angelsoft” program was clearly becoming an increasingly common way to distribute documents, and allow member feedback, including rankings, of the business plans by screening committee reviewers. Several respondents indicated that they had just starting using “Angelsoft” within the past six months.

The remaining 48% (n=12) of the committee-based screening process used either a consensus process during a screening committee meeting, or a simple ranking or rating on the overall proposal (rather than on multiple dimensions).

With respect to the important dimensions used in the scoring systems, Table 2 indicates what dimensions were most commonly identified within the scoring sheet.

Clearly the quality/experience of the management team and the competitive advantage of the firm’s product or service, including strength of intellectual property protection, were consistently the most common dimensions seen in the scoring systems examined in this study. This is consistent with many of

the studies that have examined the general criteria for selection (e.g., [21] [27, pp. 331-336] [31, pp. 343-357]).

TABLE 2: SCORING DIMENSIONS FOR SCREENING	
	Percentage Mentioned in Scoring Sheet (N=13)
Quality/Experience of Management Team	100.0%
Competitive Advantage of Product or Service (Including IP Protection)	92.3%
Attractiveness/Growth/Size of Market	84.6%
Transaction/Valuation Characteristics	61.5%
Business Model/Strategy	46.2%
Quality of Pro-Forma Financials	38.5%
Scalability	30.7%
Geographical Location	30.7%
Exit Strategy	23.1%
Prior Performance	15.4%
Stage of Technology Development	7.7%

It is also interesting to note, however, that in the two formal weighted scoring systems examined, the competitive advantage of the firm's product or service, including strength of intellectual property protection, were weighted somewhat higher than the quality/experience of the management team. In contrast, in the screening processes that did not use a formal scoring system, the senior director or managing partner respondent almost always mentioned that, in his or her opinion, quality/experience of management team was the most important dimension.

It is interesting to note that firm valuation, or other transaction characteristics, were the fourth most common dimension seen in the scoring system. In addition, while only four of the scoring systems mentioned location, all of the Angel Investment Groups indicated a geographical preference, or requirement, within their application process.

CONCLUSION AND DISCUSSION

At one level, the responses suggested that there were extreme differences in opinion regarding the use of formal scoring systems in early stage, pre-due diligence screening decisions. On one hand, a number of Angel Investment Groups utilized a formal scoring system, with two groups even formalizing the process to the point of providing different weights to the different dimensions, then ranking the proposals based upon a weighted sum of the ratings for the different dimensions. On the other hand, several respondents clearly challenged the validity of any scoring process, or as one manager from an angel group located in

the Northeast wrote, “We specialize in early stage deals and question the utility of a scoring system in our environment.”

At another level, there was great consistency between the angel groups within our sample. Every group that used a formal rating system for their initial screening decision had quality/experience of the senior management team as one of their dimensions in the rating sheet. Similarly, all the respondents of the angel groups that did not use a formal scoring system indicated that they thought that the quality/experience of the management team was most important to the screening process. As one respondent succinctly argued, “I’m sure we could quantify the weightings but don’t because it probably wouldn’t add much value since it would be highly skewed to the management team.”

While there is certainly a difference of opinion regarding formalized screening and scoring systems for early stage equity investment screening, there remains an even broader question to still needs to be answered – do early stage reviewers and screeners actually have any ability to predict future success?

Given the hindsight and memory decay biases inherent in *ex-post* analysis, a few researchers are starting to examine technology commercialization or success within an *ex-ante* framework. Some of the *ex-ante* research has examined the decision making process among equity investors, such as venture capitalists (e.g., [34, pp. 311-332] [28, pp. 381-401] [4, pp. 411-436] [33, pp. 323-346]) For example, Zacharakis & Meyer (2000) conducted a controlled experiment by providing a sample of experienced venture capitalists with different levels of information on 25 non-associated investments, and found that venture capitalists had, at best, a prediction accuracy of less than 40 percent, and that this prediction accuracy decreased as more information was provided. Astebro (2004) studied 561 R&D “low-technology” Canadian projects’ evaluations from the mid-1990s, and tracked their success over time. The research suggests that the factors of technology opportunity, developmental risk, expected profitability, and intellectual property protection provided the greatest explanatory power.

Galbraith, DeNoble, & Erlich (2006) tracked sixty-eight early-stage technologies from government and defense research laboratories, universities, and small firms for approximately two years after grant funding, and found that the initial expert assessments based upon a formal scoring system on the average provided no predictive power. Only experts with current scientific responsibility appeared to have some predictive capability of future success. In several follow-up *ex-ante* studies, they also found that expert reviewers were particularly bad at managing Type II errors; that is, recommending investments in technologies that later proved to be failures [11] and that reviewer discussions after hearing a firm’s formal presentations did not result in any additional ability to predict future success even though greater consensus was achieved [17].

While only a few *ex-ante* screening studies have been published, these findings tend to challenge the validity of early-stage screening processes, regardless of whether or not a formal scoring process is used, or at least these studies challenge using non-technical experts in early stage screening. In fact, this may be the primary reason why such emphasis is placed upon the quality and experience of the management team – most members of Angel Investment Group screening committees are not technical experts, but rather serial entrepreneurs, investment portfolio managers, physicians, attorneys, and retired executives. Clearly, much more research needs to be accomplished in this area, particularly in the areas of accuracy of prediction and assessments by equity investment investors and business plan screeners.

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EMPLOYEE-MANAGER FIT ON THE DIMENSION OF CUSTOMER SERVICE CLIMATE AND EMPLOYEE OUTCOMES

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ABSTRACT

Customer service is a critical element in the success of retail organizations. Agreement or congruence between employees and their managers on customer service climate may be associated with important organizational and employee outcomes. In the present study we examine the relationship between PO fit on the dimensions of customer service climate and outcomes. Sixty-six employee manager dyads participated in this survey. Agreement between employees and managers on the importance of developing a long-term relationship with customers was associated with perceptions of service quality, employee need satisfaction, job satisfaction, organizational commitment, and turnover intention. Congruence on service orientation was similarly associated with employee need satisfaction, job satisfaction, organizational commitment, and turnover intention.

INTRODUCTION

Organizations, especially those in the retail sector, are increasingly recognizing the importance of excellent customer service for remaining competitive. In a recent survey of retailers, almost 80% identified quality and consistency of customer service as critical issues for success (Field, 2008). Further, the collective climate for customer service has been examined as a key variable for predicting quality of customer service. Customer service climate has been defined as “the shared perceptions of employees concerning the practices, procedures, and kinds of behaviors that get rewarded and supported with respect to customer service and service quality” (Schneider et al., 1998, p. 151).

Customer service climate is a dimension along which we may examine person-organization fit (PO fit) in the work place. Earlier studies of fit on the dimension of customer service climate have examined fit with the collective organizational climate (e.g. Little and Dean, 2006) and person-group fit in self-managed teams (e.g. de Jong, de Ruyter, and Lemmink, 2005). Fit with the customer service climate has been shown to be associated with higher levels of customer service as rated by the employee (e.g. Little and Dean, 2006) and by the customers (e.g. de Jong, de Ruyter, and Lemmink, 2005). Fit with customer service climate has not, however, been associated with higher levels of productivity (e.g. de Jong, de Ruyter, and Lemmink, 2005; Little and Dean, 2006). This is likely due to the fact that the increased levels of interaction with the customer necessary for high levels of customer service are more time consuming, thus limiting productivity (de Jong, de Ruyter, and Lemmink, 2005; Little and Dean, 2006). At the employee level, PO fit, has been shown to be associated with higher levels of job satisfaction and organizational commitment (e.g. Meglino, Ravlin, and Adkins, 1989). The latter is especially important because higher levels of organizational commitment have been shown to be related to higher levels of customer service (Little and Dean, 2006). Organizational commitment is also important because it is associated with lower levels of employee turnover (e.g. Griffeth, Hom, and Gaernter, 2000). Lower levels of turnover, in turn, provide workforce stability which may lead to higher levels of customer service and lower costs. This is especially important given that the retail industry is notorious for high turnover rates. Thus, customer service climate, and person-organization fit on the dimension of customer service climate has been shown to be an important construct in the retail sector.

One fit relationship that has received less attention in the retail sector is fit between the employee and his or her manager on the dimension of customer service climate. In many organizations, the manager is the

personification of the company's values and norms to the employee. In a study in a manufacturing organization, Meglino, Ravlin, and Adkins (1989) found that value congruence between employees and their supervisors was associated with higher levels of job satisfaction and organizational commitment on the part of the employees. As noted previously, commitment is a critical outcome in the retail sector because of its relationship with improved customer service and lower turnover. Thus it is important to examine the relationship between an employee's fit with his or her manager on the dimension of customer service climate and employee and work outcomes.

The purpose of the present study is to examine the relationship between PO fit on the dimension of customer-service values between workers and managers and the relationship of that fit with organizational and employee outcomes. We examine two measures of P-O fit, specifically 1) congruence with the supervisor on the perceived importance of developing a long-term relationship with customers and 2) congruence on service orientation, that is, the perceived importance of being attentive to the wants and needs of the customer. We examine the organizational outcome of service quality and the individual outcomes of need satisfaction, job satisfaction, organizational commitment, and turnover intent. As noted previously, the latter are also important organizational outcomes because satisfied, long-term employees enhance the organization's ability to develop a positive customer service climate. Thus, we predict that P-O fit on the dimension of service climate will be positively associated with customer service, employee need satisfaction, job satisfaction and organizational commitment, and negatively associated with turnover intention. Customer service is an important organizational outcome that may lead to customer satisfaction and loyalty, and ultimately profitability. As noted above, employee satisfaction and commitment, as well as low turnover intention is important to the organization because of their relationships with customer service and by helping the organization avoid the high costs of employee turnover.

In the following sections, the methodology of the study will be described and the results will be presented.

METHODOLOGY

This study utilized a survey of retail organizations. Retail goods and service organizations were recruited from a wide range of businesses in order to maximize differences in operations, focus, strategy, size, and other variables. The retailers were contacted through direct mail and asked to participate in the study. The sampling frame was a listing of addresses and telephone numbers for businesses throughout the United States purchased from a list service. The list included SIC categories and so stratified random sampling was used on the list to derive a representative set of businesses from across the retail industry. For each organization, a packet was sent with a letter of introduction, one survey for a manager and three surveys for employees under the supervision of that manager. Postage-paid reply envelopes were included with all surveys. Managers were asked to participate and to then recruit employees who would fill out their surveys independently.

Packets were mailed to 2000 organizations with the goal of obtaining 300 usable dyads. One hundred twenty four managers and 186 responses employees responded. After matching for organization, this produced 66 usable dyads. Although the resulting sample is small, given the difficulty of performing dyadic research, it can still yield useful information.

Measures

P-O Fit. Person organization fit on the dimension of customer service climate was measured in two ways. The first measure assessed employees' and manager's perception of the importance of developing a long-term relationship with customers with three items (Anderson, 1984; 1985). A sample item is: "We

particularly value repeat customers.” A seven-point response scale was used (1=“strongly disagree; 7 = “strongly agree”). The same three items were used to measure an employee’s perceptions and his or her manager’s perceptions (α for employees = .77; α for managers = .47). Fit was operationalized as the sum of the difference scores between employees and their managers on these three items.

Similarly, we measured fit on customer service orientation using nine items developed by Saxe and Weitz (1982). Again, a seven-point response scale was used (1=“strongly disagree; 7 = “strongly agree”). As before, the same nine items were used to measure employee perceptions and manager perceptions (α for employees = .92; α for managers = .77). Fit was operationalized as the sum of the difference scores between employees and their managers on these nine items.

Organizational and employee outcomes. All outcome measures were gathered on the employee survey. The organizational outcome of service quality was measured using a five-item scale developed by Parasuraman, Berry and Zeithaml’s (1990). Participants were asked to indicate the extent to which they believed that the organization and its employees were able to meet performance standards. A sample item is: “The ability of the company to perform the promised service dependably and accurately.” A 7-point response format was used (1 = “not at all”; 7 = “completely”). The reliability of the scale was $\alpha = .78$.

The first employee outcome measured was need satisfaction. Respondents were asked to indicate the extent to which the organization provided opportunities to satisfy a number of outcomes that employees might value. The twelve items were derived from Robbins, (1986) and Churchill, Ford and Walker, (1993). The scale reliability was $\alpha = .90$.

Job satisfaction and turnover intent were measured using single items (from Jaworski, et al., 1993 and Balazs, 1991). Organizational commitment was measured using the 15-item scale developed by Mowday, Porter, and Steers (1982; $\alpha = .90$).

We also measured three potential control variables, specifically span of control, the primary business of the organization, and the extent to which the organization used clan controls. Span of control was measured by asking managers to report the number of employees per supervisor in the organization. Span of control may be associated with value congruence and with employees’ job satisfaction and organizational commitment. A wider span of control would make it more difficult for the manager to have a significant amount of influence on a specific individual employee. The primary business of the organization was measured by a single item asking managers to indicate whether the primary business was providing services, or selling products. A 7-point Likert response scale (1 = “providing services; 7 = “selling products”) was used. Including this control variable allowed us to check for fundamental differences associated with being primarily a seller of goods versus being a service provider. The third control variable, clan control was measured on the employee survey using three items developed by Jaworski, et al. (1993). A sample item is “The work environment encourages employees to feel a sense of pride in their work.” A seven-point response format was used (1 = “definitely not”; 7 = “yes definitely”). The reliability for this scale was $\alpha = .84$. PO fit may be more important in organizations that use clan controls to influence employee behavior.

ANALYSIS AND RESULTS

Correlation analysis was used to initially examine the relationships between P-O fit, outcomes, and other study variables. Means, standard deviations, and correlations among the variables are presented in Table 1.

Table 1
Means, Standard Deviations, and Correlations Between Study Variables

	Mean	Standard Deviation	1	2	3	4	5	6	7	8	9
<u>P-O Fit (employee-manager)</u>											
1. Importance of repeat customers	-0.21	2.89	---								
2. Customer service orientation	-2.00	7.38	-.30*	---							
<u>Work and Employee Outcomes</u>											
3. Service quality	6.01	.73	.40**	.18	---						
4. Need satisfaction	4.98	1.14	.51**	.25+	.65**	---					
5. Job satisfaction	5.29	1.50	.28*	.23+	.49**	.59**	---				
6. Organizational commitment	5.50	.87	.46**	.28*	.60**	.74**	.47**	---			
7. Turnover intent	2.95	1.86	-.31*	-.28*	-.48**	-.65**	-.50**	-.41**	---		
<u>Control Variables</u>											
8. Span of control	8.88	10.28	-.16	-.05	-.32*	-.31*	-.32*	-.30**	.31*	---	
9. Primary business	4.80	1.88	.25*	-.08	-.02	.04	-.05	.30*	-.02	-.02	---
10. Control systems - clan	5.77	1.28	.43**	-.19	.73**	.75**	.59**	.59**	-.58**	-.33*	.10

** p < .01; * p < .05; + p < .10

As Table 1 shows, fit on the perceived importance of developing a long-term relationship with customers was positively associated with perceptions of service quality, employee need satisfaction, job satisfaction, and organizational commitment, and was negatively associated with turnover intention. Fit on customer service orientation was positively associated with employee need satisfaction (marginally), job satisfaction (marginally), organizational commitment, and negatively associated with turnover intention.

We also examined the relationships between the control variables and P-O fit and outcomes. Span of control was not significantly associated with the P-O fit measures, but it was associated with all outcome variables. The type of primary business was positively associated with fit on the importance of repeat customers, and with organizational commitment. The use of clan control systems was positively associated with fit on the importance of repeat customers, service quality, need satisfaction, job satisfaction and organizational commitment. It was negatively associated with turnover intent.

Hierarchical regression analysis was used to further examine the relationship between P-O fit and outcomes above and beyond the control variables. Each outcome variable was regressed on each control variable in the first step, and the control variable and the two measures of PO Fit in the second step. Fifteen regression equations were calculated (five outcome variables x three control variables). In only one equation was the control variable significant in the first step and the change in variance explained between the first and second steps also significant. When need satisfaction was regressed on clan control and the fit indices, the additional variance explained by the fit indices was marginally significant ($\Delta r^2 = .056$, $F = 3.0$, $p = .061$); however the regression coefficients for the individual fit indices were not statistically significant.

DISCUSSION

In the present study we examined the extent to which PO fit, operationalized as employee congruence with the supervisor on 1) the perceived importance of developing a long-term relationship with customers and 2) on service orientation, that is, the perceived importance of being attentive to the wants and needs of the customer were associated with organization and employee outcomes. Fit on the perceived importance of developing a long-term relationship with customers was strongly associated with the outcome measures of service quality, need satisfaction, job satisfaction, and organizational commitment. Fit on service orientation was associated with all outcome measures except service quality; however, the

relationships were weaker than those with the perceived importance of long-term customer relationships. Fit on customer service climate also predicted need satisfaction above and beyond clan control.

The results of this study are consistent with those of previous studies of work value congruence which show that the extent to which employees and their managers are similar in their values, the greater the employee's job satisfaction and organizational commitment (e.g. Meglino, et al.,1989). They are also consistent with the results of Little and Dean (2006), who found that employee commitment was associated with higher levels of customer service.

Of particular interest was the finding that the use of clan control systems was positively associated with fit on the importance of repeat customers, service quality, need satisfaction, job satisfaction and organizational commitment. The existence of a control system stemming from organizational culture and values seems to support a customer service climate in the organization which then has key benefits for the organization, including lower turnover intention. In the retail industry where turnover is such a critical problem, the ability of the manager and coworkers to embody important organizational values remains a powerful tool.

Limitations and Strengths

While the results of this study are encouraging, the study is not without limitations. Perhaps the greatest limitation is the low response rate and the resulting low sample size. Dyadic research is difficult to conduct, especially using mail surveys. A greater response rate may have been obtained from both managers and employees had the researchers been able to gather the data within an organization. However, a strength of the current study is the fact that the data were gathered from multiple organizations. In fact, no two dyads were from the same organization.

A particular strength of the study is the fact that it uses dyadic research. Congruence scores included manager and employee responses, spanning two levels of the organization. The control variables, span of control and primary business type, were also gathered from the managers' surveys. A limitation of the study is that all outcome measures were gathered from the employee survey, thus raising some concerns about common method variance; however, the fact that there are significant relationships with variables measured on the managers' survey lessens this concern.

Additional weaknesses bear noting. Several of the measures used in the study were adapted from measures used in other marketing or management contexts, revised for the retailing context. In some cases, single item measures were used; therefore reliability could not be estimated for those measures. While most of the multi-item scales had high reliabilities, there were several with reliabilities slightly below the $\alpha = .80$ level that is generally considered acceptable. One measure, the manager's perception of the importance of developing a long-term relationship with customers, fell far below acceptable levels of reliability; however, the fact that this measure was used as part of an index, rather than as a stand-alone measure mitigates that concern to some extent. Refinement of the measures used in the study might contribute to stronger results.

Future Research

Future research directions that may be promising could explore more influences on and effects of customer service climate in retail organizations. Alternative methodologies that result in a larger sample are needed. In addition, continued exploration of multiple organizations is needed. Retailing, spanning such diverse businesses as fast food restaurants, department stores, small kiosks in malls, and street vendors, is not a homogeneous industry. It might be useful to study customer service climate and person-

organization fit within specific sub-sectors of the larger retail industry in order to better tap into possible competitive dynamics.

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COMPA-RATIO: DO DISTRIBUTIONS WITHIN A PAY RANGE MAKE A DIFFERENCE IN DETERMINING INTERNAL PAY EQUITY?

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ABSTRACT

Compa-ratio is a necessary tool for the management of structured pays systems. It provides a method of determining how closely an employee's pay approximates the organization's policies and goals [6]. In general, a neutral evaluation ($CR \approx 1.0$) suggests a fair pay structure with the distribution of employees' pay approximately at the center of the pay range for the job. While such a pay relation may seem fair, an employee's feelings of equitable pay may not depend on a single distribution of the pay range. Rather, it may depend on the underlying distributions within the pay range. This possibility will be discussed based on equity theory [2].

INTRODUCTION

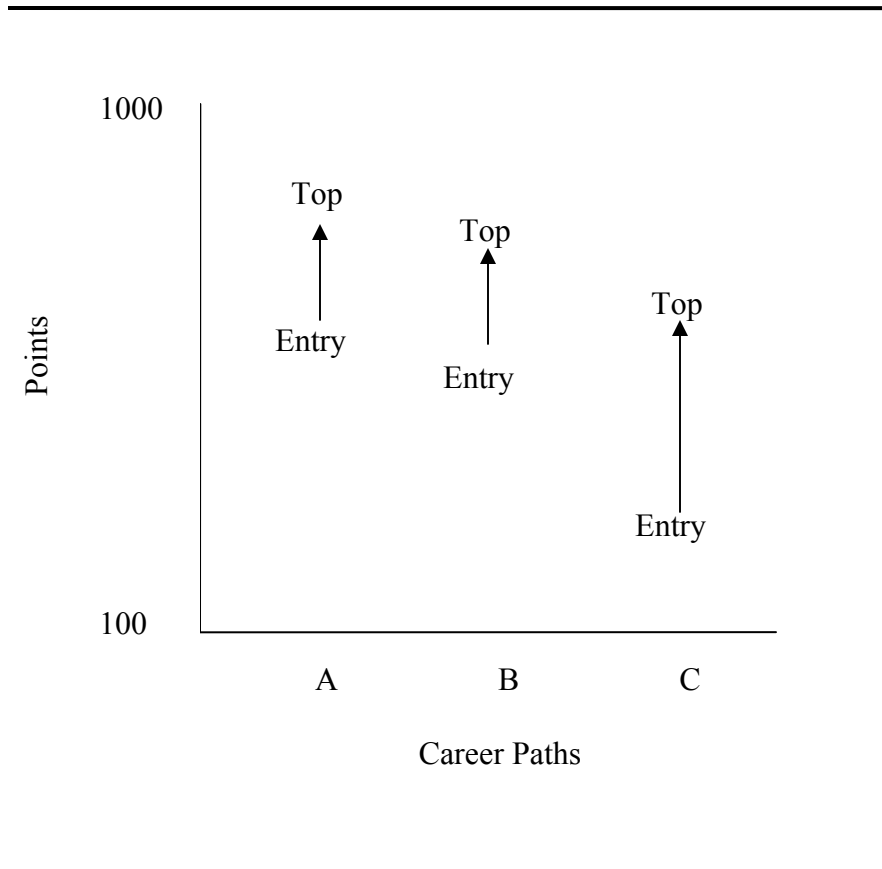
The cost of labor represents, for most organizations, one of, if not the largest, cost of production. Organizations, therefore, have a significant interest in managing this cost factor. While the organization must control labor cost to be competitive in its marketplace, the firm, at the same time, must consider the impact of the pay system on its human resources.

The instructional and application literature (e.g., [6] [9] [10] [11]) is, by design, primarily directed at the development and application of a compensation system. The goals of such compensation systems include considerations such as control of labor cost, acceptance of the system by employees, ease of application, and its ability to reflect the organization's compensation strategy. As to be expected, the literature that investigates the impact of compensation systems on the firm's human resources is directed primarily at employees' pay satisfaction (e.g., [4] [15] [17]). The following introductory information is presented as Structured Compensation Systems, Control of Structured Compensation Systems, and Pay Satisfaction.

Structured Compensation Systems

There is no disagreement (e.g., [6] [10]) that the foundation for any compensation system is the establishment of the relationship among jobs across career paths and the relation among an entry-level job and the various jobs in the career path to the top position. An example of these various relations is shown in Figure 1. They are based on the entry position's location on the vertical axis and the length of the career path. Not all entry positions begin at the same level and the number of positions in a career path may reflect significant variations (e.g., more in Career C than in A or B).

Figure 1
Job Structure for Three Career Paths Based on
1000 Points Maximum and 100 Points Minimum



The method of establishing the information in Figure 1 requires the development of a multi-dimensional and multi-step job evaluation process that leads to a determination of the internal value of each job. Because the value of money may not be stable across time and the external value, expressed as dollars, may change because of variations in the external labor market, the internal worth is usually expressed as points. While it is expected that the range of points will vary from firm-to-firm, it is shown here on the vertical axis as ranging from a minimum of 100 to a maximum of 1000.

Assignment of points to a job is determined by identifying, from job analysis, the required task, duties, and responsibilities. From this information, it is necessary to identify the job factors for which compensation should be paid. Compensational factors may include dimensions such as skills, experience, tenure, and the authority to act without supervision. The number of

compensational factors to be used is determined by the firm, but there will usually be more than three, but less than ten.

An evaluation scale is then created for each compensational factor. For example, skills may be evaluated on a scale of 1 to 10 with each value representing a specific skill level. Thus, a job that requires only basic skills would receive an evaluation of 1 and a job that requires expert skills would be assigned a value of 10.

It is not expected that each compensational factor will be of equal value. That is, some compensational factors may make a greater contribution to job performance. It is necessary, therefore, to determine the weight for each compensational factor.

As an example, the skills compensational factor may be weighted as more valuable (e.g., maximum=200 points) than the tenure compensational factor (e.g., maximum=100 points).

Assigned points for a job are then determined by:

$$\text{Job Points} = (\text{CFW}_1 \times \text{CFE}_1) + (\text{CFW}_2 \times \text{CFE}_2) + \dots + (\text{CFW}_n \times \text{CFE}_n)$$

Where: CFW_1 = Compensation Factor Weight₁

CFE_1 = Compensation Factor Evaluation₁

Assuming three compensational factors weighted respectively at 40, 30, and 30 and an evaluation scale of 1-10 for each factor, will result in a maximum of (e.g., Figure 1):

$$\begin{aligned} \text{Maximum Points} &= (40 \times 10) + (30 \times 10) + (30 \times 10) \\ &= 400 + 300 + 300 \\ &= 1000 \end{aligned}$$

and a minimum of:

$$\begin{aligned} \text{Minimum Points} &= (40 \times 1) + (30 \times 1) + (30 \times 1) \\ &= 40 + 30 + 30 \\ &= 100 \end{aligned}$$

The points assigned to each job are an expression of its internal value and provide a basis for comparing different jobs in the same career path. It also establishes the value-based relation among jobs in separate career paths.

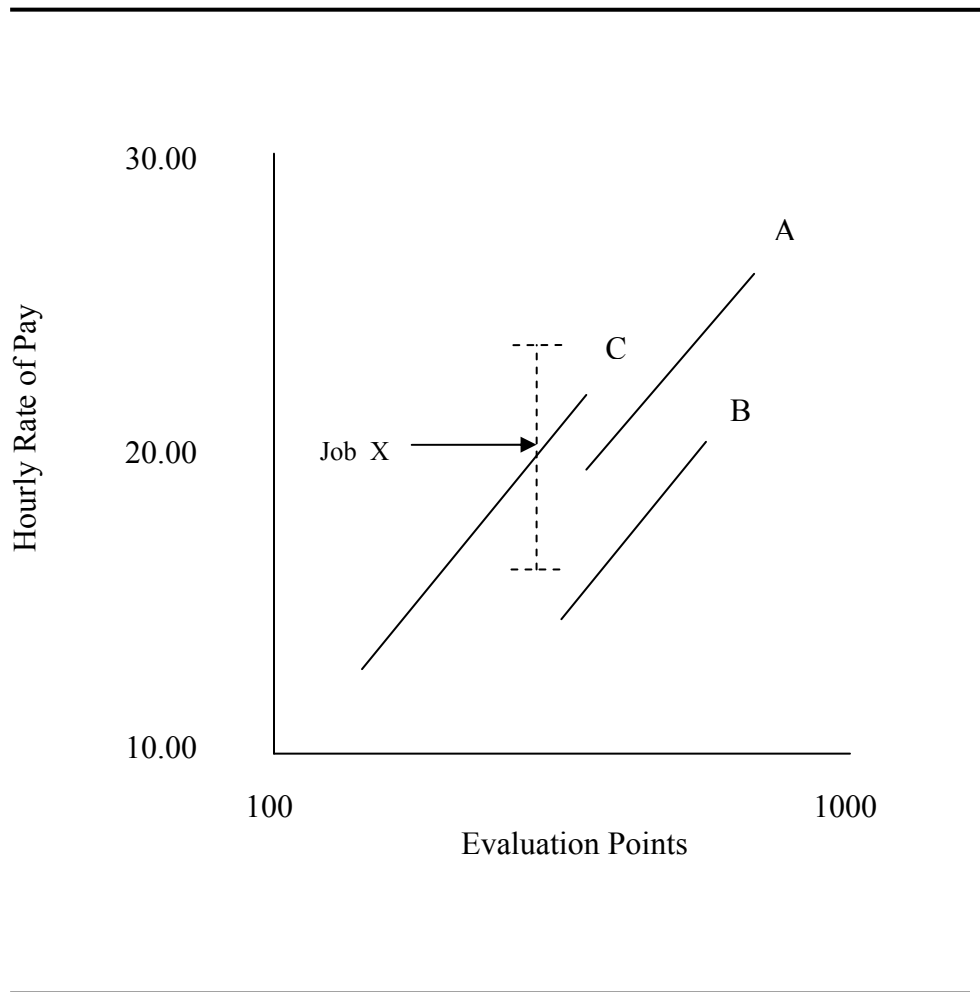
As shown in Figure 2, the three career paths from Figure 1 can be plotted on a graph defined by evaluation points and the firm's pay range policy. The firm's compensation strategy is reflected by the pay range (\$10-\$30) that encompasses the three careers. The pay range is influenced by a number of factors including the number and similarity of the career paths to be included in grouping.

Information such as that presented in Figure 2 establishes the relation between evaluation points and pay for each job career path. As such, it provides a basis for comparing all similar jobs in the separate career paths and provides a method of identifying opportunities for higher pay in other career paths. The information does not provide, however, the pay range or median pay for any single job. For instance, a cursory assessment of Job X in Career C would suggest that everyone assigned to this job would be paid \$20. In fact, however, because of variations in performance and hiring date, employees in the job may be paid within the pay range indicated by the dashed line.

Figure 2

Pay Structure for Three Career Paths from Figure 1

With a Pay Range for Job X



The pay range for a job reflects the firm's decision as to its width. The width of the pay range may vary from 20 to 100 percent [6], but the most often observed pay range is 50 percent and can be computed as:

$$\begin{aligned} \text{Pay Range} &= 1 \pm (\text{Range Percent})/2 + \text{Range Percent} \\ &= 1 \pm .5/(2 + .5) \\ &= 1 \pm .5/2.5 \\ &= .8 \text{ to } 1.2 \text{ or } 80\% \text{ to } 120\% \end{aligned}$$

The basis for the application of the pay range percentage is the determination of the median pay for the job. A number of factors can influence this decision, but often it is simply the average competitive pay in the external labor market. Based on the information in Figure 2, it is assumed

that the median pay for Job X is \$20. The pay range can then be established as ranging from \$24 (Maximum Pay = 1.2 x \$20) to \$16 (Minimum Pay = .8 x \$20) per hour.

However, because of the organization's compensation strategy, it may pay an amount different from the market average. At least three pay strategies can be identified [10]: lag the market; meet the market; and lead the market. Based on these three strategies and using the pay range noted above (\$16-\$24, with a median of \$20), it is possible to generate the three pay distributions, shown in Figure 3. The three strategies (shown as **Lag**, **Meet**, and **Lead**) would exhibit approximate ranges of: Lag=\$16-\$19, *Md*=\$17.50; Meet=\$18-\$22, *Md*=\$20; and Lead=\$21-\$24, *Md*=\$22.50.

Control of Structured Compensation Systems

Compa-ratio ($CR = \text{Pay}/\text{Median}$) is a widely used tool that provides the firm a method of determining the extent to which its compensation system is under control [8] [16]. It is a measure of dispersion around the median pay, which is assumed to be the firm's assessment of the fair pay in the external labor market. Consequently, most organizations will seek values close to 1, which suggests the employee is fairly paid. Values less than one indicate that the employee is underpaid and greater than one suggests the employee is overpaid.

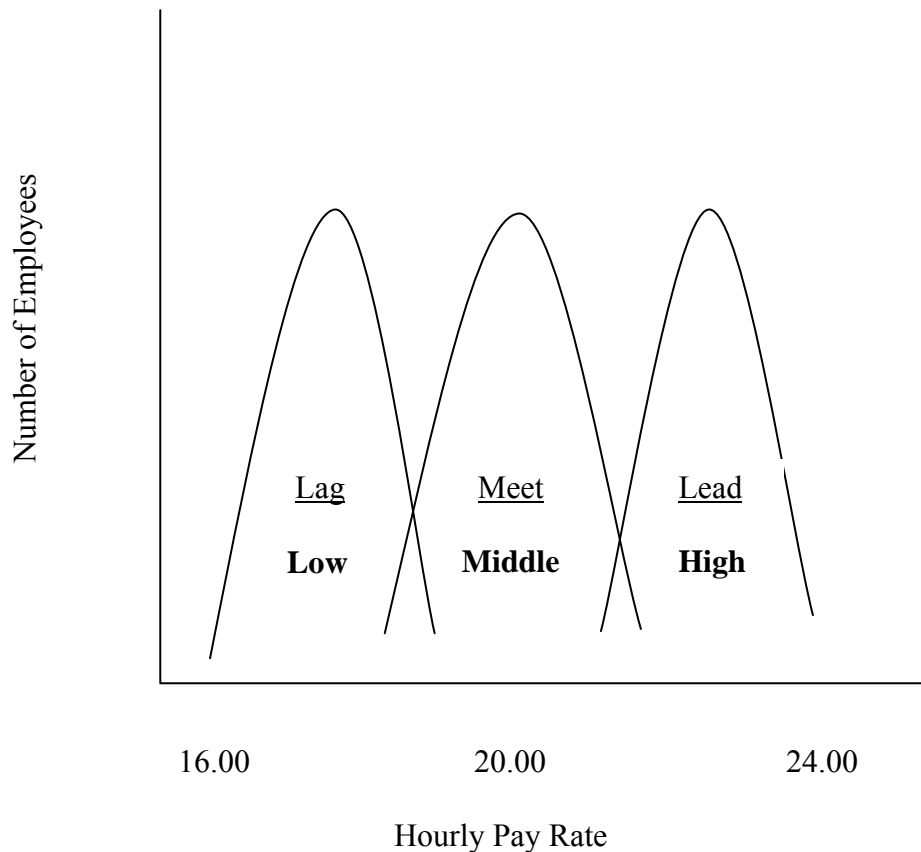
Compa-ratio is most often used to identify an employee's location within a pay range to determine whether the employee is fairly paid, overpaid, or underpaid. It is also useful in comparing one employee's pay with that of another employee who is assigned to the same job. Recently, it has been utilized as an analysis tool in identifying pay discrimination by comparing the compa-ratio for a group composed of members of a protected group with the compa-ratio of other employees [3].

Numerous explanations can be provided for variations from the desired compa-ratio of 1. One explanation for underpayment ($CR < 1.0$), is that the firm is expanding and has hired a number of new employees. Explanations for overpayment ($CR > 1.0$) include long tenure and the lack of promotional opportunities.

Both over- and underpayment can have negative consequences for the firm. For instance, overpayment causes the firm to pay more than necessary for the job and underpayment increases the firm's risk that valued employees will leave for higher pay offered by other employers. Consequently, most firms will attempt to administer the pay system to maintain a compa-ratio very close to 1. While this information aids the employer in controlling the structured pay system, it does not address employees' attitudes regarding under- or overpayment.

Figure 3

Lag, Meet, and Lead Pay Strategies for a Job or
Low, **Middle**, and **High** Pay Distributions for the Same Job



Pay Satisfaction

It has been long established that a major determinate of satisfaction is the employees' perceived fairness of the pay they receive (e.g., [2] [7]). From an objective view, the compensation system described above should allow employers and employees to determine if the pay is fair. For this discussion, fair is determined solely on comparisons within the internal labor market. That is, it is based on the pay the employee receives compared with that received by other employees who are doing the same job or, at least, who are in the same career path [13].

Compa-ratio provides such an objective evaluation, but for the employee perceptual fairness, based on social comparison theory [5], may be more important. A structured model provided by Adams [2] is most often used as a method of determining, explaining, or predicting pay fairness or equity. Generally, the model is presented in textbooks (e.g., [12]) as a relatively simple

comparison model. It is, however, a complex theory with an almost unlimited number of potential comparison variables, choices as to the person who will serve as the basis for the comparisons, and outcomes for both the employee and comparison person.

The results of these comparisons provided a measure of whether the employee is treated equitably or inequitably. Assumed general knowledge of the theory and the focus of the present paper do not warrant a detailed presentation of the model, therefore, it is discussed here in a more limited form.

In essence, the model requires the employee to make a comparison between his/her inputs and outcomes and the inputs and outcomes of the identified relative other. The identification of the relative other is important because the quality of the comparison is based on the comparability of the employee and the relative other. In its simplest form, a relative other is someone who exhibits similar skills, background, potential, and work performance. Deviations from the “similar” criterion will result in a biased and unreliable comparison. However, the identification of the relative other is the choice of the employee.

Limiting the location of the relative to the internal labor market avoids a number of complexities associated with the inclusion of external labor market comparisons [14]. Consequently, for this paper, an employee’s relative other is considered to be an individual working for the same company who is doing the same job as the employee.

The number of inputs, noted above as comparison variables, may be extensive. Inputs are comprised of all variables that have the potential to contribute to the receipt of valued outcomes. Inputs in the following discussion are considered those characteristics that help identify the relative other. That is, skills, background, potential, and performance. For additional simplicity, inputs for both the employee and relative other are considered equal and constant. Outcomes, because of the focus of the present paper are limited to pay.

The comparison and results can be illustrated as:

Comparison	Results
$I_E = I_{RO}$ and $P_E = P_{RO}$	Equity
$I_E = I_{RO}$ and $P_E > P_{RO}$	Inequity/Overpayment
$I_E = I_{RO}$ and $P_E < P_{RO}$	Inequity/Underpayment

Where: I_E = Inputs, employee.

I_{RO} = Inputs, relative other.

P_E = Pay, employee.

P_{RO} = Pay, relative other.

An equity comparison is expected to result in the employee's attitude of pay satisfaction. A comparison that reveals either over- or underpayment for the employee will result in pay dissatisfaction. The consequences of pay dissatisfaction include, but are not limited to reduced effort levels leading to lower performance, leaving the firm, and insecurity because of the inability to explain the reason for the overpayment.

COMPA-RATIO AND EQUITY

Generally, an inspection of a job pay range would exhibit only one distribution consistent with the firm's pay strategy. It is reasonable to think, however, that if the firm has a large number of employees in a one job, that a multimode distribution can be observed. Using the information in Figure 3 to represent pay for one job rather than three pay strategies, each distribution would exhibit a range of compa-ratios (Low Distribution=.91-1.08; Middle Distribution=.9-1.1; High Distribution=.93-1.06) that are significantly smaller than the compa-ratio for the \$16-\$24 pay range (i.e., CR=.8-1.2). As a result, the assumption of one pay distribution and one compa-ratio to represent the pay range may not accurately predict an employee's feeling of equity or inequity.

A compa-ratio of .8 (\$16 in a single distribution) would suggest the employee may exhibit feelings of inequity, but the same pay in the Low Distribution (CR=.91) may not cause similar feelings. These results, however, are dependent on the employee's choice of a relative other.

Accepting that there is a legitimate reason for a job to exhibit different pay distributions (e.g., multi-tier pay program) [1], and the relative other is in the same pay distribution, the employee may express no feelings of inequity [12]. If the relative other is outside the employee's pay distribution, the results are predicted to be different. Compa-ratios based on the median pay for the low, middle, and high pay distributions are shown in Table 1. If the relative other is within the employee's pay distribution, diagonal cells, the compa-ratio is one (equity), a value greater than one is reflected for the three north/northeast/east cells (inequity/overpaid), and values less than one are shown in the three south/southwest/west cells (inequity/underpaid).

Table 1

Lag, Meet, and Lead Pay Strategies for a Job or

Low, Middle, and High Pay Distributions for the Same Job

Median Pay for Distribution	Low 17.50	<u>1</u>	1.14	1.26
	Middle 20.00	.875	<u>1</u>	1.1
	High 22.00	.796	.91	<u>1</u>
		17.50	20.00	22.00
		Employee Hourly Pay		

Based on equity theory [2], employees represented by the data in the diagonal cells would express an attitude of pay satisfaction because of their feelings of being equitably paid. Those employees represented in the north/northeast/east cells would exhibit feelings of inequity even though they are overpaid. Feeling of inequity and pay dissatisfaction also would be displayed by employees in the south/southwest/west cells because they are underpaid. It is obvious that the magnitude of the compa-ratio values would be related to more intense feelings of inequity and corresponding attitudes of pay dissatisfaction.

SUMMARY AND CONCLUSIONS

Organizations expend considerable time and money in establishing structured pay systems that reflect the firm's compensation policies and competitive position in the external labor market. A number of tools are available to help maintain the pay structure, but compa-ratio is one of the most helpful. Compa-ratio provides a measure of the dispersion of employee pay within a pay range.

A compa-ratio of 1 indicates that the firm is paying, based on its compensation strategy, a rate that it considers competitive in the external labor market. Values less than 1 may indicate a significant number of new-hires, but it may also indicate that the firm is paying less than the market rate and could lose employees to employers offering higher pay. If the compa-ratio is greater than 1, the firm is paying more than the market rate and may be incurring cost greater than its competitors.

A single compa-ratio is generally used to evaluate a job or pay range. It is possible, however, that factors such as significant differences in performance, tenure, and multi-tier pay systems may result in multi-mode pay distributions for the same job. The possibilities of these multiple distributions suggest that the use of one compa-ratio for a pay range may lead to incorrect predictions regarding employees' feelings of equity and inequity.

The basis for equity is a comparison with the employee's relative other [1]. With one pay range and multiple distributions, it is possible that the employee's relative other will be in the same or a different distribution. Thus, while a compa-ratio for each distribution within a pay range may provide a more accurate representation of the dispersion, variations of the relative other must also be recognized (e.g., Table 1).

It is apparent that distributions within a pay range can influence employees' feelings of equity and inequity. While it may be difficult for the firm to change its pay structure to assure complete pay equity, it may be possible to influence the employee's choice of a relative other. . A multi-faceted approach to promote the choice of a relative other in the employee's pay distribution should include information about "similar" employees (e.g., tenure, skills, etc) and efforts to strengthen both on- and off-the-job relations among the separate groups of employees.

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A FRAMEWORK FOR MANAGING THE STRATEGIC SOURCING PROCESS

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ABSTRACT

This study presents a methodology for capitalizing on the advantages of centralized purchasing in a multiple facility firm and aligning it with the company's strategic plan. We review the primary strengths and weaknesses of a centralized versus decentralized purchasing paradigm and present reasoning as to why the terminology change to Strategic Sourcing is more descriptive of the process. We then offer an approach to overcome some of the weaknesses of centralized purchasing and transform the process to that of Strategic Sourcing.

BODY

As companies have adopted supply chain initiatives, internal and formally functional departments have been tasked with realignments or restructuring. This requirement is especially apparent in the purchasing effort. Annual expenditures by purchasing departments are estimated in excess of \$2 trillion and are the largest single cost of doing business for a company [12]. The image and status of the purchasing function has been based upon its perceived contribution to corporate performance and to the performance of other departments [4]. Through the 1970's [1] this has often been a second class roll in strategic decision positions [2] even though the purchasing function is responsible for committing 50 to 80 percent of corporate revenues for goods and services [7], [2]. Through their research [4] conclude that purchasing issues and strategies are on par in importance as those traditionally accorded to marketing, finance, or operations. It is recognized that purchasing decisions do impact firm performance and that the acquisition and management of resources impact corporate performance. Recent research is establishing that world-class purchasing practices boost long-term competitiveness and short-term profits [2], [7]. It is the level of capabilities and strategies that determine whether a function is tactical or strategic [4]. Historically, nonpurchasing personnel have viewed the purchasing function as simplistic in roll (support) and not important in corporate performance although recent studies note a shift in corporate practices around the early 1980's [7]. This shift in perception of purchasing from a tactical to one of strategic importance has been documented [20], [12], [1].

At one time, purchasing was viewed as a tactical function within the firm, wherein purchasing managers' chief function was to act as negotiators and trackers of requisitioned items. There are many firms today who still hold that view. Over the past two decades, however, supply management organizations have taken a more prominent role within corporations as the benefits of their efforts have been recognized as driving significant bottom line impact. As has been noted by numerous executives worldwide, the savings dollars generated by driving costs down for materials and services provide a bottom line impact that an increased top line cannot match. This means that for every thousand dollars saved on materials and services, organizations would be required to generate an additional ten thousand dollars of sales, based on a ten percent contribution margin.

As the role of purchasing changed, so did the title used to describe the changing job requirements. The use of purchasing changed to procurement to more fully include a responsibility greater than that of just placing orders. The term “purchasing” fails to describe the activities associated with current materials management requirements [9]. Later the term strategic was added to the title to reflect both the impact on a company’s financial health as well as an alignment of that effort with the company’s competitive priorities. A further evolution of that function has been to the term “Sourcing” and most recently Strategic Sourcing.

Strategic sourcing has been defined as “the process of designing and managing supply networks in line with operational and organizational performance objectives” [14]. A listing of strategic sourcing definitions used in prior research has been compiled by [14], [10]. As past research has focused on different dimensions of strategic sourcing, [10] present a listing of strategic sourcing dimensions identified in prior research. An evolutionary development hierarchy of five stages that a purchasing function might transition through in reaching an integrated and seamless supply chain status was presented by [18].

Strategic sourcing enhances an organization’s performance by “(1) improved ability to achieve strategic goals due to alignment of purchasing strategies with business strategies and (2) improved contribution from purchasing outcomes resulting from increased support that purchasing process receive from being aligned with business strategies” [9]. As companies realign to implement supply chain management practices, strategic sourcing is considered a requirement for the future [3].

Procurement Models

There are two basic models for procurement; centralized and de-centralized. In a de-centralized model, each plant’s or operating entity of the larger company strives to maximize locally its own performance measurement without concern for the larger organization. Decentralized organizations tend to fail to develop higher level skill sets, lack coordination across business units and often cannot challenge purchasing decisions mandated by more powerful functional units like marketing or engineering [2]. In the classic example, each operating entity buys the same item from the same supplier individually, thus incurring repeating acquisition cost and forfeiting any quantity discounts or inventory management schemes.

In a centralized environment, a single element of the organization has control over the purchasing function. Centralized purchasing organizations tend to grow into large bureaucracies [2] with the image of little concern for functional requirements. Benefits of centralization include cost reductions, improvements in the quality and timeliness of services, creation of a high level of buying expertise, streamlining and standardizing the purchasing process, and the benefit from economies of scale. In addition, common items may be warehoused to meet the larger quantity specifications at lower per piece quantity prices in order to have supplies readily available when needed. In an unanticipated result, [4] concluded that as purchasing decisions become more decentralized, the business units performance declines

The major complaint against a centralized system is that it is often perceived as slow when reacting to problems within a particular facility or division. Proponents of decentralization believe that moving responsibility of decisions closer to the source will result in quicker reactions and speedy solutions. A centralized purchasing system also requires one experienced purchasing department, and therefore when initially beginning a centralized system, many purchasing jobs must be cut.

A third type of organization that is gaining acceptance is that of a center-led organization [16]. This organization structure uses a small but high-powered purchasing group as a nucleus and lower level purchasing activities placed within the operating units.

As the number of outsourced items grows, corporate attention focuses on cost and this focus reinforces the idea of centralized sourcing. The use of outsourcing as a strategic issue and risk companies are exposed to should they outsource a core competency was investigated by [15]. They found that few companies out-sourced their procurement function and that most respondents were satisfied with their company's procurement efforts.

Strategic Sourcing Objectives

1. Provide Business Collaboration

When large corporations work to aggregate spend to increase their leverage or buying power, this is generally accomplished by pooling buying from multiple locations and sometimes multiple divisions within a corporation. This is no easy task since most divisions generally like to work independently of one another. With this factor, these divisional entities behave differently and have different needs. If there is an opportunity to aggregate spend and create a solution that fits all areas of the business, one must be able to have all parties agree to the strategy. This process is not simple and requires supply management professionals that are adept at creating a collaborative approach among the parties. The process simply includes bringing influential people within the business groups together to define sourcing strategies. This can be a daunting task if the locations are not geographically near each other or the people have significantly different needs. By using some techniques discussed later, a sourcing person will have more success in this process.

2. Create a disciplined and consistent approach to strategic sourcing.

This is especially important in large organizations or those companies that are involved with governmental procurement contracts which require those contracted with it to follow strict procurement guidelines. The consistency of approach benefits large corporations in many ways. One benefit is to ensure its sourcing agents do not commit the company dollars to suppliers that are not a good fit for the business. This means that suppliers must have a cultural, technological, structural fit that meets the overall objectives of the buying organization. If the supplier does not provide products and services that match the needs of the buying organization, then committing to a long term contract to this supplier will waste important time and financial resources on an ineffective supplier.

The supplying organization must be a cultural fit to the buying organization if the contract is substantial and requires significant resource sharing between companies. Many companies try to do business together only to be bogged down by clashing personalities from all levels of the organizations. An example of this would be if a supply management professional negotiated a two million dollar annual savings to buy office supplies with a supplier but the buying locations would not buy from this new supplier due to service issues or personality clashes between sales and the user communities. While the potential savings are staggering, if the buying organization does not buy from this new source, the savings will not be realized. Finally, if the supplier is not structured to manage the needs of a buying organization, then the buying organization may not be able to meet its basic needs and will not continue to do business.

3. Create Additional Competitive Tension in the Marketplace

A key measure of a sourcing organization's ability to perform well is how they create competitive tension in the marketplace. In other words, does the buying organization have the ability to make those suppliers in the market feel as if the products or services they wish to buy have substantial value to those able to offer them a solution and that there are many willing to participate to "win" the business? When a sourcing organization can effectively drive a feeling among the available suppliers that the business is valuable and needed, then the suppliers will work hard to win the business. Many times this means they will offer improved terms, reduced lead times, additional technical support, and of course lower pricing. Overall, this creates additional value to the buying organization and reduces the overall cost of the products and/or services. Again, this cost savings goes to the bottom line of the buying organization. An example of a creative sourcing organization might be to create a competitive reverse auction when there are only two suppliers bidding for the business. This is difficult given most suppliers are knowledgeable of their competition and should understand there is only one competitor working against them.

4. Increase Overall Savings Contribution to the Organization

The bottom line is that strategic sourcing groups are chartered to drive savings to the corporation by driving down product and services costs. This is a simple concept although the group must be sound with their approach if they will be successful in maximizing the benefits of the actions. Any sourcing person can save money, but only the best can create a buyer supplier relationship that provides the minimum cost for a product or service and derives the greatest value out of the relationship. Sound sourcing processes help facilitate this.

The Transformation Process

An extensive overview of tactical and strategic sourcing has been presented by [13]. They also note that there are distinct differences between tactical and strategic purchasing and that for best results, each has to be managed differently. The importance of strategic fit between supply chain strategies and competitive strategies was presented by [5]. A method for segmentation the supplier base to assist in the identification of tactical and strategic suppliers is presented by [6]. Strategic fit has been discussed strategic management of products or suppliers but not towards the function as a whole [22].

From their research [9] describe a thirteen step process for transitioning from a traditional procurement function to a corporate strategic sourcing perspective. Slaight [19] describes a seven step sourcing process consisting of; Internal assessment, Market assessment, Supplier information, Develop a sourcing strategy, Solicit/evaluate bids, Negotiate/select suppliers and Implement recommendations. Using these steps, the sourcing manager or team, measures and reports results, captures learning from the project and assures compliance. This work addresses itself essentially to a single facility with multiple operating departments. Both perspectives require that the firm first recognize that sourcing/procurement can be a critical business success factor. Virolainen [22] presents a framework for developing an integrated procurement strategy that involves five phases that attempts to integrate corporate strategy with the functional activities.

A survey methodology was used by [17] to assess the impact of Interorganizational Systems (IOS) on sourcing leverage and process efficiency. They found that IOS Breadth significantly impacted Sourcing Leverage. IOS Breadth was measured by the number of suppliers the firm had electronic linkages with and/or the number of suppliers with whom the firm routinely interacted. They further reported that an integrated IOS improves process efficiency. One of the factors useful in measuring the degree of integration of an IOS is Internal Integration. The major thrust

of our paper is to present a methodology for improving both the interaction with suppliers and the degree of information sharing within a multiple facility firm.

Ghodsypour and O'Brien [8] present a model combining linear programming with an analytical hierarchy process for selecting suppliers and determining purchase quantities. We note that it should be relatively easy to incorporate an analytical hierarchy process within the process described in our work. Prior research has cited the potential advantages of a closely linked supply chain process built upon well structured and tiered supplier relationships similar to that of the Japanese Keiretsu relationships. Although this works well for Japanese companies, it is illegal in the United States due to antitrust laws. The question then becomes, "How do we erect an efficient procurement function that supports the company's competitive strategy that also gains competitive advantage through supplier relationships?"

What is missing from the literature is a method, model, or framework that companies can follow and customize to their environment that will help to ensure that tactical needs of decentralized operating units will be provided as purchasing moves to a strategic sourcing perspective to contribute to a corporate competitive strategy. A method to move procurement in this direction is presented in our gateway model.

The Strategic Sourcing Process

The proposed Strategic Sourcing process is a 5-step process that ensures business objectives and targeted benefits are met. Since communication is a key success element, we propose a series of "Gateways" to ensure that all stakeholders are in agreement at certain key times. A second, often overlooked but necessary function of the process, is to ensure that the results of each of the sourcing projects are distributed to the buying locations the corporation.

Step 1. Analyze

The Analyze phase of our sourcing process includes gaining external market knowledge, establishing an internal sourcing team, deep data analysis of past supplier performance, extensive discussions with business people to understand current needs, and segmentation of the supply base. This process may take a significant period of time for a sourcing agent to complete, however, the benefits of understanding the marketplace and competitive forces is tremendous. Because this process may take a significant period of time, sourcing agents may begin this process as early as 6 months prior to creating a formal strategy. We strongly recommend that the organization appoint a Sourcing professional to spearhead this and other steps in the process. The Sourcing professional will begin the process by doing a thorough analysis of external market conditions, supplier performance, and business need, guided by a Market Research checklist. As the process develops, an understanding of opportunity is developed and the need for a collaborative sourcing team is recognized.

Led by the Sourcing professional, the sourcing team is comprised of representatives from across the business organization. Supply Management works with the heads of the business units to nominate the people they want to participate on the sourcing team. Expanding the information previously developed by the Sourcing Professional, the team develops a recommendation on how to proceed with the sourcing process, including the negotiation strategy and expected deliverables from the negotiation. Input by the cross-functional team is one of the most important elements of the sourcing process as having the stakeholder buy-in to strategies help facilitate common goals and increased compliance. Overall, strategies are more likely to be successful if they are created by key stakeholders within the organization.

The Sourcing Professional will review the information and recommendation developed by the Sourcing team with his/her manager and gain agreement on strategy, timing, and expected benefits. This is considered the first Gateway in the process. A Gateway is a scheduled stopping point in the process to ensure that all parties are in agreement with strategies before the project moves forward.

Utilizing a strategic plan template, which is a template that is a synthesis of answers to questions a sourcing team must answer to ensure a thorough investigation of the spend category, the Sourcing professional will document the information and recommendation learned in the Analyze step and will request a Gateway review. To ensure all of the steps have been adequately covered in advance of the Gateway review, the Sourcing professional will utilize an “Analyze Phase Completion Checklist” and will meet with the Sourcing Process Improvement Leader.

Step 2. Recommend

The intent of the Recommend step is approval of the sourcing strategy developed during the Analyze step and a commitment of resources by the right business leaders. The Gateway review should include the vice-president, Corporate Supply Management, and his staff. Normally, it also includes the leaders of the larger business units affected by the specific sourcing initiative.

During the Gateway review the Sourcing team will present market information, supplier segmentation information, and recommendation on negotiation strategy, along with expected deliverables from the effort, using a Strategic Plan template. The Gateway Steering team (comprised of the management team mentioned previously) will ask questions to assess comprehensiveness of the recommendation and will eventually agree to the recommendation. Ensuring the business leaders are at this Gateway meeting increases their understanding of the supplier strategies, and includes a commitment to provide resources to make the process happen.

GATEWAY 1: Flow chart 1 here

Step 3. Select

The intent of the Select step is effective negotiations and selection of the right supplier to fulfill business needs. In this step the sourcing team communicates the sourcing strategy more broadly throughout the business, and stresses the need for the business to speak with one voice. Special effort is taken to reduce the opportunities for a supplier to use contacts within the firm to gain inside information and reduce market competition. Instead, the team identifies disciplined communication strategies for suppliers to ensure they are aware of the need to ‘give their best offer’ or potentially lose the business. This supports the increased competitive tension aspect of the sourcing process. In some cases, the business has a valued partner which they are working closely with. In this case, the buying organization must instill a desire to provide the lowest cost option otherwise a potential for loss of business could result. This is a complicated process.

At the appropriate time, supplier negotiations occur, either using the appropriate negotiation process, including face to face negotiations or reverse auctions. The Sourcing team negotiates with the supplier to fulfill the deliverable requirement agreed to with the Gateway Steering Team.

After the negotiations are concluded, the Sourcing professional requests another Gateway review with the steering team, where the results of the negotiation are compared with the expected deliverables from the Recommendation step. If the Steering Team is satisfied that the appropriate

negotiations have been completed, the Sourcing team is given approval to agree to the negotiations and select the supplier.

GATEWAY 2: Flow chart 2 here

Step 4. Implement

The intent of the Implement step is to award business to the selected supplier, develop a contract (using a uniform standard contract template) and begin the implementation plan. Detailed communications about the completion of the sourcing Select step are delivered across the organization. Suppliers assist in the development of the implementation plan. The team identifies barriers to any implementation and develops plans to overcome the barriers.

Compliance to the new agreement is developed and sustained by use of specialized reporting done out of the data warehouse. Savings arising from the sourcing project are reviewed, validated and reported by Finance.

Step 5. Manage

GATEWAY 3: Flow chart 3 here

The intent of the Manage step is to ensure continued supplier performance. The sourcing professional will monitor supplier performance, ensure all contract deliverables are met, host a regular business review with supplier management, be aware of the financial stability of the supplier, and will explore any new appropriate offerings in the marketplace. Output from the Manage step is input for the Analyze step as the process is re-created near contract completion.

CONCLUSIONS

The strategic sourcing process is managed uniquely within each company although many include some of the basic elements included in this study. Through a review of the purchasing and supply chain literature, we have attempted to present a method or framework that allows for companies to gain the benefits of a centralized procurement model, supplier reduction, volume reduction, spend aggregation, and yet avoid the perceived disadvantages of a centralized procurement model, slow response to functional units. Some of the key elements of this process are process discipline, stakeholder participation and support, and a project manager capable of creating a collaborative environment. With these key elements, an organization can drive considerable cost savings initiatives throughout the organization.

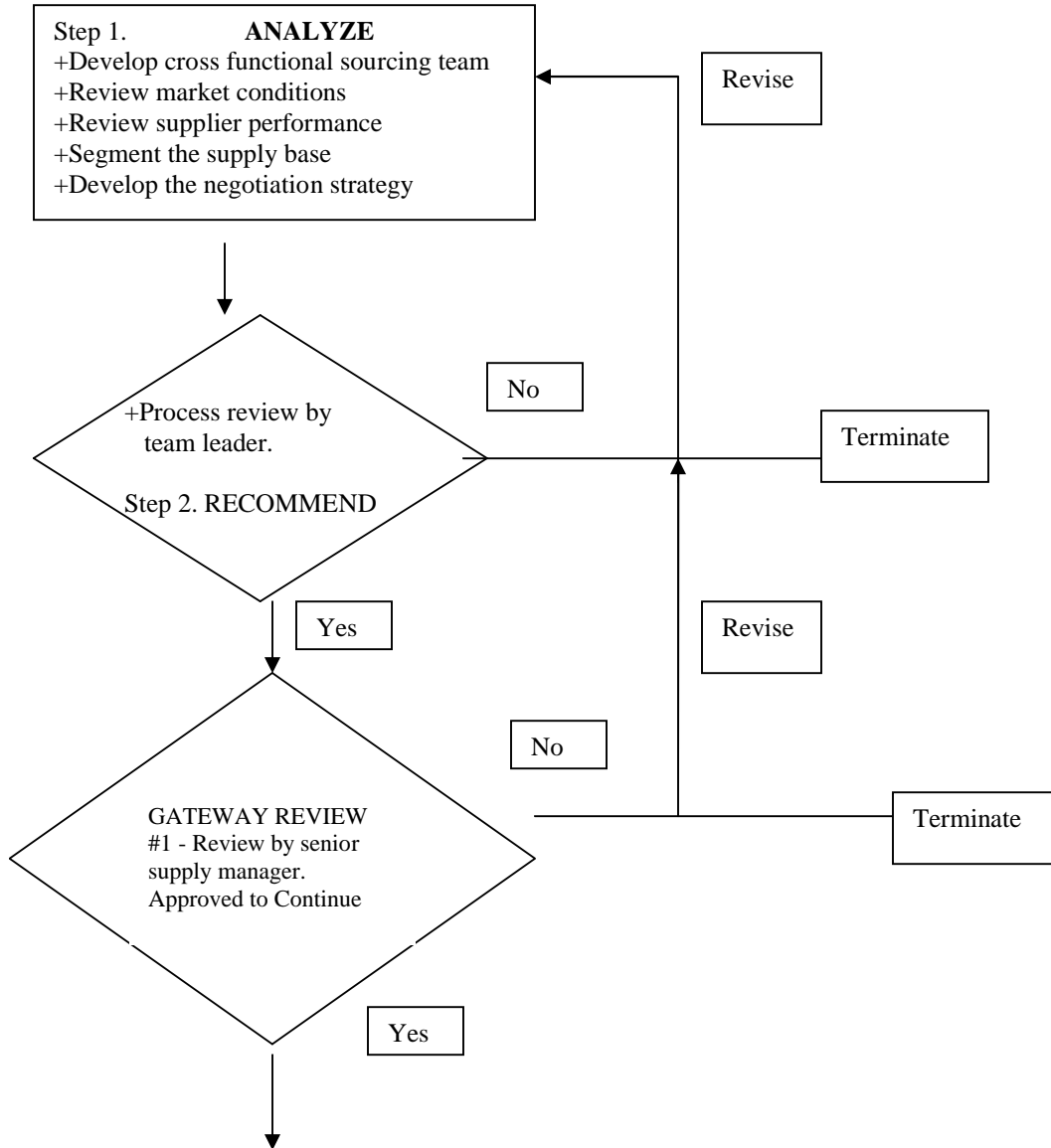
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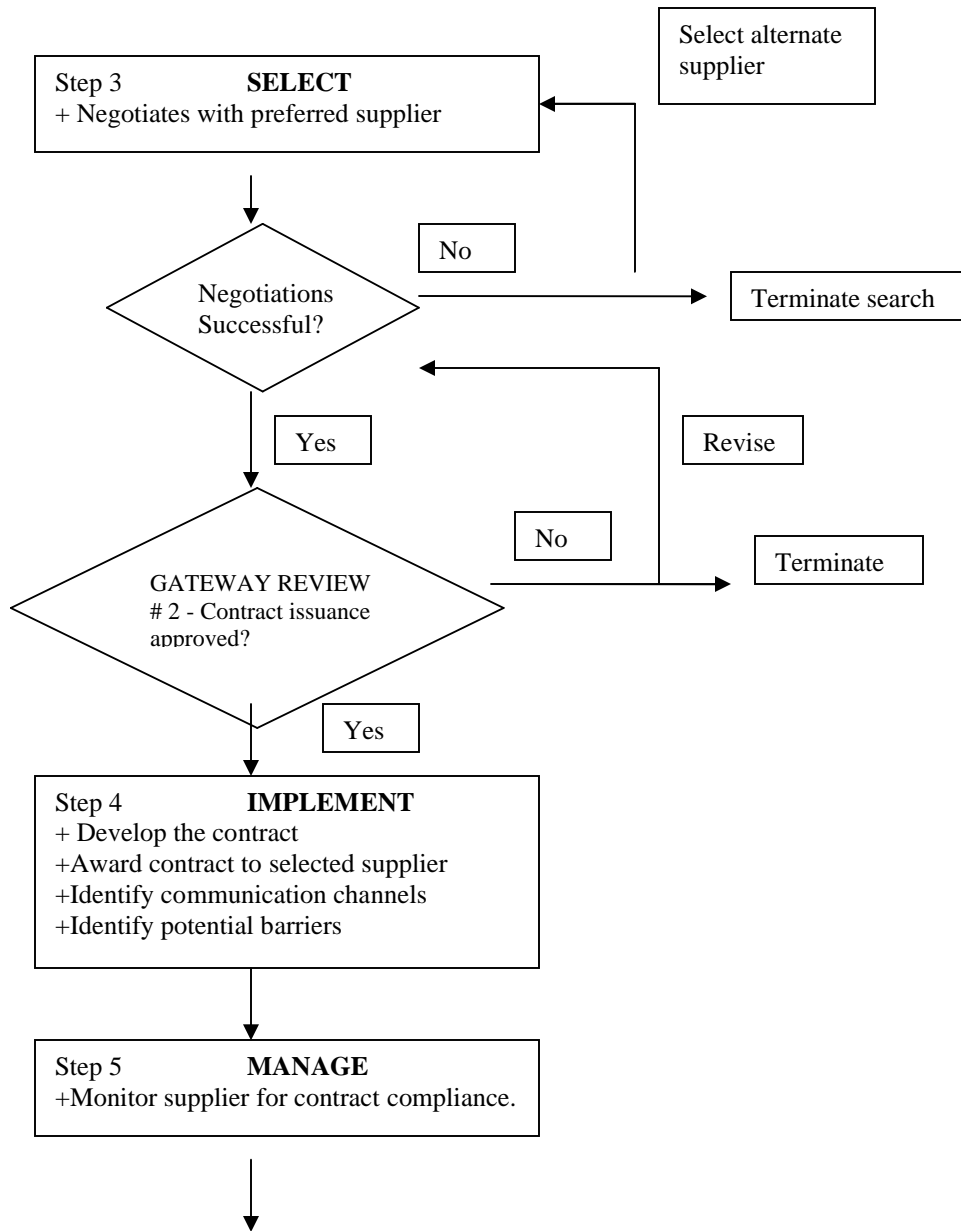
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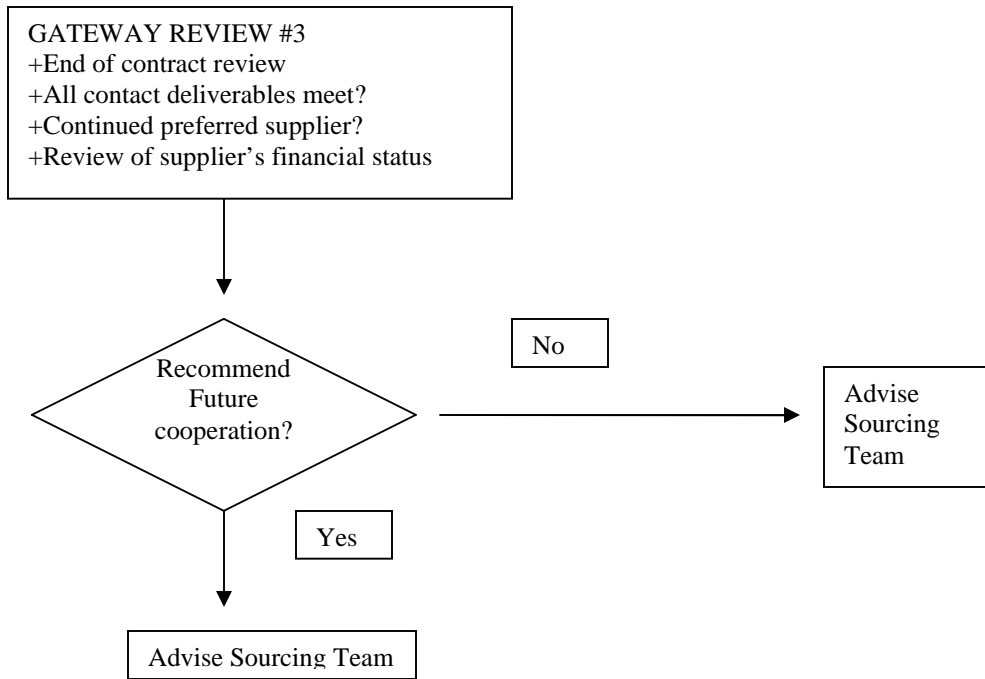
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Appendix A

Gateway Model;







UNIVERSITY STUDENTS' PERCEPTIONS OF TWO COUNTRIES: TURKEY AND U.S.A.

Norman V. Schnurr, Associate Professor of Marketing, Robert Morris University, Pittsburgh, Pennsylvania, U.S.A

Selime Sezgin, Ph.D., Director the Institute of Social Sciences, Bahcesehir University, Istanbul, Turkey.

Gulberk Gultekin Salman, Graduate Assistant, Ph.D. candidate, Istanbul, Turkey.

ABSTRACT

This study was generated to understand how Turkish university students perceive their country and the U.S.A. and how U.S.A. university students perceive their country and Turkey. Perceptions are people's realities. They use their perceptions to make decisions, form opinions and behave based on them. Perceptions may have tremendous impacts on the economic and political future relations for both countries. The paper was conceived and conducted by university faculty from both Turkey (Bahcesehir University, Istanbul Turkey) and the U.S.A. (Robert Morris University, Pittsburgh, PA). The authors would like to thank their colleagues who had their students complete the surveys.

PURPOSE

Bahcesehir University (BU), Istanbul, Turkey and Robert Morris University (RMU), Pittsburgh, Pennsylvania, U.S.A. have a study abroad agreement. During the several years since this agreement had been in effect, BU students have studied at RMU but no RMU students have opted to study at BU. The hypothesis is that RMU students' perception of Turkey is significantly different from that of BU students. The perceptions of Turkey and the U.S.A. for students at both RMU and BU will be evaluated.

Additional purposes of the study:

- To delineate the information by BU versus RMU students, and
- To isolate why "people" may not travel to the others' country
- To further examine if perceptions by males versus females at each university differ.

Transforming US Army Supply Chains: An Analytical Architecture for Management Innovation

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I. Multi-stage Analysis of Systemic Challenges: A Summary

Conceptual Approach: Multi-Stage Logistics Model

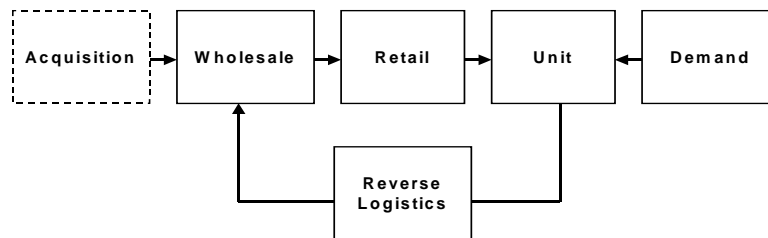


Figure 1

The US Army's logistics enterprise is truly enormous in scale and scope. However, it is not merely the size and complexity of the supply chain that causes difficulty, but rather the structure and policies within the system that are the root cause of persistent problems. Army aviation logistics has especially suffered from several disorders which are both systemic and chronic. This research project has previously illuminated these problems using inventory management theory, supply chain principles, and logistics systems analysis as key sources of diagnostic power. To summarize generally, these causal disorders and their respective effects include:

(1) lack of an aviation readiness production function which induces both uncertainty and variability at the point of consumption in the supply chain resulting in inappropriate planning, improper budgeting, and inadequate management to achieve readiness objectives;

(2) limited understanding of mission-based, operational demands and associated spares consumption patterns which contribute to poor operational and tactical support planning and cost-ineffective retail stock policy;

(3) failure to optimize retail stock policy to achieve cost-efficient readiness (customer) objectives which results in inefficient procurement and reduced readiness;

(4) failure to proactively synchronize and manage reverse logistics which contributes significantly to increased DLR RO, excess inventory, and increased delay times (order fulfillment) with reduced readiness;

(5) inadequately organized depot repair operations that may be creating a growing gap in essential repair capacity while simultaneously precluding the enormous potential benefits of a synchronized, closed-loop supply chain for DLRs;

(6) limited visibility into and management control over disjointed and disconnected OEM and key supplier procurement programs which are vulnerable to boom and bust cycles with extremely long lead times, high price volatility for aerospace steels and alloys, and increasing business risk to crucial, unique vendors in the industrial base resulting in diminishing manufacturing sources of materiel supplies, and growing obsolescence challenges for aging aircraft fleets;

(7) independently operating, uncoordinated and unsynchronized stages within the supply chain creating pernicious “bullwhip” effects including large RO, long lead times, and declining readiness;

(8) fragmented data processes and inappropriate supply chain MOEs focusing on interface metrics which mask the effects of efficient and effective alternatives, and further preclude an ability to determine “readiness return on net assets” or to relate resource investment levels to readiness outcomes;

(9) lack of central supply chain management and supporting analytical capacity results in multi-agency, consensus-driven, bureaucratic “solutions” hindered by lack of an Army supply chain management science and an enabling “analytical architecture” to guide Logistics Transformation; and

(10) lack of an “engine for innovation” to accelerate then sustain continual improvement for a learning organization.

The existing aviation logistics structure is indeed vulnerable to the supply chain “bullwhip”. While endless remedies have been adopted over the years to address visibly apparent symptoms, the fundamental underlying disease has not been adequately diagnosed or treated, much less cured. Now, better understanding these underlying causes of failure, a new approach to logistics management is required for the US Army.

The analytical challenge is to conquer unpredictability: to better understand then attack the root causes of variability and uncertainty within each stage and their collective contributions to volatility across the system of stages – the “bullwhip effect”. Analysis clearly reveals that inventory investment levels can be significantly reduced while maintaining or improving performance (e.g., readiness) simply by linking stock policies to the sources of uncertainty and inefficiency that require inventory in the first place. However, to reduce the impact of this variability, some of which is unpredictable but much *is predictable*, supply chain managers must understand their sources and the magnitude of their impact. By improving demand forecasting and reducing supply-side variability and inefficiencies within each of the stages, logistics system performance is moving toward an efficient frontier in the cost-availability trade space.

The first step in suppressing the bullwhip effect is to isolate, detect and quantify these inefficiencies within each stage and their respective contributions to AMC system-wide aggregate inventory requirement objectives (RO). The next step is to use this knowledge to drive inventory policy. Since Army inventories are managed to these computed ROs, reducing the value of the RO is critical to eliminating unnecessary inventory. As prescriptions for improved performance recommended by this project are implemented in each of the stages, their respective contributions to reducing RO - while sustaining or actually improving readiness performance - can be measured, compared and assessed within a rational cost-performance framework (figure 2).

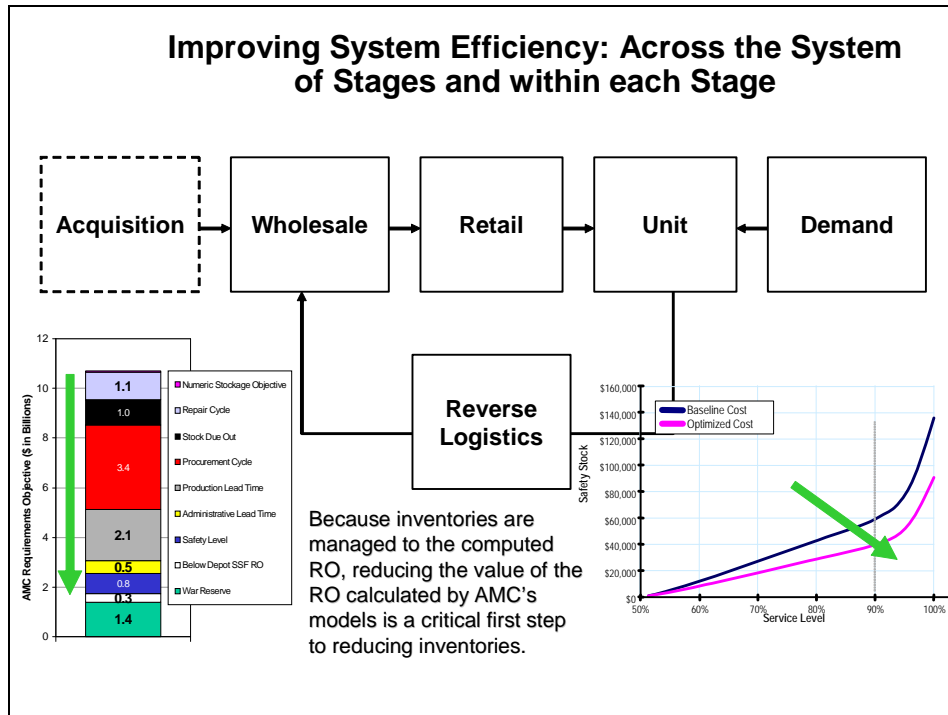


Figure 2

In general, these various contributions to aggregate system-wide RO - induced by the “bullwhip” effect - can be isolated, quantified, then systematically reduced by understanding and attacking root causes: reducing demand uncertainty by adopting empirically-derived, mission-based demand forecasting; reducing supply-side lead times (for all components that contribute to higher RO including administrative, procurement, retrograde and repair cycle times) and their associated variability; and improving order fulfillment while reducing backorders and requisition wait times by implementing RBS, inventory pooling, and ultimately, tactical-level demand driven supply networks.

An especially compelling and urgent need, and also one with lucrative potential benefits (so-called “low hanging fruit”), is the reverse pipeline: as retrograde operations become more responsive and contribute to a synchronized closed-loop supply chain, it becomes possible to reduce RO and safety stock for specific DLRs while simultaneously reducing backorders and *increasing readiness (Ao)*. As these efforts are systematically pursued, the logistics system becomes more efficient: RO (safety stock, etc.) is reduced while performance (backorders and Ao) is increased, thereby moving toward the “efficient frontier” in the spares investment-readiness performance trade space (figure 3).

Achieving “Efficiency” in the Cost - Availability Trade Space

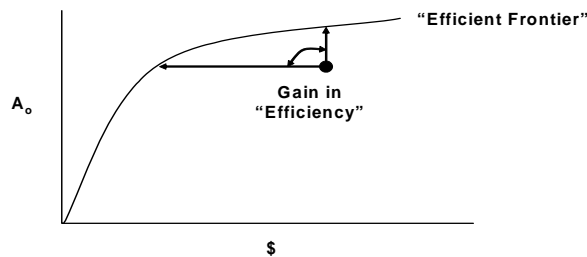


Figure 3

II. Multi-stage Integration for Efficiency, Resilience and Effectiveness

Although its recognition provides important insight into Army logistics, merely acknowledging that the aviation supply chain is vulnerable to the “bullwhip” does not, of course, automatically solve the problem. Simply recognizing that these conditions exist does not guarantee that needed changes will actually be made. However, these persistent effects can be avoided if long term organizational behavior and management processes are addressed.

In addition to reducing demand uncertainty, identifying the causes and reducing the effects of supply and demand variability within each of the logistics stages, the stages must also be “integrated” - linked together in meaningful ways – in order to enable credible cause and effect relationships to be identified among new initiatives, Department of the Army resource allocation investment levels, and readiness-oriented tactical outcomes.

Complex challenges typically require an analytical approach where the problem is systematically broken down into smaller, more manageable models based on process, function, organization, etc. This component-based modeling approach, in which the pieces of a complex problem are modeled as segments, must then be complemented with an integrating modeling effort – “synthesis” – where the segments are then incorporated into a parent model that represents the broader scope of the original challenge. Although component-based analysis provides great insight into sources of uncertainty and variability, we must guard against treating the entire logistics enterprise merely as an aggregation of its component parts that can be improved independent of one another. The historical record suggests that many of the “panaceas, fads, and quick fixes” that operate under the guise of innovative management approaches are likely to fail because they are fundamentally “anti-systemic”.

A. Achieving Efficiency: An Integrated Multi-Echelon Inventory Solution

One of AMC’s most challenging functions is the requirement to position and effectively manage a large, globally-distributed inventory with millions of parts in hundreds of locations. The challenge is further magnified since these geographic locations are situated in different tiers, or

echelons, of the supply chain. One of the major difficulties in managing this enormous multi-echelon network is achieving an enterprise-wide inventory optimization solution. Multi-echelon inventory optimization is difficult for at least two reasons: replenishment policies are applied to a particular echelon without regard to the impact of that policy on other echelons (“sub-optimizing” within independent stages of the supply chain); and higher-echelon (in this case, wholesale stage) replenishment decisions tend to be based on specious, uncertain or unreliable demand forecasts.

Visualizing this complexity using a set of hierarchies is useful. A “geographic hierarchy” addresses the question of “where” spares and repair parts should be deployed across multi-echelon, global supply chains. A “product hierarchy” exploits the multi-indentured nature of major assemblies and subassemblies, such as aircraft turbine engines, addressing “which” specific parts should be placed within the various echelons of the geographic hierarchy. And a “planning horizon hierarchy” addresses the question of “when” parts will be needed since demand is triggered by events that are highly uncertain, yielding demand patterns that are both probabilistic, and dynamic – hence stochastic processes.

This demand uncertainty cannot be completely eliminated through forecasting, yet increasing inventory to buffer this uncertainty is costly. This phenomenon results in a classic risk management challenge. Failure to achieve an integrated solution results in several inefficiencies and degraded performance:

- the supply network carries excess inventory as redundant safety stock;
- customers face shortages even when inventory exists elsewhere in the network;
- shortfalls and backorders occur yet interface metrics between echelons (e.g., fill rates and safety level) appear to be acceptable;
- upstream suppliers receive distorted and delayed demand projections and cannot deliver reliable performance;
- and short-sided internal allocation decisions are made for parts with limited availability.

Commercial enterprises characterized as “multi-echelon” have typically used one of two approaches to address this inventory positioning challenge: a sequential application of the single echelon approach; or, more recently, distribution requirements planning (DRP), an extension of materials requirements planning (MRP) used in manufacturing. Both approaches (figure 4), however, result in excessive inventory without necessarily improving performance levels. This occurs because an optimal solution for the entire network has not been achieved: total inventory has not been minimized subject to an outcome-oriented result such as customer service performance objectives. Inefficiencies occur due to lack of visibility both up and down the supply chain: the retail stage has no visibility of the wholesale stage inventory balance, and wholesale lacks visibility into retail demand.

Independent demand forecasts among the stages result in greater demand variation between them - the “bullwhip” effect - leading to bloated but undifferentiated inventory levels, especially at wholesale. Furthermore, total network costs are difficult to assess, and the enterprise-wide implications of new initiatives or strategies cannot be accurately evaluated since this sequential approach can only focus on their impact one stage at a time. Similarly, DRP, which uses a deterministic approach, cannot rigorously compute safety stock for the wholesale stage since retail stage demand variability has not been incorporated. As with the sequential approach, there is no linkage between safety stocks in the two stages.

Multi-Stage Integration Options

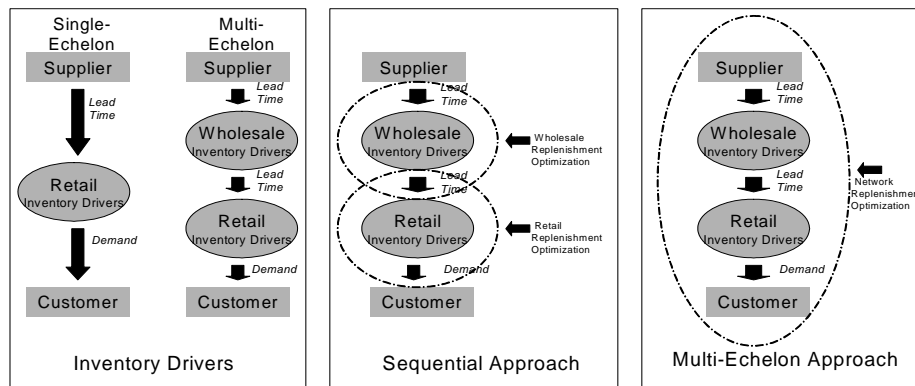


Figure 4

In complex supply chains, then, a recurring management challenge is determining where, and in what quantities, to hold safety stock in a network to protect against variability and to ensure that target customer service levels are met. In an effort to improve supply chain efficiency, an appreciation for the interdependencies of the various stages is required in order to fully understand how inventory management decisions in one particular stage or location impact other stages throughout the supply chain.

For military and aerospace logistics systems, optimizing these decisions requires a decision support system that captures multi-echelon, multi-item, multi-indenture interactions and also the dynamics of the reverse flows for reparable components. Such a decision support system must also be linked to the various supply information transaction, depot repair and overhaul, and long term planning systems that affect the overall responsiveness, support adequacy, and capacity of the fleet supply chain enterprise – the “readiness” of the entire, globally-dispersed logistics support system. These supporting management systems include maintenance, repair and overhaul scheduling, procurement and order fulfillment, asset visibility, and transportation support.

Consequently, an integrated, multi-echelon network, if achievable, offers several opportunities for supply chain efficiency:

- multiple, independent forecasts in each of the stages are avoided;
- variability in both demand and lead time (supply) can be accounted for;
- the “bullwhip” effect can be observed, monitored, and managed;
- its various root causes can be identified and their effects measured, corrected and tracked;
- common visibility across the supply chain stages reduces uncertainty, improving demand forecasting and inventory requirements planning;
- order cycles can be synchronized (this has special significance for DLRs in the retrograde and depot repair stages);
- differentiated service levels (e.g., Ao targets for different units) can be accommodated;
- and action can be taken to reduce unnecessary inventory and operational costs while simultaneously improving readiness-oriented performance [1].

Although the calculations to incorporate key variables, their relationships, and associated costs are certainly not trivial, they can nonetheless be performed using advanced analytic methods, including RBS optimization methods mentioned previously and described in greater detail below. Improved results are then possible and the organization can have far greater confidence that it is operating closer to the efficient frontier within an investment-performance trade space (see figure 5 for a comparison of these approaches).

Multi-Stage Optimization Advantages

KEY AREAS	SEQUENTIAL APPROACH	DRP APPROACH	TRUE MULTI-ECHELON APPROACH
	Optimization Objective	Meet immediate customer's (RDC or DC) service goals at minimum inventory; suboptimal for network	Not optimization; objective is to provide net requirements upstream to determine replenishment needs
Demand Forecasting	Independent forecasts in each echelon based on immediate customer's demands	Pass-up demands or projected orders with no measures of their variabilities	Forecasts based on lowest echelon's primary demand signals and other information; demand variations also are forecasted
Lead Times	Uses immediate suppliers' lead times and lead time variabilities	Uses immediate suppliers' lead times; ignores variabilities	Uses all lead times and lead time variations of upstream suppliers
Bullwhip Effects	Ignored	Ignored	Effects measured and accounted for in overall replenishment strategy
Network Visibility	<i>Immediate</i> downstream customers' demands and <i>immediate</i> upstream suppliers' lead times- <i>myopic</i> view of the network	Some downstream visibility; no upstream visibility	All echelons have complete visibility into other echelons; this visibility is exploited in the replenishment logic
Order Synchronization Between Echelons	Ignored	Maybe, probably not	Fully modeled to reduce unnecessary lags in network
Differentiated Customer Service	Not possible	Not possible	Achievable, as orders out of a higher echelon location to a lower echelon are fully controllable; allocation schemes using set-aside inventories can be used
Cost Implications Between Echelons	Not possible	Not possible	Fully modeled so true network optimization can be achieved

Figure 5

Within DoD and its supporting FFRDCs, the mathematical theory for multi-echelon, multi-indenture, multi-item optimization supporting military inventory systems has been developed and refined over recent decades. Much of this pioneering theoretical work, primarily focusing on ground-based land combat systems, was accomplished by scientists and mathematicians at the Army Inventory Research Office (IRO) in Philadelphia. However, IRO was abolished in the early 1990s as part of the post-Cold War drawdown and much of the original talent at IRO has retired or been reassigned to other organizations.

For military aircraft it has also been demonstrated that DLRs most directly relate to aircraft performance and, in general, minimizing the sum of DLR backorders is equivalent to maximizing aircraft availability [2]. Significant effort has also been placed on determining optimal stock levels and locations for reparable components in a multi-echelon system. While the subsequent extension of this theory has been widespread [3], the focus of practical implementation within DoD has been on fixed-wing aircraft in the Navy and the Air Force rather than rotary wing aircraft in the Army (figure 6).

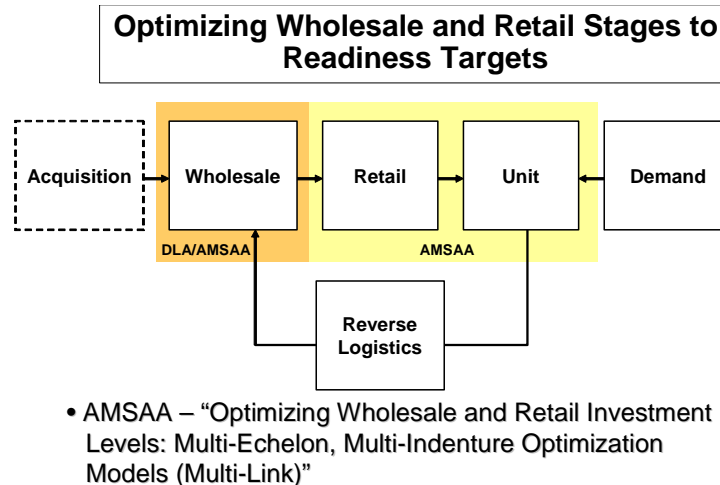


Figure 6

Another structural constraint which previously precluded an integrated multi-echelon approach for Army supply systems was the existence of separate stock funds used by the Army financial management system for retail and wholesale operations. In recent years, however, these separate funds have been combined into one “revolving fund”, the “Single Stock Fund” (SSF) within the Army Working Capital Fund (AWCF). In theory, this should both facilitate and encourage adoption of an integrated multi-echelon approach. For example, in AMCOM’s case, the wholesale stage now has both visibility into the retail stage and more control over stock policy in the wholesale *and* retail stages, which it previously did not have for aviation and missile Class IX. Upon achieving milestone III for the SSF program, it becomes possible for AMC to incorporate a multi-echelon optimization model and enable wholesale stock levels, *in addition to retail RBS solutions*, to be directly related to readiness (Ao) (figure 7).

However, in practice so far, although AMC “owns” these retail stocks under this new SSF policy, ASL and SSA stocks are still being “managed” by retail organizations as in the past.

Consequently, if the SSF policy implementation is not complemented with business process re-engineering, including multi-echelon, multi-item, multi-indenture optimization methods, then the full potential of SSF will not be realized.

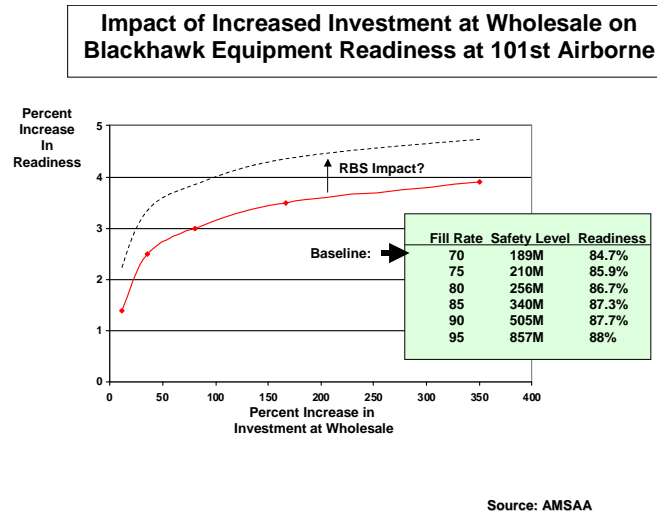


Figure 7

It is not possible to truly “optimize” performance output from large scale, complex systems if they have not first been “integrated”. The key integrating enabler for improved efficiency in all Army weapon system supply chains – and the more complex the system, the more crucial the enabler - is multi-echelon readiness based sparing. Indeed, this is a *precondition* for Army Logistics Transformation.

B. Designing for Resilience: Adaptive Logistics Network Concepts

The intent is certainly *not* to blindly adopt the latest management “fad” inundating the corporate world but rather to consider adapting proven concepts to the unique needs and challenges the Army now faces. For example, the idea of “integration”, when achieved by reducing slack or “waste” in the system, does not necessarily enable greater flexibility. The opposite result could occur with “just-in-time” methods. Lean manufacturing concepts have certainly helped firms to become more competitive through the application of “just-in-time” principles which exchange “industrial age” mass for “information age” velocity. And many of the original lean manufacturing concepts, especially the focus on reducing “stagnant” work-in-progress inventory, have been successfully adapted for supply chain management (SCM) across the entire enterprise.

Nonetheless, “just-in-time” manufacturing concepts, although a powerful inventory reduction method, need stable, predictable supply chains for maximum efficiency. Even when enabled by IT, “lean” supply chains can be fragile, vulnerable to disruption, and unable to meet surge requirements needed to accommodate an immediate increase in demand. In fact, recent official documents describe exactly such a condition for Army logistics in recent years. Under greater duress and the compounding stress of ongoing wars, the military logistics system has indeed resulted in “a lean supply chain without the benefit of either an improved distribution system or an enhanced information system” [4].

A more appropriate analogy for Army logistics is a flexible, robust logistics “network”; not a serial “chain” or hierarchical arborescence (figure 8), but rather a network “web” - as in spider web - which is then enabled by a strong analytical foundation with supporting information technology to achieve an integrated, flexible, efficient and effective logistics capability.

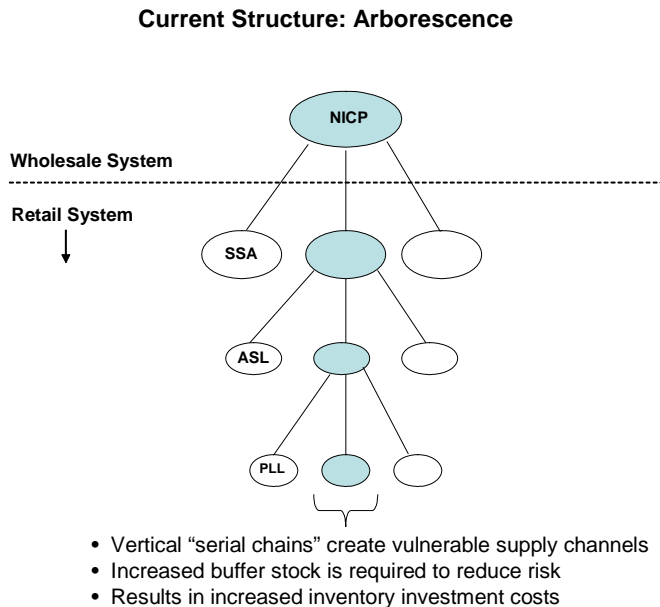


Figure 8

These adaptive network concepts are driven by an overarching DoD “Transformation” program coordinated by the OSD Office of Force Transformation (OFT). For logistics, which is one of six major battlespace functional area groupings (others are fire, maneuver, protection, C3 and ISR), this visionary adaptive enterprise capability is referred to as “Sense and Respond Logistics” (S&RL) [5]. The basic foundational theory for S&RL is derived from the autonomous nervous system in biological systems which, in conjunction with the sensory perceptions of sight, smell, taste, hearing and feeling, enable reactive and anticipatory protective responses to be taken.

This S&RL concept builds upon IBM’s “autonomic computing initiative” in which machines use on-board diagnostic sensors to assess and monitor system “health”, forecast and predict system and component level failure using prognostics, then employ automatic identification technologies to alert maintenance and logistics managers and engineers to developing problems even before they become visible. S&RL then further extends this “autonomic logistics” platform-level concept to the larger logistics support network thereby providing the capacity to predict, anticipate and coordinate logistics support wherever and whenever it is needed across the battlespace. Conceptual documents currently describe S&RL as a “network-centric, knowledge-driven, highly adaptive, self-synchronizing, dynamic and physical functional process [which] achieves ‘effects-based’ operations and provides a precise, highly agile, end-to-end, point-of-effect to source-of-support network of logistics resources and capabilities” [6].

Adaptive network concepts have evolved from pioneering work performed at the Santa Fe Institute [7]. Their research has focused on understanding how immensely complicated networks,

made up of large numbers of interacting “agents” that cooperate and compete, regularly arrange themselves into complex organizations that are efficient, adaptive and resilient even though the various agents are pursuing their own respective self-interests. According to this “complexity theory”, efficient, self-organizing systems like this emerge only at the edge of “chaos”, somewhere between a prescribed rigid order that is unresponsive to new information (including threats) resulting in paralysis, and a system so overloaded with new information that it dissolves into chaos.

The research and subsequent understanding of emergence in self-organizing systems has been rapidly advancing in recent decades, extending originally from cybernetics to incorporate growing knowledge in cognitive science, evolutionary biology, dynamical systems, stochastic processes, computational theory, and culminating now in “complex adaptive systems”.

Complex adaptive systems become self-organizing by responding to external conditions while maintaining an internal integrity that keeps them together and cohesive. This results in a higher level of order that enables the system to adapt in ways that continually benefit its member “agents”. A byproduct of this concept is that it is not possible to accurately predict the future for such a complex adaptive system. Therefore the “best”, or “optimal” solution, cannot be engineered in advance. Research is showing that some of the greatest improvements occur when these self-organizing systems are forced to respond to random or unexpected events, and creative solutions are thereby discovered.

This ambitious vision endeavors to replicate, albeit in a highly accelerated fashion, evolutionary, nonlinear biological concepts characterized by terms such as “versatile”, “adaptive”, “elastic”, “agile”, “robust”, and “resilient”. This approach differs from linear, mechanical engineering system concepts which have been the traditional province of large-scale systems design. For military operations, this “network-centric” future force will be linked and synchronized in time and purpose, allowing dispersed forces to communicate and maneuver independently while sharing a common operating picture. Conceptually, the traditional mandate for overwhelming physical “mass”, in the form of a linear array of land combat forces converging at the decisive place and time, is replaced by attaining comparable “effects” derived from dispersed and disparate forces operating throughout a non-linear battlespace.

Demand Driven Supply Network (DDSN)

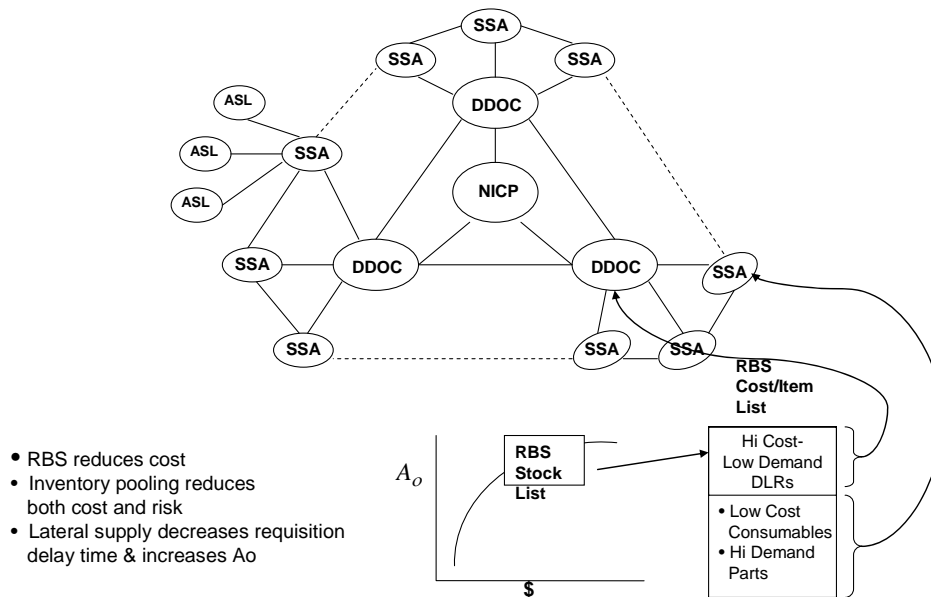


Figure 9

Our ability to logistically support at least some of these concepts, especially the notion of an agile supply network at the theater and tactical levels for Army and joint logistics distribution, may be much closer at hand now than previously recognized. At the tactical level for example, the demand driven supply network (DDSN) described previously, which includes mission-based forecasting on the demand side and RBS, lateral supply and risk-pooling (especially for DLRs) on the supply side, provides the foundational basis for a more agile and resilient network “web” (figure 9).

Through theoretical development corroborated by recent field tests, this DDSN concept has also been shown to attain *both* improved effectiveness (A_o) and, as total asset visibility (TAV) and in-transit visibility (ITV) IT-based technologies are incorporated, increasingly better efficiency [8]. Such a tactical-level DDSN is not only effective and efficient then, but also both resilient and adaptive, enabling a rapid transition away from the traditional hierarchical arborescence structure, which required “mountains of iron” necessary to buffer uncertainty, inefficiencies, and rigidity, toward an adaptive network design consistent with Sense and Respond Logistics.

An example at the theater level pertains to additional aviation repair capacity, currently provided by the ADMRU/AVCRADs concept, needed to sustain overseas operations. Although the conventional view, from an “efficient” supply chain perspective, would be that surplus capacity (“repair capacity” in this case) and inventory (DLR “safety level”) are undesirable, the operational disposition of such additional capacity and inventory is clearly beneficial as a means for creating “agility” and “adaptability” for supply chains that must react quickly to sudden demand shifts due to operational mission requirements or to disruptions of various components within the supply chain.

By applying design principles for supply chain resilience [9], a supply chain operating a large-scale (global), demand-driven (“pull”) system under stable and predictable demand can quickly adapt to support localized (e.g., theater scenario), forecast-driven requirements that may involve considerable uncertainty, but which must be “pushed” by the customer (combat units) to achieve maximum effectiveness (mission Ao in this case). Resilient design concepts include the identification of “push-pull” boundaries separating “base” from “surge” demand using decoupling points for the placement and use of strategic capacity and inventory.

These concepts suggest, first, creating pre-positioned mission-tailored support packages (e.g., ASLs) designed using RBS in conjunction with mission-based forecasting. Or, if not pre-positioned, the same effect could be achieved by “setting aside” small, similarly constructed packages that could be rapidly deployed along with the Army aviation unit similar to the US Marine Corps “fly away element” or the US Air Force “war reserve spares kit”. These tailored mission support packages can then accommodate Class IX replacement needs at deployed locations where existing (e.g., host nation) sustainment is not immediately or readily available. This is an example of defining a “decoupling” point in the existing supply chain and creating additional slack inventory to accommodate a short term surge that the existing logistics supply network infrastructure cannot support.

Second, to accommodate sustained, rather than temporary, higher demand for extended operations (e.g., OIF today), resilient supply chain design principles would suggest creating additional capacity, or relocating existing capacity, closer to the demand source. This strategic supply chain concept shifts “decoupling” points and push-pull boundaries by dynamically changing the supply chain configuration. Hence, the logistics network responds quickly to initially accommodate a short-term need with built-in slack inventory, and then adapts, if and when necessary, by actually changing its configuration to sustain increased longer-term requirements by relocating production (repair) capacity closer to the source of demand. During OIF, AMCOM acted belatedly to achieve the latter by activating, deploying, and now rotating AVCRADs for in-theater repair. However, the former (pre-positioned stock) could not be accomplished since Army aviation assets currently are neither included in pre-positioned stocks or “set aside” as mission-tailored deployable support packages.

In summary, effort for attaining resilience must focus on strategically designing and structuring supply chains to respond to the changing dynamics of globally positioned and engaged forces, conducting different operational missions under a wide range of environmental conditions. Ultimately, this necessitates innovation in supply chain design, implementation, and management.

C. Improving Effectiveness: Pushing the Logistics Performance Envelope

So far, using supply chain concepts and the graphical Army multi-stage logistics model (figure 3), several challenges and opportunities have been isolated and identified both within these several stages and across them. However, “efficient” and “effective” solutions should be explicitly differentiated within the investment-performance, or cost-availability, tradespace. This section clarifies and illuminates these distinctions using the graphical tradespace construct that has been consistently used throughout the book. Then, using additional analytical methods and concepts, the next chapter further endeavors to develop and offer an “analytical architecture” to guide Logistics Transformation for the Army.

Economists commonly make a distinction between efficiency and productivity: efficiency refers to the output achieved from inputs using a given technology, while productivity also encompasses the results of changes in technology. By “efficient” we refer to those methods (whether policies,

techniques, procedures, technologies) which, if adopted, reduce uncertainty and/or variability both within any particular stage as well as across the “system of stages” that comprise the multi-stage logistics enterprise. The results of these methods would have the effect of moving toward the “efficient frontier” in the cost-availability trade space (figure 10). Achieving an “efficient” solution results in operating on the existing efficient frontier and implies the best possible use of existing resources *within the constraints of the current system design and business practices* using existing technology.

Achieving “Efficiency” in the Cost - Availability Trade Space

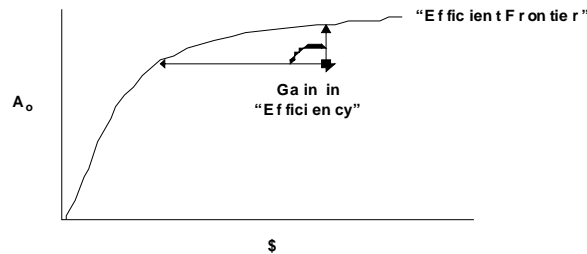


Figure 10

In contrast, a more “effective” (“productive”) method is one which actually shifts the existing efficient frontier representing an improved “operating curve”. This reflects the fact that current business practices have actually changed: new or different technologies are being exploited. Cost benefit analyses can be performed on various initiatives which yield improved, but different results (figure 11). The relative magnitude of each of these cost benefit alternatives, however, is dependent upon knowing the location on the current efficient frontier and, to some extent the expansion trace of the new, improved frontier that results when taking an existing “efficient” operation and, through organizational redesign, business process changes, or other forms of reengineering, creates a more “effective” operation characterized by an improved “operating curve”.

Increasing “Effectiveness” in the Cost -Availability Tradespace

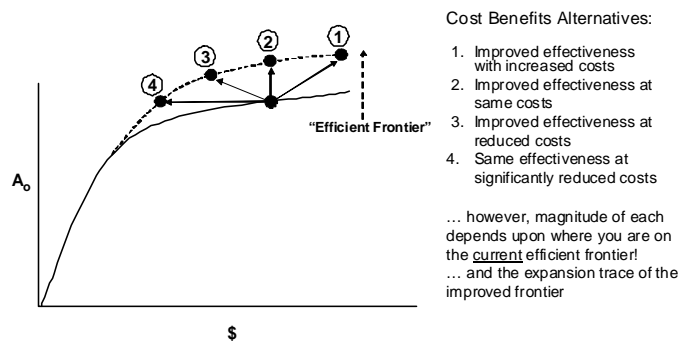


Figure 11

Finally, then, the obvious (graphical) goal to is sustain continual improvement and progress over time through “innovation” in all of its various forms. . . the notion of “pushing the envelope” (figure 12). This is the essence of “productivity gain” and differentiates, in competitive markets, those commercial firms that successfully compete, survive, and flourish over extended periods from those that do not.

For a “noncompetitive” governmental activity an “engine for innovation” is needed to compensate for the lack of competitive marketplace pressures typically driven by consumer demand and customer loyalty. The most obvious such engine for a military organization is imminent or evident failure on the battlefield. Failure in battle, especially if sufficient to cause the loss of a major war, clearly constitutes an “unmet military challenge” which is one of several key historical prerequisites for a “revolution in military affairs” (RMA) [10].

However, the US military, especially the Army, has been extraordinarily successful in recent battle, despite several acknowledged logistics shortcomings and inadequacies. The current issue then is whether or not these very real, persistent and serious logistics inadequacies are sufficiently compelling to warrant the necessary attention, resources, sustained intellectual support and extended commitment required for necessary change.

Indeed, a fundamental question is will, or even *can*, a so-called Logistics Transformation actually occur, especially with the Nation at war?

“Every Army Chief of Staff, Chairman of the Joint Chiefs of Staff, and Secretary of Defense in the last 15 years has stated unequivocally that a true transformation of the US Army cannot occur without significantly changing the way we conduct logistics. The premise is that logistics is clearly the one area that absolutely must be transformed if the Army’s vision of the future force is to be realized” [11].

So far, however, the actual experience of over a decade and a half of both Logistics Transformation and the Revolution in Military Logistics that preceded it offers a resounding “no” to this fundamental question. As with many large commercial firms, the Army appears to be paralyzed by an “innovation trap” common to such organizations. The consistent pattern has been one of internal cognitive capacity denying the need for change thus causing an inability within these organizations to commit to large-scale transformation efforts before it becomes too late [12].

Pushing the Envelope: Innovation to Sustain Continual Improvement

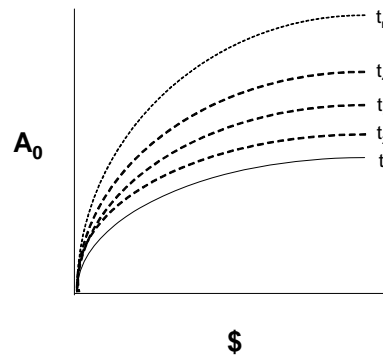


Figure 12

In the absence of imminent or evident failure resulting in battlefield losses which threaten the Nation's interests and/or values, an alternative "engine for innovation" is an extensive experimentation capacity providing an ability to "see" the impact of alternative concepts, policies and procedures, doctrine, tactics and organizational design - a "virtual" or "synthetic" environment that can realistically illuminate a better way thereby possibly preempting future failure.

This experimentation capacity must also have a "receptive organizational climate" including strong, sustained leadership support, mechanisms that actually enable discovery and "learning" to be derived from these experiments, and the institutional means to incorporate positive results into new or existing policies, doctrine and resource programs - in short, a bureaucratic capacity to both encourage and accommodate change. There are certainly illustrative examples of very successful "engines for innovation" within the Army that have had extremely influential, positive results, some with long term effects and others of short term impact.

One example with relatively long-term, sustained effects is the transition toward simulation-based training to capitalize upon the emerging power of live, virtual and constructive simulation technologies. This "opportunity" was initially forced upon the Army by both increasingly prohibitive training costs and decreasing availability of adequate real estate for live maneuver training areas, largely a consequence of the "environmental" movement. The resulting revolution in training and training technology has been ongoing for well over two decades now and has yielded a remarkable ability to provide a quasi-realistic, surrogate environment for the crucible of actual combat at nearly every organizational level. Training simulation is now ubiquitous, spanning individual soldier combat skill training, weapon system team training in crew simulators, highly stressful command and battle staff exercises up to and including multi-national corps exercises, simulation-driven theater and global wargames, and especially our combined training centers in CONUS and Europe. This transformation has produced the best-trained and arguably most dominant conventional Army in history.

A less conspicuous example within a much shorter timeframe, yet one with far more immediate consequences, is provided by the dramatic challenges to the Army's recruiting mission in the late 1990s. After nearly a decade of decline during the post-Cold War drawdown, the demand to stabilize Army end strength led to increasing recruiting requirements at a time when youth market

conditions had become the most difficult and demanding in the history of the modern All Volunteer Force (AVF). The interaction of these and several other trends were not well understood at the time. As a consequence of several years of failed recruiting missions and retention challenges, Army combat organizations were struggling to meet personnel readiness objectives. Two of the Army's 10 active component divisions actually reported the lowest possible rating then. Indeed, recruiting forecasts at the time portended "imminent catastrophic failure" and, although not well known, the AVF was indeed in jeopardy as the military manpower system of choice for the US Army.

As a consequence of imminent failure, both Department of the Army and US Army Recruiting Command (USAREC) senior leadership focused attention on the creation and successful implementation of an "engine for innovation". Creative solutions which directly addressed the fundamental nature of the challenge were found and quickly implemented. This transformation was achieved through nation-wide testing, experimentation, modeling, market and recruiter surveys, extensive simulation and rigorous analysis, all conducted by newly-formed but very cohesive, multi-disciplinary teams of experienced recruiters, demographers, labor economists, statisticians, advertising experts, military psychologists and sociologists, market research and operations research analysts, and systems engineers. USAREC suffered its worst recruiting year, completely reengineered itself while transforming its approach to the youth market, then enjoyed its best year yet in its 30-year history, all within a span of less than 3 years from 1999 to 2001 [13].

These examples, though very different in form, duration and content, suggest the power, value and enormous contribution provided by a strong, comprehensive, analytically-based "engine for innovation" as a surrogate for failure to motivate needed organizational transformation. Indeed, the simulation revolution in training has now spawned an entire growth industry in Orlando, Florida, an area which has truly become a global training simulation center of excellence.

However, consensus-driven "demonstrations", adopted in recent years replacing analytically sound, empirically-based experiments and field testing for warfighting concept development, do not provide, and are not a substitute for, an adequate engine for innovation. The bad news is that such an approach clearly has not yet been adopted to support Logistics Transformation, much less accelerate it. The good news, however, is that the US Army, as these two examples illustrate, clearly has the experience and the potential capacity for doing so . . . if it chooses.

III. Design and Evaluation: An "Analytical Architecture" to Guide Logistics Transformation

Research to date has been largely "descriptive" in nature. An assessment of the current logistics structure was conducted using supply chain concepts to diagnose and better understand root causes of persistent challenges, their consequences and effects. Next, three "prescriptive" supply chain performance objectives - efficiency, resilience and effectiveness - were presented to focus various technology initiatives, policy reforms and management actions comprising Logistics Transformation.

A viable strategy is now needed to transition from the existing state of affairs toward a desired outcome defined by the characteristics presented previously. Inherent in developing such a strategy, or more simply a "plan", are needs to: (1) optimize the allocation of limited resources, and (2) understand and anticipate in advance the consequences, likely outcomes, and risks associated with an unlimited array of tasks that must be selected, sequenced, and synchronized for implementation.

These two analytical approaches - optimization modeling to efficiently allocate constrained resources toward desired objectives, and predictive modeling, including testing, experimentation and simulation, to anticipate likely outcomes and effects within a complex system - must be used together in a complementary manner to illuminate a viable plan for implementation. They provide an analytically-based strategy to link means (resources) with ways (concepts and plans) to achieve desired ends (objectives), or in other words, an “analytical architecture” to guide Logistics Transformation.

Furthermore, changing operational conditions, emerging test results, or outcomes from previously enacted policy changes may illuminate a clear and compelling need for adjusting the Logistics Transformation plan at a point in time (most likely doing so several times). These conditions may reveal certain project tasks that should be re-sequenced, possibly accelerated or conducted in parallel, or implemented in a more comprehensive, widespread and rapid manner. Further testing and evaluation may be needed to resolve key anomalies or concerns thus causing delays or completely eliminating altogether those initiatives which are not sufficiently mature for implementation or have been precluded by better methods. These options and resulting decisions should be grounded in thorough cost-benefit analyses conducted in a large-scale systems modeling environment representing the Army’s logistics structure and processes. Today, however, our analytical capacity to evaluate new ideas and concepts is inadequate.

The modeling and simulation methodology outlined in these next sections would provide this much-needed analytical capacity and could constitute a “dynamic strategic planning” capability for Logistics Transformation. The intent is to avoid the typical project management “master plan” approach which prescribes a pre-defined, although detailed, set of tasks with tightly specified milestone schedules. Dogmatically following such rigid master plans admittedly may be mandated by various DoD regulations and federal contract laws. Yet these constraints discourage the possibilities of adjusting program initiatives and tasks when either necessity requires such adjustments or opportunities are presented through adaptation and experimentation. A more responsive, adaptive planning approach is needed to accommodate doctrinal changes driven by evolving mission needs and operational concepts, and to capitalize on emerging results from experimentation, field testing, and unanticipated breakthroughs yielded by a supporting engine for innovation.

This logistics analysis test bed could be patterned after any one, or a combination, of several organizational constructs, including the TRADOC “battle lab”, US Government “reinvention center” provided for by the National Performance Review and Reinventing Government Act, or a think tank-based “center for innovation” design described at the end of this chapter. The purpose of this engine for innovation, regardless of the form it ultimately takes, is to provide large-scale systems simulation, analysis and experimentation capacity and expertise needed to serve as a credible test bed. This capability will generate the compelling analytical arguments needed to induce, organize, sequence, and synchronize the many changes needed to gain momentum then accelerate transformation for Army logistics, including those identified and described previously.

Furthermore, it would offer potential for quantum improvement - real substance - over the PowerPoint “analysis” that has become pervasive. Indeed, PowerPoint presentations have been elevated to an art form, yet they are as insidious as they are pervasive. Managers devote increasing time to packaging their ideas in media-friendly ways rather than to the rigor and resulting implications of their analyses. In contrast, rigorous analysis offers insight and alternative solutions to complex, seemingly intractable challenges that have persistently yielded to emotionalism and myth.

Finally, it is both practical and insightful to visualize overall “system efficiency” across all components of the multi-stage logistics model as the multiplicative *product*, rather than the additive *sum*, contributed by all parts of the supply chain process. In linear systems, changes in output are generally proportional to input; the sum of the inputs equals the output in a relatively predictable pattern. However, complex systems are inherently nonlinear, and outcomes cannot be predicted or understood by the simple act of adding up the parts and component relationships.

The purpose, function and relationships of key components of this enabling “analytical architecture” are described next

A. Multi-Stage Supply Chain Optimization

Evolutionary progress for an Army Logistics Transformation trajectory can be easily imagined along a spectrum transitioning from legacy-reactive to future-anticipatory concepts:

- reactive, cumbersome, World War II-era mass-based, order and ship concept where “days of supply” is the primary metric;
- modern supply chain management incorporating velocity-based, sense and respond concept where “flow time” is the metric;
- adaptive and dynamic, inference-based, autonomic logistics network concept to anticipate and lead, where the metrics are “speed and quality of effects”.

However, a clearly defined implementation scheme for “transformation” is certainly not self-evident. Analytical methodologies are needed to properly sequence the vast array of new initiatives, modern technologies, process changes, and innovative management policies in cost-effective ways: Which ones are dependent upon others as “enablers” for their success? How many can be done in parallel? For those that can be, will it be possible to identify and quantify the different effects of their respective contributions? Will the synergistic consequences of interactions among complementary initiatives be measurable? Which ones may be precluded by combinations of other, more cost effective options? And how can we be assured that these various initiatives are not inadvertently discarded because their potentially positive effects on readiness are “lost” in the existing “noise” of such a complex, massive supply chain? In short, how can cause and effect be “disentangled” as transformation proceeds?

The earlier use of a multi-stage conceptual model to analyze the Army’s logistic structure throughout Chapter III of this paper naturally lends itself to the use of dynamic programming (DP) or a comparable problem solving technique. DP is designed for complex, non-linear, mixed discrete/continuous problems that can be decomposed into smaller, more manageable parts for analysis, and then recombined in such a manner as to yield an overall system-wide optimal solution while avoiding the normal pitfalls and inadequacies of so many other methods which lead to suboptimal results. The basic concept which makes DP relatively unique in the field of mathematical programming optimization theory is referred to as the “principle of optimality”. DP works “backward” through the several stages of the problem to ultimately enable an optimal solution to be derived using a solution procedure, rather than a mathematical algorithm which is typically used for most other optimization methods [14].

Using figure 13 for reference, 4 of the 6 logistics model stages are aligned for illustrative purposes. Working backward from the point of consumption where readiness output occurs at the “unit” stage, the DP solution procedure moves from stage to stage - each time finding an optimal policy for each state (impacting Ao in this case) at that stage - until the optimal policy for the last stage (N) is found. A recursive relationship is used to relate the optimal policy at each successive

stage (n) to the n-1 stages that follow. Once the final N-stage optimal policy has been determined, the N-component decision vector can be recovered by tracing back through all the stages. In this graphical example, the challenge is to determine the optimal allocation of a defined budget across a range of initiatives associated with these several logistics stages. Consideration must be given to various constraints that may be imposed within each of the stages as well. The overall goal is to maximize output from the “system of stages” - readiness (i.e., A_0).

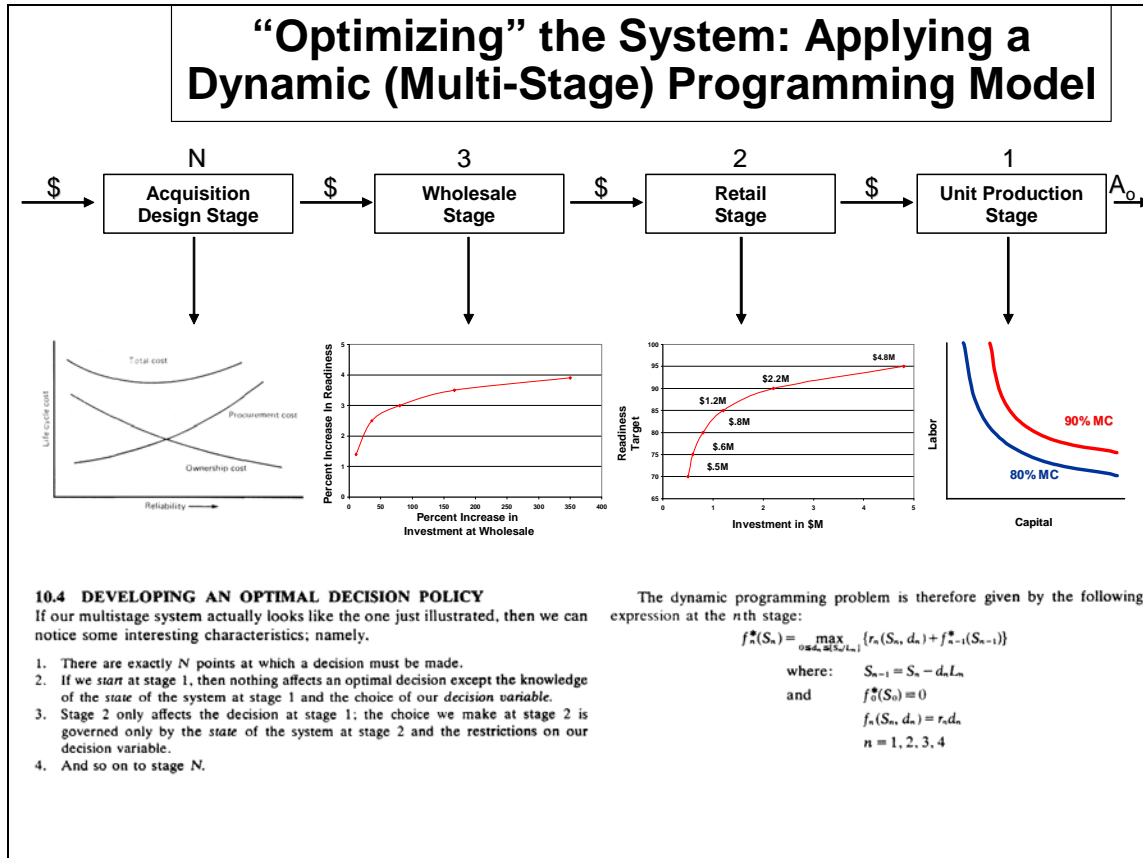


Figure 13

From a practical perspective, this illustrative example especially reinforces the crucial importance of developing a clearly-defined aviation readiness production function and adopting STA/RBS stock policies as enabling prerequisites to realize further cost-effective improvements to the system. For example, if the link between the unit stage (where readiness is produced for specific capabilities) and the retail stage management policy has not been optimized to desired readiness objectives (A_0) by adopting RBS, then the potential positive effects of a wide range of other improvements throughout the supply chain will not be clearly visible and fully realized. Additionally, potential investments should not be chosen on an individual basis but rather on how they interact with each other. Their real effects will simply be lost in the downstream “noise” of a very volatile, disconnected and inefficient supply chain.

B. System Dynamics Modeling and Dynamic Strategic Planning

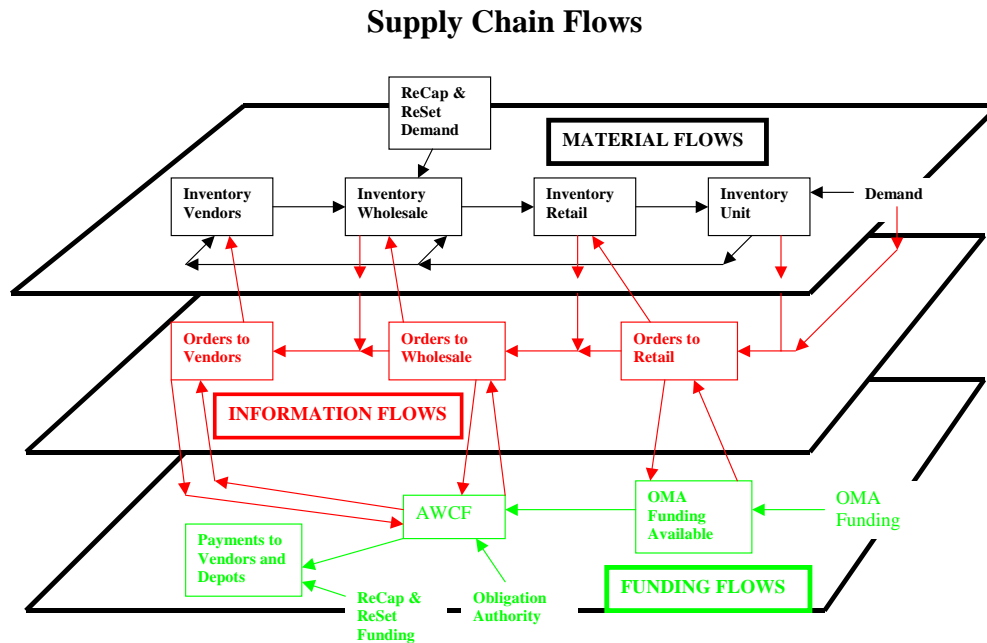


Figure 14

Second, use of a multi-*period* model must be incorporated into Logistics Transformation to accommodate both the extensive and extended nature of this enormous undertaking. As events occur and a transformation trajectory evolves, a mechanism is needed to routinely update the “optimal” solution which, inevitably, will change over time due to: (1) the inability to perfectly forecast future conditions; (2) consequences of past decisions which do not always reveal the results expected; and (3) the opportunities provided by adaptation and innovation as they materialize and offer improved solutions requiring new decisions.

This dynamic strategic planning (DSP) approach is, in essence, a multi-period decision analysis challenge which also encourages and assists in identifying, clarifying and quantifying risk to the transformation effort. Risk “assessment”, a precursor to risk “management”, is needed to reduce and mitigate the inevitably disruptive consequences of any major transformative effort with all the uncertainties surrounding significant change.

Most planning methods generate a precise, “optimized” design based upon a set of very specific conditions, assumptions, and forecasts. Optimization techniques which provided the foundation upon which DSP would subsequently evolve are primarily mathematical programming methods such as linear programming and its many derivatives, including integer programming, goal programming, and geometric programming. Although powerful and essential, a practical limitation of these techniques is that they require a specific set of conditions and explicit assumptions. While these conditions and assumptions may be appropriate in the short term for tactical operations, they are almost certainly never valid over longer planning horizons as strategic designs for technological systems [15].

In contrast, DSP instead presumes forecasts to be inherently inaccurate (“the forecast is always wrong”) and therefore “builds in” flexibility as part of the design process. This engineering systems approach incorporates and extends earlier best practices including systems optimization and decision analysis. It has recently evolved by adapting “options analysis” now commonly associated with financial investment planning. DSP allows for the optimal solution - more precisely, optimal “policy” - which cannot be preordained at the beginning of the undertaking, to reveal itself over time while incorporating risk management: a set of “if-then-else” decision options that evolve as various conditions unfold which, even when anticipated, cannot be predicted with certainty.

This planning method yields more robust and resilient system designs which can accommodate a wider range of scenarios and future outcomes than those more narrowly optimized to a set of specific conditions. Though perhaps easier to engineer and manage, traditional “optimal” designs can quickly degenerate toward instability when such conditions no longer exist [16].

The human mind also exhibits difficulty inferring accurately the behavior of “complex, dynamic systems” characterized by feedback loops and nonlinear relationships inherent in their large scale, scope and complexity. Advanced by Professor Herbert Simon (1978 Nobel Prize in economics), this “principle of bounded rationality” suggests even the best human judgment and mental analysis when applied to large, complex problems simply cannot account for all the interactions that will affect and determine outcomes[17]. Compelling evidence from theoretical investigation and the empirical record of actual experience clearly reveals that the behavior and performance of large-scale, global supply chains must indeed be characterized as “complex, dynamic systems”.

These defining features - large-scale, complex, dynamic, tightly coupled, feedback, and nonlinear- are summarized in this paragraph to illustrate their relevance to supply chain behaviors, including oscillation, amplification and phase lag. *Large-scale* implies that the system is composed of a large number and variety of interdependent components. *Complexity* exists as a consequence of these interdependent components having cascading impacts on other aspects of a *tightly coupled* system which can yield counterintuitive effects. The system is *dynamic* with the cumulative impact of market-based cycles, multiple delays, error corrections, and unexpected changes creating short run responses to perturbations which may be different than long run response. Interactions abound due to internal linkages with causal connections causing *feedback*, tight coupling and cascading effects. Cause and effect relationships do not have simple, proportional relationships and, for systems easily affected by outside conditions, result in high synergy, *nonlinear* behavior.

Unless these feedback mechanisms and their interactions can be anticipated, standard optimization methods will underestimate the impact of changes, often dramatically. Fortunately, an alternative approach which explicitly focuses on capturing the structural dynamics and complexity of such systems has been developed and refined.

System Dynamics, more than other formal modeling technique, stresses the importance of nonlinearities in model formulation while also possessing highly evolved guidelines for model construction, including proper representation, analysis, and explanation of the dynamics of complex technical and managerial systems. While traditional mathematical programming tools are useful when dealing with *combinatorial complexity* in projects that have multiple parallel and sequential activities, system dynamics better deals with the *dynamic complexity* created by the interdependencies, feedbacks, time delays, and nonlinearities typically found in large-scale projects [18]. A central feature of systems dynamics, especially when enabled with computer

simulation, is its ability to illuminate and explain seemingly counterintuitive results and effects commonly found in complex organizational and social systems.

These observations suggest that large-scale, transformational endeavors are much more than conventional “construction” engineering efforts. They represent a major human enterprise where effective managerial decision-making requires a thorough understanding of the evolution and dynamics of the change undertaken. New software tools now make it possible for managers to actively participate in the development of these system dynamics models, so-called management “flight simulators”, which have become the basis for learning laboratories in many organizations [19].

Army Logistics Transformation would benefit enormously from such an application. Within a supply chain management context, system dynamics modeling and analysis would explore how various policies interact; would they interfere or cause diminishing returns? Ideally, the aggregate sum of their effects and benefits would be greater than their individual policy impacts; but what are the sources of synergy to create such results? Since supply chain behavior often exhibits persistent and costly instability, a “stock management structure” (figure 15) is used to model and explain these effects. Since this structure involves multiple chains of materiel stocks, information and financial flows, with resulting time delays, and because decision rules often create important feedback loops among the interacting operations of the supply chain, system dynamics is well suited for modeling and policy design. As described previously, it is important to understand the “optimal sequencing” of a wide array of possible policy initiatives in order to fully capitalize on their collective potential benefits.

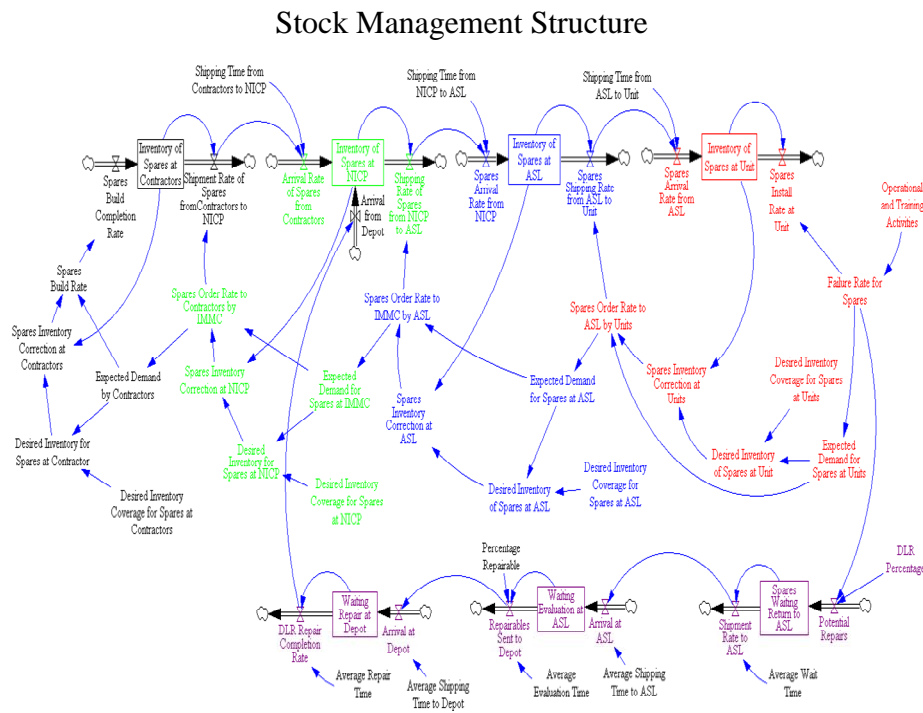


Figure 15

Much of the management literature in business process reengineering emphasizes focusing on finding, then relaxing, major bottlenecks in the existing manufacturing or operations process [20].

Focusing improvement effort on the current bottleneck immediately boosts throughput, while effort on non-bottleneck activities is wasted. However, relaxing one constraint simply enables another to develop as time progresses. Obviously, waiting for each successive bottleneck to occur would prolong and retard rather than accelerate continuous improvement. The value of system dynamics modeling is accelerating this understanding by exploring the implementation of different sequences in a synthetic (simulated) environment. By using the model to anticipate and accelerate this shifting sequence of bottlenecks, a *prioritization* scheme for these many initiatives can be developed.

This process redesign method, referred to as “sequential de-bottlenecking”, enables potential chokepoints in the actual system to be anticipated, understood then eliminated, using the system dynamics model, before they become binding constraints on throughput. When applied to commercial supply chains, this approach has enabled faster growth, lower volatility, and greater value creation for organizations that have used it [21]. For the Army, a system dynamics model of the supply chain has the potential to guide and help accelerate Logistics Transformation by optimally sequencing and synchronizing the vast array of initiatives that have been suggested for implementation. Previously, we used a system dynamics model to demonstrate aviation supply chain vulnerability to the bullwhip effect.

Decisions Analysis, the second major analytical component in the evolution of DSP, enables structuring the combination of system dynamics-enabled design choices so they can be made in stages as a system evolves over time. Cost-effective options can be evaluated to determine the best pattern for system development depending on how uncertainties, both within the system and external to it, are resolved over time. Thus, DSP defines an optimal *strategy* or policy rather than a fixed plan; it is the designer’s responsibility to determine this (resilient) strategy rather than merely pick a single (fragile), “optimal solution” from a menu of choices.

The most recent DSP improvements have focused on incorporating means to evaluate and build “flexibility” into designs. These include “real options” and “robust design” methods which enable calculation of the value of “flexibility” which was not previously considered. Consequently, “flexibility” as an attribute of engineering systems design was systematically neglected. “Real options”, applied to “real”, physical systems, is an adaptation of “options analysis” which was developed for and has been applied extensively in financial markets. Recent and ongoing applications of this newest aspect of DSP indicate the approach leads to substantial improvements in design. Also, embedding flexibility into diverse systems already “optimized” for performance under traditional deterministic concepts is leading to substantial savings in many cases [22]. An illustrative military application of DSP was development of an Army strategic resource planning capability to support the national defense strategy during the first Quadrennial Defense Review (QDR) in 1996-97, then guide Army resource planning in subsequent QDRs as defense strategy adapted to changing geopolitical trends [23].

C. Operational and Organizational Risk Evaluation

Third, in conjunction with DSP, a wide variety of analytical methods should be used to understand, evaluate and reduce “risk” during Logistics Transformation. “Risk” can take on different connotations depending upon the application. Accordingly, we address two concepts here: (1) operational risk faced by the logistics system responding to various shocks, supply chain disruptions, and mission requirements that may not have been anticipated, and (2) organizational risk to the Army logistics community, including the combination of investment, or programmatic, risk associated with new project undertakings and the larger impacts induced by transformation uncertainties associated with organizational change at a difficult and challenging time.

Operational risk, in this decision analysis context, consists of assessing both the likelihood of a particular adverse outcome as well as the consequences of that outcome. One of the most important steps in this risk assessment process is the quantification of risk. Yet the validity of the approach commonly used - expected value - is fundamentally flawed. Expected value metrics fail to represent the true risk of “safety-critical” systems for which the consequences may be catastrophic, even though the probability of such an event may be low. This occurs because the expected value approach essentially equates events of high consequence but very low probability of occurrence (“extreme events”) with those of low consequence yet high probability, perhaps frequent occurrence. Thus, extreme events with low probability are given the same proportional importance regardless of their potential catastrophic and irreversible impact. Such systems should not be measured solely by the standard expected value metric, especially when the consequences are unacceptable.

Theoretical advances in modeling and assessment have addressed the risk associated with extreme events and the fallacy of the expected value approach. One particular technique, the partitioned multi-objective risk method (PMRM), explicitly captures the value of extreme events. Then, using a risk filtering, ranking, and management (RFRM) methodology, these risk elements are ranked based upon severity, then systematically addressed through a risk mitigation process. The mitigation process includes relevant scenario-based analyses in conjunction with risk reduction methods including redundancy (backup components to assume functions of those that have failed), robustness (insensitivity of system performance to external stresses), and resilience (system ability to recover following an emergency).

Another more recently refined technique which should also be considered includes an adaptation of the Leontief input-output model. This new technique provides for a comprehensive risk assessment and management framework designed to ensure the integrity and continued operation of complex critical infrastructures. The theoretical derivation and supporting application principles for these analytically-based risk management methods are presented in reference [24].

Practical management frameworks, incorporating the advances described above, have recently been developed to systematically identify supply chain vulnerabilities, assess risk, and then formulate strategies to reduce those vulnerabilities and mitigate risk. Various sources and potential causes of disruption are then bundled into associated risk categories [25]. Analytical “tool kits” can be applied to examine specific effects and larger consequences for these risk categories, then supply chain modeling and simulation is used to analyze, evaluate and compare alternative operational strategies and their respective costs [26].

Those strategies which reduce disruptive risk and enhance supply chain resilience, *while simultaneously improving both efficiency and effectiveness*, are ideal candidates for accelerated implementation. Two practical risk mitigation strategies which impact all three supply chain system performance objectives - efficiency, resilience, and effectiveness – are: (1) a demand-driven supply network (DDSN) which reduces buffer inventory, improves readiness, and provides tactical agility, and (2) theater-level “decoupling points” to enhance operational agility and flexibility by providing, respectively, “slack inventory” for short, specific mission surge needs (e.g., humanitarian NEO) and, when necessary, “slack capacity” for long-term increases in demand to sustain in-theater operations (e.g., AVCRAD for sustained combat operations).

To address organizational (rather than operational) risk for Army Logistics Transformation, a variety of virtual, constructive, and live simulation methods, especially analytical demonstrations, field testing and experimentation, can identify, early on, which technologies or new methods

warrant further consideration. This process enables differentiating those appropriate or sufficiently mature for implementation from others that are not. In this context, organizational risk consists of the combined effects of both uncertainty of outcomes - simply not knowing the impacts of various alleged improvements on the logistics system - and also the uncertainty of future costs incurred as a consequence of either adopting, or failing to adopt, particular courses of action.

A recent example of this accelerating, “crawl-walk-run” approach is the sequence of experimentation and testing adopted by this project to first demonstrate, through rigorous analytical experimentation using the UH60 aircraft in the 101st Airborne Division, the potential value of adopting RBS as aviation retail stock policy; these insightful, positive results then provided impetus for and enabled further, more widespread field testing with several aircraft types in an operational training environment at Fort Rucker.

Confidence and credibility in a new, different method have been gained through experience while significantly reducing the uncertainty initially surrounding the new initiative. And return-on-investment results clearly reveal reduced investment costs while still meeting or exceeding aircraft training availability goals. A graphical display to conceptually portray these several analytical contributions to reducing organization risk is provided at figure 16.

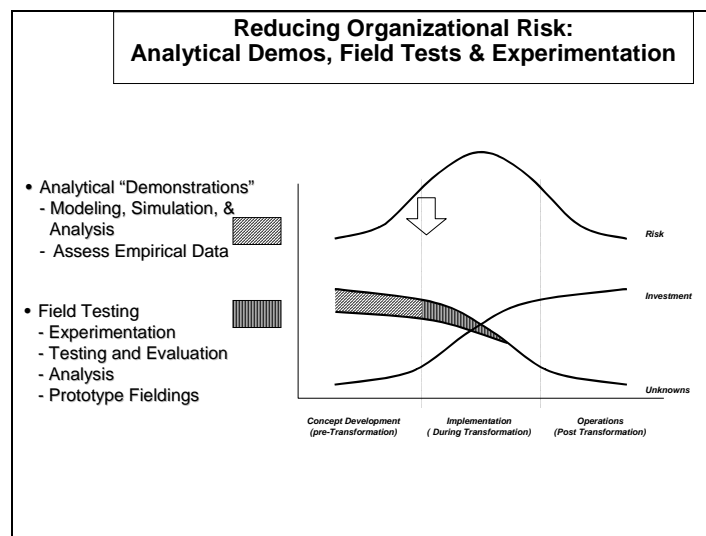


Figure 16

Finally, the Global War on Terrorism has illuminated a wide range of vulnerabilities in commercial global supply chain operations [27]. Among several research projects addressing these challenges is the “Supply Chain Response to Global Terrorism” project recently initiated by MIT’s Center for Transportation and Logistics (CTL). This project is highlighting the “dependence of corporate supply chains on public infrastructure and systems coordinated or affected by the government [which] represents new vulnerabilities for businesses now more heavily dependent on the government than previously recognized” [28]. Using assessments from recent terrorism effects on supply chain disruption as well as other historical observations, both natural and man-made, several common failure modes have been identified. The current research focus is on developing cost-effective methods and classifying various responses for reducing vulnerabilities by improving both the internal security and organizational resilience of these global networks. The Army logistics community should actively participate in this project.

D. Logistics System Readiness and Program Development

The fourth and final enabling analytical component includes the development, refinement and use of econometric/transfer function models. This capability is needed so that OSD and HQDA-level budget planners and resource programmers can relate budget and program investment levels with associated performance effects, including future capability needs and desired readiness outcomes. New impetus for this long-recognized need is now provided by DoD Directive 7730.65 which requires developing and implementing a new “Defense Readiness Reporting System” (DRRS). This new DRRS:

“ . . . shall provide the means to manage and report the readiness of DoD and its subordinate Components to execute the National Military Strategy. . . the DRRS [will] establish a capabilities-based, near real-time readiness reporting system . . . to identify critical readiness deficiencies, develop strategies for rectifying those efficiencies, and ensure they are addressed in program/budget planning and other DoD management systems. . . The Secretaries of the Military Departments shall develop Service mission essential tasks in support of their responsibilities to Combatant Commanders and functions as prescribed in [Title 10, United States Code, as amended]” [29].

In general terms, these Title 10 “functions” include manning (e.g., recruiting), equipping (e.g., weapon system procurement), training (e.g., BCT and AIT, unit training, NCOES, etc), and sustaining (e.g., logistics) forces in each of the military departments. The Services, as “force providers”, generate and maintain military capabilities which are then provided to the regional Combatant Commanders to accomplish specified missions. Each Title 10 “function” consists of significant institutional resources, organizations, and programs which collectively define “systems”. Hence, a measure of each system’s ability to achieve its respective goal can be defined as its “readiness” (e.g., logistics system readiness).

Application of this systems approach using supply chain management concepts will help to identify constraints and “weak links” that are inhibiting desired readiness output (e.g., Ao) thus reducing the overall strength of the logistics chain. Marginal investment resources should then be spent on strengthening these weak links. OSD and the Services are pursuing many logistics initiatives, but as the supply chain structure is improved and refined the logical next step is to understand and report the ability and capacity of the chain to generate output commensurate with its purpose [30].

New supply chain management concepts are incorporating geo-spatial sensors and automatic identification technologies (AIT) to enable “total asset visibility” (TAV) and the transition toward adaptive supply chains. In particular, radio frequency identification (RFID) is expected to significantly reduce transaction error rates while also providing near-real time, high volume data. Although these new technologies hold great potential, it is unlikely that legacy software and enterprise resource planning (ERP) systems will be able to provide improved decision support and fully extract all of the potentially useful information contained in these high volume data streams.

Traditional forecasting methods typically use conventional *linear* regression models (CLRM) which assume that unexplained variance is *homoskedastic* implying that the error term in the model is constant (and normally distributed). However, complex supply chains exhibit *nonlinear*, dynamic qualities due to the interactions, delays, and feedback effects across multiple stages of

materiel, information, and financial flows - the bullwhip effect as previously described. Not only does CLRM fail to capture the volatility inherent in the process, but as data streams magnify in volume and accelerate in time due to RFID, the error term becomes increasingly *heteroskedastic* (the error term itself is stochastic and varies with time) rendering forecasts that are less, rather than more accurate.

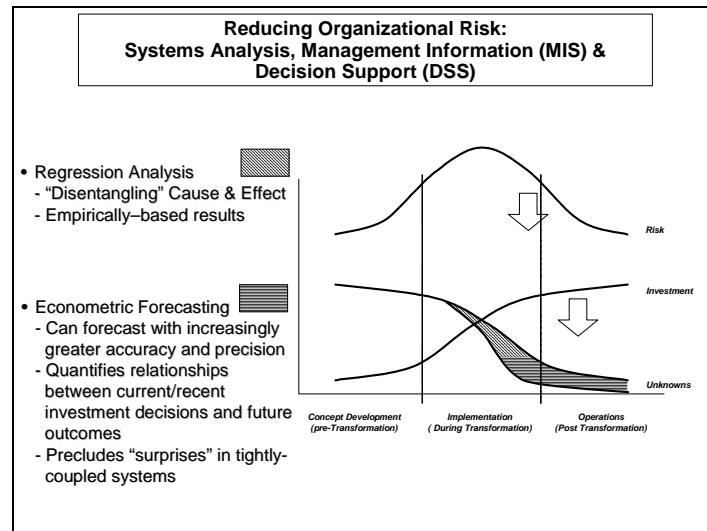


Figure 17

Recent forecasting advances for financial markets (including a Nobel Prize in economics), which exhibit similar volatility, have yielded improved, more accurate and precise results [31]. These models, described as *generalized autoregressive conditional heteroskedastic* (GARCH), are able to significantly reduce the error term by better quantifying interaction and lag effects among the explanatory variables and time series within the model. As the volume of data increases, the ability of GARCH techniques to better disentangle and explain cause and effect relationships *while reducing forecasting error* (unexplained model variance) improves. One project initiative involves examining the application of GARCH to RFID-generated supply demand data for units engaged in ongoing military operations in Iraq. Early results are promising, indicating that GARCH is yielding order of magnitude improvements for predictive performance compared to standard CLRM methods [32].

As these new, powerful forecasting tools are refined and improved to provide near real-time, enterprise-wide visibility into demand variability and volatility at the points of consumption, they can be combined with emerging agent based modeling (ABM) approaches which will replace existing equation based models (EBM) currently used in legacy and ERP systems [33]. These innovative technologies, when fully developed and implemented, will ultimately enable the transition to adaptive value networks in the commercial sector and, for DoD, a genuine capacity for autonomic Sense and Respond Logistics.

In the near term, however, driven by the new DRRS mandate and enabled by supply chain concepts, econometric modeling and dynamic forecasting to understand, measure and monitor Army logistics as a readiness-producing system, a conceptual framework has emerged for a "Logistics Readiness and Early Warning System". The purpose is not only to assess and monitor supply chain capacity to efficiently and effectively support current requirements, but also to anticipate its ability to responsively meet a range of future capabilities-based requirements as

well. The objective is to overcome what has historically been a funding-induced cycle of instability manifested in periodic “boom and bust” cycles.

As figure 18 portrays, three elements would interact in a “feedback-alert-warning” cycle. “Automated Monitoring” continuously tracks and forecasts both tactical readiness (e.g., Ao) and supply chain parameters, then signals an alert if there is a decline in projected readiness or adverse trend in metrics. “Management Assessment” then validates an alert, quickly evaluates the potential problem, and assesses the impact of current and planned resource allocation as well as other technical initiatives which might mitigate or improve the logistics projection. After HQDA-level policy analysis and review, “Policy Response” acts to prevent a shortfall while minimizing recognition and resource response lags. This responsive link to program development is absolutely crucial to an adaptive demand network. Historically, however, this response has significantly lagged or been missing altogether causing “boom and bust” cycles in resource programming, thus precluding viable resource-to-readiness frameworks for management decisions.

Logistics Readiness and Early Warning System

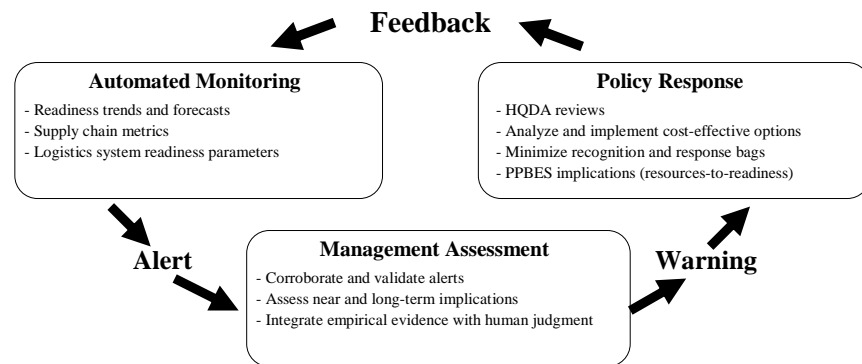


Figure 18

As cause-effect relationships are better understood, and as model parameters, decision variables and elasticities are refined to reduce forecasting error and improve model “calibration”, this capability will help to quantify high-impact investments and the differential effects of various logistics “drivers” on readiness outcomes. Our purpose is to both improve performance execution and refine requirements planning abilities using supply chain systems readiness leading indicators to anticipate, diagnose, and then pre-empt potential failures using analytically-based DSS. As part of this project, a modeling capability is being developed to support performance-focused strategic resource analysis and logistics program and budget development [34].

Further developed and refined over time, these forecasting models can increasingly be used for future capability forecasting, program requirements determination, and readiness prediction.

“Forward forecasting” is used to proactively anticipate and get ahead of the problem; “forward planning” to evaluate a range of alternative solutions, and then “forward budgeting” to lock in program (POM) resources in order to dampen, and ideally eliminate, future boom and bust cycles. These models should constitute part of a “Logistics Readiness and Early Warning System” contributing toward the DoD mandate for a larger Defense Readiness Reporting System by linking Army PPBES (resource planning system) to operational planning systems (readiness) [35]. The goal is to relate planning guidance, funding decisions, and execution performance in meaningful ways, all of which are informed by this supply chain “health monitoring and management” concept

E. Accelerating Transformation: An “Engine for Innovation”

Several agencies and organizations with logistics modeling and supply chain simulation capabilities could be pulled together, just as this new Army aviation-focused logistics readiness project has attempted to do [23]. They should now be integrated, even if loosely, into a more formal research consortium to better coordinate their efforts and reinforce their respective strengths. This synergistic effort will facilitate properly sequenced field tests, experiments and evaluation with supporting modeling, simulation and analysis. Furthermore, these organizations should form the nucleus of an “engine for innovation” for Logistics Transformation.

There are several commercial applications and academic sources of expertise that should also be included. One possibility is to create, as the Navy has done, a dedicated organization consisting of a partnership with both academia (for creative, cutting edge concepts) and the corporate world (for existing commercial applications) working in conjunction with a new Navy-led, Congressionally-funded logistics readiness research center. Another recently proposed partnership concept is creation of a “Center for Innovation in Logistics Systems” (CILS), summarized in the following paragraphs.

The CILS organizational construct consists of three components which essentially comprise the core competencies (mission essential tasks) for the center:

- (1) an R&D model and supporting framework to function as a generator, magnet, conduit, clearinghouse and database for “good ideas”;
- (2) a modeling, simulation and analysis component which contains a rigorous analytical capacity to evaluate and assess the improved performance, contributions and associated costs that promising “good ideas” might have on large-scale logistics systems; and
- (3) an organizational implementation component which then enables the transition of promising concepts into existing organizations, agencies and companies by providing training, education, technical support and risk reduction/mitigation methods to reduce organizational risk during transformational phases.

These three components serve to:

- (1) encourage and capture a wide variety of “inventions”;
- (2) “incubate” those great ideas and concepts within virtual organizations to test, evaluate, refine and assess their potential costs, system effects and contributions in a non-intrusive manner; then
- (3) transition those most promising into actual commercial and/or governmental practice.

Hence the term “innovation” is deliberately in the center’s title to express the notion of an “engine for innovation” to support major transformation endeavors in the government and private

sectors driven by an increasingly recognized necessity for change. These organizational components and their relationships (figure 19) are defined below.

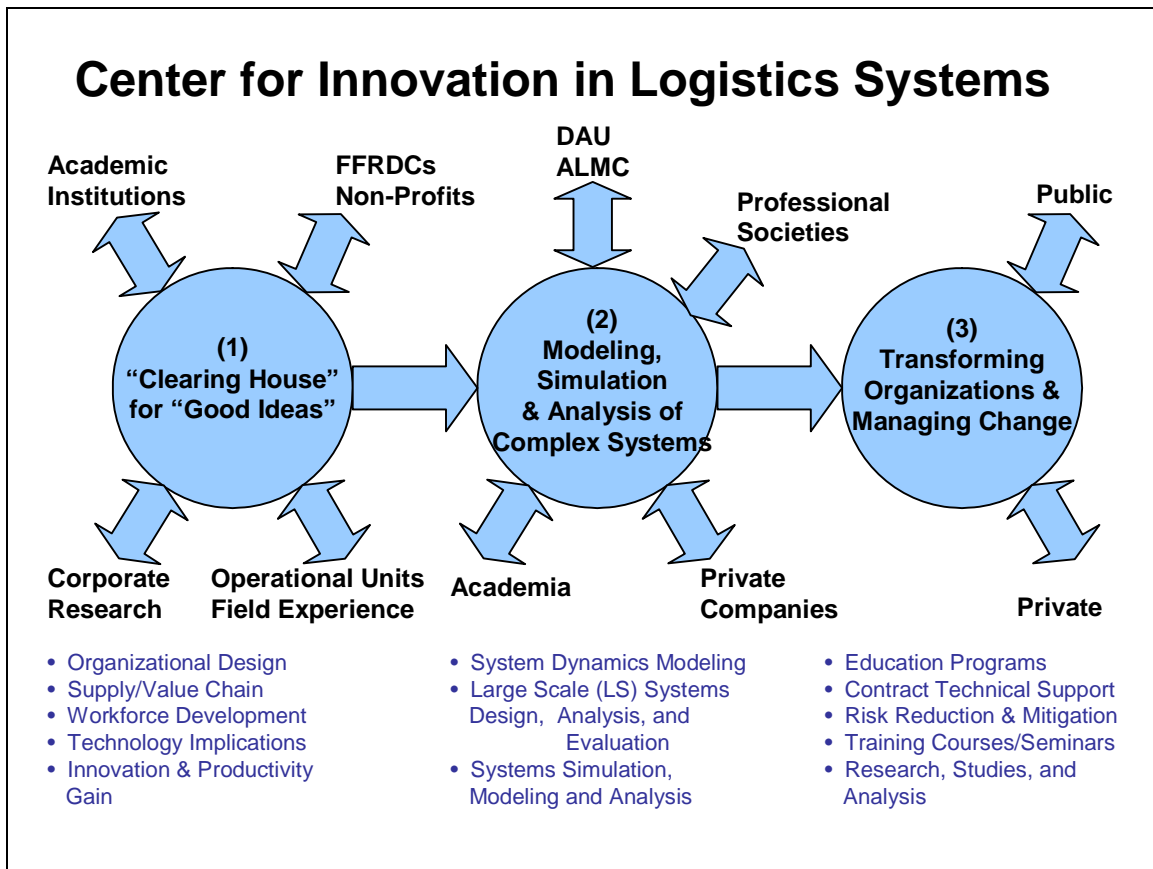


Figure 19

The "R&D Model and Framework" - (1) in figure 19 - provides a generalized structure for supply and value chains enabling the development of a research model. The model enables our current understanding of endogenous and exogenous factors influencing the performance of logistics organizations and also indicates where existing theory and research are inadequate. The logistics research model also yields an association between various subject matter expertise (organizations and individuals) and the manifold elements that comprise the research model. These organizations include academia, FFRDCs, research offices and companies in the corporate world, and both federal and state government agencies.

A consortium will be established, consisting of representatives of these research organizations, to share recent research information, define and clarify gaps and opportunities in current theory and research, partner on research development projects, refine and adjust the research model, and generally guide the advancement of the logistics research model thereby improving the collective understanding of supply chain behavior, management and design. This collaborative effort is intended to drive the "engine for innovation" with "good ideas" generated from a focused, solid research program and supporting research campaign plan. It could also further the interests of private sector companies wishing to offer their creative concepts to further scientific scrutiny and

greater visibility. This enterprise constitutes the logistics research “strategic outreach” program to promote and encourage innovation thereby enabling a continual process of improvement in practical application.

The “Large-Scale SCM and Logistics Systems Analysis, Modeling, Testing and Experimentation” component - (2) in figure 19 - rigorously examines the implications of good ideas generated by the research consortium. Using comprehensive modeling, simulation, and testing capabilities, it provides a virtual, or synthetic, laboratory for innovation and transformation. The disciplines involved and methods applied should include:

- industrial and systems engineering;
- engineering management;
- market research and cost analysis;
- workforce implications of socio-demographic, psychographic and labor economic trends;
- organizational design and social psychology;
- high-performing systems theory;
- inventory theory, supply chain management and design;
- system dynamics and large-scale, high resolution systems simulation; and
- the integrating power of systems analysis, operations research, and management science.

The purpose of this extensive modeling and analysis effort is to thoroughly understand not only the likely immediate and isolated impact of adopting new and different concepts and initiatives, but their potentially broader implications for the larger value producing enterprise over time. Concepts warranting further evaluation from these analytical demonstrations, which use constructive and virtual simulation and modeling approaches, would then be assessed in a “live” environment using pilot tests, field testing, experimentation and evaluation.

The final CILS component, “Implementing Organizational Change” - (3) in figure 19, provides the means to accelerate the “transition to market” phase of the larger innovation process: commercializing good ideas and inventions into successful applications in both the public and private sectors. Effective training, education and technical support are indispensable to ensuring the success of leaders and organizations committed to and about to undertake major change in traditional practices, processes, procedures and especially their organizational culture.

The development of strategic planning and management frameworks are also essential to enable learning within organizations. The identification of organizational risk, including investment costs and anxiety-causing unknowns, can illuminate the need for and value of applying analytical methods to reduce and mitigate these various elements of risk for organizations embarking upon major transformations (figure 20). This component provides feedback loops to the other two components in the logistics innovation center. This feedback, central to a “learning” organization, provides the connection to real world challenges and results thus refining and guiding the research model by providing necessary adjustments and enhancements, grounded in empirical evidence, to improve the accuracy and predictive power of systems simulation models. These feedback loops provide for a repository of lessons learned as well.

Reduced “Transformation” Risk: Using Analysis to Disentangle Cause & Effect, Reduce Uncertainty, and Mitigate Risk

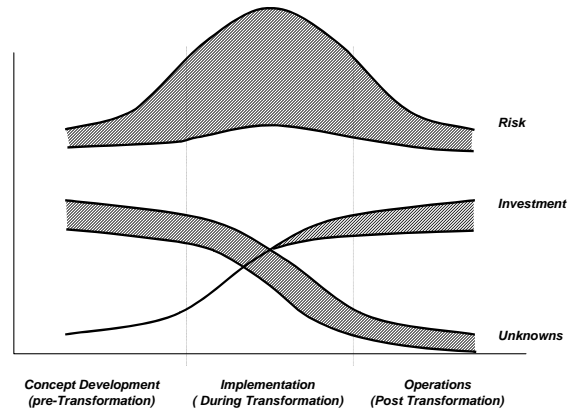


Figure 20

These four modeling approaches - multi-stage optimization, dynamic strategic planning, risk management, and program development - should be used in unified and complementary ways to constitute a “dynamic strategic logistics planning” (DSLPL) capability. DSLPL can take, as input, both the empirical evidence of ongoing operational evidence (real world results) and also the potential contribution of new opportunities derived from an “engine for innovation” (synthetic results), and then guide - as output - Logistics Transformation toward strategic goals and objectives: an efficient, increasingly effective, yet resilient global military supply network. Collectively, they constitute the “analytical architecture” needed to sustain continual improvement for Logistics Transformation (figure 21).

Collectively, CILS and DSLPL have the potential to accelerate the process of management innovation by building a capacity for low-risk experimentation using a credible, synthetic environment. The purpose of this cyclical process is to sustain continuous improvement through a deliberative process of incremental innovation achieved through experimentation, prototyping, and field testing.

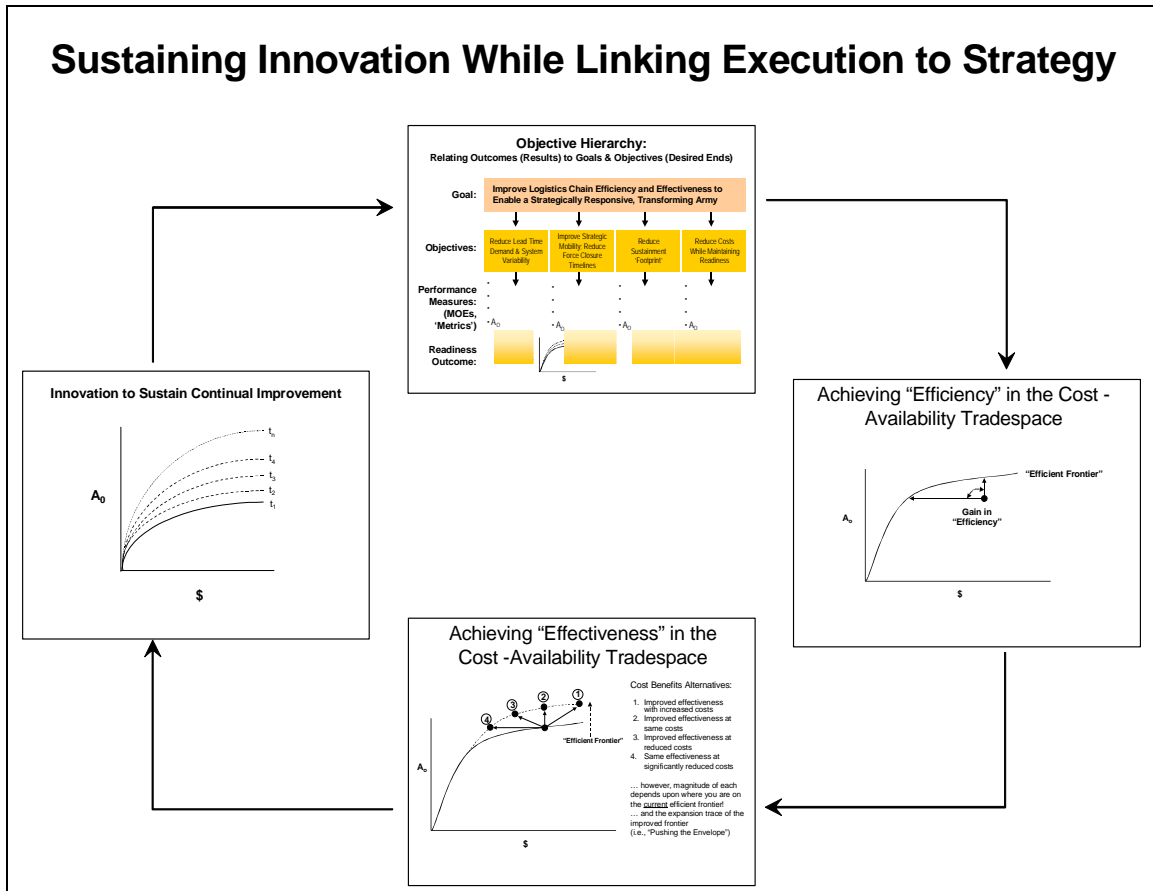


Figure 21

IV. Final Thoughts

Strategy is fundamentally about dealing with change - it represents the heart of management. Today, however, an honest appraisal suggests existing organizational structures, relationships, and logistics processes are, collectively, the product of decades of short-term workarounds, ad hoc solutions, and periodic management fads, but mostly inertia, rather than disciplined strategic thinking. This pattern has been accompanied by a persistent failure to challenge predisposed paradigms, management policies, and organizational procedures. Under increasing organizational pressure, the tendency toward reactive, ad hoc crises management has completely supplanted long-term strategy.

Tactical units in the US Army are renowned for pioneering and refining the After Action Review (AAR) concept as a continuous learning method to surface, diagnose, and correct deficiencies in order to improve and sustain operational excellence. Yet comparable diagnostic effort has not been prevalent at strategic levels within the institutional Army bureaucracy. Since analytically rigorous "autopsies" - "dissection" for root cause diagnosis, understanding, and response - on management issues are not routinely performed to uncover "ground truth" and learn from mistakes, reactive "firefighting" has been the standard response to visible symptoms. Army logistics management has become sclerotic.

As with any complex, large-scale systems challenge, key implementing concepts will be essential to ensure a successful Army Logistics Transformation endeavor. These organizational, analytical, information systems, technology, and management concepts should all be guided by a clear understanding of the ultimate purpose for which the enterprise exists, an organizational vision for the future, and a supporting strategy to realize the vision (figure 22).

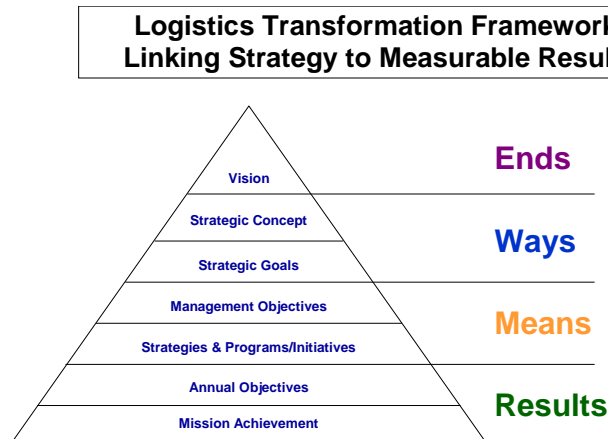


Figure 22

Ultimately, this strategy must focus the effects of transformative change upon capabilities-based, readiness-oriented outcomes. All too often for logistics, the “ends-ways-means” strategy paradigm has not been applied. Sporadic efforts have attempted to compensate for perceived inadequacies in “means” (resources) and “ways”, instead yielding reactive, narrowly focused responses attempting to band aid yesterday’s problems, rather than focusing on the “ends” – generating mission readiness - which is the purpose for which the entire enterprise exists.

“Transformation” will indeed require disturbing existing cultural paradigms, causing an inevitably disruptive period of significant change. And, despite the inexorable advance of technology, it will be improved management and decision support systems that ultimately enable innovation potential to be realized. Finally, this endeavor should embrace that of a Learning Organization. This will be a crucial enabler for sustaining continuous improvement.

The purpose of this project is to ensure Logistics Transformation for the US Army transitions toward a readiness-focused logistics organization which, averting Path D, ultimately follows a strategic trajectory along Path C (figure 50).

The future is properly the temporal focus of “transformation”. However, a major precept of any “learning organization”, even more fundamental than the five disciplines that characterize one, is the ability to actually learn from - not merely observe - the past [37]. Distilled to its essence, simply failing to repeat past mistakes represents the most basic form of human progress [38]. The study of history informs contemporary conceptual thought. Additionally, since people naturally tend to see their current problems as unique and overwhelming, historical analogies can be especially helpful. They stretch and broaden our thinking and allow contemporary challenges to come into better focus through the long lens of history. Emphasis on “out of the box” thinking today should also be tempered through understanding and appreciation by “looking into the box” of the past.

Accordingly, consider the following characterization:

“ . . . the system lacked a clear chain of command. Agencies all shared responsibility yet no one was responsible. . . it could not coordinate and standardize [data] to a common ‘language’. Each bureau had raw data, analyzed for only its purposes, expressed in its terms, and responsive to its need. . . reorganizations [were] a response to crises and created the illusion of progress while merely producing confusion, inefficiency, and, most seriously, personnel demoralization. . . Because of continual reorganizations, the bureaus had new difficulty furnishing data . . . The situation became more complicated when records in one division differed from those in another . . . [he] found the independent, loosely related bureau financial practices a ‘nearly insuperable barrier to consolidation’ [and] varying interpretations of regulations caused confusion . . . He believed supply should conform to industrial and scientific principles yet lacked the authority . . . The Army was pushing an already strained supply system into a state of paralysis. . . an integrated supply system remained a myth . . . by the end of the war he feared the supply system would collapse . . . [after the war, Congressional] hearings pinpointed the supply problem . . . Yet their Act did not unify the system. It institutionalized divided authority, providing enough checks and balances to paralyze action. . . ” [39].

This extract is from Phyllis Zimmerman’s historical biography of Major General George W. Goethals, the famous Army engineer who designed and managed construction of the Panama Canal [40]. Today, more than a century later, this achievement is still recognized as one of the greatest engineering and project management feats in modern history. At the beginning of America’s entry into World War I Goethals was recalled from retirement to head the Army’s supply organization. While his frustrations above, expressed in 1918, may also sound accurate in 2007, the long lens of history surely reveals one major advantage now compared to conditions nearly a century ago.

Turning to history then, rather than technology, to provide comparative insight into past and current conditions, one powerful observation becomes apparent: the “Power of Analysis” - operations research, systems analysis, and supply chain management science - did not exist then to help Goethals with the Army’s enormous supply and logistics challenges. This truly incredible power is, however, at our disposal today. The contrast between the methods we have been using and what we could and should use could not be more stark. While significant organizational change has always provoked resistance and should naturally be expected, as one of our most distinguished historians, Barbara Tuchman, observed: pursuing flawed and failed policies *knowing* that plausible alternatives and better options are available is truly “the march of folly” [41].

We hope this endeavor will serve as a catalyst for an intellectual and professional resurgence in military logistics systems analysis. We are certainly encouraged by our empirical research results which continue to reinforce and corroborate many of the intuitive concepts and ideas presented in this paper. Nonetheless, the degree to which the significant changes proposed herein can impact institutional culture and practice remains to be seen. Consequently, we have engaged the larger military operations research and professional logistics communities and continue to encourage the participation of all those interested to collectively pursue this enormous challenge.

Finally, it is certainly appropriate and necessary to ask what the potential impacts and expected benefits of this undertaking may be. Figure 23 offers a series of direct responses to this question.

They are framed from various perspectives of several key professional positions involved in focusing logistics to better support and sustain the Army's most effective, flexible, and adaptable assets - America's Soldiers. Now at the dawn of the 21st Century, just as they did during the 20th Century, American Soldiers collectively constitute the single most powerful force for good in the history of the world – the next “Greatest Generation”.

Specialist Four Dalton: AH-64 Attack Helicopter Mechanic, 82nd Airborne Division Combat Aviation Battalion - reduces his labor-intensive “workarounds”; he no longer is the routine “bill-payer” and go-to-guy who must compensate for inadequate supply support; a more satisfied customer - the one who matters most.

SFC Dalton: Maintenance Production NCO - gains much greater trust in a supply support system that is more responsive and better anticipates his needs; a more satisfied customer with renewed confidence.

CW2 Dalton: Aviation Company Maintenance Tech - no longer wastes so much time scrounging for parts, making “deals” and placing his integrity at risk to achieve readiness goals for his unit and commander; a more satisfied customer who believes the Army is now beginning to have a smoothly functioning supply system.

CW5 Dalton: AVCRAD Production Officer - for this “crusty” Vietnam vet, a long-recognized need without any previous attempts at an honest solution; the fundamental flaw has always been organizational design and OIF yielded a very predictable disaster; now, finally retiring, with an “honest solution” actually appearing on the horizon, he is no longer so cynical. . . but, true-to-form, still “crusty”.

LTC Dalton: AH-64 Attack Battalion Commander - eliminates “distorted behavior” in his command; he no longer must “game” the readiness reporting, supply and financial management systems, resorting to twisted, convoluted, counterproductive actions needed to achieve ER goals that he alone has always been held responsible for. Now, working collaboratively with both his supporting Apache PM and contract logistics provider, he gradually believes that the supply “system” becomes at least partially accountable for ER his unit achieves.

Ms. Dalton: IMMC “Item” Manager - empowers her to become a weapon system “readiness” manager. Always hardworking and dedicated, she notices fewer episodes of “intense management” and ad hoc workarounds. She knows her decisions make a real difference now . . . and she can see the results.

COL Dalton: Program Manager - can now actually do his job and make sensible tradeoffs among cost, performance, schedule (RDA) - and, unlike before, reliability, maintainability, tactical Ao and sustainment costs (O&M) - empowering and enabling him to manage his program to readiness goals and LCC for the first time. He works smarter, not harder.

MG Dalton: (G-8, Director, PAE) - can now relate HQDA program investment inputs to future readiness (Ao) outcomes and recommend PPBS/PPBES-related PB decisions and tradeoffs across RDTE, PA, and OMA accounts with much greater clarity and confidence. He can now provide compelling programmatic arguments since he has the analytic foundation for determining a multi-year resource program which matches resources necessary to meet readiness demands for a “capabilities-based” force prescribed in the DPG.

LTG Dalton: CG, CJTF - is assured that he’ll receive ops-based, mission-focused log support; neither “just-in-case” (too burdensome) nor “just-in-time” (too risky), he will have both the package appropriate for his mission and responsive resupply.

Dr. Dalton: ASA (ALT) - can now report to SecArmy that Army complies with DRRS for Title X logistics function; he is now empowered with insight from a new “Logistics Early Warning System”.

GEN Dalton: CSA - has greater confidence that his HQDA investment decisions can now be related to readiness-oriented results; unlike his predecessor, he no longer feels compelled to ask in frustration “Why am I still throwing billions down this ‘black hole’ called ‘spares’?”

Congressman Dalton: HASC - gains much greater confidence in credibility of both budget submissions and requirements presented for Army logistics. He supports full funding because he understands implications for national security. He concurs with his colleagues that GAO should now remove Army “inventory management” from its “high risk” list of government programs, where it has been for a decade and a half.

“Joe” (the American taxpayer) Dalton (SP4 Dalton’s father): gets a better return on his tax dollar; feels assured that his young, 82nd paratrooper son will be OK - Airborne Hooah!!

Figure 23

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Technological Forecasting: A Strategic Imperative

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ABSTRACT

Assessing future opportunities and threats is a serious management concern. All we know about the future is that it will very likely pose new and different challenges. Hence, the basic resources which serve a business today may have little relevance under tomorrow's conditions. If a business is to survive, it must be prepared to adapt rapidly to the requirements of the future. Difficulty arises in forecasting these requirements. However imperfect forecasts may be, an attempt must be made to predict with some reasonable degree of certainty customer (product) needs and internal (process) company requirements.

As inputs to the process of strategy formulation and planning, forecasts have been used to gain a better understanding of the threats and opportunities to the business, and therefore the direction and magnitude of needed changes. Since technology has been responsible for many important changes in our society, forecasting future advances in technology may be as vital to executives in corporate level strategy formulation as it is for engineers and scientists reviewing an R&D program. During the last 30 years, numerous techniques for technological forecasting have been developed to enable a manager to obtain predictions which can be used with some certainty. These techniques will be addressed in this paper with emphasis on advantages and disadvantages from the manager's point of view.

INTRODUCTION

Most technology forecasting is classified as exploratory or normative. Exploratory is based on predicting future events from what has happened in the past up to the present day. A normative approach starts in the future at some possible state of events and works backward to the present determining steps necessary to reach the end point and associated probability of success. Although the scenarios developed from normative forecasting are interesting, they are beyond the concern of the typical manager whose objectives are more specific and limited. In most practical forecasting problems, it is common to use a combination of techniques. Selection is sometimes as simple as the technique which seems to be giving the least amount of forecast error. From the manager's point of view it is important to examine data from as many different angles as possible before making decisions.

It is rare that one company or a series of decisions has a profound influence on the future of technology. If one company does not proceed with a potential innovation, it is highly probable that another will do so within a short space of time. The history of technology contains many examples where similar innovations occurred almost simultaneously in different locations. This is not chance, but the result of a combination of advances in several technologies necessary for the achievement of an innovation. Although the principle of the gas turbine had been known for many years prior to its development in the late 1930's, the development of high-temperature materials allowed the gas turbine technology to be practically produced. Another example of ancillary technologies being integrated with a primary technology is the use of transistors in electronic equipment. Although transistor technology is credited for size reduction in electronic equipment, without such technologies as tantalum capacitors, transformers, printed circuits, dip soldering, nickel cadmium batteries, and silicon cell power supplies; the electronic equipment

would only be about 10% smaller than a vacuum tube equivalent [3]. Therefore, if forecasting is to provide useful information to managers regarding a specific innovation, it must take into account all technological advances in an area and their interactions.

Additionally, timing is extremely important. Before a certain date, it would be impossible to support the innovation because the technological capabilities would not exist. Once this stage has been reached, competitive forces are likely to ensure a limited time advantage to the company that seizes the initiative. Technology forecasting can assist in deciding when to start but will not guarantee success in the marketplace.

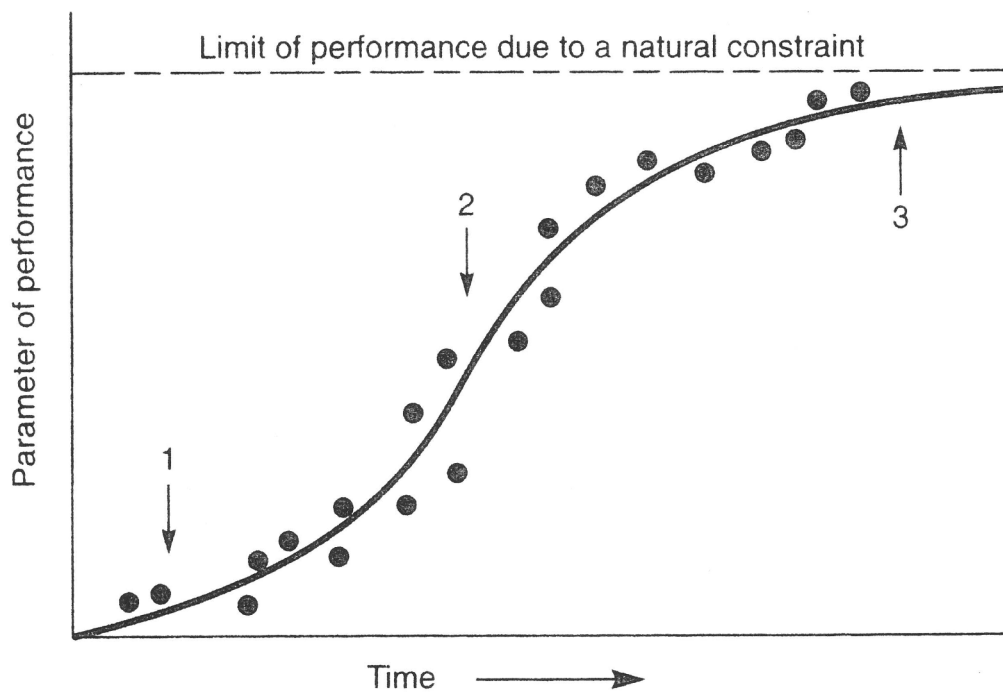
DEVELOPMENT OF THE S-CURVE

Fortunately for the manager, analysis of historical data from a number of phenomena shows that technological progress is not random or discontinuous but follows a regular pattern when a selected attribute is plotted against time. This pattern is referred to as an S-curve (See Figure 1). The curve is similar to a product life cycle which shows a slow initial growth, followed by a rapid rise of approximately exponential growth, which slows down as it approaches an upper limit set by some physical property. One can assume that there is a predetermined path that progress always follows. No progress occurs without management investment decisions. These decisions can significantly affect the slope of the S-curve and therefore the rate of growth of new technology [9].

The manager must also remember that just because an S-curve is approaching a natural limit does not remove the need to continue forecasting. Generally, it is at this time that a new technology may emerge. This new technology will have a new natural limit and the potential for further progress in performance. This situation frequently creates a stair-step succession of S-curves (See Figure 2). Ayres has shown this application in two separate studies: (1) the first looking at efficiency of the external combustion engine over a 270 years period and (2) the second plotting computer performance over a 30 year period spanning four new technologies [1].

Obviously, the study of past technological progress confirms the existence of regular patterns and provides a framework within which forecasting can be undertaken. It also indicates the types of information that the manager would like to extract from forecasts. Armed with this information, the following section will describe six technology forecasting methods.

Figure 1
The S curve



TECHNOLOGY FORECASTING TECHNIQUES

The following descriptions of a few of the most widely used techniques will not attempt to provide a working basis for their practical application; instead, they are intended to reinforce principles and show some of the potential problems likely to be encountered. Remember that the techniques are not an end in themselves, and their successful application must rest heavily upon the technological experience and insights of the managers using them.

Trend Extrapolation

The extrapolation of past trends into the future is a common technique used by economic forecasters for many years. This technique seems to be an easy exercise of applying a mathematical curve-fitting technique to past data and extrapolating future requirements. However, the technological forecaster must be wary of potential difficulties and traps in this technique. Considerable judgment is required both in the choice and use of data.

Selection of the proper attributes to plot is very important. The wrong choice will certainly lead to the wrong conclusion. An example would be the late entry of the U.S. aircraft engine manufacturers into using gas turbines for civil air transport. One suggestion for this problem was the use of specific fuel consumption as the primary engine performance measure. Considering another parameter such as passenger miles per unit of cost would have shown the potential of the gas turbine power system in spite of high specific fuel consumption. Therefore, the traditional direction of technology established for over 30 years in the propeller-driven aircraft powered by piston engines caused engine manufacturers to lose sight of customer needs in a different market. This shows the danger of mechanically forecasting without a proper understanding of the technologies, their interactions, or the markets in which the technologies are to be used [9].

One of the most difficult problems in trend extrapolation occurs from the absence or inadequacy of data to use for forecasting. Whereas the economic forecaster has reliable statistics to use, this is rarely the case with historical technological data. Questions of where the data was obtained and how it was obtained (civilian aircraft versus military aircraft, actual test versus static testing, classified information, etc.) are relevant. Unless such questions are resolved, curve fitting can be difficult and plotted data will not be comparable. Therefore, most forecasters will make several projections using different curve-fitting techniques which may offer the manager little useful decision making guidance. As a manager faced with inadequate or little usable data, a system for collecting and recording data should be established so forecasting accuracy can be steadily improved.

In spite of difficulties of accurate trend extrapolation, it is one of the most widely used techniques used today. However, confidence will diminish over a long forecast time and this technique is consequently of greatest value in the short term.

Curve Matching Using Precursor Trends

Commercial application of a new technology is usually linked to a specific use where cost and reliability are very important. However, in pure scientific research or military applications, high

cost or doubtful reliability may be less important than performance. Aerospace and electronics are two industries where this is particularly true.

The trends for both the initial technology application and the follow-on commercial adoption are likely to follow each other exactly but with a consistent lag. Lenz has shown that the speed of transport aircraft has lagged combat aircraft by about ten years over the period from 1930 to 1970. Therefore, if a forecaster can identify a precursor application which follows a regular trend behind his own application, then there is a good indication of the introduction of advanced technologies into commercial products [5].

The discovery of a precursor relationship gives the forecaster two data points for future use. One obtained from extrapolating the curve for his own application, and a cross-reference from the precursor. It may also provide the forecaster with useful data on the date when a new research laboratory technology is likely to achieve commercial introduction.

Delphi Technique

Expert opinion can give important insights into the future, particularly in the identification of potential innovations likely to disturb the path of progress away from the extrapolated trend. The Delphi technique was developed at Rand Corporation to overcome the weaknesses of the committee by using the individual judgments of a panel of experts working systematically and in combination, divorced from the distortions introduced by their personalities. Delphi attempts to eliminate these weaknesses by using a questionnaire techniques circulated to a panel of experts who are not aware of the identity of their fellow members.

Selection of the panel members is an extremely important task. The value of the forecast is a function of the caliber and expertise of the individual contributors, as well as, the appropriateness and comprehensiveness of their areas of knowledge. Questionnaire formulation also requires considerable skill to ensure the right questions are asked and that they are framed in specific, quantifiable, and unambiguous terms. Delphi is widely used for longer range forecasts.

Evidence supports the contention that Delphi studies result in a gain of consensus; however, the question of forecast accuracy is still unanswered. There are some indications that there is a tendency to err in an optimistic direction in the short term due to an underestimation of development times. In contrast, long term forecasts may well be pessimistic due to the mind's inability to properly estimate the effects of exponential growth [6].

Scenarios

Scenarios describe a possible future situation based upon a wide range of environmental analysis. Several scenarios or alternate futures are frequently prepared supported by detailed research using a wide variety of technology forecasting techniques. Scenario writing is based on the idea that a choice between alternative set of assumptions is not always possible.

Energy forecasting is an area where scenarios have been use extensively . Several practical techniques for industrial scenario writing have been developed to enable the consideration of the interactions of a wide range of environmental factors both upon themselves and upon an organization's strategic objectives. Therefore, this is an approach which extends beyond top management to review their strategic assumptions and the consequences flowing from them [7].

Most authors stress the interaction between the decisions resulting from forecasts and the determination of the future. If a certain scenario is thought to be likely, then following a specific policy as a result of the forecast could make it a self-fulfilling prophecy. Few companies have the ability to shape the future; however, one can see how scenarios could be used to shape government policy. For example, if a specific scenario is highly undesirable for Americans in the future, then government policies could ensure that the path leading to it is sealed off [4].

Relevance Trees

A relevance tree is developed to determine and evaluate systematically the alternative paths by which a normative objective or mission could be achieved. Thus, starting from a desired objective, it is possible to examine exhaustively all possible alternative paths by which it can be reached, working backwards through a hierarchy ending with specific research projects. The next stage is to investigate each step in greater depth including feasibility, resources required, probability of success, and time scale. This involves the use of other technology forecasting methods such as Delphi and trend extrapolation.

This technique can lead to highly complex, sophisticated computer approaches which are very time consuming and expensive. Honeywell used a relevance tree to model all military and aerospace activities which the company was or could be involved. The cost of setup for this program was \$250,000 with an annual run cost of \$50,000. The scale of this effort should not deter the manager with limited resources. The basic relevance tree methodology can be a useful planning tool even in a simplified form [8].

Technology Monitoring

Although the simplest of the techniques that have been described, technology monitoring can be a very attractive technology forecasting method to the typical manager. Since the period between the emergence of a technological advance/new technology and its practical application may span many years, a well informed manager using judgment and insight may be able to accurately forecast application introduction.

Most managers receive their information randomly from reading, discussions, conferences, etc. If judgment is to be upon good and comprehensive information, the gathering of the information should be as organized as possible. Those of potential value should be stored with their significance noted.

Bright has proposed monitoring the environment on a systematic basis. The monitoring process is based upon journal entries of significant technological events with possible significance to your product or manufacturing process. These individual entries of information can be pieced together with managerial logic to form a picture of the future [2].

The attraction of monitoring is that it can be performed by any individual manager for his own information. It is surprising how much one person can glean from systematically processing information received daily. The richness of the information and the deductions are obviously

enhanced if organized on a departmental or larger basis.

THE TECHNIQUES IN PERSPECTIVE

Vanston's 5 Categories

Putting these techniques into the context of the way forecasters view the future, Vanston (2003) classifies forecasting approaches based 5 classifications:

1. Extrapolators. Based on the assumption that the future will resent itself as an extension of the past, extrapolators believe that the future can best be forecast by extrapolating past trends in a logical manner. This approach may not take consider the possibility, sometimes likelihood, that some technologies can result in dramatic shifts.
2. Pattern analysts. Like extrapolators, pattern analysts follow the assumption that the future will replicate past events. Future events occur cycles and patterns that replicate the past. Identifying and analyzing similar conditions from the past and applying them to future circumstances then provides the best forecast.
3. Goal analysts. Goal analysts believe that by examining the stated and implied goals of various leading decision-makers and trendsetters the future can be projected by considering the impact each can have on future trends and events. The forecast, then, will represent the sum of the beliefs and actions of these people and institutions.
4. Counter-punchers. Counter-punchers approach the future as series of essentially random events that cannot be predicted. The best approach, then, is to consider a range of possible scenarios, and maintain a highly flexible system of planning. The complexity of society and technology often results in unexpected results.
5. Intuitors. Intuitors believe the future will be a result of complex forces, random outcomes and the actions. Because of this complexity, there is no rational approach to forecast the future analytically. Forecasting, then, is approached through information, intuition, and insight. (10)

Mehta's Future Signals

Mehta (2005) found in his research that executives at all of the “high-risk, high-growth” companies surveyed responded that considering future signals, rather than was largely responsible for successfully predicting outcomes, managing transitions, and adjusting their strategies for success. Carefully monitoring these signals allowed them to react quickly to environmental changes. Further, Mehta postulates that a strategy of simply attaining goals, without monitoring and considering these future signals may actually impede reaching those goals. In his study, Mehta identified roughly “90 unique future signals or leading in- dicators used by the 56 companies, with most companies tracking 10 or more regularly” [9].

CONCLUSION

Most of the initiatives in technology forecasting originated in the United States, where several major aerospace companies invested heavily in it. Some authors doubt whether the results justified the substantial investments. However, in recent years there has been a resurgence on two levels. The first is concerned with research and development planning decisions, while the second focuses on corporate strategic issues, sometimes referred to as "futures studies". It is also recognized that since technology now grows more rapidly than ever before, discontinuities may be experienced which may make extrapolation techniques of questionable use to managers. Therefore, a growth in the use of such techniques as scenarios and technology monitoring has been experienced.

A major cause for the low rate of acceptance in industries is likely to be reluctance to invest large resources in an untried technique. Nevertheless, as the pace of technological progress continues to increase, so will the need to accurately forecast the future. All R&D decision makers must take a conscious view of the future. Forecasts are needed which take full account of the information available and the techniques of technology forecasting. However, it should be noted that the effort devoted to technology forecasting should be related to the characteristics of the industry, the company, and the decisions to be made, rather than to the size of the company.

Technological forecasting cannot enable decision makers to predict the future with certainty, but it can assist them in refining their judgments. The value of the forecasts was seen to be highly dependent upon the quality of the inputted data to the forecasting process and the ability of the decision makers to use it properly. Sophisticated forecasting techniques can only be aids to this process, and care should be taken to guard against technology forecasting absorbing greater resources than can be justified by the introduction of the technology.

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**SCHEDULING REMANUFACTURING OPERATIONS:
A LITERATURE REVIEW AND ANALYSIS**

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**SUBMITTED TO 2008 ANNUAL MEETING OF THE SOUTH EASTERN INSTITUTE FOR
OPERATIONS RESEARCH AND THE MANAGEMENT SCIENCES**

ABSTRACT

We examine our progress in scheduling remanufacturing operations by reviewing the literature in detail. We individually examine published research in scheduling disassembly, remanufacturing/repair, and reassembly operations and their integration. The objective functions/performance criteria, quantitative methodologies, and complexities/issues are examined. Finally, an overall assessment of our progress and continued research needs are presented.

1. INTRODUCTION

Remanufacturing allows products that are no longer functional to re-enter the manufacturing process to be refurbished or disassembled into usable modules, components, or materials or disposed. Remanufacturing in the U.S. is a \$53 billion per (Giuntini and Gaudette 2003). This reprocessing can significantly reduce the amount of waste directed at landfills and conserve natural resources involved in product development. This is particularly important when manufacturers are facing increasing pressure to produce products in an environmentally supportive manner. According to Carter and Ellram (1998), over \$124 billion is spent in the United States to comply with mounting environmental statutes and regulations and this undoubtedly will escalate. Remanufacturing received academic attention at MIT's Center for Policy Alternatives as early as 1979 (Lund 1984) and published reports of industrial applications of remanufacturing/recycling in the automobile industry emerged in the early 1990's (e.g., Wolfe 1991, Stix 1992, Anon 1993).

There is enormous complexity involved with developing effective and efficient remanufacturing operations. They are arguably more difficult than designing and managing forward supply chains, since forecasting the timing and quality of product returns and determining the optimal disassembly sequence(s), as examples, are so problematic (Toktay 2003). Guide (2000) outlines the characteristics that significantly complicate the production planning and control activities involved in remanufacturing: (1) the uncertain timing and quantity of returns, (2) the need to balance returns with demands, (3) the disassembly of returned products, (4) the uncertainty in materials recovered from returned items, (5) the requirement for a reverse logistics network, (6) the complication of material matching restrictions, (7) the stochastic routings for materials for remanufacturing operations, and (8) highly variable processing times. Other researchers (e.g., Krupp, 1993; Brennan, Gupta, and Taleb, 1994; Flapper et al., 2002; and Kim et. al., 2007) have noted other significant challenges, issues, and decisions involving remanufacturing scheduling, such as the selection of order release mechanisms, lot sizes, and priority scheduling rules; capacity restrictions; part commonality among multiple products; the planning of buffer inventories; scheduling over multiple time periods; integration of forward and reverse manufacturing operations, etc. and these are listed in Table 1.

TABLE 1

REMANUFACTURING SCHEDULING COMPLEXITIES AND ISSUES¹

- Mission or objective/objective function
- Need for a reverse, rather than forward, logistics network and operations
- Facility location decisions (location decisions now must consider recovery, transport, and remanufacturing considerations)
- Stochastic demands
- Balancing returns with demand
- Remanufacture or sell product as is
- Single vs. multiple stage operations
- In line vs. off-line rework
- Buffer stock location decisions
- Resource availability and allocation (particularly for facilities that produce new products and remanufacture returned items)
- One versus multiple products
- Product structure considerations (e.g., material or part commonality)
- Focused versus integrated (scheduling one or more than one operation simultaneously)
- Sourcing decisions (number of cores needed from returns, brokers, and new production and when)
- Uncertain timing and quantity of core returns
- Capacity restrictions per operation and for inventories
- Uncertainty in recovery materials or parts quality (material recovery rate or yield)
- Inaccuracies in grading returned product/component quality
- Uncertain routing for materials and parts in the remanufacturing operations
- Highly variable and uncertain processing (disassembly, reprocessing, and/or assembly) times
- Lot sizing
- Order release mechanisms

TABLE 1: CONTINUED**REMANUFACTURING SCHEDULING COMPLEXITIES AND ISSUES¹**

- Priority scheduling rules
- Scheduling for single vs. multiple time periods
- Complication of material or parts matching restrictions
- Accumulation of excess inventories for certain kinds of materials or parts
- Scheduling methodology employed (MRP, mathematical programming, heuristic, queuing theory, computer simulation, etc.)
- Allowing backlogging

1. List compiled from Krupp 1993; Brennan, Gupta and Taleb 1994; Guide 1997(a); Guide 2000; Flapper, Fansoo, Broekmueulen and Inderfurth 2002; Sousa, Ketzenberg, and Guide 2002; Lee, Kim, Choi, and Xirouchakis 2004; and Kim, Lee, and Xirouchakis 2007.

Guide (2000) describes a typical remanufacturing facility to consist of three distinct operations: (1) disassembly, (2) remanufacturing/repair, and (3) reassembly. Disassembly separates the returned item into its modules, components, or basic materials. These are evaluated and determined to be acceptable for reuse, repairable, sold for scrap, or discarded. Those modules and components needing repair or rework are inventoried for later recall or sent to the remanufacturing/repair operations. After reconditioning to a usable state the modules or parts are inventoried awaiting use or sent directly to the reassembly processes, where they are reassembled into products for resale and readied for finished goods inventory or shipment. As emphasized by the complicating characteristics, the scheduling and control of each of these operations is an extremely challenging task.

However, progress has been made in: (1) identifying the realistic complexities and issues in remanufacturing scheduling needing address, (2) reporting how industry is actually addressing these issues, and (3) developing numerous quantitative methodologies and testing various objective criteria to achieve improved, if not optimal, solutions. Numerous articles have been published and research projects completed on these subjects; the review article by Gungor and Gupta (1999) alone contains over 300 references. Review articles are needed periodically to summarize and analyze these efforts – establish where we are and the future directions needing exploration. Thus, the purpose of this research effort can be divided into three stages: (1) review the progress we have made in the scheduling and control of disassembly, remanufacturing/repair, and reassembly operations; (2) assess how we have advanced our ability to address the scheduling complexities mentioned in the literature; and (3) highlight additional research. Our research is currently at stage one. We know of no other research that has reviewed in detail the scheduling literature for all three remanufacturing areas and further analyzed each stage by production strategy (make-to-stock, assemble-to-order, and make-to-order). Figure 1 delineates the boundaries of our research effort, which includes the three remanufacturing operations and the buffer inventory considerations between them. Figure 2 illustrates the three remanufacturing stages and their further analysis by production strategy.

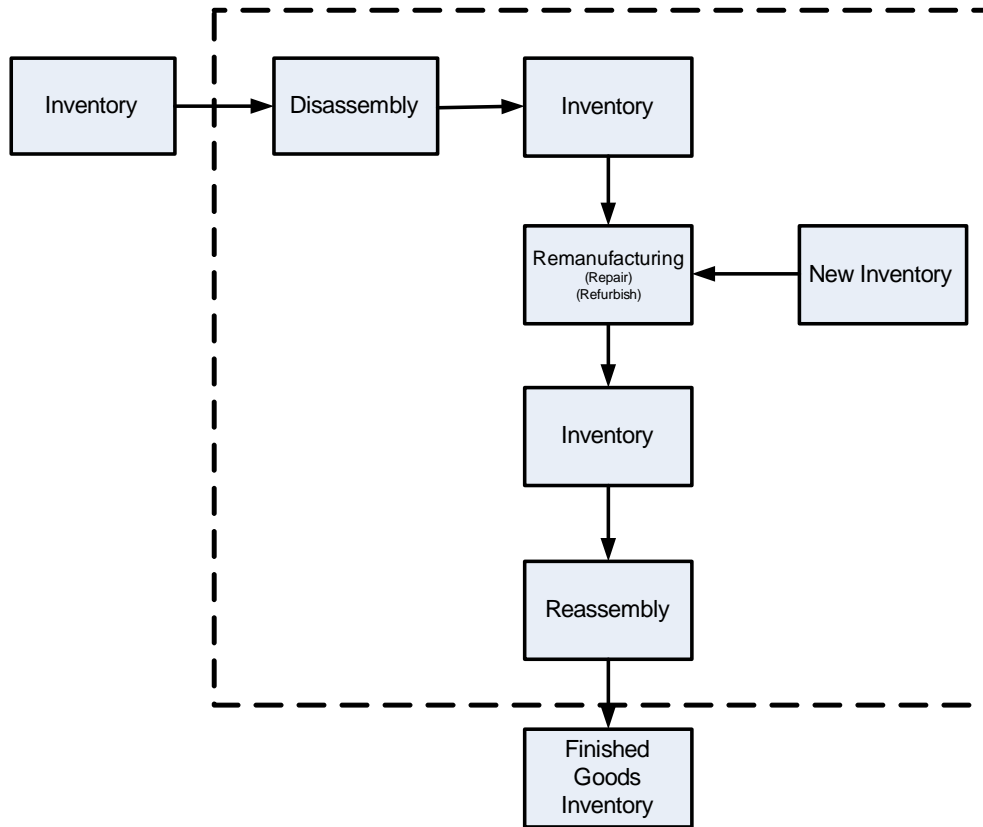


Figure 1: Remanufacturing Shop

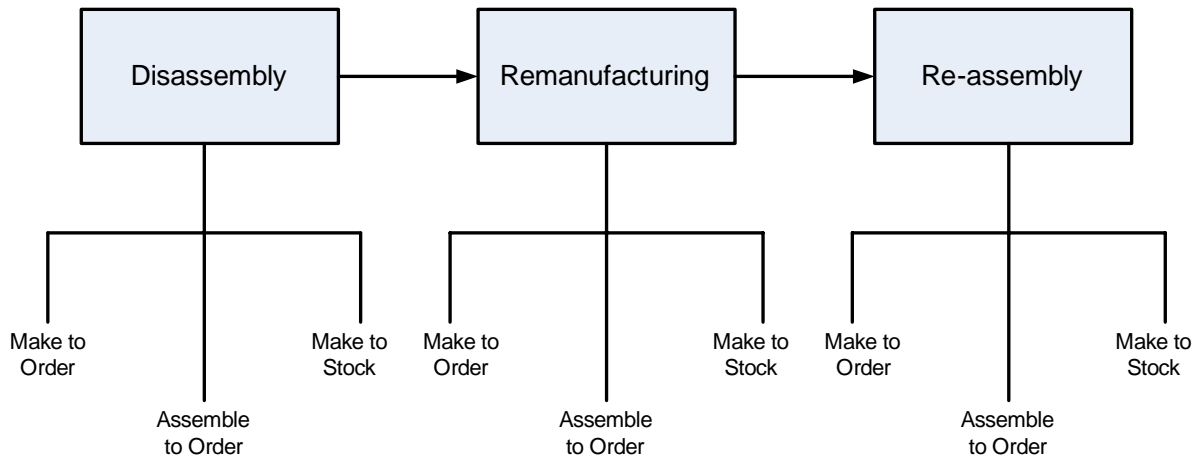


Figure 2: Remanufacturing stages and production strategy

The current state of our literature analysis is divided into three sections. In Section 2 we review the literature on disassembly scheduling. Section 3 describes our current progress in analyzing the literature regarding scheduling remanufacturing and repair operations. Section 4 reviews the literature that approaches sustainable manufacturing from an integrated approach. That is, those research efforts that provide a comprehensive approach to disassembly, remanufacturing, and reassembly. Within each section, we further subdivide the literature into single versus multiple products. The final breakdown is by topic, e.g., part commonality/ product complexity, capacity planning,, lot sizing and inventory effects, order release, priority dispatching rules and control mechanisms, and uncertainty and stochasticity. Finally, Section 5 characterizes our future work.

2. SCHEDULING DISASSEMBLY OPERATIONS

We first characterize the disassembly structure. The root item is the product to be disassembled. A leaf item cannot be disassembled further and are the items to satisfy demand. In Figure 3, item 1 represents the roots and items 4, 5, 6, and 7 are leaf items. A child is defined as any item that has at least one parent and a parent has at least one child. Referring to Figure 3, item 3 is a parent to child items 6 and 7. Numbers in parentheses represent the item yield when the parent item is disassembled. Thus, when item 2 is disassembled it yields four units of item 4. From this, we define the basic disassembly problem as follows:

For a given disassembly structure, determine the quantity and timing of disassembling all parent items (including the root item) while satisfying the demand of leaf items over a given planning horizon with discrete time periods.

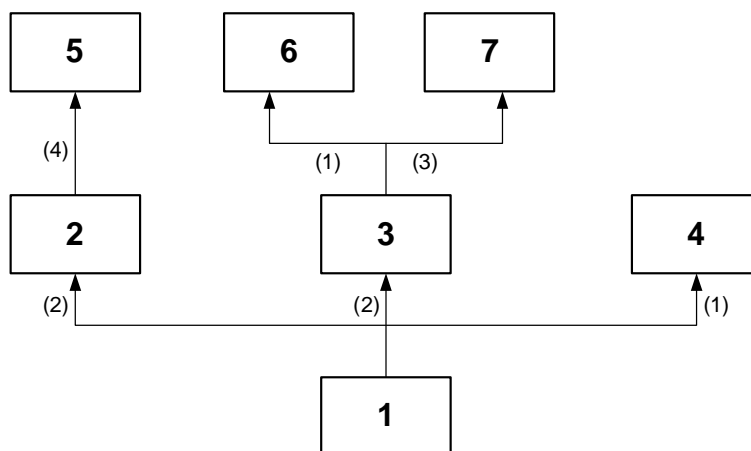


Figure 3: Disassembly Structure/ no commonality

2.1 Disassembly Operations for Single Products

Gupta and Taleb (1994) help define the disassembly scheduling problem and reiterated that MRP cannot be applied to shop floor operations that require disassembly of some items. They present an algorithm that is essentially a reverse version of materials requirements planning. In their algorithm the demand for leaf items (parts) is converted into the required demand for parent items level-by-level up to the root item (finished good). Thus, the disassembly schedule for the root item and all other parents is determined so as to satisfy the demand for all leaf items; no other objective is addressed. The authors demonstrate the procedure for a single product assuming constant lead times, no defects, and infinite capacity. They recognize the likelihood of excess part inventories that can result. Finally, they also mention the need to address part commonality and the necessity to integrate the scheduling of disassembly and assembly operations.

Lee *et al.* (2004) develop integer-programming models to solve disassembly scheduling. Integer programming models are developed to solve three cases of the disassembly-scheduling problem – (1) single product without part commonality, (2) single product with parts commonality, and (3) multiple product types with parts commonality. For ease of presentation the integer programming results for each problem case will be discussed in the appropriate section of this paper. The objective is to minimize the sum of the purchase, set-up, inventory holding, and disassembly operations costs. The authors do not compare their results directly to the results obtained by Gupta and Taleb (1994; single product with no part commonality), since the MRP-like algorithm of Gupta and Taleb provides the optimal solution. However, the authors do test the performance of their integer programming formulation on a set of 900 randomly generated test problems for each combination of three levels of the number of items (10, 20, and 30) and three levels of the number of periods (10, 15, and 20) for a total of 2700 evaluated test problems. Results show that most problems are solved optimally. The performance of the integer programming models becomes worse as the number of items increase and as the number of periods increase.

Jayaraman (2006) presents a linear programming model that minimizes the total cost per remanufactured unit. The solution to the model provides a value for the number of unit cores with a nominal

quality level that are disassembled and remanufactured in a period, the number of modules remanufactured, and the number of cores that remain in inventory at the end of a time period.

Parts Commonality and Product Structure

Disassembly scheduling that takes into account part commonality is more challenging to solve. Part commonality implies that a product or subassembly shares its parts or components. The complexity with parts commonality arises from the multiple procurement sources for each common part and the additional interdependencies between parts/components (see Figure 4).

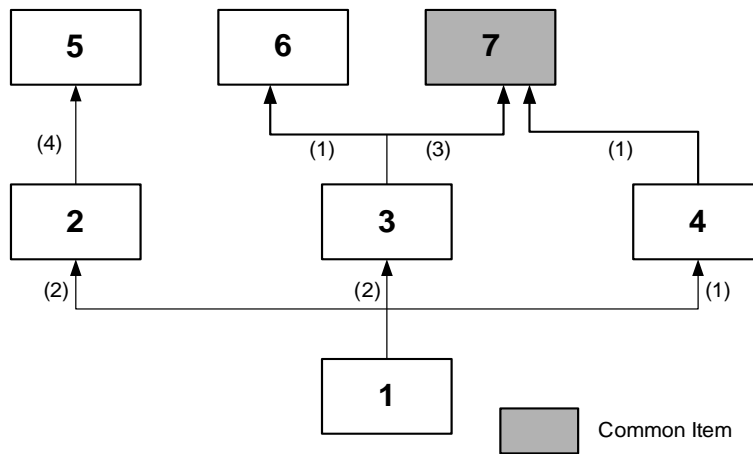


Figure 4: Single Product with part commonality

In 1997 Taleb, Gupta, and Brennan (TGB) offer a reverse MRP-based algorithm for a disassembly product structure that includes common parts and materials. Their objective is to minimize the total number of end items to disassemble to fulfill the demand for components. The authors assume lead times are constant, no defects, and unrestricted capacity.

Neuendoft et al extends the work of TGB (1997) by presenting an algorithm based on Petri Nets. In the first step of the algorithm, the minimal number of root items to meet the total demand of all leaf items is computed. The second step details the disassembly schedule of the root item so that demand in each period can be satisfied. The authors show that their Petri Net algorithm, overcomes many of the shortcomings of the TGB algorithm. Most notably, the TGB algorithm has the assumption that parts commonality occurs at the same level within the disassembly product structure making the algorithm less extendable to a variety of product structures.

In the work of Lee *et. al.* (2004) their integer programming formulation is modified to solve single product disassembly problems with parts commonality. The cost-based objective remains the same. However, the inventory balance constraints are modified to account for the potential of multiple parents for a given item. The result of their integer programming solution are compared with Taleb Gupta, and Brennan (TGB) (1997; single product with part commonality) and Neuendorf et al (2001) who in addition to their Petri Net algorithm, present a corrected version of TGB to overcome the round-off errors observed in the TGB original solution. Results show that the integer programming models achieve the optimal solution for the existing problems in the open literature and provide optimal or near-optimal solutions to a set of randomly generated test problems. The cost-based objective function proves to be particularly useful when compared with TGB, since multiple solutions exist and the cost-based objective presented in the paper provides a method to distinguish among the solutions generating the same number of products to be disassembled. Extensions to the integer programming models call for incorporation of defective parts and/ or components, stochastic demands and disassembly operation times.

Capacity planning

The difficulties in planning capacity for remanufacturing operations have been cited by Fourcaud (1993). Guide and Spencer (1997) state that traditional methods of manufacturing planning and control are difficult to use because of complicating factors such as probabilistic routings, uncertain material replacement, and highly variable processing times for repair operations. To aid in planning capacity with these uncertainties they develop a modified bill of resources method. This methodology incorporates an occurrence factor (OF), the percentage of time that a particular operation is required, and a material recovery rate (MRR), the frequency that material recovered from a core unit is repairable, into the bill of resources. These modifications help to account for the variation inherent in remanufacturing.

Later Guide, Srivastava, and Spencer (1997) use computer simulation to evaluate the performance of five rough-cut capacity planning techniques in a remanufacturing environment. These are the bills of resources, capacity planning using overall factors, modified bills of resources, bill of resources with variances, and modified bills of resources with variances. The latter two techniques are modified from the original methods in order to account for the inherent variability in the remanufacturing system. This is done by adding the standard deviation of the historical utilization rates at each work center to the calculations for

the required capacity. Results indicate that the modified bill of resources with variance is the best choice.

A clear result of this analysis is that techniques for capacity planning which recognize and include a measure of the variability inherent in the uncertain remanufacturing environment will perform better than the standard rough-cut capacity planning models.

Lee *et. al.* (2001) present a review of disassembly planning and scheduling research and call for an integrated approach to disassembly planning and scheduling. They emphasize that since the disassembly plan feeds into the disassembly schedule, it is imperative that both are considered at the same time.

Lot sizing and inventory effects

Perry 1991 reports the differences in lot sizing and lead times for thirteen remanufacturers in seven industries and compares these to traditional manufacturers and concludes that the differences were due to management and control policies.

Guide and Srivastava (1997) study the impact of safety stocks in a MRP system on remanufacturing customer service and inventory levels. The computer simulation study focuses on a single product, both a homogeneous and a heterogeneous material recovery environment, smooth and lumpy product demand, short and long component lead times, and five different safety stock levels (including none). Results from the study indicate that for both types of material recovery environments safety stock does protect against uncertainty and improve customer service, but only to a certain point. Slightly more buffer inventory is required for the heterogeneous environment to achieve equivalent customer service levels. The authors conclude that, due to the high degree of uncertainty in remanufacturing, increasing buffer inventories to enhance customer service levels has limits and they suggest managers also investigate shorter lead times and demand management as alternative areas of exploring improved customer service levels.

Guide and Srivastava (1998) emphasize the importance of inventory buffer locations to connect remanufacturing operations and provide managerial flexibility and control. They study the interaction of disassembly release mechanisms (DRM) (time-phased to minimize flow time, time-phased according to due date, and disassembly flush - all parts disassembled and released to the shop floor) and the location of inventory delay buffers – after disassembly, before reassembly, or mixed (at both locations). They conduct their experiment using computer simulation based on an actual facility, allow both common and serial specific parts within a single product, and examine three levels of utilization. Results are assessed on mean

flow time, mean lateness, and mean reassembly delay time. They learn that serial numbered parts should be managed distinctly from common parts with the best DRM being a flush leading to a reassembly delay buffer. This combination performs well for flow time and lateness. However, for common parts the authors encourage a time-phased, minimum flow time DRM with mixed inventory buffers. Finally, the authors note that the time-phased, due date DRM and the resulting disassembly delay buffer, predicated on MRP logic and commonly favored by managers, is an extremely poor performer regarding flow time and lateness. They emphasize the significance of this finding, given the popularity of MRP systems. They attribute this finding to the higher degree of uncertainty and unpredictable lead times in remanufacturing versus traditional operations.

Inderfurth et al. (2001) develop a stochastic, dynamic optimization model to tackle the complex problem of determining optimal or near-optimal, periodic review inventory policies necessary to support various remanufacturing options (including disposal). Both the returns and the demands for the single product are stochastic. The objective is to select quantities of returned product to be remanufactured via each option so that the total expected, discounted total costs of remanufacturing, disposal, stock holding, and backordering is minimized, while satisfying the demand over a finite or infinite horizon. The authors show the complexity of this multiple recovery option problem, particularly when returnable products are scarce and an allocation scheme must be employed. However, the authors illustrate that use of linear allocation rules allow the development of fairly simple, near-optimal control policies. The authors assume infinite remanufacturing and inventory storage capacities.

Teunter and Vlachos (2002) study a single item, stochastic, hybrid production system (manufacturing and remanufacturing). They examine a variety of demands, returns, and manufacturing/remanufacturing characteristics to determine what the cost reduction for incorporating a disposal option for returned items would be. They conclude that under the assumptions that, on average, demands exceed returns and remanufacturing is marginally profitable, a disposal option is not necessary. Exceptions are for very slow-moving items (fewer than a demand of 10 per year) for which remanufacturing is almost as expensive as manufacturing plus disposal (at least 90%), and for which the recovery rate is large (at least 90%). As returns exceed demands a disposal option is increasingly desirable. However, such situations simplify the production system, as the manufacturing option would be increasingly unnecessary.

Barba-Gutierrez *et. al* (2008) extend the reverse MRP algorithm of Gupta and Taleb (1994) by incorporating the concept of lot sizing in connection with disassembly scheduling. The authors use the period order quantity (POQ) lot sizing rule on a portion of the example from Gupta and Taleb (1994). Results indicate that the POQ turns out to be one and thus the ordering sequence has the same structure that the sequence for planning disassembly. To test the behavior of the algorithm further the authors consider nine different scenarios with different cost combinations. Four different lot-sizing rules (i.e., lot-for lot (L4L), POQ, best disassembly schedule in each subassembly (BIES), and best combination (BC)) are tested on the nine different problem scenarios. Results indicate that the BC lot-sizing rule is the best in all cases considered.

Order release, priority dispatching rules, and control mechanisms

Kizilkaya and Gupta (1998) introduce the use of a Flexible Kanban System (FKS) to control the flow of returns to a disassembly cell, the partially disassembled products and parts among work stations within the cell, and to demand points external to the work cell. The authors report the results of a simulation study, which shows the FKS system had slightly higher WIP inventory than a traditional Kanban system (TKS), but that the amount of shortages were less.

Uncertainty and stochasticity

Guide, Kraus, and Srivastava (1999) emphasize that remanufacturing systems face a greater degree of uncertainty and complexity than traditional manufacturing systems and thus, require planning and control systems designed to deal with the added uncertainty and complexity. A number of researchers support this position (e.g., Flapper 2002, Gupta and Taleb 1994, and Johnson and Wang 1995).

Guide (2000) insists that managers must be deliberate in their actions to reduce the uncertainty in the remanufacturing environment. Unlike the traditional forward supply chain, production planning and control in a remanufacturing environment must contend with acquiring cores. In this work, a framework for product acquisition is developed that links reverse logistics activities with production planning and control activities. A set of six managerial guidelines are presented and encouraged to be used as the starting point to reduce uncertainty in the timing and quantity of materials. This in turn provides the potential to reduce uncertainty

throughout the remanufacturing system particularly in regard to inventory control and balancing returns with demand.

Inderfurth et al. (2001) develop a stochastic, dynamic optimization model to tackle the complex problem of determining optimal or near-optimal, periodic review inventory policies necessary to support various remanufacturing options (including disposal). Both the returns and the demands for the single product are stochastic. The objective is to select quantities of returned product to be remanufactured via each option so that the total expected, discounted total costs of remanufacturing, disposal, stock holding, and backordering is minimized, while satisfying the demand over a finite or infinite horizon.

Teunter and Vlachos (2002) use computer simulation to study a hybrid production system (manufacturing and remanufacturing). They examine for a variety of demands, returns, and manufacturing/remanufacturing characteristics what the cost reduction associated with a disposal option for returned items would be. Poisson and normal distributions are used to model demands and returns per time period.

Tang et. al. (2007) estimate planned lead times in a make-to-order remanufacturing environment. Specifically, the problem of determining when to disassemble such that component parts are available in the right quantity and condition for reassembly is modeled as a newsboy problem. The authors also use a mixture of Erlang distributions in their stochastic computations.

2.2 Scheduling Disassembly for Multiple Products

The case of multiple products with parts commonality adds additional complexity. In this scenario there is more than one root item and items that may have more than one parent (see Figure 5).

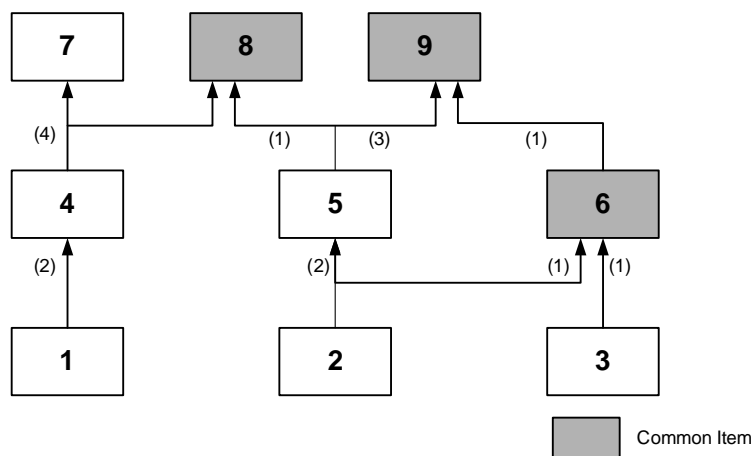


Figure 5: Multiple products with parts commonality

Part commonality and product structure

Taleb and Gupta (1997) present a methodology, in part employing reverse MRP logic, for disassembling multiple product structures with parts and material commonality. This methodology consists of two algorithms: the Core Algorithm and the Allocation Algorithm. The first algorithm determines the total disassembly requirements of the root items over the planning horizon in order to minimize the total disassembly cost. The latter algorithm provides a schedule for disassembling the root items and subassemblies by allocating requirements over the planning horizon and implicitly minimizes the holding cost by delaying disassembly as much as possible. The methodology assumes constant and known lead times, no defects, and unrestricted capacity.

Lee *et al.* (2004) modify their integer programming model once again to handle the case of the multiple product types with parts commonality. Their integer programming model is compared to the two-phase heuristic of Taleb and Gupta (1997) described above. Two objective functions are considered (i.e., minimize the number of products to be disassembled and minimize the sum of product disassembly costs) with the integer program for adequate comparison with the Taleb and Gupta (1997) two-phase heuristic. Results indicate that the integer program outperformed the two-phase heuristic under both objective function scenarios using the existing problems from the literature.

Capacity planning

Kim *et al.* (2006) present an integer programming model for disassembly scheduling (i.e., the quantity and timing of disassembly) such that the sum of set-up, disassembly operation, and inventory-

holding costs are minimized. Multiple products with part commonality are considered. A two-phase heuristic procedure is presented which first finds an initial solution by solving the linear programming relaxation and then refines the solution using a dynamic programming algorithm. This paper extends the work of Kim (2003). Test results show that the two-phase heuristic provides near-optimal solutions in short computation time. Extensions to this work call for the elimination of several assumptions to the model. Specifically, the complicating characteristics of (1) defective part and component recovery, (2) stochastic demand and lead times, and (3) resource capacity constraints need to be incorporated into the model.

Additional literature analysis in the areas of order release mechanisms and priority dispatching rules, uncertainty and stochasticity and lot sizing remain for future work.

3. SCHEDULING REMANUFACTURING/REPAIR OPERATIONS

Order release, priority dispatching rules, and control mechanisms for remanufacturing operations (Single Products)

Researchers (e.g., Panisset 1988, Krupp 1993, Gupta and Talem 1994) recognized that traditional material requirements planning (MRP II) was inadequate to address the needs of remanufacturing due to multiple demand points (leaf items), the divergence property, the uncertain rate of recovery, uncertain routings, uncertain yield from material recovery, stochastic task times, etc. However, a number of efforts were made to modify or augment elements of MRP to make it more amenable to remanufacturing scheduling. Panisset (1988) pointed out that traditional material requirements planning (MRP) logic and the supporting bills of materials do not provide sufficient guidance for repair/refurbish industries (e.g., diesel locomotives and railcars).

He offered a “repair bill”, which had lead-time offsets for disassembly, repair, and assembly. He recognized that different repair plans and times would be needed and would often be unknown until the end item was disassembled. Thus, he created different “repair classes” which prescribed different repair operations and times. For some parts these were based on the repair class that occurred most frequently. For others, it was based on the most complex or pessimistic repair. Finally, some had only one type of repair. The planners decided the appropriate repair class.

Thus, Panisset handled the uncertain nature of the work (routings, operations, times) by creating repair classes and employed the intervention of the planner to select the appropriate repair class before

disassembly and modify the plan, if necessary, after disassembly operations. The production strategy here was essentially a repetitive, make (or repair)-to-order job shop, since one or multiple items could be sent for repair (locomotives, box cars, electrical equipment, etc.) and similar items were sent for repair/refurbish operations allowing somewhat standardized planning.

Krupp (1991) offered suggestions and evidence of how restructuring and adding additional bills of materials can address some of the challenges of using MRP II systems in a remanufacturing environment. These challenges include the uncertain timing and quality of returned of cores, salvage yield, and the need to having matched sets of replaced parts.

Inderfuth *et. al* (2001) consider product recovery with multiple remanufacturing options. Products entering the reverse network are not all suitable for the same reuse option. Different remanufacturing options have different cost and profits values associated with them that must be considered. The objective of this work is to select the correct quantities of product for a specific remanufacturing option such that the costs (i.e., disposal, remanufacturing, stock holding, backordering) are minimized. A periodic review system is employed with stochastic returns.

Souza *et al.* (2002a) investigate the impact of various dispatching rules to determine the optimal remanufacturing policy. This work considers the case where a remanufacturer can sell products “as is” to the consumer or remanufacture the product. Products returned to the remanufacturer are categorized or graded base on condition. Graded products that are not sold “as is” to the consumer are assigned to a remanufacturing station based on three different dispatching rules (*Random*, *MaxDiff*, and *Dynamic*). The objective is to maximize profit while achieving a desired service level which is measured by the flow time (lead time) for an order. Results show that the *Dynamic* dispatching rule which accounts for the current workload at each remanufacturing stations outperforms the *Random* and *MaxDiff* dispatching rules.

A second objective of Souza’s work explores the impact of inaccuracies with the sorting/ grading function on product flow time/ service level. Simulation results show significant increases in flow times as grading errors increase with the *Dynamic* dispatching rule appearing to be less sensitive to increased grading errors over the *MaxDiff* rule.

Part commonality and product structure for multiple products

Kim *et al.* (2006), present a mixed integer program to aid remanufacturers in deciding how many cores should be designated for remanufacturing and how many new parts to purchase from an external supplier, such that the cost savings from remanufacturing is maximized. A numerical example with multiple products and part commonality is presented to test the proposed model. Sensitivity analysis is conducted to assess how changes in the capacity of the remanufacturing facility impacts the objective function. Results indicate that an optimal remanufacturing capacity exists such that additional capacity expansion does not improve the cost savings.

4. SCHEDULING INTEGRATED OPERATIONS

Scheduling integrated operations encompasses the full range of complexities associated with remanufacturing supply chains.

Product Structure Complexity, Disassembly Release Mechanisms, Priority Scheduling Rules, and Control Mechanisms for single products

The vast majority of research on product structure complexity focuses on the impact of product structure on stocking decisions, such as lot sizing and safety stocks (Blackburn and Millen 1982, Collier 1982, Benton and Srivastava 1985, and Sum *et al.* 1993) in OEM assembly operations. Other research (Fry *et al.* 1989, Philipoom *et al.* 1989, and Russell and Taylor 1985b) examined the effect of product structure on the performance of dispatching rules in an assembly job shop.

Guide, Srivastava, and Kraus (1997) use computer simulation to test the impact of different types of product structures (simple, intermediate, and tall) on the performance of remanufacturing operations using sixteen different priority-scheduling rules. Four different performance criteria were employed. They conclude that for simple product structures the best performing priority-dispatching rules are the high level (level 0) bill of material-based rules (HLB). However, as the complexity of the product structure increases, the shortest processing time rule and dynamic priority dispatching rules perform better than the HLB rules. When the product structure becomes very complex, due date rules outperform all others. The authors conclude that the mechanism guiding the release of materials from the disassembly operations to the remanufacturing stage is also critical.

In a related work Guide and Srivastava (1997b) use computer simulation to evaluate the performance of four order release strategies (level, local load oriented, global load oriented, and batch) and two priority

scheduling rules (first come-first served (FCFS) and earliest due date (EDD)) against five performance criteria (mean tardiness, mean flow time, work-in-process, mean idle time, and mean throughput units). They determined that in this complex and highly variable environment: (1) the batch release strategy performed poorly and should not be considered, (2) the EDD rule outperformed the FCFS rule in four out of five performance measures (all but throughput), and (3) since there was no clear victor among the three remaining release strategies, managers should opt for the simplest strategy, the level order release strategy. Thus, the authors conclude that a simple level order release strategy combined with a due date priority scheduling rule provides an effective means of releasing and scheduling work in this environment.

Guide (1996) introduces the drum-buffer-rope (DBR) production philosophy as a means of planning, scheduling, and controlling remanufacturing operations. He promotes this “synchronous manufacturing” methodology as a means to cope with routing uncertainties (frequency and time) and required task sequences. In this scheme the final assembly schedule and the assembly buffer, which feeds the final assembly operation, drive the order releases. The “drum” and primary constraint is the schedule of parts arriving to the final assembly area. The final assembly inventory “buffer” acts to protect against assembly disruptions (late parts due to routing delays, scrap, rework, etc.). The “rope” pulls parts into the repair shop to ensure that all parts appear at the final assembly area at the right time. Guide uses computer simulation to test the DBR approach against an existing modified MRP system. Since the set-up and processing times were stochastic, Guide utilized beta distributions with the mean, maximum, and minimum expected times based on historical data. Material release schedules for individual parts were dictated by the buffer size per part. Parts with longer expected processing times had precedence. Each work center follows a FCFS queue discipline. The primary objective was to complete orders on schedule with secondary performance measures including the mean WIP, the mean throughput rate, and the mean flow time. He learned that the DBR approach, regardless of buffer size multiplier outperformed the MRP-based method on every performance measure. Guide concludes that the inventory buffer multipliers help the system to cope with variability in the remanufacturing environment.

Guide (1997) later employs computer simulation to examine the impact of different priority dispatching rules (FCFS, SPT, EDD, longest processing time (LPT), global SPT, and Slack) on the performance of the DBR methodology at non-constraint work centers. Again using the assembly operation

as the “drum” and the various priority dispatching rules (PDR) to release parts from the disassembly area, he assesses the mean flow time, mean lateness, mean percentage of parts expedited, and mean throughput at non-constraint work centers. He also tests his results over three shop load levels and incorporates one complicating characteristic – the requirement for mating specific parts. His results indicate that at low levels of utilization any of the PDRs examined performed well; the only performance measure which was sensitive to the PDR was percentage of units expedited for which EDD and FCFS performed the best. At intermediate levels of utilization EDD or FCFS produces the best results with respect to all performance measures. The results from these levels of utilization indicate that the simpler priority rules, EDD or FCFS, outperform the more complex and that rules that perform well in a typical job shop, e.g. SPT, had poor results in this remanufacturing shop. Finally, at high levels of utilization *none* of the PDRs performed well. Guide suggests that in this situation variability and queues increase and, as a result, the part buffer sizes need to be enlarged.

Guide, Srivastava, and Kraus (1998) investigate the performance of proactive expediting policies with different product structures and disassembly release mechanisms. Using computer simulation they find that the proactive expediting systems do not significantly improve the performance measures, regardless of the level of utilization or threshold value (the percentage of a product’s parts that have arrived at the reassembly operation and which is used to initiate the expediting). In addition they report that the performance of these policies decrease with increasing product complexity. They also report that the disassembly release mechanisms (DRM) do not affect the performance of the expediting policies nor was there any difference in the performance of the various DRMs. Additionally, they note that the highest level BOM priority dispatch rule performed well for simple product complexity, but was outmatched by the earliest due date release at intermediate and high product complexity. Therefore, Guide et al. reassert the value of simple priority rules (e.g., EDD) for the remanufacturing environment.

Veerakamolmal and Gupta (1998) develop a procedure, which sequences multiple, single-product batches through disassembly, and retrieval operations in order to minimize machine idle time and makespan. The procedure requires that returned (electronic) products be grouped into like product batches. A standard process plan (and time) for disassembly is then assigned to each batch and used to determine the optimal batch sequence.

Thus, these research efforts link the overall remanufacturing system performance to the release of materials from the disassembly stage to the remanufacturing operations and the means of scheduling from the remanufacturing operations to the reassembly area.

Order release mechanisms, lot sizing, priority dispatching rules, and control mechanisms (Multiple Products)

Guide, Kraus, and Srivastava (1997) use computer simulation to comprehensively test the performance of fifteen priority dispatching rules and four disassembly release mechanisms against four performance measures (mean flow time, mean tardiness, root means square tardiness, and mean percentage tardy) in a multiple product remanufacturing environment. They found that: (1) there was no significant performance differences among the disassembly release mechanisms and interestingly the time-phased release mechanism provided no significant advantages over the simpler mechanisms, (2) due date priority rules provided good, and in some cases the best, overall performance, and (3) the use of reassembly accelerator rules to proactively expedite parts to the assembly operation made no significant difference in any of the performance measures. They, therefore, concluded that use of the simplest disassembly release mechanisms (first off, first to shop) is warranted. They also encouraged the use of due-date-based rules and discouraged the use of accelerator priority rules, which provided no significant benefits in performance.

Guide, Jayaraman, and Srivastava (1999) use computer simulation to assess the effect of lead time variation on the performance of disassembly release mechanisms in a multiple product environment. They tested five disassembly release mechanisms and three performance measures - mean flowtime, RMS tardy, and percentage tardy. Since the due date priority rule had worked well in previous studies for the authors (e.g., Guide, Kraus, and Srivastava, 1997), EDD was used exclusively in this analysis. Job batches were a mixture of three products with simple, intermediate, or complex structures. Five different levels of lead time variability were tested. Results indicate that the lead time variation does have an effect of the release of parts from the disassembly operation. At all levels of variation the FOFS release mechanism performed well, particularly for serial specific parts. Although at high levels of variability there is less distinction between the performance of various DRMs, the authors encourage the use of the FOFS DRM for both serial number specific and common parts over a range of lead time variances.

Table 2 is in the beginning stage of providing a summary of the pertinent features of the remanufacturing scheduling literature and aiding in its analysis.

TABLE 2

AN ANALYSIS OF REMANUFACTURING SCHEDULING RESEARCH

<u>References</u>	<u>Year</u>	<u>Operation Focus</u>	<u>Production Strategy</u>	<u>Product-Related</u>	<u>Process-Related</u>	<u>Work Schedule -Related</u>	<u>Performance Measurement/</u>	
							<u>Objective Criteria</u>	<u>Quantitative Methodology</u>
Panisset	1988	I	MTO	S, NC	IC, US	PO, D	MRP	MMRP
Krupp	1991	I	MTS	M	US	MP, D	MRP	MMRP
Perry	1991	I	MTO	M	FC	MP	MLL	
Krupp	1993							
Fourcard	1993							
Gupta and Taleb	1994	DS	MTS	S, NC	IC, KS	MP, D	MRP	RMRP
Johnson and Wang	1995							
Clegg, Williams & Uzsoy	1995	I		S, NC	IC, KS	D		LP
Hoshino, Yura and Hitomi	1995	I	MTS	S, NC	IC, KS	MP, D	MC	GP
Guide	1996	I	MTO	S, NC	FC, US	MP, S	MC(1)	SIM, DBR
Guide	1997	I	MTO	S, NC	FC, US	MP, S	MC(2)	SIM, PDR, DBR
Guide & Srivistava	1997a	I	MTO	S, NC	FC, US	MP, S	MC(3)	SIM, MMRP, PDR, ORS
Guide & Srivistava	1997b	I		S, NC		MP, S	MC(4)	SIM, MMRP
Guide, Kraus & Srivastava	1997	I		S, NC	US	MP, S	MC(5)	SIM, PDR, DRM
Guide, Srivastava & Kraus	1997	I		S ¹ , NC	US	MP, S	MC(5)	SIM, PDR
Guide & Spencer	1997	I	MTO	S, NC	FC, US	MP, D*	MRP	RCCP, MBOM, MBOR
Guide, Srivastava & Spencer	1997	I	MTO	S, NC	FC, US	MP, D*	MINΔCAP	SIM, RCCP
Guide & Srivastava	1998	I	MTO	S, NC	FC, US	MP, S	MC(6)	SIM, DRM
Guide, Srivastava & Kraus	1998	I	MTO	S ¹ , NC	FC, US	MP, S	MC(5)	SIM, PDR
Kizilkaya & Gutpa	1998							
Veerakamolmal & Gupta	1998	I	MTS	MP, PC	AS	SP, D	MC(8)	HR
Taleb, Gupta and Brennan	1997	DS	MTS	M, PC	IC, KS	MP, D	Min #, MRP	RMRP
Taleb and Gupta	1997	DS	MTS	MP, PC	IC, KS	MP, D	MRP, Min H	RMRP, HR
Guide, Jayaraman & Srivastava	1999	I	MTO	MP, NC	FC, US	MP, S	MC(7)	SIM, DRM

TABLE 2: CONTINUED
AN ANALYSIS OF REMANUFACTURING SCHEDULING RESEARCH

Key:**Operation Focus:**

Disassembly = DS
 Remanufacturing/Repair = RE
 Reassembly = RA
 Integrated = I

Production Strategy:

Make-to-Stock = MTS
 Make-to-Order = MTO
 Assembly-to-Order = ATO

Product-Related:

Single Product = S
 Multiple Products = M

Product Commonality = PC
 No Product Commonality = NC

Process- Related:

Infinite Capacity = IC
 Finite Capacity = FC

Known sequence = KS
 Adaptive sequence = AS

Work Schedule-Related:

Project Oriented = PO
 Single Period = SP
 Multiple Periods = MP

Deterministic Task Times =
 Stochastic Task Times = S

OBJECTIVE FUNCTIONS:

Right quantity – right time = MRP
 Min. number of root items used to satisfy demand = Min #
 Min holding cost = Min H
 Min. costs (set-up + holding cost) = Min. S+H
 Min. disassembly costs = Min. D
 Min. costs (disassembly + holding) = Min. D+H
 Min. costs (set-up + disassembly. + holding) = Min. S+D+H
 Min. costs (purchase + set-up + disassembly + holding) = Min. P+S+D+H
 Min. expected costs (purchase + disassembly + disposal) = Min. E(P+D+DI)
 Max profit (revenue – disassembly – disposal) = Max. Profit
 Min lot sizes and lead times = MLL
 Completion to schedule = CS
 Min WIP = WIP
 Max throughput = Max
 Min flowtime = Min. FT
 Min. actual – estimated capacity level deviation = Min. ΔCap
 Multiple criteria = MC
 Minimize CS, Min. WIP, Max throughput, Min. FT = MC(1)
 Min. (FT, Min. lateness, % of parts expedited, % tardy), Max throughput = MC(2)
 Min. WIP, tardiness, FT, Idle time, Max throughput = MC(3)
 Min. (% stockout, safety stock level) = MC(4)
 Min. (FT, tardiness, % tardy, root mean square tardiness) = MC(5)
 Min. (FT, lateness, reassembly delay) = MC(6)
 Min. (FT, root mean square tardiness, % tardy) = MC(7)
 Min. (Machine idle time, makespan) = MC(8)

QUANTITATIVE METHODOLOGY:

Modified Materials Requirements Planning = MMRP
 Reverse Materials Requirements Planning = RMRP
 Heuristic = HR
 Linear programming = LP
 Integer Programming = IP
 Branch and Bound = B&B
 Nonlinear Programming = NLP
 Goal Programming = GP
 Queuing Theory = Q
 Computer Simulation = SIM
 Petri Nets = PNETs
 Drum-Buffer-Rope = DBR
 Priority Dispatching Rule = PDR
 ORS = Order Release Strategy
 Dispatching Release Mechanism = DRM
 Modified Bill of Resources = MBOR
 Modified Bill of Materials = MBOM

¹ Three series of runs were made each for a single, but increasingly complex, product structure.

² The process sequence is established for each new product before the disassembly operation begins.

5. FUTURE WORK

Our future work will analyze the quantitative methodologies used to aid scheduling remanufacturing operations and the performance measurement/objective criteria used to guide or assess their performance. In addition, we will discuss the other issues and complexities, quantitative and qualitative, pertinent to the effectiveness of remanufacturing operations; these will include strategic, economic, behavioral, and implementation issues and the complexities highlighted in Table 1. Finally, we will assess, in detail, our progress in scheduling remanufacturing operations, both theoretical and applied. Remanufacturing industry needs will be discussed and the avenues yet remaining for future research.

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LEAN, AGILE AND DEMAND-DRIVEN STRATEGIES FOR SUPPLY CHAIN PERFORMANCE

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ABSTRACT

Supply chain management is an organizational function that is critically important for organizational performance in today's global business environment. Organizations are formulating various strategies to enhance supply chain performance and are continually seeking ways to gain a competitive advantage. This paper explores three widely acclaimed strategies: Lean, Agile and Demand-Driven approaches for supply chain management. Main benefits and suitable environments will be discussed for each of the three strategies.

Introduction

The complex and competitive nature of today's global business environment is characterized by shorter product life cycles, more demanding customer requirements and a variety of supply chain

risks. In this environment, organizations seek new competitive approaches to achieve an advantage and formulate adaptations of strategies to enhance their supply chain performance.

In

the supply chain many exchanges occur in the overall process of planning, sourcing, making and

delivering products, services and the related supply chain information. As these exchanges occur

and the material moves through a series of providers and ultimately reaches consumers, the efforts of several parties need to be aligned – this is referred to as the supply chain [26].

The following definition for “supply chain management” offers further clarification:

“Supply chain management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders” [10].

The important fact to take away from this description is the need to coordinate across the entire network of companies in the supply chain. Superior supply chain performance cannot be achieved without superior performance along each link of the supply chain. Superior performance requires integrated strategies to achieve the high degree of coordination.

In the next sections we discuss the three main approaches: Lean, Agile and Demand-Driven, as leading strategies for enhancing supply chain performance.

Lean

Lean is a manufacturing management philosophy that has been well documented through the publications by Womack, Jones and Roos [28] and Womack and Jones [29], [30], [31]. Among the publications by these authors there are several company examples that describe some of the

early successes that were achieved by applying lean principles to improve their businesses (e.g. LanTech and Danaher) [31].

“Lean is about doing more with less” [4]. Lean principles are based on the Toyota Production System (TPS) [28][30][31]. The primary aim of Lean is to eliminate waste of all kinds throughout a production process or in this case all supply chain processes. The Japanese word for

waste is muda. Lean thinking is a “powerful antidote for muda” [31]. When companies apply Lean techniques, they “specify value, line up value-creating actions in the best sequence, conduct

these activities without interruption ... and perform them more and more effectively” [31, p. 15].

In order to accomplish those objectives, companies apply the following five major principles of Lean:

- Specify value (i.e. what is value for the customer);
- Identify the value stream;
- Flow (make the value-creating steps flow);
- Pull (let the customer “pull” for the product); and
- Perfection (waste of effort, waste of space, and waste of all types of resources can be reduced in an ongoing fashion by pursuing “perfection”) [31].

Due to the complex, multiple tier nature of supply chains a complete value stream map is a major

undertaking. For this reason, value stream maps focus on internal processes and then extend only

to a few suppliers of critical items rather than every supplier.

Another supply chain approach is the Supply Chain Operations Reference (SCOR®) model from

the Supply Chain Council [27]. Utilizing the SCOR® model, the “Configuration Level” provides an excellent opportunity to employ the waste reduction techniques of Lean. This level is where core process strategies are established and where companies align their supply chain with their overall operations strategy. In the terminology of SCOR®, this is where the process can be “configured-to-order” [27]. Lean bases the configuration on eliminating waste. So the choice of “make-to-order” or “engineer-to-order” is based on eliminating the waste of finished goods inventory that is not needed to satisfy current demand. These choices are also based on the market and they are “demand-driven” [20]. “Make-to-stock” is a possible option under the scope of SCOR® but it is not a viable option under Lean [20]. A summary of benefits and environments will compare the three strategies later in the paper.

Agile

Flexibility is a key element for agility. What began as manufacturing flexibility has been extended broadly into the business context including organizational structure, information systems, logistics processes and organizational mindsets [4]. The Agility Forum is credited with the extension and spread of the agile concepts in the early 1990s [22].

Agility in the supply chain is described as being able to “respond to sudden and unexpected changes in markets. Agility is critical, because in most industries, both demand and supply fluctuate more rapidly and widely than they used to. Most supply chains cope by playing speed against costs, but agile ones respond both quickly and cost-efficiently” [16]. Clearly, a one dimensional response by an organization is not acceptable and does not constitute agility.

The concept of Design for Supply Chain Management (DFSCM) and its use by Hewlett-Packard (HP) was first introduced by Lee and Billington [11] and further explained by Lee [12]. Based on these references, the idea of DFSCM was well-established at HP in the early 1990s. The primary

issues that were addressed dealt with inventory issues and were based on a global supply chain inventory model [11][13][14]. Embedded within DFSCM at Hewlett-Packard were many different supply chain strategies aimed at various supply chain issues that HP was attempting to address. Included among the list of supply chain strategies are:

- Delayed product differentiation
- Commonality
- Standardization
- Process steps switching
- And Postponement [11][12][13][14][15][7].

Many of these strategies or principles are aimed at flexibility, agility and logistics cost reduction. First among the issues addressed by HP were the combined factors of product design, inventory

placement and design for localized markets [13].

While the intent of many of these supply chain initiatives at HP has been to provide flexibility and to move towards being more agile, the success of agility tends to be exposed when there is an

adverse condition related to either supply or demand. There are several excellent examples of supply chain agility where the agile firm succeeded while the firm that lacked agility failed. Nokia and Ericsson were faced with a supply chain disruption due to a fire at a facility a radio frequency (RF) chip in New Mexico in March 2000 [16]. Nokia executed design changes, quickly worked with alternate suppliers and implemented their contingency plan within a five day period after the fire [16]. Ericsson was caught without a plan and was in the midst of eliminating alternate suppliers [16]. They lacked a coherent contingency plan, experienced drastically reduced production levels for months and delayed a new product introduction [16]. Nokia gained market share through their agile response and at the expense of Ericsson [16].

In 1999, an earthquake in Taiwan disrupted the supply of computer components to the United States and significantly impacted major computer makers including Apple, Gateway and Compaq

[16]. While those companies were unable to make computers, Dell changed prices and altered their offerings to promote those computer configurations that could be made without the components sourced from Taiwan [16]. This agile response to the disruption by Dell also led to an increase in market share at the expense of the competitors who were not agile [16].

Lee offers the following list of characteristics or “six rules of thumb” for designing agility into the supply chain:

- “Provide data on changes in supply and demand to partners continuously so they can respond quickly. ... Ensuring that there are no information delays is the first step in creating an agile supply chain.
- Develop collaborative relationships with suppliers and customers so that companies work together to design or redesign processes, components, and products as well as to prepare backup plans.
- Design products so that they share common parts and processes initially and differ substantially only by the end of the production process. I call this strategy “postponement.” ... This is often the best way to respond quickly to demand fluctuations because it allows firms to finish products only when they have accurate information on consumer preferences.
- Keep a small inventory of inexpensive, non-bulky components that are often the cause of bottlenecks.
- Build a dependable logistics system that can enable your company to regroup quickly in response to unexpected needs. (this can be accomplished through an alliance with a third-party logistics provider).
- Put together a team that knows how to invoke backup plans” [16].

These elements have been utilized successfully by such companies as Hewlett Packard [11] [14]

[15] and Dell Computer [19].

Several characteristics are present in the “agile supply chain” [4]. “The agile supply chain is market sensitive. ... The use of information technology to share data between buyers and suppliers is ... creating a virtual supply chain. ... Shared information between supply chain partners can only be fully leveraged through process integration. ... The idea of the supply chain as a confederation of partners linked together as a network provides the fourth ingredient of agility” [4]. To summarize briefly, the four elements are market sensitivity, the virtual nature of the supply chain, process integration and the network based arrangement of supply chain partners.

The summary later in the paper will compare Agile with the other two strategies.

Demand Driven

AMR Research has publicized the term “demand-driven supply network” in the course of their research with 2003 as an originating point [2]. They also use the term within the criteria that is evaluated to determine the Top 25 Supply Chains on an annual basis [1].

The criteria for selection to the Top 25 list are as follows: “The first component of the ranking is publicly available financial data and is weighted at 60% of the total score, with return on assets and inventory turns each accounting for 25%, and trailing 12 months growth accounting for 10%.

The second component of the ranking is AMR Research’s opinion, which is weighted at 40% of the total score. The opinion component is based on a structured voting methodology across AMR

Research’s team of analysts” [1].

A demand-driven supply network (DDSN) “is a system of technologies and business processes that sense and respond to real-time demand across a network of customers, suppliers and employees” [2]. “DDSN leaders are ‘demand sensing,’ have more efforts for ‘demand shaping,’ and focus on a profitable ‘demand response’ [2].

One of the leading promoters of the “demand driven” concept is AMR Research and their Top 25

Supply Chain list. According to AMR: “The report identifies the top 25 manufacturers and retailers that exhibit superior supply chain capabilities and performance. Supply chain leaders are

able to shape demand, instantly respond to market changes, and crush their competitors.

According to AMR Research benchmarking data, leaders carry 15% less inventory, are 60% faster-to-market, and complete 17% more perfect orders. These advantages separate predators from prey” [25].

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Research’s team of analysts” [25]. Companies in the Top 25 for two years are listed in Table 1.

Table 1. Top 25 Supply Chains from AMR Research

Rank 2004 Companies 2005 Companies

1	Dell	Dell
2	Nokia	Procter & Gamble
3	Procter & Gamble	IBM
4	IBM	Nokia
5	Wal-Mart Stores	Toyota Motor
6	Toyota Motor	Johnson & Johnson
7	Johnson & Johnson	Samsung Electronics
8	Johnson Controls	Wal-Mart Stores
9	Tesco	Tesco
10	PepsiCo	Johnson Controls
11	Nissan	Motor Intel
12	Woolworths	Anheuser-Busch
13	Hewlett-Packard	Woolworths
14	3M	The Home Depot
15	GlaxoSmithKline	Motorola
16	POSCO	PepsiCo
17	Coca-Cola	Best Buy
18	Best Buy	Cisco Systems
19	Intel	Texas Instruments
20	Anheuser-Busch	Lowe’s

21 The Home Depot Nike
22 Lowe's L'Oreal
23 L'Oreal Publix Super Markets
24 Canon Sysco
25 Marks & Spencer Coca-Cola
Sources: [1] & [25]

To better understand the Demand-Driven Supply Chain we discuss one leading company from the

AMR Top 25 list. Procter & Gamble is the company selected.

Procter & Gamble (#2): Procter & Gamble is the country's leading manufacturer of household products. It has 35 manufacturing plants, 30,000 suppliers, and 5,000 retailers. Its supply chain continues to be one of the most complex and well-managed in the world. In the past, P&G used the traditional 'push' method where their products were produced and delivered in large quantities and at times that are determined by the company, and then they are shelved at retailers

for immediate sale. This became a problem due to the fact that nearly 60% of P&G's products are sold by retailers under promotion [23][24].

When stockouts occurred during promotions, P&G knew they had to change. They began bringing retailers and suppliers into the demand forecasting side of the business and switched to

the demand driven 'pull' method of the supply chain. P&G has also put into effect an initiative the company calls "Efficient Consumer Response II." This will help them reduce cycle time to 65 days from the original 130 days seen in the 1980's. According to Steve David, Procter and Gamble CIO, he stated that "currently we have 4,000 internal websites, 25,000 organizational nodes, 70,000 materials, 200,000 products, 500,000 customers, and 1 million parts.....but we still

need to clean up our act" [9].

We think that the "Demand Driven" strategy has not been thoroughly researched and is limited primarily to the publications from AMR Research. Companies utilizing the Demand Driven approach need to be explored in greater depth to create a better understanding of the successful

approaches. More in-depth empirical research about performance for the Top 25 Supply Chains would also be a fruitful research avenue.

Some example topics that can be associated with individual companies from the Top 25 list include [25]:

- Demand driven supply network (DDSN) – Dell and Best Buy
- Consumer-driven supply chain – Procter & Gamble
- Innovation for multiple channels – Johnson & Johnson
- Innovation for industrialization and commercialization – GlaxoSmithKline
- Demand shaping – L'Oreal

These are just a few examples of potential topics for future research to provide a deeper understanding of DDSN.

Summary of Three Strategies

A further literature search utilizing Google Scholar was employed to determine the top 20 articles

in each topic area. "Lean and Supply Chain," "Agile and Supply Chain" and "Demand Driven and Supply Chain" were the phrases used to conduct the searches. A summary of those results appears in Table 2:

Table 2. Frequently Cited Articles on Lean, Agile and Demand Driven

LEAN AGILE Demand-
Driven

- [21] Naylor, Naim & Berry, IJPE 1999 1 2 10
 [5] Christopher & Towill, SCM: AIJ 2000 2 3 2
 [4] Christopher, IMM 2000 6 1 1
 [6] Christopher & Towill, Management 2001 - 10 6
 [17] Mason-Jones, Naylor & Towill, IJPR
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 [8] Fisher, HBR [pages.stern.nyu.edu] 1997 11 12 11

Note: The #'s represent the ranking in each respective set of search results from Google Scholar. These results are based on a search conducted on August 22, 2008. Results will vary as number of citations and other factors change the rankings.

These seven articles are rated highest due to the multiple listing in at least two of the search results. Four of the articles do appear in all three search results. We use these articles along with

other references to further compare the three strategies.

Lean and Agile have been described as clear dichotomies in some instances [3]. While some of the objectives may be similar for the two, the operational choices may vary significantly.

“Demand-Driven” is not clear and distinct from either Lean or Agile. In fact the research for this paper indicates that Demand-Driven either overlaps or is partially embedded within both Lean and Agile. When we add the AMR Research viewpoint, Demand Driven does appear to be separate due to the intense information technology applications that are utilized by companies with successful DDSNs. The success of DDSN is clearly enabled by technology more so than the

Lean or Agile successes.

Christopher [4] has argued that Lean is best suited to an environment characterized by relatively stable or predictable demand and with low variety. By comparison, Agile strategies are best suited for an environment characterized by volatile demand and a customer expectation for a wide

range of variety [4]. Christopher [4] goes on to say that the decoupling point is the critical issue for determining the application of Agile and Lean strategies. He suggests that Lean strategies should be used up to the decoupling point and Agile strategies should be used beyond the decoupling point. The Lean side of the decoupling point is also described as being “driven by demand” [4].

From another perspective, Mason-Jones, Naylor and Towill [17] offer the “Market Winners” and “Market Qualifiers” that relate to both Agile and Lean. These are presented in a similar format as the original in Table 3.

Table 3. Market Qualifiers and Market Winners for Agile and Lean

Market Qualifiers Market Winners

Agile Supply Quality

Cost

Lead Time

Service Level

Lean Supply Quality

Lead Time

Service Level

Cost

Sources: [17] [32]

Summary

In summary, we offer a brief sketch of each of the three strategies. For Lean, the appropriate environment is one with predictable demand [4], the main focus will be on eliminating waste in the supply chain [20][31] and the market winner will be cost [17][32]. For Agile, the environment will be one with more volatile demand and more demands for customization [4][6]. Agile strategies may take many forms as seen in the examples presented in this paper [7][11][12]

[13][14][15][16] and the market winner will be 'service level' [17][32]. At this time, the broader literature does not indicate a clearly distinct Demand Driven strategy that can be separated from Lean and/or Agile. But based on the AMR Research materials [2] we believe that there is a growing distinction among companies that subscribe to the DDSN approach. Companies employing the DDSN strategy are dealing more directly with the end customer and they have utilized technology applications in an optimal way to enhance their DDSN capabilities. We believe that this trend will continue and that DDSN will become a more prominent strategy going forward. Further research will help solve the 'conundrum' of Lean, Agile and Demand Driven.

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throughout a production process or in this case all supply chain processes. The Japanese word for waste is muda. Lean thinking is a “powerful antidote for muda” [31]. When companies apply Lean techniques, they “specify value, line up value-creating actions in the best sequence, conduct these activities without interruption ... and perform them more and more effectively” [31, p. 15].

In order to accomplish those objectives, companies apply the following five major principles of Lean:

- Specify value (i.e. what is value for the customer);
- Identify the value stream;
- Flow (make the value-creating steps flow);
- Pull (let the customer “pull” for the product); and
- Perfection (waste of effort, waste of space, and waste of all types of resources can be reduced in an ongoing fashion by pursuing “perfection”) [31].

Due to the complex, multiple tier nature of supply chains a complete value stream map is a major undertaking. For this reason, value stream maps focus on internal processes and then extend only to a few suppliers of critical items rather than every supplier.

Another supply chain approach is the Supply Chain Operations Reference (SCOR®) model from the Supply Chain Council [27]. Utilizing the SCOR® model, the “Configuration Level” provides an excellent opportunity to employ the waste reduction techniques of Lean. This level is where core process strategies are established and where companies align their supply chain with their overall operations strategy. In the terminology of SCOR®, this is where the process can be “configured-to-order” [27]. Lean bases the configuration on eliminating waste. So the choice of “make-to-order” or “engineer-to-order” is based on eliminating the waste of finished goods inventory that is not needed to satisfy current demand. These choices are also based on the market and they are “demand-driven” [20]. “Make-to-stock” is a possible option under the scope of SCOR® but it is not a viable option under Lean [20]. A summary of benefits and environments will compare the three strategies later in the paper.

Agile

Flexibility is a key element for agility. What began as manufacturing flexibility has been extended broadly into the business context including organizational structure, information systems, logistics processes and organizational mindsets [4]. The Agility Forum is credited with the extension and spread of the agile concepts in the early 1990s [22].

Agility in the supply chain is described as being able to “respond to sudden and unexpected changes in markets. Agility is critical, because in most industries, both demand and supply fluctuate more rapidly and widely than they used to. Most supply chains cope by playing speed against costs, but agile ones respond both quickly and cost-efficiently” [16]. Clearly, a one dimensional response by an organization is not acceptable and does not constitute agility.

The concept of Design for Supply Chain Management (DFSCM) and its use by Hewlett-Packard (HP) was first introduced by Lee and Billington [11] and further explained by Lee [12]. Based on these references, the idea of DFSCM was well-established at HP in the early 1990s. The primary issues that were addressed dealt with inventory issues and were based on a global supply chain inventory model [11][13][14]. Embedded within DFSCM at Hewlett-Packard were many different supply chain strategies aimed at various supply chain issues that HP was attempting to address. Included among the list of supply chain strategies are:

- Delayed product differentiation
- Commonality
- Standardization
- Process steps switching
- And Postponement [11][12][13][14][15][7].

Many of these strategies or principles are aimed at flexibility, agility and logistics cost reduction. First among the issues addressed by HP were the combined factors of product design, inventory placement and design for localized markets [13].

While the intent of many of these supply chain initiatives at HP has been to provide flexibility and to move towards being more agile, the success of agility tends to be exposed when there is an adverse condition related to either supply or demand. There are several excellent examples of supply chain agility where the agile firm succeeded while the firm that lacked agility failed. Nokia and Ericsson were faced with a supply chain disruption due to a fire at a facility a radio frequency (RF) chip in New Mexico in March 2000 [16]. Nokia executed design changes, quickly worked with alternate suppliers and implemented their contingency plan within a five day period after the fire [16]. Ericsson was caught without a plan and was in the midst of eliminating alternate suppliers [16]. They lacked a coherent contingency plan, experienced drastically reduced production levels for months and delayed a new product introduction [16]. Nokia gained market share through their agile response and at the expense of Ericsson [16].

In 1999, an earthquake in Taiwan disrupted the supply of computer components to the United States and significantly impacted major computer makers including Apple, Gateway and Compaq [16]. While those companies were unable to make computers, Dell changed prices and altered their offerings to promote those computer configurations that could be made without the components sourced from Taiwan [16]. This agile response to the disruption by Dell also led to an increase in market share at the expense of the competitors who were not agile [16].

Lee offers the following list of characteristics or “six rules of thumb” for designing agility into the supply chain:

- “Provide data on changes in supply and demand to partners continuously so they can respond quickly. ... Ensuring that there are no information delays is the first step in creating an agile supply chain.
- Develop collaborative relationships with suppliers and customers so that companies work together to design or redesign processes, components, and products as well as to prepare backup plans.
- Design products so that they share common parts and processes initially and differ substantially only by the end of the production process. I call this strategy “postponement.” ... This is often the best way to respond quickly to demand fluctuations because it allows firms to finish products only when they have accurate information on consumer preferences.
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These elements have been utilized successfully by such companies as Hewlett Packard [11] [14] [15] and Dell Computer [19].

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7	Johnson & Johnson	Samsung Electronics
8	Johnson Controls	Wal-Mart Stores
9	Tesco	Tesco
10	PepsiCo	Johnson Controls
11	Nissan Motor	Intel
12	Woolworths	Anheuser-Busch
13	Hewlett-Packard	Woolworths
14	3M	The Home Depot
15	GlaxoSmithKline	Motorola
16	POSCO	PepsiCo
17	Coca-Cola	Best Buy
18	Best Buy	Cisco Systems
19	Intel	Texas Instruments
20	Anheuser-Busch	Lowe's
21	The Home Depot	Nike
22	Lowe's	L'Oreal
23	L'Oreal	Publix Super Markets
24	Canon	Sysco
25	Marks & Spencer	Coca-Cola

Sources: [1] & [25]

To better understand the Demand-Driven Supply Chain we discuss one leading company from the AMR Top 25 list. Procter & Gamble is the company selected.

Procter & Gamble (#2): Procter & Gamble is the country's leading manufacturer of household products. It has 35 manufacturing plants, 30,000 suppliers, and 5,000 retailers. Its supply chain continues to be one of the most complex and well-managed in the world. In the past, P&G used the traditional 'push' method where their products were produced and delivered in large quantities and at times that are determined by the company, and then they are shelved at retailers for immediate sale. This became a problem due to the fact that nearly 60% of P&G's products are sold by retailers under promotion [23][24].

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- Demand driven supply network (DDSN) – Dell and Best Buy
- Consumer-driven supply chain – Procter & Gamble
- Innovation for multiple channels – Johnson & Johnson
- Innovation for industrialization and commercialization – GlaxoSmithKline
- Demand shaping – L'Oreal

These are just a few examples of potential topics for future research to provide a deeper understanding of DDSN.

Summary of Three Strategies

A further literature search utilizing Google Scholar was employed to determine the top 20 articles in each topic area. "Lean and Supply Chain," "Agile and Supply Chain" and "Demand Driven and Supply Chain" were the phrases used to conduct the searches. A summary of those results appears in Table 2:

Table 2. Frequently Cited Articles on Lean, Agile and Demand Driven

	LEAN	AGILE	Demand-Driven
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[5] Christopher & Towill, SCM: AIJ 2000	2	3	2
[4] Christopher, IMM 2000	6	1	1
[6] Christopher & Towill, Management 2001	-	10	6
[17] Mason-Jones, Naylor & Towill, IJPR 2000	9	8	-
[18] Mason-Jones, Naylor & Towill, IJAMS 2000	10	6	-
[8] Fisher, HBR [pages.stern.nyu.edu] 1997	11	12	11

Note: The #'s represent the ranking in each respective set of search results from Google Scholar. These results are based on a search conducted on August 22, 2008. Results will vary as number of citations and other factors change the rankings.

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Table 3. Market Qualifiers and Market Winners for Agile and Lean

	Market Qualifiers	Market Winners
Agile Supply	Quality Cost Lead Time	Service Level
Lean Supply	Quality Lead Time Service Level	Cost

Sources: [17] [32]

Summary

In summary, we offer a brief sketch of each of the three strategies. For Lean, the appropriate environment is one with predictable demand [4], the main focus will be on eliminating waste in the supply chain [20][31] and the market winner will be cost [17][32]. For Agile, the environment will be one with more volatile demand and more demands for customization [4][6]. Agile strategies may take many forms as seen in the examples presented in this paper [7][11][12][13][14][15][16] and the market winner will be ‘service level’ [17][32]. At this time, the broader literature does not indicate a clearly distinct Demand Driven strategy that can be separated from Lean and/or Agile. But based on the AMR Research materials [2] we believe that there is a growing distinction among companies that subscribe to the DDSN approach. Companies employing the DDSN strategy are dealing more directly with the end customer and they have utilized technology applications in an optimal way to enhance their DDSN capabilities. We believe that this trend will continue and that DDSN will become a more prominent strategy going forward. Further research will help solve the ‘conundrum’ of Lean, Agile and Demand Driven.

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CURRENT TRENDS IN BUSINESS ETHICS RESEARCH

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ABSTRACT

This paper examines research focusing on factors affecting managerial ethics. In addition, it discusses research investigating managers' and business students' ethical attitudes as well studies exploring similarities and differences between these two groups. It concludes with a brief discussion of future trends.

INTRODUCTION

Media reports of recent illegal and unethical activities involving large corporations have diminished the public's confidence in the integrity of business executives. As a result, numerous questions have been raised over the extent to which managers are responsive to society's expectations.

FACTORS AFFECTING MANAGERIAL ETHICS

Whether a manager acts ethically depends upon a complex interaction among several factors. Clearly, a person's individual characteristics will have a major impact. These include one's values, that is, basic convictions about what is right and wrong. Every person enters an organization with a set of values. Most of these values were developed at an early age through the influence of parents, teachers, friends, and so on. A manager's "ego strength" is another key variable. It is a measure of the depth of one's convictions and self-regulating skills. Ego strength helps us maintain emotional stability and cope with internal and external stress (Trevino, 1986). Research indicates that those who have high levels of ego strength are more likely to resist impulses than those who are low on ego strength. Also, they tend to demonstrate consistency between their judgment and actions when facing ethical issues.

Integrity is another construct which has been examined. It consists of at least four factors: conscientiousness, agreeableness, emotional stability, and reliability (Sackett and Wanek, 1996). A number of studies have indicated that those who score high on this factor tend to have unethical tendencies. For example, unethical behaviors such as stealing, excessive absenteeism, and violence have been linked to low integrity (Hogan and Brinkmeyer, 1997; Hogan and Hogan, 1989). Finally, although research is inconclusive, some studies suggest that "locus of control" affects one's decisions (Davis, 1997). Those who have an internal locus of control believe their outcomes in life are determined by their own actions and that they can, to a great extent, control their own fate. They tend to take personal responsibility for the consequences of their behavior. Therefore, they are more likely to rely on their own (as opposed to others') standards of right and wrong to guide their behavior.

Several organizational variables help shape ethical behavior. Some companies legitimize the consideration of ethics as an integral part of decision making by providing strong guidance, minimizing ambiguity, and continuously reminding managers of what is ethical (Paine, 2005). Another powerful influence is the behavior of those in positions of authority. Their actions serve as a benchmark for acceptable practices (Fulmer, 2004). The extent to which the employee performance appraisal system emphasizes ethical conduct is another influential factor (Lovicki et al., 2007). Also, various job pressures – such as the amount of time available, the intensity of competition, unreasonable goals, and cost

pressures – have a substantial impact on ethical behavior (Martinko et al., 2005). Finally, the organization's reward system sends a clear message about what is (and is not) acceptable behavior. When those who receive important tangible or intangible rewards are unethical, the incentive for compromising ethical standards becomes deep-rooted and an integral part of the organizational culture (Bandura, 1979).

MANAGERS' ETHICS

One of the earliest calls for investigating the ethics of managers and executives was an article by Raymond Baumhart in 1961 aptly titled: "How Ethical is Business?" When he presented managers with some hypothetical situations, he found important differences between what they said they would personally do and what they thought the average manager would do. That is, business executives tended to attribute significantly higher ethical standards to themselves than they did to their associates. He concluded that actual business practices are likely to be closer to what these managers said the "average" business person does than to what they said they would personally do.

Similar results were obtained by Newstrom and Ruch (1976). They found that managers rated their colleagues to be more unethical than they themselves claimed to be. These same managers, however, had a propensity to capitalize on opportunities to be unethical, if those situations arose. This view was later supported by Fritzsche and Becker (1984) who reported that decision makers show a pragmatic orientation when presented with ethical dilemmas and are "likely to take action that would pollute the environment when a competitive advantage could be gained" (p. 174). When one generation of business managers was compared with another, Brenner and Molander (1977) found that "ethical standards have...fallen in business so that practices once considered unethical are now not viewed as such" (p. 60). A decade later, Longenecker, McKinney, and Moore (1989) reached a similar conclusion. They noted that younger managers are more permissive than older ones in what they accept as ethical behavior.

A related stream of research is in response to calls by a number of writers for the study of a person's demographic characteristics as antecedent variables. As increasing numbers of women enter business schools and assume managerial and executive positions, the ethics literature has recognized the value of incorporating the gender dimension in particular into ethics research. Thus a number of researchers have examined differences and commonalities of responses based on gender.

In their study of 1,875 business people, Weeks, Moore, McKinney, and Longenecker (1999) found that females assumed a more strict ethical stance than their male counterparts on 7 out of 19 vignettes. Males, on the other hand, adopted a more ethical stance on 2 out of 19 vignettes. Kidwell, Stevens, and Bethke (1987) concluded that female managers were more ethical for one of seventeen situations. Interestingly, they reported that, when asked to estimate the ethics of the opposite sex in each of the situations, respondents almost universally perceived the opposite sex to be more unethical than themselves. When Harris (1990) examined ethical values of individuals at different levels in the organizational hierarchy, he found that females were more ethical for one of five dilemmas that were presented to them. Similarly, Simga-Mugan, Daly, Onkal, and Kavut (2005) reported that gender does have a significant impact on ethical sensitivity and Deshpande, Joseph, and Maximov (2000) found that compared to male managers, female managers perceive questionable business practices as more unethical. However, a study by Barnett and Karson (1989) found that, among business executives, gender had no impact on ethical beliefs. Also, a more recent study of senior executives found no significant differences between the genders regarding their ethical preferences (Das, 2005).

Other studies have sought greater homogeneity among the respondents by focusing on practitioners within certain business areas. The overall findings have been inconclusive. For example, in a study of marketing professionals that used scenarios to measure a person's ethical score, Akaah and Riordan (1989) reported that females had higher scores for 3 of 11 scenarios. When practicing accountants were

surveyed by David, Kantor, and Greenberg (1994), males rated 3 of the 12 components of the AICPA's "Code of Professional Ethics" as more important than did females. When ethical differences in the sales profession were studied, Dawson (1997) concluded that females were more likely to agree that behaviors described in twenty scenarios were unethical. Among insurance employees, Serwinek (1992) reported that females were more ethical for one of the four factors that were examined. On the other hand, two recent studies of accountants (Jones and Hildebeital, 1995; Radtke, 2000) concluded that no significant differences between the genders regarding the appropriateness of ethical conduct. Similar results were obtained by Browning and Zabriskie (1983). In their study of industrial buyers, they found no significant differences between men and women.

BUSINESS STUDENTS' ETHICS

Today, a sizeable academic literature has focused on the ethics of business students. Business leaders and organizational theorists have long been interested in their attitudes toward the social and economic consequences of business ethics. Also, the ethics literature has recognized the importance of including these prospective leaders and executives in ethics research. Many have called for sustained formal exposure of students to business ethics. In recent years, students majoring in business administration have been exposed to business ethics in a number of courses. Business programs teach business ethics in some form, either in Business-and-Society courses or by infusing ethics throughout their curricula. The goal is to develop the ability to integrate a concern for the welfare of others with an individual's managerial role. It is hoped that this will raise the students' awareness of the impact of ethics and social responsibility upon both business and society. The basic premise is that today's business students aspire to be tomorrow's business leaders. Once these students enter the business world, they will be expected to execute their duties in an ethical manner because of their fiduciary obligations toward shareholders and other stakeholders. As the nation's future business professionals and executives, their values will help to determine the course of organizations over the next three or four decades.

More than three decades ago, Hawkins and Cocanougher (1972) examined students' reactions to ethical matters in business. Their study revealed that those majoring in business were more tolerant of questionable business practices than were non-business students. More recent studies have confirmed these earlier findings. For example, St. Pierre, Nelson, and Gabbin (1990) found that accounting students scored lower on a test of moral reasoning than psychology students. In a survey of individual subscribers to *Business Ethics Quarterly*, Hosmer (1999) reported that accounting and finance students were more likely to view business ethics and social responsibility as generally unimportant. In their research, Glenn and Van Loo (1993) noted that there were indications that business students were making less ethical choices in the 1980s than in the 1960s. More recently, Harmon and Webster (2002) compared today's college students with college students of the 1960s and found "a continuing societal movement toward Machiavellian behavior" (p. 435).

Similar to the research on business practitioners, business students are another group whose demographic characteristics have been examined. When gender was included as an independent variable, the results have been inconclusive. Some studies have reported no significant differences between female and male students. For example, no gender differences were found by Davis and Welton (1991) regarding 17 ethical situations dealing with professional ethics. Similar results were obtained by Tsalikis and Ortiz-Buonafina (1990); Ford and Lowery (1986); Friedman, Robinson, and Friedman (1987); and McCuddy and Peery (1996). Other studies have focused on more homogenous subjects, based on their area of study. For example, Stanga and Turpen's (1991) survey of accounting students found no significant differences between females and males. Similarly, Gilligan and Attanucci's (1988) study of medical students revealed no relationship between gender and moral orientation.

Other studies have reported very different results. Significant differences in ethical judgments of female and male business students have been found by a number of authors. For example, Arlow's (1991) study found that females place greater emphasis on ethical values and social responsibility than males. A study by Church, Gaa, Nainar, and Shehata (2005) revealed that gender does influence ethical decisions. Ruegger and King (1992) reported that female students rated behavior as less ethically acceptable than males in 6 of 10 situations. Also, Whipple and Wolf (1991) and Whipple and Swords (1992) concluded that females are more ethical when different business scenarios were presented to them. Galbraith and Stephenson (1993) reported that, when dealing with issues of self-interest, males and females use different decision criteria.

Concerning the role of ethics in social and interpersonal relationships, Smith and Oakley (1997) found that females had higher expectations for ethical behaviors which reflect concern for social and interpersonal relationships. In a study among undergraduate business students, males and females offered different perceptions of a just society (Prasad et al., 1998). When Lawson (2004) examined classroom cheating, he concluded that, on average, women held more ethical beliefs than men. Betz, O'Connell, and Shepard (1989) observed that men were more than twice as likely than women to say they would engage in certain actions regarded as less ethical. Khazanchi (1995) concluded that women are better able to recognize unethical actions in information systems than men. Landry, Moyes, and Cortes (2004) found that female students, compared with the men, had a higher degree of ethical sophistication. The women demonstrated strongervresponses with respect to situations involving unfairness, injustice, and moral wrongness. Also, Loe and Weeks (2000) found that women demonstrated higher levels of moral development than did the men. Finally, Ameen, Guffey, and McMillan (1996) reported that, among accounting students, females were less tolerant than males of unethical behavior.

COMPARING STUDENTS' AND MANAGERS' ETHICS

Studies regarding the similarities and differences between managers and business students with respect to business ethics have produced mixed results. One of the earliest investigations was conducted by Goodman and Crawford (1974) who failed to find any meaningful difference in the ethical behavior of marketing executives, MBA students, and undergraduate business students. However, contradictory findings were reported by others. For example, Stevens (1984), and DeSalvia and Gemmill (1971) reported that, compared to practicing managers, students - mostly business students - typically manifest slightly lower ethical standards. Similarly, Hollon and Ulrich (1979) found that the business ethics of managers exceed those of business students. Also, Glenn and Van Loo (1993) reported that students consistently made less ethical choices than practitioners. More recently, Lawson (2004) found a general belief among business students that business practitioners fail to act in an ethical manner. Interestingly, he reported that students believe they may need to act unethically in the business world to advance their careers.

Other researchers reported different results. For example, Ibrahim and Angelidis (1993) found that, compared to business executives, business students exhibit greater concern about corporate ethical conduct and philanthropic activities. Similar results were reported by Smith, Skalnik, and Skalnik (1999) who compared managers and students and found that students exhibit a greater degree of sensitivity to the ethical dimensions of business decision making.

THE FUTURE

The term "business ethics" has become firmly entrenched and an established part of our vocabulary. All evidence points to a growing emphasis on business ethics in the future. The many high-profile scandals have added urgency to this issue. The public is constantly reminded of the important role business decisions play in their lives and, consequently, expects a business to exhibit a very high degree of ethical

performance. Regulators are keen to promote transparency. Politicians are no longer opposed to legislating ethical behavior for business. Businesses have responded to legislative and popular pressure in a variety of ways. Self-monitoring of adherence to a corporation's stated principles and standards is becoming more common. Managers are increasingly aware that ethics cannot be divorced from business. Many have embraced a new business model in which ethics and profitability are treated as complementary rather than as mutually exclusive. Their real challenge is to treat ethics as a corporate asset by creating an environment that develops, sustains, and advances an unambiguous commitment to ethical behavior. When fully integrated into the organizational culture, the moral fabric created will have a potent and durable influence on day-to-day behavior.

As an academic field, business ethics contributes discussion forums, research, and instruction. Many universities have established Business Ethics Centers and conduct regular seminars for business managers. Globalization, the march into the Information Age, and work force diversity are changing the way business is conducted and the ethical issues businesses face. If business ethics is to remain relevant, it must change its focus accordingly.

In 1994, John Elkington coined the phrase Triple Bottom Line, also known as Sustainability. It expands the traditional company reporting framework to take into account social endeavors and environmental stewardship in addition to financial performance. Although this notion has been criticized by many as a misguided approach, it has been adopted by some large corporations such as General Electric, Toyota, and Dupont.

Business ethics is neither “a frivolous, transient, utopian fad” as some declared early on, nor an oxymoron as others allege. It is a vibrant, potent, and complex undertaking developing on many levels. Its three strands (financial, social, and environmental concerns) are intertwined in intricate, dynamic and fascinating ways. It is safe to predict that all three will remain vigorous and closely linked for the foreseeable future.

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**CYBERSTALKING AT A MID-ATLANTIC UNIVERSITY:
A PROPOSAL**

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ABSTRACT

The problem that leads to this research project is that the increased use of the Internet has created an increased number of online harassing/cyberstalking cases among college students. The purpose of this research study is to explore online harassing/cyberstalking experiences at a Mid-Atlantic university. This study will use quantitative methods to determine the number of students that have been stalked, harassed or threatened through the use of the Internet, email or other forms of electronic communication devices. A survey will be administered to the participants, which will be used to gather data addressing the goals of this research project. The survey will be administered to undergraduate and graduate students.

Background

1.1 Introduction

The Internet has become a medium for people to communicate either locally or globally in course of business, education and in their social lives. Cyberstalking become easy for people to compete, meet a companion, or talk to people on the other side of the world with the click of a mouse. In 2008, according to the Internet World Stats Report, there were 237,168,545 Internet users in the United States, so as a result there is a concern for Internet safety (Internet World Stats, 2008). This increased use of the Internet has created an impact on the number of online harassing/cyberstalking cases.

Jack the Ripper is the popular name of the unknown killer who terrorized London between August and November 1888. He was also known as the Whitechapel Murderer after the city district where he operated. The exact details of the case are uncertain, but five women are considered to be definite victims of the Ripper, though there may have been more. All were stalked, strangled and then had their throats cut. The nickname Jack the Ripper came from the signature of a letter sent to a news agency during the rampage. The killings stopped as abruptly as they began and the London police were unable to solve the case or find a firm suspect. The case was closed officially in 1892, but the mysterious anonymity of the killer has kept the case in the public eye (Jack the Ripper, 2005). During the summer of 1985 the infamous "Night Stalker," Richard Ramirez terrorized Southern California. He was eventually captured and convicted of thirteen murders and thirty other crimes including robbery, sodomy and attempted murder. There are more, names like John Wayne Gacy Jr., Ted Bundy and Jeffrey Dahmer are among the individuals who gruesomely stalked, murdered and tortured their victims (Myers, 2002).

The United States Department of Justice defines cyberstalking as the "use of the Internet, e-mail, or other electronic communication devices to stalk another person" (U.S. Attorney General Report, 1999, p. 2). Offline stalking is a crime with which many people are familiar. Stalking is a "repetitive pattern of unwanted, harassing or threatening behavior committed by one person against another" (Mechanic, 2000, p. 1). Stalking that involves the use of multiple individuals to stalk, harass or threaten a victim is known as gang stalking (Gang Stalking, 2006). Although offline stalking acts have been reported since the 19th Century, cyberstalking is a crime that is just being examined and reported since the late 1990's. The U.S. Attorney General states, "cyberstalking is an existing problem aggravated by a new technology" (U.S. Attorney General Report, 1999, p. 2). Many similarities have been noted between offline stalking and cyberstalking cases including that "the majority of cases involve stalking by former intimates, most victims are women, most stalkers are men and stalkers are generally motivated by the desire to control the victim" (U.S. Attorney General Report, 1999, p. 3). One of the biggest differences with cyberstalking and offline stalking is that cyberstalkers face no geographic boundaries. A person can live in Hawaii and be stalked by a person in Italy. The Internet makes it possible for a person to be stalked virtually anywhere in the world.

1.2 Problem

The problem that leads to this research project is that the increased use of the Internet has created an increased number of online harassing/cyberstalking cases among college students. The University of Cincinnati conducted a national telephone survey during the 1996-97 academic years of 4,446 randomly selected women attending two and four year institutions. "The study found that 581 women, 13.1 percent had been stalked and there had been 696 stalking incidents. Of the 696 stalking incidents, 166, 23.9 percent involved e-mail. Thus, 25 percent of stalking incidences among college women could be classified as involving cyberstalking" (Ashcroft, 2001, p. 4).

Since there is limited research indicating the extent of cyberstalking in the United States researchers must rely on studies of offline stalking for statistics. The Centre for Disease Control conducted a phone survey of 8000 men and 8000 women inquiring about their experiences with stalking. Their results indicate that by 1997 an estimated 1 million females and 0.4 million males have been stalked in the United States (Tjaden & Theonnes, 1997).

In 2004, an exploratory study of "339 students at the University of New Hampshire found that approximately 15 percent of students reported receiving repeated e-mail or instant messages that threatened or harassed and more than half of the students received unwanted pornography. Approximately 7 percent of students reported online harassment to an authority" (Finn, 2004, p. 468). According to the Department of Justice 1999 Report to Congress, one out of every 12 women (8.2 million) and one out of every 45 men (2 million) have been stalked at some time in their lives. One percent of all women and 0.4 percent of all men were stalked during 1998. Statistics and prior research suggest that women are far more likely to be victims of stalking than men and men are far more likely to be stalkers.

Working to Halt Online Abuse (WHOA), 2006 Cyberstalking Statistics were correlated for statistical purposes from 372 cases. According to WHOA, of the 372 cases, 148, 40 percent of the victims of cyberstalking were between the ages of 18-30, 107 cases, 29 percent were ages 31-40, 106 cases 28.5 percent over 40 and 11 cases 2.5 percent the ages were unknown. The majority of the victims 260, 70 percent were female with 47 percent had a prior relationship with the harasser.

1.3 Purpose

The purpose of this research study is to explore online harassing/cyberstalking experiences at a Mid-Atlantic university.

1.4 Research Questions

The research questions that will be explored in the field project include:

Research Question 1: Are women more likely than men to become a victim of cyberstalking?

Research Question 2: Are students over the age of 30 less likely to become cyberstalked than students under the age of 30?

Research Question 3: Are victims of cyberstalking likely to know their stalker?

Research Question 4: Are victims of cyberstalking likely to have had a prior relationship with their stalker?

Research Question 5: Do the majority of cyberstalking victims report the incident to law enforcement or other social agencies?

1.5 Limitations

The deficiency of this study is that there are limited comprehensive, nationwide data on the extent of cyberstalking in the United States. Another limiting factor is that many victims are reluctant to come forward and admit they have been stalked. Consequently comprehensive cyberstalking statistics do not exist, which makes many of the research findings in the literature anecdotal and informal.

LITERATURE REVIEW

2.1 Stalking Defined

Offline stalking acts have been reported since the 19th Century. Cyberstalking is a new crime that is just being examined and reported since the late 1990's. Many similarities exist between stalking and cyberstalking. In order to understand cyberstalking it is necessary to define stalking. The U.S. Department of Justice defines stalking "as harassing and threatening behavior that an individual engages in repeatedly" (U.S. Department of Justice, 2001, p. 1). These behaviors include, but are not limited to, following a person, repeated phone calls and phone messages, appearing outside a persons home or work, vandalism, taking an individuals mail or entering a persons home. "Most stalking laws require the perpetrator (the person committing the stalking) to make a credible threat of violence against the victim" (U.S. Department of Justice, 2001, p. 1). Stalking can be used to instill fear and/or intimidate the victim.

A person commits stalking if they cause another person to fear for their safety. "Stalking is a crime of power and control" (National Institute of Justice, 2002, p. 1). As defined by Tjaden and Thoennes, stalking is a course of conduct directed at a specific person that involves repeated (two or more occasions) visual or physical proximity, nonconsensual communication, or verbal, written or implied threats, or a combination thereof, that would cause a reasonable person fear" (Tjaden & Thoennes, 1998, p. 7). Again, stalking instills fear in the victims.

Very few stalkers believe that they are hurting the victim. "Stalking is not a crime of love or desire, but an attempt at domination" (What Is Stalking, 2006, p. 2). Ogilvie states that, as a concept, stalking possesses sinister and threatening connotations. It implies being hunted and harassed, whilst powerless and unable to stop a relentless and threatening pursuit (Ogilvie, 2000a, p. 2).

There have been reported cases of celebrity stalking. In November of 2007 a movie was released titled *The Killing of John Lennon*. Beatles singer, John Lennon was stalked for months and killed by Mark David Chapman in 1980 (Privacy Rights Clearinghouse, 2007). Unfortunately, the killing of John Lennon is what grabbed the public's attention and brought the meaning of stalking into the homes of millions.

A man named Robert John Bardo stalked actress Rebecca Schaeffer who played in a sitcom titled *"My Sister Sam"*. "Bardo became fixated on the young television star and built a shrine to her in his room using media photos and videotapes of her shows" (Ramsland, 2007). Bardo stalked Schaeffer for almost two years before killing her. He was able to determine where she lived, what kind of car she drove and where she ate and shopped. In Bardos diary he wrote, "I don't lose. Period." He drew a diagram of her body and marked spots where he planned to shoot her (Ramsland, 2007). On July 18, 1989, Bardos took the life of actress Rebecca Schaeffer as she opened the door from her apartment. The killing of Schaeffer enacted North America's first stalking law in 1990. Unfortunately, it took a high profile case to attract the public's attention. All 50 states now have anti-stalking laws.

Stalking has been addressed in books, movies and publications. Stalking can even be recognized in music lyrics. The band "The Police" wrote a song called *Every Breath You Take*. The lyrics of the song can be considered by some to be written about stalking.

Every breath you take / Every move you make
Every bond you break / Every step you take
I'll be watching you.
Oh can't you see / You belong to me

(Sumner, 1983)

Even if "The Police" were not talking about stalking, by reading the lyrics the true meaning of stalking can be heard. In explaining cyberstalking, references to stalking will be referred. Traditional stalking will be referred to as offline stalking.

2.2 Cyberstalking Defined

The Internet and use of telecommunications technologies have become easily accessible and are used for almost every facet of daily living throughout the world. Cyberstalking is "the use of the Internet, e-mail and other electronic communication devices to stalk another person" (U.S. Department of Justice, 2001, p. 1). For this study, cyberstalking will be referred to as online stalking and is similar to offline stalking, which is being aggravated by new technologies. Cyberstalking "entails the same general characteristics as traditional stalking, but in being transposed into the virtual environment as it is fundamentally transformed" (Ogilvie, 2000a, p. 1). Stalking itself is not a new crime, but cyberstalking is a new way to commit the crime of stalking while using the Internet or other forms of electronic communication devices.

Stalkers, online or offline "are motivated by the desire to exert control over their victims and engage in similar types of behavior to accomplish this end" (U.S. Attorney General Report, 1999, p. 3). The term cyberstalking can be used interchangeably with online harassment. "A cyberstalker does not present a direct threat to a victim, but follows the victim's online activity to gather information and make threats or other forms of verbal intimidation" (Jaishankar & Sankary, 2006, p. 1). A potential stalker may not want to confront and threaten a person offline, but may have no problem threatening or harassing a victim through the Internet or other forms of electronic communications. One can become a target for a cyberstalker through the use of the Internet in many forms. The victim can be contacted by email, instant messaging (IM) programs, via chat rooms, social network sites or the stalker attempting to take over the victims computer by monitoring what they are doing while online. Fullerton states that Internet Service Providers (ISP's) e-mail, web pages, websites, search engines, images, listservs, instant chat relay (ICR's) are all cyberstalking tools (Fullerton, 2003, p. 2). Other forms of communication used to contact a victim are cell phones, text messages, short message services (SMS), or fax machines. Cyberstalkers can choose someone they know or a complete stranger with the use of a personal computer and the Internet. The information that is available about people on the Internet makes it easy for a cyberstalker to target a victim. With only a few keystrokes, a person can locate information on an individual via the Internet. The types of information that can be found include e-mail addresses, home telephone numbers, bank account and credit card information and home addresses. Some services charge to obtain confidential information for any person that is willing to pay. Thanks to search engines such as "Google," a cyberstalker can type a person's home or work address in and see where they live and work. Once the cyberstalker can physically see what the home or place of employment looks like the stalker can use the descriptions of the locations as a way to let the victim know they are being watched. "The fact that cyberstalking does not involve physical contact may create the misperception that it is more benign than physical stalking" (U.S. Attorney General Report, 1999, p. 3). It is not uncommon for cyberstalkers to progress into offline stalkers. "If not stopped early on, some cyberstalkers can become so obsessed with a victim that they escalate their activities to the level of physical stalking" (Hitchcock, 2006, p. 168).

The anonymous nature of the Internet has left the doors wide open for cyber crimes to be committed. Online stalkers often try to hide their identity by using pseudonyms. Pseudonyms

are a way for a person to create a fake name as their identity. The Internet and ISP providers allow people to use pseudonyms. "One can fake gender, age, race and physical appearance" (Fullerton, 2003, p. 2). Offline stalkers are usually within close proximity to their victims, whereas online stalkers can be located virtually anywhere in the world. An online stalker can live next-door, ten blocks away, in another state or even in another country. Just because the stalker may live in another state does not mean that the threats should not be taken seriously. As noted, a cyberstalkers identity can be concealed. The stalkers identity can be blocked from the "recipient by using different ISP's or adopting different screen names. More experienced stalkers can use anonymous remailers that make it all but impossible to determine the true identity of the source of an e-mail or electronic communication (U.S. Department of Justice, 2001). A remailer takes a message being sent and reroutes it so that the original message looks as if it came from somewhere else before reaching the intended recipient. Remailers can make it hard for an individual or law enforcement to track that sent the original message. Dr. Emma Ogilvie believes there are three ways that data exchanges are categorized.

- Category One – The Internet as a medium for convenience.
- Category Two – The Internet as a medium of control
- Category Three – The Internet as a medium of "range" enhancement (Ogilvie, 2000, p.2).

The Internet as a medium of convenience is when "data may be transferred directly from sender to a nominated and willing recipient" (Ogilvie, 2000a, p. 2). Receiving unwanted e-mail is the most common type of harassment that includes hate or threatening e-mail. An example of this is personal e-mail communications. Stalking using e-mail resembles traditional stalking patterns of telephoning or sending a letter (Ogilvie, 2000a, p. 2).

As one reader of Caslow Analytics online newsletter said, "sticks and stones may break your bones but emails never hurt you, so just hit the delete button" (Arnold, 2006, p. 1). Hitting the delete button does not take care of the problem. Messages can continue to appear in a person's inbox as one hit the delete button. By hitting the delete button a victim could miss details and possible actions of the stalker.

The Internet as a medium of control is when "data may be exchanged in an interaction involving unwilling and/or unknowing party being manipulated by a usually unknown and effectively invisible third party" (Ogilvie, 2000a, p. 2). In order to access a person's computer, stalkers can enter a computer through a backdoor. "Some applications are actually designed with a feature that allows for remote access. Hackers and criminals use backdoors to gain access and control applications and programs" (Ledford, 2006, p. 141). The stalker uses a backdoor to gain control over the victim's computer. A stalker that enters a victim's computer to gain control usually has advanced technical skills. Not all stalkers would be able to complete this technique. With the help of search engines, finding instructions on how to control or hack a person's computer is becoming easy to find. Using a backdoor a "cyberstalker can communicate directly with their target as soon as the targets computer connects in anyway to the Internet" (Ogilvie, 2000a, pp.2-4). An example of this would be that every time a person picks up the phone, the stalker is on the other line. Backdoor programs can make the victim feel helpless. As the victim works online or sends e-mail messages the stalker is their watching and reading their every move. Another example is if an offline stalker entered your home through a backdoor and installed cameras so they could watch all of the victim's daily activities.

The Internet as a medium of range enhancement is when "data may be electronically positioned in such a way that any number of data "seekers" may locate and obtain it" (Ogilvie, 2000a, p.2). In this instance, the stalker can use the Internet to degrade the victim. This form of cyberstalking is the most likely to turn into offline stalking. Using the Internet as a medium of range allows the stalker to pose as the victim in chat rooms and to open up free e-mail services and addresses, such as Yahoo, in the victim's name. These allow the stocker to post inflammatory or threatening

messages about the victim. “The Internet needs to be recognized as a new medium of communication rather than the ‘latest version’ of old mediums” (Ogilvie, 2000a, p. 6) such as the telephone or postal mail.

Any one of the categories mentioned can turn into stalking in the offline world. One may believe that communications transmitted online do not post emotional distress. “While emotional distress is acknowledged in most criminal sanctions, it is not considered as serious as an actual physical threat. Cyberstalking remains at the level of inducing emotional distress, fear and apprehension” (Jaishankar, & Sankary, 2006, p. 2). The fear and distress caused to a victim can cause the person to lost sleep, stop eating, miss work or refrain from social engagements. The stress caused to victims of online stalking are similar to victims of offline stalking.

2.3 Comparison of Offline vs. Online Stalking

In order to identify the potential victims of cyberstalking it is necessary to analyze the research on offline stalking. The National Violence Against Women Survey by Tjaden and Thoennes defines stalking as involving instances where the victim felt a high level of fear. One out of every 12 women, (8.2 million) in the United States and one out of every 45 men (2 million) have been stalked. Women are more likely than men to be victims of stalking; nearly 80% of victims are women while men are more likely to be stalkers. Women are twice as likely as men to become victims of stalking by men and eight times as likely to become victims of stalking by someone they knew or had a prior relationship. A review of table 2.1 depicts a comparison of offline and online stalking. The table presents a list of similarities and differences between the two.

Table 2.1 Comparison of Online and Offline Stalking

Offline Versus Online Stalking: A Comparison
Major Similarities
<ul style="list-style-type: none">• The majority of cases involve stalking by former intimates, although stranger stalking occurs in the real world and in cyberspace.• Most victims are women, most stalkers are men.• Stalkers are generally motivated by the desire to control the victim.
Major Differences
<ul style="list-style-type: none">• Offline stalking generally requires the perpetrator and the victim to be in the same geographic area: cyberstalkers may be across the street or across the country• Electronic communication technologies make it much easier for a cyberstalker to encourage third parties to harass or threaten a victim (e.g. a stalker will impersonate the victim and post inflammatory messages on bulletin boards and in chat rooms, causing viewers of these messages to send threatening messages back to the victim)• Electronic communication technologies also lower the barriers to harassment and threats; a cyberstalker does not need to physically confront the victim.

Chart taken from the U.S. Department of Justice, 2001, p

A cyberstalker can choose their victims without even seeing them. Offline stalkers have had some type of contact with the victim even if it is just passing the person on the street. “The public press and even governments seem to make a distinction between stalking and cyberstalking” (Bocij, 2004, p. 21).

In general, stalkers always have had, or have, some form of physical or emotional relationship to their victims. We are not aware of any reported cases where a stalker has not at least seen their victim, whether in a photograph, on television or in person. In contrast, there are many reported cyberstalking cases where the stalker has never seen the victim and where he may not have known even the most basic information – such as the age, gender or ethnicity of the victim.

(Bocij and McFarlane, 2003, p. 22)

Victims of cyberstalking suffer psychological and emotional harm. Cyberstalking cases can take an offline turn and physical harm can be placed on the victim. It is imperative to know that cyberstalking can always move to the offline world.

2.4 Existing Laws

Stalking laws within the 50 states are relatively recent, meaning that the first traditional stalking law was enacted in 1990 in California. California’s legal definition of stalking is “any person who willfully, maliciously, and repeatedly follows or harasses another person and who makes a credible threat with the intent to place that person in reasonable fear of their safety” CAL. PENAL CODE § 646.9 (West 2008). Since California’s enactment of the first stalking law in 1990, all 50 states and the federal government have anti-stalking laws. Most stalking cases are prosecuted at the state and local levels. Each states stalking laws will vary in their legal definitions and the degree of penalty for the offense.

As of March 2008, 45 states have cyberstalking or related laws in place. In 1998, only 16 states had cyberstalking and harassment laws. Within many of the 45 states stalking laws, cyberstalking is covered under the states current stalking law. Stalking laws that are written to include forms of stalking using electronic communication devices such as email, Internet or similar transmissions cover the crime of cyberstalking. If a states current stalking law covers forms of electronic communications that are punishable by law, a separate cyberstalking law is not required. If the stalking laws within the 50 states do not cover any forms of electronic communications such as the Internet then a separate law should be written. For example, the Pennsylvania stalking law states:

- (1) a person commits the crime of stalking when the person either engages in a course of conduct or repeatedly commits acts toward another person without proper authority, under circumstances which demonstrate either an intent to place such other person in reasonable fear of bodily injury or to cause substantial emotional distress to such other person, or
- (2) engages in a course of conduct ore repeatedly communicates to another person under circumstances which demonstrate or communicate either an intent to place such other person in reasonable fear of bodily injury or to cause substantial emotional distress to such other person. 18 PA. CONS. STAT. ANN. § 2709.1 (a)(1) and (2) (West 2008).

As used in the definition of stalking under Pennsylvania law, “communicates” is defined as:

To convey a message without intent of legitimate communication or address by oral, nonverbal, written or electronic means, including telephone, electronic mail, Internet, facsimile, telex, wireless communication or similar transmission. 18 PA CONS. STAT. ANN. § 2709.1 (f) (West 2008).

Under Title 18 of the United States Code, Federal Law, covers threatening messages transmitted electronically in interstate and foreign commerce 18 U.S.C §875 (2008). This means that a person who is being threatened in Ohio via the Internet, from a person living in Florida is protected by Federal law. In these instances, law enforcement agencies will determine at where the online stalking began in order to find the physical location of the stalker. If the state of origination is determined, most likely that state will have jurisdiction over prosecuting the case.

Methodology

3.1 Introduction

This section includes a description of the methodology used to determine whether students at a private mid-Atlantic university have been a victim of cyberstalking. Cyberstalking is “the use of the Internet, e-mail and other electronic communication devices to stalk another person” (U.S. Attorney General Report, 1999, p. 2). This exploratory study will examine cyberstalking of both undergraduate and graduate students. This research will expand upon the research conducted by Jerry Finn. Finn conducted an exploratory study of 339 students at the University of New Hampshire. Finn’s study found that approximately 10% to 15% of students surveyed received repeated threatening or harassing emails or instant messages and approximately 7% reported the threats to an authority (2004, p. 468). This chapter will enhance the quantitative methods used by Finn and provide the development and contents of the survey that will be used to measure victims of cyberstalking among university students.

3.2 Research Method

This study will use quantitative methods to determine the number of students that have been stalked, harassed or threatened through the use of the Internet, email or other forms of electronic communication devices. Earl Babbie defines quantitative analysis as the techniques by which researchers convert data to a numerical form and subject it to statistical analysis (2007, p. 405). A survey will be administered to the participants, which will be used to gather data addressing the goals of this research project.

3.3 Survey Design

The survey that will be administered to undergraduate and graduate students at a mid-Atlantic university will be developed from two existing cyberstalking surveys. By combining the Working to Halt Online Abuse (WHOA) survey and a survey that was administered to victims of cyberstalking by Paul Bocij over the Internet this study may be able to provide detailed information in relation to cyberstalking.

3.4 Conclusion

Jurisdictions across the globe are now beginning to take legal action against stalking behavior, recognizing it is a public problem which merits attention. The effects of stalking upon an individual may include behavioral, psychological and social aspects. Specific risks to the victim include a loss of personal safety, the loss of a job, sleeplessness, and a change in work habits. These effects have the potential to produce a large drain on both criminal justice resources and the health care system and it is therefore in the best interests of the authorities to take swift action when cases are presented (Petherick, n.d.).

The relatively high prevalence of stalking is cause for concern. What strategies can individuals, mostly women, use to prevent or end both online and offline stalking? What programs might colleges implement to control, or counsel men or women who stalk? More generally how can the lives of all people and especially college students whether on or off campus be made safer and thus free from the psychological and financial cost imposed by this type of violence.

APPENDIX – A

**DRAFT
CYBERSTALKING SURVEY**

Cyberstalking can be defined as threatening behavior or unwanted advances directed at another using the Internet and other forms of online and computer communications. The U.S. Department of Justice defines cyberstalking as the use of e-mail, or other electronic communication devices to stalk another person. Cyberstalkers can target their victims through threatening or harassing email, flaming (online verbal abuse), computer viruses, chat rooms, message boards, social network sites (such as MySpace), or tracing a persons Internet activities plus many more.

Many online stalking (cyberstalking) cases can manifest into offline stalking cases where the victim can actually face physical harm. This survey is designed to find out the number of people that have been victims to the crime of cyberstalking. Please read the questions and instructions carefully. Select the best answer from the available choices.

1. What is your gender?

Male Female

2. What is your age?

- a) 18-25
- b) 26-35
- c) 36-45
- d) 46-55
- e) 56-65
- f) Over 66

3. This semester, what is your level of education?

- a) freshman
- b) sophomore
- c) junior
- d) senior
- e) masters
- f) doctorate

4. Do you utilize the Internet?

Yes No

5. If yes, what is the frequency of Internet use?

- a) one time a day
- b) more than once a day
- c) once per week
- d) 3-5 times per week
- e) every 2 weeks
- f) every month

6. What are the online activities that you access?

- a) Email
- b) bulletin boards
- c) newsgroups
- d) instant messaging
- e) chat rooms
- f) social network sites (such as MySpace, Facebook)
- g) dating sites

7. According to the definition provided at the beginning of the survey, are you a victim of cyberstalking.

Yes No

If yes, please answer the following questions. If no, there is no need for you to continue with the survey.

8. What form of communication has the cyberstalker used to contact you? You may choose more than one answer.

- a) email
- b) bulletin board
- c) instant messaging
- d) text messaging
- e) chat rooms

- f) social network sites (such as MySpace)
- g) news groups
- h) dating site
- i) eBay

9. Did you or do you personally know the cyberstalker (the person harassing you)?

- a) did not know identity
- b) former boyfriend or girlfriend
- c) work
- d) school
- e) friend
- f) online acquaintance

10. If yes, what is the gender of the harasser?

Male Female

11. What was the style of communication used by the cyberstalker? You may choose more than one answer.

- a) friendly
- b) sexual
- c) threatening
- d) hateful
- e) humorous
- f) intimidating
- g) other, Please specify _____

12. How long did the communication last?

- a) less than one month
- b) 1 – 3 months
- c) 3-6 months
- d) 6-12 months
- e) more than 1 year

13. At any time during the harassment did you fear for your safety?

Yes No

14. If yes, what was your level of fear?

- a) low level of fear
- b) moderate level of fear
- c) high level of fear

15. Are you still being contacted by the cybersalker?

Yes No

16. Did you report the cyberstalking to anyone?

Yes No

17. If yes, who did your report the incident to?

- a) law enforcement
- b) Internet Service Provider (ISP)
- c) Campus Advisor
- d) Cell Provider
- e) Web Administrator
- f) Online Help Organization
- g) Other, Please specify _____

18. If yes, did you receive help?

Yes No

The following is a list of places to report cyberstalking incidents and online abuse:

- Working to Halt Online Abuse (WHOA) – whoa@haltabuse.org
- National Center for Victims of Crime Stalking Resource Center
- Online Privacy Alliance
- Your Local Law Enforcement Agencies
- Your School Administration
- Safety Ed International

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CONSUMER PERSPECTIVES OF IMPLANTED RADIO FREQUENCY IDENTIFICATION (RFID) DEVICES FOR MEDICAL INFORMATION RETRIEVAL

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ABSTRACT

Many organizations are adopting radio frequency identification technologies (RFID) as part of their information supply chains for the myriad of benefits that come through the use of such devices. But the applicability of RFID in other marketplaces is just beginning to be realized. One of these areas of significant potential is in medical information retrieval. The application of implantable RFID technology for medical information retrieval has been the subject of heated debate and controversy, regardless of the benefits that may be realized from such use. On one hand it has been called merely an extension of the technologies we already embrace (such as cell phones, Bluetooth devices, MP3 players, etc.), while on the other it has even been referred to as the “mark of the beast” by certain evangelical movements [1]. In this study, we outline some of the advantages and disadvantages of implantable RFID devices, then follow up with a discussion and analysis of consumer perceptions gained from a series of semi-structured interviews with potential users and healthcare professionals, including paramedics and firemen, nurses, doctors and administrators.

Keywords: Technology Acceptance, Medical RFID, Implantable RFID.

INTRODUCTION

The pending wide-scale adoption of radio frequency identification (RFID) technologies has been the subject of significant debate in professional and academic circles for some time. Mandates by Wal-Mart, Target Corp. and Albertson's in the United States, Metro Group in Germany, and Carrefour in France have pushed the use of RFID in retailing while governmental regulations on the traceability of food in the United States and Europe have pushed RFID into food production [4]. RFID is also being used in security systems, healthcare, livestock tracking, parcel and parts tracking, casinos, U.S. toll roads, law enforcement, and the U.S. Department of Defense [2]. As the potential markets for RFID continue to expand, the inherent concerns regarding privacy risk associated with the technology become increasingly important.

RFID chips or tags are increasingly used in the healthcare industry specifically in addressing the emerging threats of diversion, theft and counterfeit medications. In addition to healthcare supply chain management, hospitals use RFID to prevent infants from being switched in nurseries and to track in-patient Alzheimer's sufferers. But while government agencies consider the use of RFID in healthcare and debate controls and regulations for the technology, privacy and consumer advocates continue to worry about the possible abuses of RFID [1][8].

In 2004, the U.S. Food and Drug Administration gave approval to VeriChip, a Florida-based company that has been developing implantable RFID chips for the past 15 years, (primarily to tag livestock and pets), to implant RFID chips in human beings for the purpose of medical information retrieval [3]. With the VeriChip system, the patient's information is not embedded upon the chip, but rather is housed within VeriChip's online, secure database. When hospital personnel pass a scanner over the implanted RFID chip, the chip's identifier is displayed on the screen of an RFID reader [5]. An authorized health professional can then use the identifier to access the patient's clinical information from the VeriChip database. Between 2004 and 2006, VeriChip claims to have implanted RFID devices in more than 2,000 people around the world, 60 of those in the United States [3].

Systems such as the VeriChip system may offer certain medical benefits, such as expedited patient identification, expedited medical records retrieval, and expedited treatment and/or problem diagnosis [5]. But such systems also raise ethical concerns regarding patient privacy.

The principal argument against RFID technology has always been and continues to be the privacy risk the technology poses to consumers. Retail items tagged with RFID chips can be scanned by anyone with an appropriate RFID scanner. According to Spiekermann and Ziekow (2005) there are five immediate and key threats posed by RFID technology, all related to the issue of privacy:

1. Unauthorized assessment of one's belongings by others
2. Tracking of persons via their objects
3. Retrieving social networks
4. Technology paternalism
5. Making people responsible for their objects

These concerns speak specifically to RFID tags found within consumer goods, but when the RFID device is within the human body, and contains a link to personal information, the issue of privacy becomes of far greater concern. Critics of the technology are particularly concerned with the risk of a patient's identifying information being used for nonmedical purposes, stating that "unauthorized access could potentially result in social discrimination, the loss of health care coverage, or the publication of potentially sensitive medical information" [5, p. 1709].

Problems with Current Implantation Standards: VeriChip

The current standard permitted by the FDA requires that no personal information be stored on an individual RFID device, but that the device contains only a unique identifier to serve as a link to a patient's medical information, housed within a separate and secure database [5]. This regulation greatly diminishes the risk of abuse of personal information related to implanted RFID devices, but does not guarantee the security or accuracy of the database containing the information. In fact, when an individual consents to implantation with a VeriChip RFID tag, he or she must sign an informed consent agreement that absolves VeriChip of any and all liability with respect to the security of its own database, as well as the accuracy of the information contained therein [8]. Even the FDA acknowledges that the VeriChip system may cause a range of technical failures and compromised information security [8].

While the VeriChip design diminishes privacy and security risk, it is not an error proof solution. VeriChip states that it does not guarantee the accuracy of the medical information stored within their secure online database [8]. It also absolves itself of any personal damage a client may incur due to a security breach, which may result in crimes such as medical ID theft [8].

In addition, hospitals are required to have special access to the VeriChip database to retrieve an individual's medical information. VeriChip's design is also proprietary, meaning that hospitals must be set up to accommodate VeriChip's design and data format. The very nature of the design demands that it be proprietary and difficult to access, otherwise the risk of unauthorized access into the system greatly increases. However, it is unlikely that all hospitals will make use of the same system, that they would agree on a standardized system of medical identification such as VeriChip, particularly as competing products are introduced to the market.

Another concern is that RFID does not fall under the protection of the Health Insurance Portability and Accountability Act (HIPAA), because it has no medical significance. Therefore there are no laws to regulate how or by whom RFID tags may be scanned, or the unique identifiers recorded. Consequently, the potential for privacy invasion and information abuse as the result of inter-database linkage is vast [5].

Alternative Design

The functionality of RFID devices is limited, and FDA regulations currently prevent increased functionality. But as the capabilities of RFID devices expand, and especially if active RFID devices (those with their own power source, capable of broadcasting their own signal) are approved by the FDA, the risk of information abuse becomes even greater, as such devices could disclose the location of the owner and/or carry significant personal information [5].

We propose that as the capabilities of RFID devices expand, particularly in regards to the amount of data the devices themselves may contain, it may be useful for consumers as well as government agencies to consider alternative means by which the technology may be used for medical information retrieval. Specifically, we are interested in evaluating consumer responses to both the VeriChip type of system, as well as another design, which would embed critical health-related information on an implanted RFID tag, but without any specific identifying information. This design would function much as the medical alert bracelets, listing significant allergies, health conditions, regular medications, even organ donor information or resuscitation preferences. Such a tag could be scanned by emergency medical or hospital personnel, providing caregivers with immediate access to critical health-related information, while leaving the patient's identification to more traditional means. This design is also more accurate than the VeriChip design. Personal medical information is more likely to be correct and accurate if it is controlled by the individual, the owner of the information, rather than by a third party.

We propose that the data contained on the chip be coded in a series of bits indicating a positive or negative flag for several common medical conditions, from allergies to Penicillin or bee stings to cardiac conditions and diabetes. To protect the individual's data from unwarranted scanning, we propose the data be encrypted using an encryption algorithm whose decryption key would be tied directly to a biometric feature unique to the individual, such as a retinal scan. The encoded data could therefore be decrypted whether the individual was conscious or not. A simple, open-source software program can be written to initiate and process the decryption of the data stored in the implanted RFID tag upon completion of the appropriate biometric scan, providing emergency caregivers with immediate critical information regarding the individual's specific health needs.

Using an open-source software solution for this system renders this an inexpensive and easily-implemented solution for healthcare facilities, as opposed to the proprietary and exclusive contracts that would be required by other, more elaborate solutions. Such a benefit would make this solution more attractive to lower budget facilities, such as hospitals and emergency clinics in rural areas.

We are on the verge of massive technological advances in health care information, characterized by Google's recent launching of their web health services as well as other companies and technologies going in this direction [6]. It is imperative that we think now about the type of system we want for the future. If we can determine the types of systems consumers are more likely to accept, we can greatly increase the chances of system acceptance and thereby achieve greater efficiencies within the health care system. Health care reform continues to be a major political issue, and if reforms are forthcoming, it is important that we understand what is likely to be most acceptable to consumers.

METHODOLOGY

The research methodology will be conducted using a series of semi-structured interviews conducted with both potential users of the technology as well as healthcare professionals, including paramedics and firemen, nurses, doctors and administrators. Through these interviews, we will assess the perceptions and usage intentions of potential users of the technologies, those who may suffer from the health issues these technologies address, as well as the perceptions of healthcare professionals, toward four different potential uses of implantable RFID devices for medical information retrieval.

- 1) The VeriChip design, which employs an implanted RFID tag containing a unique identifier that can be used to access a patient's personal medical information within a separate secure database;
- 2) An alternative design, which stores critical health-related information — such as serious allergies, required medications, health conditions, etc., but no personal identifying information — directly on the RFID tag;
- 3) A design identical to the alternative design presented above, but with the added security of data encryption, with the encryption key tied to a unique biometric feature, such as a retinal scan.
- 4) A design identical to the alternative design presented above, but with the addition of a unique identifier (such as that employed in the VeriChip design) that can be used to link to the patient's complete medical record and identifying information in an online, secure database.

Interview subjects will be asked to listen to a brief education piece outlining the basics of RFID technology, its benefits and liabilities, as well as a brief but detailed description of each of the four proposed design alternatives prior to offering their responses to the interview questions. Results of the study will then be analyzed and a discussion of the results will be presented at the conference.

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EXAMINING NURSES PERCEPTIONS OF REWARDS STRUCTURE

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ABSTRACT

Nurses in a hospital located in Southern U. S. were surveyed to determine their perceptions of the reward structures existent in their hospital. Reward structures were divided into two categories: extrinsic and intrinsic. The cluster analysis procedure partitioned the sample into two clusters based upon their level of satisfaction with the hospital's reward structure. The analysis of variance procedure comparing scale responses on Comfort, Challenge, Financial Reward, Relation with Coworkers, Resource Adequacy, and Promotion suggest that nurses in one group (Cluster 2) are less satisfied with Financial Rewards and Promotion Opportunities.

INTRODUCTION

The shortage of nurses in the United States is having a significant impact on the American healthcare system (Andrews and Dzlegielewski, 2005; Bednash, 2000; Buerhaus et al, 2000). According to Upenieks (2005) nurses have felt physically exhausted and emotionally drained because of the increased patient load and the conditions under which they must work. Also, the present shortage is more acute as a result of nurses opting out of the nursing profession due to dissatisfaction with their roles in a clinical setting.

It has been estimated that, by 2010, there will be a shortage of 729,000 registered nurses with a BSN. The estimate increases to 1,119,000 by 2020 (Sigma Theta Tau, 1999). In a 2004 study, the Health Resources and Administration forecasts for a registered nurse shortage in 2020 will be between 400,000 to 1,000,000 nurses. This situation will increasingly worsen as more "baby boomer" nurses retire and, in turn, more aging "baby boomers" require care. Thus, by 2020, there will be 340,000 fewer nurses practicing than today (Auerbach et al., 2007). In the March 2008 issue of RN, it is estimated that the United States is currently facing a shortage of approximately 150,000 nurses; in the next decade, more than 650,000 new nursing jobs will be created, and about 450,000 nurses will have retired.

RESEARCH METHODS AND RESULTS

In a continuous effort in studying the factors that impact the retention of nurses, one of the initial steps would be to measure the satisfaction level of nurses. For example, the rewards offered to nurses in the hospital. In this present study an attempt is made to study the reward structure of nurses in a hospital in

the Southern United States. We have classified the reward structure into two categories, extrinsic reward and intrinsic reward. The study used the job satisfaction scale developed by Quinn and Staines (1979). The scale of intrinsic reward included the items such as: How satisfied with the chances to learn new things; How satisfied with the chances of accomplishment something worthwhile; and How satisfied the chances to do something that make them feel good about you as a person. The scale of extrinsic reward included items such as: How satisfied with the pay; How satisfied with the fringe benefits; and How satisfied with the job security. The items were measured on the scale of 1 to 7 (1=very dissatisfied and 7=very satisfied). The surveys were distributed in a hospital and forty nurses completed the survey.

The data were analyzed using the cluster analysis procedure. The procedure identified two clusters as presented in Table 1.

Table 1:
Results of Cluster Analysis

	Cluster 1 Satisfied with Intrinsic and Extrinsic Rewards	Cluster 2 Less Satisfied with Intrinsic and Extrinsic Rewards
Intrinsic Mean	6.04	4.60
Extrinsic Mean	5.36	2.55
Observation (%)	72%	28%
Scale: 1=Very Dissatisfied 7=Very Satisfied		

The analysis identified two distinct groups. The one group of nurses (72%) was more satisfied with the intrinsic reward than the second group of nurses (28%). In terms of extrinsic reward, the cluster two nurses were significantly more dissatisfied with their counterpart in cluster one.

Table 2
Results of ANOVA Procedure

Scale	Cluster 1 Mean	Cluster 2 Mean	p-value
Comfort: Seven items ($\alpha = 0.7338$) e.g., My work schedule is good I have enough time to get job done Physical surroundings are pleasant	2.70	2.53	0.2422
Challenge: Six items ($\alpha = 0.8186$) e.g., Have opportunity to develop own special ability I can see the results of my work The problems I am expected to solve are challenging	3.33	2.89	0.0037
Financial Reward: Three items ($\alpha = 0.6898$) e.g., The pay is good The job security is good Fringe benefits are good	2.98	1.87	0.0001
Relation with Coworkers: Three items ($\alpha = 0.6901$) e.g., People I work with are friendly Plenty of chances to make friends	3.39	3.03	0.0271

Scale	Cluster 1 Mean	Cluster 2 Mean	p-value
Resource Adequacy: Thirteen items ($\alpha = 0.9011$) e.g., Have enough information to get job done Enough supplies to get job done Supervisor is competent Supervisor is helpful in getting job done Supervisor is successful in getting job done Responsibilities are clearly defined Coworkers are competent Coworkers are helpful in getting job done	3.39	3.00	0.0138
Promotion: Three items ($\alpha = 0.8411$) e.g., Promotions are handled fairly Chances of promotion are good Employer is concerned about giving everyone a chance to get ahead	2.76	2.07	0.0039
Scale: 1=Not at all true 2=A little true 3=Somewhat true 4=Very true			

The review of Table 2 indicates that in general, the nurses in cluster two reported significantly more agreement ($p\text{-value} < 0.05$) with scales on *Challenge*, *Financial Reward*, *Relation with Coworkers*, *Resource Adequacy*, and *Promotion* than cluster one. These findings indicate that the nurses in Cluster 2 are significantly less satisfied with financial rewards, followed by the promotion opportunities. The *Comfort* scale did not provide significant difference between two clusters. The nurses in both groups viewed comfort similarly, although this scale is not highly rated by both groups.

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**A STATISTICAL QUALITY CONTROL TECHNIQUE
FOR ASSURING JUST-IN-TIME PATIENT FLOW IN AN
OUTPATIENT SURGICAL SETTING: A CONCEPTUAL APPROACH**

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ABSTRACT

This study focuses on a sub-system process in an outpatient surgical clinic within a tertiary care hospital complex. Since the surgical staff provides services to the patients on a continuous yet sequential basis, just-in-time patient flow could significantly enhance not only the productivity of the process, but also the quality of patient care. When patient arrival times are out-of-kilter or not just-in-time, the entire surgical schedule can be thrown off balance. The objective of this paper is to develop a quality assurance mechanism to achieve just-in-time patient flow and better utilization of resources. The methodology of the study makes use of a Statistical Process Control (SPC) Chart, called the \bar{c} -bar chart, which is designed for countable or enumerable data. The study provides a conceptual framework for the use of SPC techniques as modeling methods in quality assurance and continuous improvement in a healthcare sub-system wherein the patient is the final product and the consumer of the product as well.

INTRODUCTION

In modern manufacturing systems, there are many sub-systems, which are highly dependent on quality control and assurance in a quest for optimality. Similarly, within a hospital system there are many sub-systems that have objectives such as the reduction of “defects” or the improvement of quality in that sub-system’s processes. With this goal of quality improvement in mind, we might study the sub-system processes in a tertiary hospital with outpatient clinics for several professional specialties such as pediatrics, obstetrics and gynecology, orthopedics, podiatry, gastroenterology, and surgery. Accordingly, a process may be thought of as a set of operations that repeatedly link together in a series of steps that transform inputs into outputs or outcomes. A hospital sub-system is an organized unit with a specific purpose, customer(s)/patient(s), technologies and professional practitioners who work directly with these customers/patients through processes that bring about successful outcomes.

Just as in manufacturing, processes in a healthcare sub-system are normally a part of a larger healthcare organization or system necessarily implying that the larger system is rooted in a legal, financial, and regulatory environment. In a manufacturing system, the inputs are raw materials (non-human) that go through a conveyance system and in the process are transformed into finished products. In a healthcare system, the people are the inputs and outputs! Donabedian (1980) refers to a healthcare delivery system as the “process of care” that does not reflect quality until the desired patient outcomes are established, perhaps more appropriately in a healthcare environment “just right” patient care. In a perfect world, a functional system would entail defect-free processes consisting of participants who know and understand their level of performance, how they can improve the quality of the product, barriers they encounter and how they deal with them, all of which requires the presence of an adequate feedback and quality assurance system. These concepts provide a general framework for developing a quality assurance system in the health care environment.

PROBLEM AND CONTEXT

The problem and context for this study is based upon the following account. At a hospital’s outpatient surgical clinic (which shall remain nameless), patient flow was affecting a patient’s progression through

the process (from preoperative nurse activities, to the anesthesia team, to operating room aids and finally to the scrub nurses and surgeon). There was general agreement that medical processes (operating room procedures) from the patient's perspective were achieving excellent outcomes. However, because patient's arrival times were out-of-kilter or not just-in-time, the entire surgical schedule was thrown off balance. The nurse manager was fully aware that managing patient flow through the facility was critical to the surgical clinic's operations. The manager also understood that patient flow with varying degrees of consistency can have consequences such as longer patient wait times, staff discontent, compromised patient safety and lost revenue. To diagnose and determine the deficiencies of this process, the nurse manager emphasized to the surgical clinic's staff that quality control and improvement was dependent on the process and the coordination of activities. The manager also tried to convey to staff members that providing timely patient care required awareness of each member's stress loads and resource constraints. In one particular staff meeting, the manager remarked that "it was imperative for the staff to foster collaboration and break down any barriers;" and, that it was "also important for the manager to ensure that the staff was empowered to the degree possible to achieve continuous improvement in quality-of-care".

As a starting point, the manager utilized two tools: a deployment flowchart and a lead time analysis to document and identify weaknesses in the process and rectify inefficiencies. The manager found that the deployment flowchart revealed that pre-op nurse activities delayed other activities and interactions in the surgical process. These findings prompted the nurse manager to conduct a lead time analysis, which revealed that patients were spending fifteen minutes or more finding their way to pre-op. In addition, the nurse manager utilized results from a root cause analysis conducted by another manager in an outpatient services clinic within the hospital complex. This analysis revealed that originally the clinic's location and design was chosen because it was close to a public entrance with automobile access. Even though well intended, the result brought confusion in connection with parking locations. In addition, because other patients and staff frequently used the same hospital entrance for various activities, many patients lost their way and as a result arrived late for surgery pre-op registration.

Armed with these data, the nurse manager implemented a system such that each patient was given a registration packet from his/her surgeon's office one week prior to surgery. Staffs from pre-op services were to contact the patients one or two days before surgery to assure their understanding of the process, surgical procedures, transportation assistance, and the need to be prompt. This included a post-op evaluation in which patients were asked specific questions about the process. After these changes were introduced, the manager sought to examine the new data collection in order to isolate any assignable variation in the process due to late arrivals. The nurse manager felt that tracking and comparing performance over time would help bring the process back into control so that just-in-time patient flow met specified standards of quality assurance. It is in this context that this study proposes a statistical process chart (SPC) method as a way of displaying performance data so as to identify the performance variation (late patient arrivals) of the process over time.

THE LITERATURE AND QUALITY CONTROL IN HEALTHCARE DELIVERY

Over the past several decades, the literature on a systems approach to management has grown immensely with contributions pertaining to both the healthcare and manufacturing sectors. Some of these are briefly discussed below. Such a review will aid in understanding some of the differences in the processes of the two sectors. The research revealed in the literature will also explore some fundamental ideas pertaining to complex, dynamic systems and reasons for their unpredictability as a theoretical proposition. In terms of cause that leads to effect, the implications of variation about predicted values results from as yet unexplained causal factors (non-random or assigned variation). As more is understood about unexplained

random variation, defects (just-in-time) or less than desirable patient flow will diminish. This contention is compatible with that found here and throughout the literature.

The systems approach to management has helped the healthcare sector synthesize new knowledge and theories. But, it doesn't tell managers exactly what the significant elements of their organization are; instead, it tells them that their organization consists of many sub-systems and is an open system that interacts with its external environment. Not recognized in the systems approach are the specific variables that affect management functions. Furthermore, it specifically does not single out what in the environment affects management and how both the internal and external environments influence the overall performance of their organization. In combination with the contingency approach, the identification of relevant performance variables and their impact on organizational effectiveness has helped to logically extend systems theory. Since organizations are contrived, human-engineered systems, there are internal variables that are principally the result of the decisions made management itself. However, this does not mean that all internal variables are under the control of management. Nonetheless, there are key internal variables that management must consider, including objectives, structure, tasks, technology and people and the interrelationships among them, in improving the performance of the organization (Mescon, Albert and Khedouri, 1985).

The Committee on Quality of Care in America (2001) reported its confidence that Americans could have a healthcare system that provides the quality they need, expect and deserve. Yet, the Committee also stated their awareness that a higher level of quality could not be achieved by further stressing current systems of care. The current care systems cannot do the job, they say. Attempting to achieve a higher level of care by doing the same things over and over will not accomplish the changes and improvement in systems needed to bring about better outcomes. In its wisdom and in an effort to contrast healthcare systems, the committee speaks to the idea of complex biological species (for example, human beings) evolved through evolutionary processes such as genetic mutation, and random variation. In complex biological species, they contend, changes that are useful to survival tend to persist. In a parallel manner, the report illustrated and pointed out that human beings rely on two processes in order to evolve: (1) processes that generate variation and (2) processes that "prune" the resulting evolutionary tree. As such, the Committee translated this insight to the task of designing the 21st-century health care system(s) as a means of combining the many systems that generate and test ideas with avenues for enhancing the spread of "good" ideas and impede the spread of "not so good" ideas According to the Committee's report, these concepts of evolutionary design are innately contributing to the rapid-cycle improvement methods currently being widely utilized in healthcare. Of course, healthcare cannot claim exclusivity to the ideas of evolutionary design, since private sector manufacturing firms have also utilized these ideas for years. But, like manufacturing organizations, healthcare institutions are also complex systems. Their complexity is often less obvious than in the manufacturing and high technology service systems. For instance, healthcare institutions are frequently developed as models for their effectiveness in safety and delivery of "defect-free" patient care because of the nature of their services. In manufacturing and high technology service processes, performance standards and quality control are important for the long-term survival of a company because of the global competitive environment. Although healthcare systems emphasize a people orientation, they can gain valuable insights from manufacturing and high technology services. In a similar tone, O'Neill (2007) argues that solutions can be found in proven strategies designed for improving complex systems. He says that Toyota is a leading example of highest quality/lowest cost manufacturing and has demonstrated the capacity of quality management principles for a number of years. O'Neill (2006) says that he adopted them at Alcoa. He goes on to say when applied in the right way, these tools drive an elementary reorganizing and generalization of work processes, rather than transitory improvements toward perfection. For healthcare, these concepts have compelling applications says O'Neill (2007). His reasoning is simple since improving work processes would let doctors and

nurses do something about the frustrating things that are keeping them away from their patients. In essence, it would allow them the opportunity to get back to delivering quality care to patients. When participants are left to do their jobs and design and implement the solutions, it prevents medication errors before they occur, O'Neill (2006) insists. It is the power of utilizing the quality management principles approach that pushes forward perfection in systems. But, he admits best practices in health care settings are somewhat daunting (<http://rand.org/publications/randreview/issues/summer2006/perspect.html>).

Healthcare organizations are striving to improve patient care and the minimization of “defects” that affect quality assurance (just as manufacturing companies do with customer service). The Joint Committee on Accreditation of Healthcare Organizations (JCAHO), for example, has published a leadership standard (LD.3.15) to manage patient flow and prevent overcrowding. It centers on the importance of identifying and justifying impediments and levels of stress to efficient patient flow throughout a healthcare organization (www.jointcommission.org). JCAHO's demand for performance improvement has driven health care organizations to gain as much knowledge as possible about continuous quality improvement. In fact, over the past two decades, these institutions have undertaken initiatives such as: teams and facilitators with training on problem solving, which has seen wider utilization of statistical tools and standardized problem-solving procedures; data collection, including patient, physician and employee surveys; process management using clinical algorithms and practice instructions with training on conduit development; and planning using balanced scorecards and performance measurements (Méndez, 1999). With continuous quality improvement often delegated to levels below senior management, organizations have struggled to integrate and justify their many initiatives. The Baldrige National Quality Program (BNQP) Healthcare Criteria for Performance Excellence assists managers in choosing performance indicators utilizing a systematic approach including a vehicle for initiating continuous discussions with regard to organizational performance. The BNQP model provides the most current structure for organizational effectiveness. Thus, healthcare organizations have to be aware of the unique attributes in patient care delivery processes and procedures. If not, the processes may create an environment more prone to “defects” (Kelly, 2007). In this regard, Stacey (1993) in Rosenhead (2001) maintains that “extraordinary management” is the prescription if the organization is to be able to transform itself in situations of indefinite change and systems' adaptability within the organization. Here rational-based forms of decision making are largely broken, he maintains, since these require as their starting point precisely those “givens” which must now be disputed. Again and according to Stacey (1993) as revealed in Rosenhead (2001), the innovation is the concept of “extraordinary management”.

Extraordinary management requires the activation of the implied knowledge and creativity available within the organization. This necessitates the encouragement of informal structures, for example, that are centered round particular issues and/or processes. Formation of informal structures should be essentially spontaneous, provoked by contradictions, variance and conflicts originating in the process of normal management. They need to be self-organizing and adaptive, capable of redefining or extending their efforts rather than being constrained by fixed terms of reference, which would have the effect of sub-optimality (Rosenhead, 2001). Obviously, in a healthcare setting there must be a focus on understanding team or staff performance and the maximization of that performance as a basis for measurement. For example, Headrick et al. (1998) points to the increasing numbers of professionals directly involved in healthcare delivery processes and the significance of cooperative functioning relationships and the delivery of patient care. As mentioned previously, patients are not only the consumers or recipients of health care services. They are also the raw materials used in the “process,” as in the manufacturing or the construction industries. Unlike the raw material inputs or final products in entertainment, energy or electronics industries, patients are not standardized commodities in the sense that their characteristics are highly heterogeneous. That is, they may be ill, injured, old, or very young. No two patients are alike, and indeed, there may be many differences between one patient and the next. These differences make them much less able to participate in their “consumption of care” and more susceptible to being seriously damaged or injured through mistakes or medical errors. Even when patients are receiving safe and

appropriate care, some may have underlying physical conditions that may make the care hopeless. Such outcomes are not the same as adverse events, which are the corollary of improper and risky care. This also points to the increased emphasis on the consumer/patient in healthcare.

In addition and according to Headrick et al. (1998) the variety of interactions by healthcare professionals that range from coordinated collaborative relationships at one end of the continuum to more tightly organized work teams at the other, often within the same time interval, makes the team concept a preferred method of delivery. Schaefer et al. (1994) have noted that 70 to 80 percent of health care mistakes caused by human factors tend to be associated with interpersonal interactions (Page 2004). Also, Page (2004) cites the issue of wide variation in team makeup, which ranges from those composed of senior clinicians overseeing residents to those involving representatives of multiple professions from various organizations. Clearly and concurrent with these and other researchers, differences exist from a situational standpoint especially when team makeup is motivated by hierarchical learning and/or accountability systems as opposed to those in which team members have equal sway on team performance and results. Again, Page (2004) summarizes what Hambrick and D'Aveni (1992) report by concluding that difficulties also arise when determining whether the failure of a team's performance is the cause or the result of a single team member's behavior. Researched by Hambrick and D'Aveni (1992) and reported by Page (2004) is the indication that deteriorating team performance is a back-and-forth pattern developed between member performance and overall team performance as top management teams began to fail. In addition, the mode of health care delivery is different from usual private sector transactions. Hambrick and D'Aveni, (1992) in Page (2004) continue by stressing the processes, products and services of other private sector industries are usually delivered in a more impersonal "few-to-many" manner. Because of this, not many individuals are involved in communicating the service to many others, perhaps many times in a mass market. Page (2004) also discusses Hambrick and D'Aveni, (1992) explanation that health care delivery is largely "one-to-one" or "few-to-one" communication. As such, health care delivery is very personal requiring face-to-face contact with a detailed orientation, which must be embedded within effective and efficient processes. As a result, characteristics and attributes of healthcare professionals are likely to contribute more to service delivery (operational processes) and (clinical/medical processes) than in the manufacturing sector. Whether or not the health care professional chooses to go the extra mile is likely to have a far greater impact in health care than elsewhere.

Healthcare delivery also has to contend with inexact scientific knowledge and incomplete patient information in a quickly changing world with rapidly shifting population demographics. Developing cultural competence is a growing problem because without it healthcare professionals cannot understand how to communicate with and effectively interact with people across cultures. Consequently, developing a culturally competent approach to healthcare systems requires a patient-centered approach. According to Clarke and DeGannes (2008), cultural competence includes four mechanisms: awareness of one's own cultural worldview; attitude toward cultural differences; knowledge of different cultural practices and worldviews; and cross-cultural skills. These authors contend that the main idea behind the patient/provider encounter is to obtain information and educate the patient for the creation of a treatment plan that suits the patient's cultural values and expectations, which will likely lead to less variation and a more optimal system(s). Differences in patients' and providers' verbal and nonverbal communication styles are different and expectations of the patient/provider relationship and understandings of illness and treatment may present barriers to achieving the objective and can contribute to sub-optimal system(s) and health outcomes. There is a high degree of uncertainty and there is no room for mistakes (variation). When acquiring medical knowledge, both healthcare delivery professionals and their patients have to face the reality that any acquired medical knowledge is not complete. Accidents and mistakes in economic sectors other than healthcare are usually newsworthy and have good investigative potential with widely disseminated consequences. In contrast and with few exceptions, accidents and mistakes in healthcare

tend to be investigated quietly with a local perspective. Even today, findings are not shared widely for public consumption and scrutiny. Since there are many variables and various sources of variation including people, materials, machines, methods, measurement and environment, we can collect data over time from these sources to study the behavior and development of the processes. Yeung and MacLeod (2004) rely on modern quality-management experts such as Deming (1982), and assert that variation can originate from random causes (common causes) and assignable non-random causes (special causes). According to Deming (1982), random causes are inherent in every process. Since random variation is a physical attribute of the process, the only way to reduce it is to design a new process that exhibits a new level of random variation. Assignable variation, on the other hand, is attributable to causes that somehow found their way into the process and could be identified.

In addition, Yeung and MacLeod (2004) say that (according to Deming, 1982) if there is only common or random cause variation in the process, then the process is said to be “in control” or steady toward an optimal outcome. Alternatively, if variation due to assignable causes is identified, then it said to be “out of control” or unsteady toward a sub-optimal outcome. The level of random variation is a physical attribute of a process. Separating the random from assignable variation, requires the use of Statistical Process Control Charts (SPC), which can be utilized to reveal control limits, runs, trends and other patterns of longitudinal data. As Deming (1982) pointed out, variation in a process is ubiquitous and further, the variation caused by random causes can be predicted within statistical limits or boundaries. Therefore, in order to reduce random variation it is necessary to find a new process with a new level of random variation, which is superior to the original process. In most cases, the new process is a modification of the previous process. Of course, management may also design a completely new process. This perhaps can be accomplished in a trial with a small test group. After this step, management would study the results attempting to answer the question: does the new process have a level of performance and/or random variation that is superior to that displayed by the old process? Lastly, management would act by applying the analyzed alternative, and then may modify it, try again, or perhaps discard it (Mundorff, 2007). These process modifications are best thought of in terms of the Deming (1982) or Shewhart PDSA cycle, which is based on the scientific method (Kelly et al. 1997). However, Gawande (2002) and Rosenhead (2001) view the scientific method as imperfect, since it involves a venture in acquiring knowledge that is tentative with imperfect healthcare professionals who have a responsibility for saving and preserving life.

Gawande (2002) also alludes to the gap between what we know and what we aim for, as a basis for complicating everything in health care delivery. Accordingly, this tends to affect both operational/patient flow processes and clinical/medical processes and thus effectiveness and quality assurance. The assumption is that you are supposed to get rid of a problem they give you and not create another one reports O’Neill (2002), which is actually defeating the purpose of adaptability and perfection in the system(s). Such an approach would also add to the cost, a cost without value, suggesting a sub-optimal system. In a similar manner, O’Neil (2002) contends that we can look at benchmarking, which he says is not the best method to track systems at least in terms of improving the process. If you benchmark you hold up a standard, which may be less than what may otherwise be an optimal system. In striving to attain perfection and improvement in systems and conditions and outcomes, benchmarking may create sub-optimal systems. With this proposition, O’Neill (2002) declares that if you look at what’s happening in American medical care today, a nurse spends 50 percent of his/her time doing non-value added work. Nurses are racing around doing things that have to be done because the design of the system is flawed. In other words, the hospital outpatient surgical clinic would not be well served by such disorganization under any conceivable circumstances (<https://www.carlsonschool.umn.edu/Page5382.aspx>).

QUANTITATIVE METHODOLOGY

In order to monitor and continuously improve the quality of processes, a statistical process chart (SPC) is utilized. Specifically, a control chart is a time-ordered sequence of data, revealing a center-line (or the

measure of central tendency, mean) of a process variable and the upper and lower limits for that variable. It also serves as a tool in tracking variations in the process variable. As a quantitative exercise, constructing control charts involves collecting data from several same-size samples and obtaining estimates of the center-line and the lower and upper control limits. There are three different types of charts used in industry (Dondeti, 2005) based on three different types of variables: (1) variables measured on continuous scales (such as length, weight, volume, etc.), (2) variables built on the dichotomy of attributes, and (3) variables based on simple counting (Dondeti, 2005). Variables based on simple counting arise frequently in manufacturing. Consider a workshop where the manager might ask “how many machines are down today?” The reply to such a question would entail a simple counting of those machines that have broken down (Dondeti, 2005). Similarly, in a population of patients scheduled for outpatient surgery there may be late arrivals (defects), which could cause delays in the process. If the number of defects (number of late arrivals for outpatient surgery) exceeds a specific limit, then depending upon the causes (common or special causes) the process itself may be considered out-of-control and may require greater scrutiny as to what action(s) might be necessary. Whether it is in a manufacturing context or healthcare setting, the focus of quality control/assurance efforts will be on the number of defects in the process. Of course, in healthcare the idea of “defects” concerns the human element. These “defects” or late arrivals affect the entire process of continuous improvement.

It is clear that in the context of late patient arrivals, we are dealing with a variable whose value is based on simple counting. For this variable, the \bar{c} -bar chart is the more appropriate control chart, which is useful for countable or enumerable data. It permits the observation of the process and the detection of the variation in the process over time (Yeung and MacLeod, 2004). Here, the observable data is time-ordered and sequenced. It should also be noted that the number of patients scheduled (i.e., customer arrivals in the parlance of Queuing Theory) per eight hour day involves a discrete variable over a fixed interval of time and thus follows a Poisson distribution. The assumption of Poisson arrival rates is commonly used in simulation models (Stevenson and Ozgur, 2007). More specifically, the probability distribution involves a discrete random variable representing the number of events occurring during a fixed time period with a known average rate. If the arrival rate is Poisson, the average time between the arrivals follows a negative exponential distribution (Stevenson and Ozgur, 2007).

In the \bar{c} -bar chart, the interest lies in the number of non-conforming units (late patient arrivals). The number of non-conforming units would be plotted on the y-axis and the number of days on the x-axis. Suppose the clinic operates five days per week, eight hours per day; the nurse manager may be interested in determining the total number of late patient arrivals (defects) or the number of non-conforming units per day. The appropriate statistical technique is described in Dondeti (2005). In general, c denotes the number of defects observed in the process on a given day; and, K the number of days for which the data is collected. The formulation is shown below:

Step 1- Find the mean number of defects (number of late patient arrivals) \bar{c} for a predetermined number of days K (generally, K should be 30 days or more):

$$\bar{c} = (c_1 + c_2 + \dots + c_k) / K$$

Step 2- Calculate the upper and lower control limits for c as follows:

$$s = \sqrt{\bar{c}}, \text{ UCL}(c) = \bar{c} + 3s, \text{ LCL}(c) = \bar{c} - 3s, \text{ or}$$

$$\text{UCL}(c) = \bar{c} + 3\sqrt{\bar{c}}, \text{ LCL}(c) = \bar{c} - 3\sqrt{\bar{c}}$$

Where:

$$c = \text{number of late patient arrivals in a day}$$

\bar{c} = mean

K = number of days for which data is collected

s = standard deviation of c

As an illustration, suppose that Table 1 below shows the data collected by the manager of an outpatient surgical facility. The first row is the day number and the second row is the number of late patient arrivals on a day. In this case, $K = 30$.

Table 1 -- Simulated Sample Data for a C-bar Control Chart

Day Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
No. of Late Arrivals	4	6	3	5	4	3	6	9	2	5	3	6	3	5	4	2	1	5	4	3	5	2	4	3	2	3	4	3	5	2

For the data in the table, $K = 30$

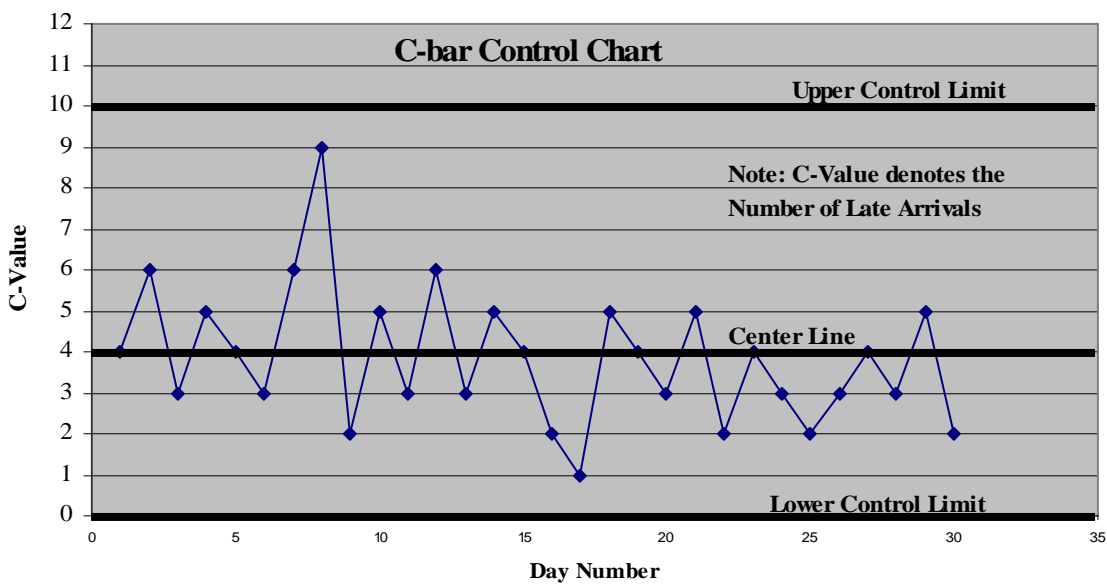
$$\bar{c} = (4 + 6 + 3 + 5 + 4 + 3 + 6 + 9 + 2 + 5 + 3 + 6 + 3 + 5 + 4 + 2 + 1 + 5 + 4 + 3 + 5 + 2 + 4 + 3 + 2 + 3 + 4 + 3 + 5 + 2) / 30 = 3.867$$

$$s = \sqrt{\bar{c}} = \sqrt{3.867} = 1.966$$

$$UCL(c) = \bar{c} + 3s = 3.867 + 3 * 1.966 = 9.765,$$

$$LCL(c) = \bar{c} - 3s = 3.867 - 3 * 1.966 = -2.031 \cong 0.00$$

Because c can never be negative, if the calculated value, LCL is negative, the LCL must be set equal *zero*. The control chart is given below.



Of course, once the c-chart is constructed, the process variation can be monitored by plotting the daily values of c . If any c value falls outside the upper control limit, the reasons for it must be carefully investigated. Suppose that one day the C value was 12, value that is outside the control limits. But, if that happened because of a snow storm, there is nothing anyone can do about it. On the other hand, if several patients said that they were held up at the front desk, then something needs to be done. In other words, look for assignable causes that can be corrected. In this case, somebody may say that the Upper Control Limit of 9.765 is rather high. If this is the case, the system would have to be designed by making several improvements. As such, the Upper and Lower Control Limits must be recalculated so that the system would be more optimal.

CONCLUSIONS

This study provides a conceptual framework for demonstrating the use of control charts as a management tool for internal performance measures. Specifically, a c -bar chart based on countable or enumerable data is utilized to determine the variation in processes and to monitor quality assurance, principally as a method for monitoring the just-in-time patient flow. Moreover, the performance of the patient flow process is captured in the statistical technique. Operationally, it is shown that the c -bar chart may allow a manager to isolate any assignable variation in the process variable. Although burdened with many variables, this system allows the manager to track and compare performance over time and bring the process back into control and meet specified standards of quality assurance. It may also demonstrate a need for creative efforts in the development of a theoretical framework, especially if it supplements and contributes to similar conceptual analyses found in healthcare literature.

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SOME ISSUES IN MEDICAL TOURISM

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ABSTRACT

Medical tourism offers physical, mental, and emotional rejuvenation, a world-class treatment at third world prices. Waiting lines at countries offering universal care plans like U.K. and Canada, and escalating healthcare costs at countries like the U.S. have contributed to strong growth in medical tourism that shows few signs of abating. The paper offers a balanced assessment of the phenomena that is playing itself out on world stage.

INTRODUCTION

Woodman estimates medical tourism revenues at \$20 billion for 2007, forecasting them to double in just three years [25]. McKinsey and Company estimates the figure at \$100 billion by 2012 [31]. While estimates may vary by source, the underlying premise is apparent - Medical Tourism is a high growth industry, and it's here to stay. To understand the rationale behind this explosive growth we need to look no further than our own backyard. Despite spending more than one-seventh of the country's GDP on healthcare, the U.S. healthcare system leaves 85 million Americans with insufficient or no coverage for their ailments, and 120 million without dental care [26, 27, 28]. While arguably the largest contributor in dollar terms, the U.S. is not solely responsible for medical tourism's growth. The National Healthcare System (NHS) of Britain keeps tens of thousands in waiting lines for urgently needed procedures [5]. Canada's nationalized healthcare system faces a similar fate. Millions of people from across the world travel to hundreds of countries for their healthcare. Over 1.5 million traveled to India alone, and the overall numbers are expected to increase 15-30% annually.

As Allen [15] indicates, one has to only peek at the various Mexican dental implant and lap-band obesity surgery ventures south of the U.S. border to see why half a million Americans venture overseas for healthcare. Hutchinson [28] reports on the trend where foreign travelers are increasingly combining inexpensive, high quality healthcare with good service. When the same heart valve operation that costs upwards of \$200,000 in the U.S. can be had under the expert care of U.S. trained physicians in India for under \$10,000 including

airfare and a brief recuperating vacation package, its easy to see why the trend will last. According to Bridge [5], 50,000 Britons engaged in medical tourism during 2006 saving more than 60 percent in total expenses, including traveling and beach vacation costs. In 2007 they spent £60 million on healthcare abroad. With a Luxembourg court in Britain ruling in 2006 permitting reimbursements for delayed NHS patients, the number of Britons seeking healthcare abroad are slated to increase 150% in the 2007-2011 period [3, 7].

The Internet is filled with websites like revahealthnetwork.com, treatmentabroad.net, tajmedicalgroup.co.uk, and surgeryabroad.org.uk that tout significant savings at hundreds of providers while bragging about their care. Hussein [6] suggests that the boom in medical tourism originating from Britain will continue so long as long lines persist at the NHS. Medical tourism may offer unique opportunity and hope to several in this group.

Medical Tourism Defined

Several decades ago, the term medical tourism characterized travel by physicians to deliver healthcare to patients [23]. Reporting on his recent Harvard Business School case study, Khanna (in [1]) believes that the old model has been switched around. In medical tourism, the patients seek out the doctors in search of first world healthcare at emerging market prices. Patsner [17] attempted to define medical tourism by focusing on three groups - foreigners coming to the U.S. for care, U.S. citizens going abroad for care, and foreigners going to other destinations for care. In general, medical tourism involves international travel to receive healthcare services.

Justification for Medical Tourism

Access and cost appear to be key factors responsible for the growth in medical tourism. The lack of access to certain procedures in some countries may be due to banning of certain operations (e.g. procedures involving stem cells for U.S. citizens), lack of technology (e.g. genetic and reproductive technologies available in the U.S. are unavailable in most countries), or a prolonged wait (e.g. universal healthcare models of Canada and Britain often result in long waiting lines for key surgical procedures) [17].

Healthcare policies of some countries involve waiting times for critically needed surgeries. In countries like Britain and Canada these wait times can often extend into several months [23]. A recent study indicates that about 1 million Canadians experience problems in getting access to needed healthcare [22]. Countries like India, Thailand, and Philippines have scores of western-trained physicians that perform various surgeries at 50 to 90% discounts over western rates [2], with no waiting. Medical tourism provides the mechanism to

get these two groups together.

A heart operation in the U.S. costs about €32,000, the same costs €16,000 in Europe, but only €3,000 in India. Similarly, a facelift that costs \$20,000 in the U.S. can be had for about \$1,250 in South Africa. In addition, as Taguri [23] points out, the international outfits that conduct medical procedure resemble four-star hotels or better, making them immensely superior to a hospital room in the US or Europe.

Hip replacements in Singapore costs one-third of that in the United States [2]. The costs for breast augmentation, tummy tuck, hip replacement, and dental implants are £4,350, £4,810, £8,000, and £2,000 in the U.K. versus £1,920 in Poland, £2,009 in Czech Republic, £3,205 in Malaysia, and £988 in Turkey respectively. All costs in foreign countries include flights and accommodations [5].

It should be noted that not all cost comparisons work out in favor of the foreign country. For instance, Hussein [6] shows that a heart bypass in Britain costs £5,000 as compared to £2,400 for a similar procedure in Thailand. However, the procedure requires a week in the hospital, three days in intensive care, followed by three weeks of monitored rest. Once these costs are added the total becomes £6,900 for Thailand (£1,900 more). As the author argues, however, the holiday aspect of the trip may be worth the differential cost.

For people who like to don't care to go too far, Belgium offers a great deal to Britons. It's only a couple of hours away, and its gall bladder removal, knee replacement, and tummy tuck costs £2,500, £6,100, and £2,400 compared to £4,650, £12,000, and £4,450 in the U.K. respectively.

Countries and Care Competencies

The significant profit potential in medical tourism has prompted several countries to offer healthcare packages that capitalize on their strengths. For instance, Costa Rica and South Africa are noted for plastic surgeries. Argentina is noted for high-end plastic surgeries and dental procedures. Dubai is noted for its prestige and host of a future branch of Harvard Medical School. India is noted for its high technology centers that provide open-heart surgeries, knee, kidney, and hip replacements, prostate surgeries, cosmetic and dental surgeries, along with bone marrow and cancer therapies [15, 28]. The degree to which various countries feel confident in their abilities to provide the needed care is exemplified the statement quoted in YaleGlobal online [20], which said, "In a corporate hospital, once the door is closed you could be in an American Hospital."

How Medical Tourism Works

Taylor [12] describes a typical medical tourism success story scenario. "They pick you up at the front door, take you to the

airport, fly you in and accompany you to all the clinical visits and operations. Then you're off to a five-star hotel to recuperate for two weeks, before flying you back and getting a private care back home. And it all comes in at half of what it would be at a private hospital in the U.K."

As the medical tourism industry is enjoying a raging growth rate, different countries have adopted a differentiation strategy to attract business. Instead of being all things to all people, the popular ones are most noted for certain types of procedures coupled with specific types of post-surgical recuperation vacation packages.

Hungary, for instance, has exploited its close proximity to Britain to offer dental treatment to the masses that are disillusioned by the long waiting at the NHS, and the lack of sufficient qualified dentists in the U.K. [18]. A recent publication reports the labor costs for dentistry at the NHS at £2.15 a minute, compared to £0.06 a minute in Hungary. The cost of a standard filling was £117 in England versus only £6 in Hungary [19].

Thailand offers healthcare to over a million tourists every year. Its Bumrungrad International Hospital with 700 board certified physicians offers a litany of services ranging from health tests for executives, and eye and cancer treatments, to cosmetic procedures like liposuction [2].

Most packages integrate the medical procedures along with rehabilitation program and leisure activities. Since most patients who engage in medical tourism are typically accompanied by three to six family members, and most stay for three to five days, hospitals and the tourism industries are partnering together to create appealing packages for the entire group [2]. The challenge lies in creating "limited frills" packages that appeal to the cost conscious consumers as well as "high-end" packages that cater to those that like to splurge.

The significant market size of the medical tourism permits countries to advertising their wares with sophisticated marketing programs. For instance, Singapore Raffles Hospital advertises in 12 countries using 50 full time agents. Similarly Parkway Group Healthcare employs agents in 15 countries to drum up its business. The sheer volume of patients traveling to some countries has prompted their leading hospitals to make deals with various airlines to offer special services. Various governments are also facilitating the creation of value-added package to add to their coffers and keeping their talented physicians in their homeland.

Even brand name insurance providers, like Blue Cross and Blue Shield of South Carolina and BlueChoice HealthPlan of South Carolina include Bangkok facilities in their plan offerings. Salud con Health Net of California provides healthcare to their Latino participants in Mexico [16].

Benefits of Medical Tourism

The consumers get the benefit of world-class healthcare at inexpensive prices. The quality of care is generally quite good. The physician to patient ratio for most countries exceeds that of the United States. Also, certain procedures not approved by the Food and Drug Administration, e.g. hip replacement surgeries, can be performed [22].

Countries like India are striving to deliver world-class service at third world prices [24]. By combining speed, availability, and low cost with formalities like visas, tickets, and transfers, medical tourism growth rates of 15-30% a year are expected to continue into the future.

Drawbacks of Medical Tourism

It is hard for patients to follow up their care upon returning to their native country. Quality assessments are hard to come by. The malpractice laws in each country tend to be different. The damage awards are generally much lower in the rest of the world [22]. It is also hard to know where to point the blame. Should it be the employer, the insurance company at work, the medical tourist agency, the hospital where the care was delivered, the physician in charge, the foreign government, or somebody else? The question regarding whether or not suing abroad will yield many tangible benefits is hard to answer. Perhaps a more prudent approach is to do the homework beforehand and keep oneself from facing such predicament.

Some critics feel that medical tourism in third world countries takes away competent doctors from caring for the native populations that are already underserved [1, 13]. For a country like India that spends less than 0.9% of its GDP on healthcare despite its billion plus population, the comment hits home hard. These conjectures are countered by arguments that medical tourism keeps well-trained local doctors from being lured away by foreign hospitals, and brings in significant revenue for the country.

Concerns Regarding Medical Tourism

Patients from around the world tend to have psychological fear of third world countries [1]. While it keeps some from pursuing care, it may keep others from availing the full benefits of the care provided.

Despite its current popularity and projected high growth rates, one should not lose sight of the fact that the medical tourism industry is not regulated. While it has the potential to do society a world of good, if left unchecked, it does have the ability to cause significant harm. Accordingly, all stakeholders involved - patients, insurers, care providers, employers, family members, foreign governments and their agents, and tourism providers should have a holistic awareness

of the concept.

A major concern in medical tourism is the quality of care. Then there are issues of culture, language, traveling risks, exposure to diseases, absence of detailed pre and post operative care due to short travel itineraries, and lack of adequate legal restitution in malpractice cases [5, 17, 23]. To make matters worse, there is a total absence of large-scale studies on risks associated with medical tourism [5]. It may be hard to check credentials, talk with previous patients, or look at the success rate of surgeries performed at a destination. It may also be easy to get swayed away by the prospect of vacationing at an exotic resort at the expense of healthcare.

On the cost front, Bridge [5] mentions that costs associated with meals, inoculations, visa, traveling family members, etc are not included in the standard cost comparison tables. The possibility of finding someone locally in the desired price range should not be overlooked. It also helps to confirm that surgical procedure selected is needed, and that it is well performed at the chosen site [16].

The Joint Commission on Accreditation of Healthcare Organization (JCAHO) that basically accredited U.S. hospitals also has an international arm called Joint Commission International (JCI) [15, 16]. The total number of international hospitals accredited by it is expected to rise up to 300, with about 100 additional hospitals joining the ranks every year. In addition, several medical tourism agencies provide information on physicians' credentials. While several physicians catering to the medical tourist market are foreign trained, some are not. Often times their U.S. colleagues recognize their names, and are familiar with their work.

There is some anecdotal evidence to suggest that some authors may be overstating the fear factor regarding quality. For instance, Taguri [23] reports a 0.8% mortality rate in 15,000 heart surgeries performed at a leading heart institute in New Delhi, India. Major U.S. hospitals average mortality rates are more than twice as high. Birch (in [2]) reports that the facilities catering to the medical tourism patients are among the best in the world. The Apollo Group of hospitals in India knows how to cater to the patients from the time they arrive in India until they depart [10]. Patients who have received treatment at these hospitals serve as ambassadors for the Apollo Group.

Another way to look at medical tourism is as medical outsourcing. Evidence from outsourced U.S. production industries suggests that medical outsourcing may cause the U.S. to lose its healthcare edge in the marketplace. While some cost pressures caused by this medical tourism may help tame the out-of-control healthcare costs, an ongoing out surge of U.S. dollars going overseas is liable to impact the industry and the GDP long term.

In the west it's common for recipients of substandard care to sue the care providers, with winners receiving large settlements. Such

scenarios are rare if not non-existent in third world countries [12] because of inefficient, overly burdened, and often corrupt legal systems.

One should avoid healthcare facilities that have a poor or no track record of surgical successes and failures [12]. While it is helpful to restrict care providers to those who have collaborated with western hospitals, it should not be taken as a precondition. .

What the Future Holds in Store

According to a recent article in the Daily Mail [18] Britons have traveled to 112 hospitals in 48 countries for care, with 70,000 making the trip in 2007 alone. More than 100,000 foreign patients were treated in India during 2005. Including countries like Thailand, Singapore, South Korea, and Malaysia makes the number grow to 1.3 million by 2006 [2]. The numbers are growing yearly at a 15-30% rate, as are expected to yield \$2.2 billion annually by 2012 for India [23]. Estimate for Asia as a whole is about \$4 billion by 2012 [2]. Singapore is expecting to contribute \$1.6 billion to its GDP by 2012, while Malaysia expects \$590 million in the same time frame. According to Birch (in [2]) Asia with its cost advantages, high quality, and travel networks is ideally suited for medical tourism.

Many countries are jumping aboard the medical tourism bandwagon. For instance, Argentina, Bolivia, Brazil, Cuba, Costa Rica, Jamaica, Jordan, Hungary, Latvia, Lithuania, Malaysia, Philippines, South Africa, etc. are all touting active programs that cater to specific healthcare ailments as well as vacation spots. Dubai is planning to open a healthcare city by 2010 that will arguably be the largest facility of its kind between Europe and Southeast Asia [28].

The baby boomers in the U.S., Canada, Europe, New Zealand, and Australia are approaching retirement age. By the year 2015, Hutchinson [28] estimates over 220 million of them will need to care for their declining health. The size of the average U.S. hospital bill in 2004 was \$6,280, twice that of other western countries [14]. The comparison is arguably far worse today since U.S. healthcare costs have increased at several times inflation over the last several years, a trend not shared by countries providing medical tourism.

The overseas organ transplant market for livers, kidneys, heart, pancreas, and lungs is estimated to perform over 115,000 procedures, estimated at \$5.25 billion by 2012 [30]. The seemingly abundant supply of needed organs is facilitating this industry's growth.

There may be economic consequences for hospitals if medical tourism continues its growth run into the future [22]. The high-end surgeries that add significantly to their bottom line could diminish in frequency. From a consumer standpoint the healthy competition provided by overseas options may help to rein in domestic costs that have for

decades faced no competition or barriers to exponential growth.

The medical tourism industry has led to alliances between the healthcare providers and the tourism industry. Additional alliances between the healthcare providers and the hospitality industry are likely in future [4]. While the Indian techniques of yoga and Ayurvedic medicine continue to allure the world, low-cost operations by skilled doctors trained in western methods will probably keep the medical tourist industry thriving.

Countries that provide medical tourism will have to figure out creative ways to care for their indigenous populations while enticing tourists [13]. Perhaps the enriched treasuries will help boost the domestic healthcare spending in these countries.

Implications for Managers

An interesting test case of medical tourism is provided by the Blue Ridge Paper Products Company. Working through an intermediary, the company allows its employees to get their ailments treated in one of several Indian hospitals. The bottom line is quite revealing - a savings of 70% in healthcare expenditures [10]. The buying power of the U.S. dollar is estimated at 5 times that of the Indian Rupee using purchasing-power parity comparisons, which allows Blue Ridge to reap the benefits.

All the candidates in the U.S. 2008 election are touting their version of the healthcare plan to fix the healthcare crisis. A recent paper [11] warns that the fine print of their plans may preclude medical tourism. Managers, therefore, need to be aware of it when supporting their candidates.

The healthcare costs in the U.S are in the stratosphere, and despite the on-going public outcry and the political chatter, major remedies may be years away at best. Employers' healthcare premium rose 73% between 2000 and 2006 while the average employee contributions rose 143% [14]. As insurance companies gather more evidence on medical tourism, they are likely to encourage, not just agree, with patients request for foreign care. While critics are likely to argue that sending U.S. healthcare dollars overseas will deplete the U.S. hospital profit centers, the situational economics may dictate otherwise. Some care providers are already teaming up with overseas healthcare operations. Not to be outdone, some governments are also actively pursuing the lucrative underserved U.S. market. Increasing transparency regarding procedures, cost, quality, and credentials is being delivered via the Internet, aimed at winning over the skeptics [17].

The economics of medical tourism are hard to ignore. Government research estimates that the average medical tourism spends \$362/day. This compares with only \$144/day for a non-medical tourist [2].

Countries are going to cater to the whims of the medical tourists to pad their own treasuries. It is expected that niche packages that cater to the individual tastes of the medical tourists will be routinely offered and fiercely contested. The quality of service can be expected to increase even further to feed the growth in the industry and the supporting infrastructure. While the medical establishment of some countries may be forced to change behavior in response to the medical tourism popularity, such changes are probably going to be slow in the making. For instance, there is a pressing need to get reliable quantitative data about medical tourism via the Internet [9].

Several factors may impact the long-term growth rate of medical tourism. The common ones include insurance market, legislation, image problems, and inelastic demand [22]. After ignoring the medical tourism phenomena for decades, the insurance industry has only lately started paying attention to it, mostly because of its positive impact on the bottom line. Companies like OptiMed Health and United Group Programs have begun offering overseas treatment options in their plans [15]

A wholesale adoption is probably several years away. The legislature needs to figure out a way to include medical tourism into the insurance plans. Since such efforts are likely to impact the bottom line for physicians and hospitals, it's likely to be contested by the American Medical Association. The perception that medical tourism is home of substandard care still exists in the mind of several consumers. The degree to which this perception changes over time will impact the growth of medical tourism. Foreign surgical demand makes a compelling economic argument for expensive domestic surgeries costing over \$1,000. For low cost surgeries, however, the motivation for engaging in foreign travel is not very pronounced.

CONCLUSIONS

For the myriad of companies that bemoan the fact that their healthcare premiums make their products less competitive in the world marketplace, medical tourism may offer a solution. Facing the threat of losing market share, or the possibility of bankruptcy, the prospect of going overseas for healthcare seems palatable. While some hearts and minds will have to be won, and some politically charged commentary regarding outsourcing battled, the solution may be well worth considering.

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ECONOMIC DEVELOPMENT OF SOUTH CAROLINA'S I-95 COUNTIES: INFRASTRUCTURE DEVELOPMENT AND PROJECT POSSIBILITIES

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ABSTRACT

Economic development in the poorest region of South Carolina is the subject of this paper. An analysis shows that this 11 county region lags behind other regions of the state in population growth and per capita income. A number of initiatives from infrastructure improvements to business investments are forthcoming and should improve opportunities for economic growth. Several of these initiatives are discussed here. There is reason for optimism, but continued focus on the region by the state legislature is crucial.

INTRODUCTION

The I-95 Corridor region of South Carolina consists of the 11 counties through which the I-95 interstate passes. This region as a whole has not developed economically at the pace of the state, although having interstate-level highways is generally felt to foster economic development. The lack of economic progress in the region is reflected in the fact that in four of the counties more than 10 percent of the White population and more than 30 percent of the Black population had incomes below the poverty level in 1999.

This region is in contrast to three other regions of South Carolina that have enjoyed healthy economic development during recent decades. These three regions are The I-85 Corridor through the northwestern part of the state, the region around the capitol of Columbia, with I-20, I-26, and I-77, and the coastal counties, with tourism and retirement communities. In this preliminary study we examine the I-95 Corridor region to understand why the region has lagged and to gain insights into how the region can foster a more healthy level of economic development.

The initial step in the present study is an analysis of the progress in economic development of the 11-county I-95 Corridor region during recent decades. In this analysis we rely on two basic measures of economic progress: population and per capita income. Economic progress for an area such as a county is closely associated with population increase. Intuitively this makes sense, since if the economy of an area is improving fewer people will leave and more will move into the area; and, in addition, this relationship between economic progress and population growth is supported by the statistical evidence. Per capita income also is a comprehensive measure of economic well-being for an area. The product of population and annual per capita income is a measure of the annual income of the individuals in an area and the year-to-year changes in an area's income provides a comprehensive measure of economic progress.

ANALYSIS OF POPULATION CHANGES

Tables 1 and 2 provide population data for the I-95 Corridor counties for the decennial census years in the 40-year period 1960-2000. Table 1 provides population levels and Table 2 shows the population of the I-95 region counties as a percent of the South Carolina population in the specified years. From Table 1 it is seen that South Carolina's population increased from about 2.38 million in 1960 to 4.01 million in 2000, which represents an increase of 68.4 percent over that 40-year period. Over the same period the 11-county I-95 Corridor region increased from 0.45 million to 0.66 million, representing a 45.8 percent increase. Thus, there was substantially slower population growth in the I-95 Corridor region than in the

state as a whole. Dorchester County showed the highest growth rate with 295.4 percent, and this is probably due in large part to the county's proximity to rapidly growing Charleston County and the Charleston metropolitan area. The second fastest growing county is Jasper County with a population increase of 68.9 percent during the 1960-2000 period. Jasper County has probably benefited from its proximity to rapidly growing Beaufort County and the Savannah metropolitan area. Four counties in the region showed good growth: Florence with 48.9 percent, Sumter with 39.6 percent, Colleton with 37.5 percent, and Orangeburg County with 33.6 percent. Three counties showed a more moderate rate of growth: Darlington County with a 27.3 percent increase, Hampton with a 22.7 percent increase, and Clarendon with a 10.2 percent increase. The lowest growth rates were shown by Marlboro County with a 1.0 percent increase and Dillon County with a 0.4 percent increase.

Table 1. Population of I-95 Corridor Counties: 1960-2000 (in 1,000).

County	1960	1970	1980	1990	2000
Clarendon	29.49	25.60	27.46	28.45	32.50
Colleton	27.82	27.62	31.78	34.38	38.26
Darlington	52.93	53.44	62.72	61.85	67.39
Dillon	30.58	28.84	31.08	29.11	30.72
Dorchester	24.38	32.28	58.76	83.06	96.41
Florence	84.44	89.64	110.16	114.34	125.76
Hampton	17.43	15.88	18.16	18.19	21.39
Jasper	12.24	11.88	14.50	15.49	20.68
Marlboro	28.53	27.15	31.63	29.36	28.82
Orangeburg	68.56	69.79	82.28	84.80	91.58
Sumter	74.94	79.42	88.24	102.64	104.65
Total	451.33	461.55	556.78	601.67	658.17
South Carolina	2382.60	2590.50	3121.8	3486.7	4012.00

Table 2 is based on the same population data as Table 1, but provides a different perspective by showing the population of the I-95 Corridor region counties as a percent of the state's population. Again it is apparent that the I-95 Corridor region did not grow as rapidly as the state, since as shown in 1960 the region had 18.9 percent of the state's population but by 2000 had only 16.4 percent. From Table 2, it also is clear that only Dorchester County and Jasper County grew faster than the state as a whole.

Table 2. Population of I-95 Counties as a Percent of South Carolina Population: 1960-2000.

County	1960	1970	1980	1990	2000
Clarendon	1.2	1.0	0.9	0.8	0.8
Colleton	1.2	1.1	1.0	1.0	1.0
Darlington	2.2	2.1	2.0	1.8	1.7
Dillon	1.3	1.1	1.0	0.8	0.8
Dorchester	1.0	1.2	1.9	2.4	2.4
Florence	3.5	3.5	3.5	3.3	3.1
Hampton	0.7	0.6	0.6	0.5	0.5
Jasper	0.5	0.5	0.5	0.4	0.6
Marlboro	1.2	1.0	1.0	0.8	0.7
Orangeburg	2.9	2.7	2.6	2.4	2.3
Sumter	3.1	3.1	2.8	2.9	2.6
Corridor Total	18.9	17.8	17.8	17.3	16.4

ANALYSIS OF PER CAPITA INCOME CHANGES

Tables 3 and 4 provide information on the per capita income of the I-95 Corridor counties. From Table 3, the per capita income of the region was \$20,539 in 2000, well below the South Carolina per capita income of \$23,988. In 2000 only Florence County, with a per capita income of \$24,517, exceeded the state per capita income. In addition to Florence County, only Darlington County and Dorchester County exceeded the region's per capita income of \$20,539. From Table 4, the per capita income of the I-95 Corridor region in 2000 is only 85.6 percent of South Carolina's level. It is useful to summarize the levels of per capita income for 2000 as is shown in Table 5. From this summary it is clear that six, more than half, of the region's counties have a per capita income less than 80 percent of the state's per capita income.

Table 3. Per Capita Income of I-95 Corridor Counties: 1960-2000 (in dollars)

County	1960	1970	1980	1990	2000
Clarendon	\$593	\$1,339	\$4,175	\$8,181	\$17,727
Colleton	\$766	\$1,763	\$4,633	\$9,193	\$18,672
Darlington	\$943	\$2,103	\$5,141	\$10,510	\$21,038
Dillon	\$692	\$1,613	\$4,162	\$8,077	\$17,580
Dorchester	\$911	\$2,063	\$6,013	\$11,884	\$20,906
Florence	\$997	\$2,218	\$5,526	\$11,007	\$24,517
Hampton	\$805	\$1,732	\$4,827	\$8,578	\$19,028
Jasper	\$703	\$1,522	\$4,312	\$7,984	\$16,716
Marlboro	\$759	\$1,743	\$4,483	\$7,948	\$16,546
Orangeburg	\$830	\$1,820	\$4,713	\$9,004	\$19,619
Sumter	\$1002	\$1,970	\$4,774	\$9,943	\$20,493
Total	\$870	\$1,915	\$4,987	\$9,943	\$20,539
South Carolina	\$1,142	\$2,312	\$5,886	\$11,897	\$23,988

Table 4. Per Capita Income of I-95 Corridor Counties as a Percent of South Carolina per Capita Income (in percents)

County	1960	1970	1980	1990	2000
Clarendon	51.9	57.9	70.9	68.8	73.9
Colleton	67.1	76.2	78.7	77.3	77.8
Darlington	82.5	91.0	87.3	88.3	87.7
Dillon	60.6	70.0	70.7	67.9	73.3
Dorchester	79.7	89.2	102.1	99.9	87.2
Florence	87.3	95.9	93.8	92.5	102.2
Hampton	70.5	74.9	82.0	72.1	79.3
Jasper	61.5	65.8	73.2	67.1	69.7
Marlboro	66.4	75.3	76.2	66.8	69.0
Orangeburg	72.7	78.7	80.0	75.7	81.8
Sumter	87.7	85.2	81.1	84.0	85.4
Total	76.2	82.8	84.7	83.6	85.6

Table 5. Per Capita Income of I-95 Corridor Counties as a Percent of South Carolina per Capita Income (in percents) - 2000

Percent of South Carolina's

<u>Per Capita Income</u>	<u>Counties</u>
More than 100	Florence
90, but less than 100	none
80, but less than 90	Darlington Dorchester Orangeburg Sumter
70, but less than 80	Clarendon Colleton Dillon Hampton
60, but less than 70	Jasper Marlboro

INFRASTRUCTURE DEVELOPMENTS

There are a number of infrastructure developments that are in process that will enhance economic development in South Carolina generally and the I-95 Corridor region in particular. Examples of these developments include: the new port in Jasper County that is to be developed jointly by South Carolina and Georgia, the Global Logistics Triangle, being developed in Orangeburg County, which incorporates a cluster of international trade activities anchored by an inland port, The I-73 Interstate that will link Myrtle Beach and the coastal region with the midwestern states, and the international airport being proposed for the northeastern section of the state. These developments are long term and are at different stages of their development.

In this proposal we describe two of these infrastructure developments: the Global Logistics Triangle and the I-73 Interstate. For the conference paper we plan to development descriptions of the others and tie these developments together in a strategic concept.

GLOBAL LOGISTICS TRIANGLE

The eastern-most part of Orangeburg County is being promoted as the Global Logistics Triangle. Bounded by I-95, I-26, and US 301, this Orangeburg County land mass takes advantage of three major highways, rail access, and close proximity to major east coast ports. The primary egress to international trade will be the Port of Charleston, some 50 miles from the eastern-most point of the Global Logistics triangle. Also within easy reach of the Global Logistics Triangle are ports at Wilmington, NC (200 miles away), and Savannah (100 miles away). A number of projects have begun to take shape in the Global Logistics Triangle.

Industrial Parks

Industrial parks have established infrastructure for potential business locations. The John W. Matthews Industrial Park, named for the State Senator from Orangeburg County, is located on US 301 ten miles form I-95 and five miles from I-26. The Orangeburg City-County Industrial Park is located at the intersection of I-26 and US 301.

JAFZA

JAFZA International (a Dubai company) purchased 1,300 acres at the intersection of I-95 and US 301. JAFZA projections indicate that over \$1 billion will be invested in the local economy bringing up to 10,000 jobs to this inland port. The JAFZA logistics center would be a staging area for cargo coming into and going out of the Port of Charleston. Warehousing, retailing, and light manufacturing will take place in this center. An Orangeburg County contingent visited Dubai in spring 2008 and held meetings with JAFZA leaders helping to plan the next steps in the project.

World Trade City of Orangeburg

World Trade City of Orangeburg is located on I-26 ten miles from I-95 and 5 miles from US 301. Plans of this private group are to develop a logistics center and staging area for cargo coming into and going out of the Port of Charleston. The plans also include wholesale and retail businesses and a residential community.

WT PERC

The South Carolina World Trade Center, South Carolina State University, and Orangeburg County are teaming together to develop a multi-complex distribution, education, business, and retail center. This center is named the World Trade Park and Education and Research Center (WT PERC). A \$97,500 feasibility study was launched in spring 2008. One potential partner for WT PERC is the James E. Clyburn Transportation Research and Conference Center, being constructed on the SC State campus in Orangeburg. That partnership would resemble the I-CAR public-private partnership that Clemson University has with BMW in Spartanburg.

The I-95 Corridor Initiative

The counties along Interstate Highway I-95 have been labeled the Corridor of Shame. Cries have been heard from local state legislators and local residents for the state to concentrate development focus on these counties. South Carolina State University and Francis Marion University received a state grant to study the economic, health, and educational issues on the I-95 Corridor. A steering committee from the two universities evaluated proposals of major research groups to conduct the study. The research team from the Research Triangle Institute (RTI) was selected. Following preliminary meetings, the first Phase of the project entailed interviews with local leaders from the 17 counties (note that this study expanded the I-95 region to counties close to I-95 even though the interstate may not touch the county) in the study along with state legislators from the region. The in-person interview subjects have included town managers and mayors; university presidents; planners and economic development experts; newspaper editors; doctors and county council members; community development representatives and school superintendents.

Results from the First Interim Report from RTI indicate that the I-95 counties are poised for development [3]. The report states, "In much of the region there is good transportation infrastructure, excellent location, an abundance of natural and cultural resources, along with an agreeable climate and low cost of living. These factors provide fertile ground for private and public investment." On the negative side, the report uncovered a bias in state support of the region relative to more developed regions:

- Development aid, they (respondents) argue, is going to already-developing regions, such as the Upstate, Columbia and Charleston, and not to struggling communities. State officials deny that the Corridor has been the victim of such bias.
- Clearly, I-95 has not enjoyed the investments in infrastructure that have been made along I-85 in the western part of the state.
- Water and sewer may be available in towns, but not in surrounding areas. Particularly frustrating is the inability in some places to extend water and sewer out to the interstate, resulting in a missed opportunity to exploit that transportation route.

The report also indicates that human development and economic development are inseparable, with these findings:

- Many communities in the Corridor are suffering from serious health, education and social problems that will play key roles in determining the prospects for future economic growth.
- This is seen most severely in the condition of public schools, but the poor performance of the schools appear to be the result of fundamental problems related to poverty:
 - health problems
 - high teen pregnancy rates
 - crime
 - drug addiction

In summer 2008, RTI interviewed approximately 50 people from each of the 17 I-95 counties and gathered additional information on pressing issues. Final report for the study will contain specific strategies to address the most important issues. This final report is due in late January 2009.

THE INTERSTATE 73 DEVELOPMENT

For more than 25 years Federal, State of South Carolina, and local governments have worked to bring Interstate 73, I-73, into being. Initially I-73 was to extend from Detroit to Charleston, SC, but in 1998 Congress amended previous legislation to change the southern terminal point of the highway to the Conway, Myrtle Beach, and Georgetown area. The Myrtle Beach community was heavily involved in the push for I-73 since it would provide an interstate highway linkage of the Grand Strand with the nation's interstate system. The Grand Strand needed this since it was one of the nation's fastest-growing tourist

destinations. This new interstate would serve the South Carolina coast generally which continues growing at a fast rate. In addition, I-73 would be a positive factor in the development of the northeastern region of South Carolina. It was recognized that I-73 would support economic growth and regional competitiveness for the state of South Carolina; and clearly I-73 would enhance development possibilities in the I-94 corridor by enhancing that region's ties to the interstate highway system.

Within South Carolina I-73 is divided into two projects: the Southern Project and the Northern Project. The Southern Project will run from I-95, at a point about 20 miles south of the North Carolina-South Carolina state line, to near Conway, SC. There I-73 will link with State Route 22 (Conway Bypass or Veteran's Highway) which runs to Myrtle Beach to intersect with Highway 17. (State Route 22 already meets interstate standards.) The Northern Project of I-73 will enter South Carolina just south of the Rockingham/Hamlet, NC area and run south through Marlboro and Dillon Counties to intersect with I-95.

In 2007 the Southern Project obtained final approval for the Final Environmental Statement from the Federal Highway Administration and the South Carolina Department of Transportation. In addition, the South Carolina Department of Transportation gained approval to begin expending federal funding to acquire right of way for the Southern Project, and the acquisition of properties for the right of way began in 2008. As a rough estimate, the I-73 Southern Project may be completed within five years.

CONCLUSION

Counties along the I-95 corridor in South Carolina are less developed than counties in other regions of the state. A number of initiatives point to an optimistic view of potential for the region. It is hoped that as more investment dollars come into the region educational and health care systems will improve along with the rising economic tide.

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Hurricane Katrina: How the Business Recovery of New Orleans is Progressing

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Abstract

In August, 2005, the greatest natural disaster occurred in the United States when Hurricane Katrina devastated New Orleans and the Gulf Coast. This paper identifies/describes/estimates the damages to, and socio-economic environment surrounding entrepreneurs/businesses in New Orleans, 10 months and 20 months after Hurricane Katrina's landfall. Hopefully, this study and estimation of damages would assist decision makers both in the public and private sector in collaboratively mitigating the negative effects and in rebuilding the economy and social fabric of the city.

Hurricane Katrina: How the Business Recovery of New Orleans is Progressing

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INTRODUCTION – HURRICANE KATRINA (THE WORST NATURAL DISASTER TO HIT THE UNITED STATES)

Hurricane Katrina further exacerbated the serious economic challenges faced by New Orleans even before Katrina. The flooding, wind, rain, and unfortunate looting and arson associated with the storm, destroyed or damaged thousands of businesses. Commerce was seriously interrupted in industries such as entertainment, hospitality and tourism, finance and transportation. Small businesses and entrepreneurial efforts suffered extensive damages/losses. The city's sales tax (base) plummeted. The labor force declined considerably, particularly in the health and education industries. Unemployment increased, and the city faced significant population losses due to out-migration, particularly of African-American community. Use of mainly Hispanic workers from outside the state in the huge construction business, while the African-American residents in New Orleans remain without jobs, has raised labor issues (Entertainment, Tourism and Hospitality, U.S. Chamber of Commerce; November 8, 2005).

The severity of Katrina's destruction makes redevelopment of New Orleans, including promoting investments, small businesses and entrepreneurs, job creation and economic growth a herculean task.

In particular, it must be kept in mind that Hurricane Katrina led to small businesses lacking in planning, susceptible to cash flow reductions, a lack of inadequate access to capital for recovery, difficulties related to federal government aid, and devastated infrastructure, slowing early recovery (Runyun, March, 2006). Also, it is important that the government agencies take

interest and assist affected businesses to survive, and motivate new entrepreneurs to start fresh businesses (Zolin and Kropp, January, 2007).

The incredible extent of damages due to this monstrous natural disaster should be a matter of great concern to residents, businesses, policy makers, and politicians for the purpose of acquiring and deploying necessary resources for a smooth and speedy recovery. This is not withstanding the fact that federal government (as well as the State of Louisiana) is providing aid to the city for the purpose of assisting residents who lost uninsured property due to the storm, and large grants to rebuild levies, roads, bridges, schools and colleges, local port and the local airport, and public service like city bus service, and environmental mitigation. The federal aid has also been extended in the form of tax relief to residents affected by the storm. Additional, Gulf Opportunity (GO) Zones have been created (in areas that were hardest hit by Katrina) providing tax incentives for economic development (Stoker and Rich, 2006). This paper identifies/describes/estimates the damages to, and socio-economic environment surrounding entrepreneurs/businesses in New Orleans, 10 months and 20 months after Hurricane Katrina's landfall. Hopefully, this study and estimation of damages would assist decision makers both in the public and private sector in collaboratively mitigating the negative effects and in rebuilding the economy and social fabric of the city. It is critical that all businesses in the city, including old ones and new opportunities for entrepreneurship are cultivated, and that the redevelopment effort is an all inclusive and collaborative one in nature.

Methodology

Undergraduate students at Xavier University of Louisiana were asked to visit businesses in Orleans Parish at both ten months and twenty months after Hurricane Katrina made landfall on the Louisiana Gulf Coast. This sample was a stratified sample consisting of a sample of 405 and

322 respectively. A sample of the questionnaires was checked for validity. A copy of the questionnaire is located in Appendix A.

Results

Prior to August 29, 2005, the metropolitan area of New Orleans had a population of 1,319,589 making New Orleans one of the most unique places in the United States. At 6:15 a.m. on August 29, 2005 Hurricane Katrina lashed out at the city causing a footprint of destruction the size of Great Britain.

Chart 1 reveals the population of the Metro Area of New Orleans five months after the storm.

Chart 1	
Metro Area Population	
Pre-Katrina	1,319,589
Post Katrina	929,554
Population Change	-30%
Orleans Parish Population Change	-71%

The Times-Picayune, January 17, 2006, page 1

Five months after the storm the City is still not operating correctly. Chart 2 reveals some salient statistics.

Chart 2

Katrina Statistics – Metro New Orleans

Work Force Metro Area

Pre-Katrina 633,759

Post Katrina 470,608

Change -25%

Local Businesses

Pre-Katrina 81,000

Post Katrina

Currently Open 42,168 52%

Partially Resumed
Operations 20, 268 25%

Closed, Future
Uncertain 18,564 23%

Restaurants Change -68%

Public Schools – Orleans Parish – Change -81%

The Times-Picayune, January 17, 2006, page 1

A more sobering statistic is the number of houses damaged in each of New Orleans' districts. (See Chart 3)

Chart 3

Hurricane Katrina's House Wreckage

<u>District</u>	<u>Wreckage</u>
New Aurora/English	100%
Village de l'Est	100%
New Orleans East	99%
Lower Ninth Ward	93%
Gentilly	85%
Lakeview	83%
Bywater	77%
Mid-City	75%
Algiers	66%
Uptown	61%
Venetian Isles	56%
Garden District	50%
Warehouse District	48%
French Quarter	32%

USA Today, April 17, 2006, Section B, Page 1

In New Orleans (Orleans Parish) there has been a significant decrease in the population as shown in Table 1.

Table 1
Orleans Parish Population Statistics

	<u>2000</u>	<u>2006</u>
Population	484,674	223,388
Per Cent Change In Population		-53.9%
<u>FedStats</u>		

Research Study

A research study was conducted in Orleans Parish ten months and twenty months after Hurricane Katrina made landfall in New Orleans to ascertain how many businesses have returned to the City.

Table 2

Location of Orleans Parish Businesses Pre- and Post- Katrina

Location	Pre-Katrina	10 Months Post-Katrina	20 Months Post-Katrina
Algiers	10.1%	10.6%	15.2%
Downtown	12.1%	11.6%	15.8%
French Quarter	22.2%	22.5%	7.8%
Garden District	12.8%	14.3%	19.3%
Gentilly	7.7%	7.4%	7.8%
Lakeview	5.7%	4.9%	9.9%
Lower 9 th	2.0%	1.7%	1.2%
Mid-City	14.6%	14.3%	11.2%
New Orleans East	7.7%	8.1%	11.2%
St. Claude	3.7%	1.2%	.3%

Table 3

What Type of Business Do You Own?

Type of Business	10 Months Post-Katrina	20 Months Post-Katrina
Retailer	55.8%	55.0%
Wholesaler	2.2%	
Distributor	1.2%	0.6%
Service	39.3%	36.0%

Table 4

Is Your Business Back to Full Operation?

	10 Months Post-Katrina	20 Months Post-Katrina
Definitely Yes	40.7%	54.3%
Almost Yes	38.8%	29.8%
Almost No	5.2%	4.3%
Definitely No	13.3%	6.8%

Table 5

Where is Your Business Located, Are The Neighboring Businesses Back?

	10 Months Post-Katrina	20 Months Post-Katrina
Yes	33.6%	50.9%
Somewhat	49.9%	38.5%
No	15.3%	5.6%

Only 39% of the population applied for an SBA loan or state assistance ten months after Katrina and 36% of the population stated they applied for assistance twenty months after the storm. Only 7.4% of the business population received an SBA loan ten months after Katrina and 13% indicated they received an SBA loan twenty months after Katrina.

Only 58% of the business population applied for business insurance and/or business interruption insurance ten months after Katrina and 59% applied twenty months after Katrina.

45% of the businesses surveyed indicated they had a hard time finding employees ten months after Katrina and 44% indicated they had a hard time finding employees twenty months post-Katrina.

At both ten months and twenty months approximately 28% of the companies' employees are Hispanic.

43% of the businesses ten months post-Katrina are paying increased employee salaries and 47% of the businesses twenty months post-Katrina are paying increased employee salaries.

Results

It is not surprising that the areas least effected with damage by Hurricane Katrina are the areas that are growing, such as, Algiers, Downtown, and the Garden District, whereas, the area most effected by Katrina are experiencing downturns in the business population. One interesting note is the significant decrease in the number of businesses in the French Quarter. It is suggested

that this is caused by the decrease in the number of tourist coming to New Orleans. Of course, there is no significant difference in the types of businesses owned. Certainly, new business owners would be hesitant to come to the city due to the lack of population, poverty, crime, and the general quality of life.

Approximately, 84% of the businesses are back to full operation in the city twenty months from Katrina's landfall. However, Table 5 reveals a very striking statistic where only 51% of the businesses surveyed indicated their neighboring businesses were back in operation.

The survey results revealed that less than 40% of the business population applied for a SBA loan and only 13% of the business population received a SBA loan twenty months from Katrina's landfall. It is interesting to note that to receive a SBA loan, businesses had to be turned down by FEMA.

Approximately 45% of the businesses located in Orleans Parish are having a problem hiring employees. 28% of their new hires are Hispanic and 47% of the businesses have increased their pay to hire employees.

Today, sections of the city look like 'ghost towns' and businesses are still providing small travel trailers for their employees. The distribution of government aid has been painstakingly slow for businesses and aid for the development of new businesses has been nil. The quality of life in Orleans Parish is abysmal, where to receive an excellent education the population must send their children to private and parochial schools and the lack of affordable housing is shocking. My university after three years from Katrina's landfall is still operating in forty-eight double wide trailers.

This paper has identified/described/estimated the damages to and socio-economic environment surrounding entrepreneurs/businesses in New Orleans, 10 months and 20 months

after Hurricane Katrina's landfall. Hopefully, this study and estimation of damages would assist decision makers both in the public and private sector in collaboratively mitigating the negative effects and in rebuilding the economy and social fabric of the city. It is critical that all businesses in the city, including old ones and new opportunities for entrepreneurship are cultivated, and that the redevelopment effort is an all inclusive and collaborative one in nature.

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THE CURRENT CHALLENGES AND ISSUES OF SUSTAINABLE BUSINESSES

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ABSTRACT

At this point in history we can safely say that the case has been made for Sustainable Business practices. There are a plethora of books and articles that have outlined this. Examples include Ray Anderson's "A Call for Systemic Change" Plenary Lecture at the 3rd National Conference on Science, Policy and the Environment" [1], Bob Willard's *The Sustainability Advantage: Seven Case Benefits of a Triple Bottom Line*. [15], *The Harvard Business Review on Business and the Environment* [6], and *The Triple Bottom Line, Does It All Add Up?: Assessing the Sustainability of Business and CSR* by Adrian Henriques and Julie Richardson [10].

While many articles and books have been published extolling the benefits of sustainable business, these is less in the literature regarding the specific challenges and constraints that these businesses face. The purpose of this research is to look at the most challenging aspects of sustainable business. In this proposal I will first briefly define sustainable business and provide a few examples, a short background will be provided as a rationale for the research. Descriptions of the proposed research procedure and the sample will follow. Then I will summarize the issues that need to be explored in the research. In the report and presentation at the SEInFORMS conference in October 2008, I intend to present some of the preliminary findings from the research.

DEFINITION OF SUSTAINABLE BUSINESS

As I have stated in my previous SEInFORMS presentation [14], sustainable development was originally defined in 1987 by the World Commission on Economics and Development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs [24]. This has become the most commonly used definition. A definition of sustainable business is defined as one that supports the triple bottom line [10]. It is one which produces economic, social and environmental benefits. This is in contrast to the traditional model of business we've all adhered to whose primary goal is profitability with social and environmental concerns relegated to CSR activities which may or may not be emphasized. Many examples of sustainable businesses include many large and small businesses. Some are more well known than others. Robert Shapiro of Monsanto and Allan Kupcis of Ontario Hydr explain the importance of shifting priorities: [19]:

Businesses grounded in the old model will become obsolete and die. At Monsanto, we're trying to invent some new businesses around the concept of sustainability. We may not yet know exactly what those businesses will look like, but we're willing to place some bets because the world cannot avoid needing sustainability in the long run (Shapiro)

Increasingly, business will be required to demonstrate management of environmental and social issues along with traditional financial performance to secure the social license to operate.
(Kupcis)

The terminology is evolving and becoming less clear. I use the term "sustainable" to refer to the businesses that strive to maximize the aforementioned triple bottom line. Now the term "green" is also being used to describe businesses that are not only concerned about the environmental but also societal and financial goals. Previously the term "green" was primarily used to refer only to environmentally responsible businesses.

BACKGROUND

For decades many of us have been concerned about the environment. Beginning in the 1960s our awareness grew as authors such as Rachel Carson [3] publishing books that sounded the warning. With the 1973 oil crisis and the establishment of OPEC, we realized that oil was a nonrenewable resource and a few small businesses began to explore alternative energies.

Early experimentation began with solar energy projects [18]. Many responded to publications such as the *Mother Earth News* and began to live more simply and naturally. However, big business did not become involved due to the high start up and transition costs of switching to more sustainable operational and business practices.

In the 1990s there was renewal of interest in the movement. Earth Day 1990 was highly publicized. More authors were making the case for more environmentally friendly and sustainable lifestyles and business practices [1][6][7][8]. Very little research was published in the academic business literature. In 2000, enough cases and articles had been published for Harvard to release a compilation of an assortment of them in the *Harvard Business Review on Business and the Environment* [6]. At the same time more and more businesses were beginning to offer products that were specifically targeted to consumers who were concerned and motivated to take action. For example, the first Toyota Prius came onto the market in the US in 2000 with its 2001 model.

Nowadays the signs of the shift to sustainable or green business are ubiquitous. It is clearly time to bring it into academic research.

RESEARCH PURPOSE

The purpose of this research is to begin to identify those issues that plague these businesses. Are they limited to those challenges and issues faced by small businesses? How intensely are these issues affecting sustainable businesses? What are the effects of the degree of sustainability, the size of the businesses and the nature of the businesses and the products they market? What are businesses doing to address these issues?

METHODOLOGY

To begin this work I have conducted some in depth interviews with entrepreneurs at the Green Business Conference in Chicago in May 2008. I intend to collect survey and qualitative data from the attendees who are currently marketing products and services. The attendees of the Green Business Conference that took place in May of 2008 consisted of mostly business owners. These include businesses that have been in place for 25-30 years as well as recent startups. This sample is hungry for all the support they can find and promise to be a solid and fertile source of information for this work.

Some preliminary interviews conducted at the conference raised some of the issues I will explore with the survey. Many of them seemed similar to those that small businesses currently face. Some of these issues include many marketing related concepts such as pricing, packaging and promotions. Others than were cited included problems associated with greenwashing which occurs when business make vague or deceptive claims about their products which produces skeptical customers and a general distrust of green marketers in general and consumer awareness due to a lack of well know certification systems. Finally I will state the issues commonly cited as problematic in small business such as staffing, leadership, sales, training, financing, technology, regulations and change management as those that will also be explored in the proposed study.

CHALLENGES TO BE EXPLORED IN THE RESEARCH

Greenwashing occurs when unsubstantiated claims are made by businesses regarding the environmental friendliness of their products. This misleads consumers and eventually creates consumers who mistrust all marketers who make such claims.

Lack of well known certification is another issue. There are various certification systems which vary depending on the nature of the product. For example, LEED certification is used for buildings, FSC certification is used on lumber products that are sustainably produced, Green Seal certification “provides a business advantage, for it identifies a product as environmentally preferable, provides third-party corroboration of environmental claims, and distinguishes a product from competitors that can't support their environmental assertions. The Green Seal may be used on packaging, in promotional material, in catalogs, and in advertising for products that have been certified to meet the applicable standard.”(17). Consumers are not well aware of these and other certification systems.

Marketing variables are also a challenge to these entrepreneurs. Initial interviews indicated **promotion** is an issue. It was stated that these businesses are struggling to get their company and product information out to the general public. Furthermore, **packaging** and **pricing** were often cited as problematic. While the product might be sustainable, it can be difficult to package it in a sustainable way. The nature of sustainable business practice often does increase costs which are then reflected in the price of the products. Consumers have responded that they'd prefer a green or sustainable alternative as long as it doesn't cost them more money. It has also been found that 42% of all Americans are willing to spend more for products branded as organic, environmentally friendly, or fair trade [4].

Branding is also an issue. In a study conducted by The Bentley Center for Marketing Technology [13], it was made clear that perceptions of brands are not closely tied to reality. Respondents would assume a brand was “green” if a specific product or activity was associated with it, even if as a whole it isn't any more sustainable than others. The Bentley study revealed that the consumers surveyed perceived British Petroleum (BP) to be “greener” than Nike. However, further investigation reveals that BP's green initiatives are only 1-5% of their total business and Nike has emerged as a true leader in green business practices.

Issues associated with Small Businesses include staffing, leadership, sales, training, change management, regulations, technology and financing. These issues were not raised by respondents in the initial interviews. However, I will include them in the preliminary study to assess their relevance.

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COMPARING ATTITUDES ON VICTIM COMPENSATION AND DISASTER RELIEF: ARE THERE REGIONAL DIFFERENCES?

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ABSTRACT

This article presents the results of two studies on attitudes toward compensation for victims of disaster and toward the respective roles of government entities and nonprofit organizations in disaster relief. As part of the national discussion on whether and how to provide compensation to victims of natural disasters and terrorism, researchers in Louisiana and Pennsylvania each surveyed a local population regarding their attitudes toward compensation for victims of natural disasters and terrorist attacks and on the responsibility for disaster relief. We found significant differences in forty-one percent of the cases. There were differences within the sample populations as well. For example, within the Louisiana population, there were significant differences of opinion between those who lived in disaster areas and those who did not on the research questions. This was not true of the Pennsylvania sample. Additional research is needed to determine the type and source of disaster relief and the level of compensation. What is clear is that there is a need for a national policy on victim compensation and disaster relief.

INTRODUCTION

In 2002, Louisiana State University at Shreveport (LSUS) conducted a study of the attitudes of northwestern Louisiana residents toward the provision of compensation for victims of natural disasters and terrorist attacks. This survey was conducted after the terrorist attacks of September 11, 2001 (9/11) but before the television coverage of the Asian Tsunami of December 2004, and the devastation of Hurricanes Katrina and Rita in 2005. The second study, which sought to replicate Louisiana State University's survey, was conducted in 2006 among Pennsylvania residents (also post 9/11 and two years after massive flooding across Pennsylvania in the wake of Tropical Depression Ivan).

Who should do what in the event of a major disaster has prompted a public policy debate (See for example, Sylves and Lindsay, 2008). Should victims of disasters be compensated for their losses and, if so, for how long? What role should the government play? What role should nonprofit organizations play?

While running for the Republican presidential nomination in 2008, former New York City Mayor Rudolf Giuliani announced his support for the creation of a national catastrophe fund for disaster victims in catastrophe-prone states. Giuliani's plan would have been funded by insurance-company revenues, rather than taxpayer dollars, at the same time promising reduced insurance premiums for voters (joinrudy2008.com). Some have argued that such aid is primarily the responsibility of a government

entity (Settle, 1985), while others believe it is the responsibility of the individual who chooses where to live, or some combination of considerations (Kunreuther, 1973). Schwarze and Wagner (2002) argue for mandatory private natural-hazard insurance to equitably compensate victims and to incentivize risk-reduction measures.

Traditionally in the United States, the government, principally the federal government, has stepped in to aid private insurance companies as they try to meet their obligations in the face of large-scale disasters – a sort of re-insurance (Lascher and Powers, 2004). Jerry and Roberts (2006) argue that only the federal government has the capacity to reinsure or to backstop a major disaster. Only the federal government has the ability to spread the risk of loss across the general population (using tax revenue).

With respect to the 9/11 attacks, the stimulus behind the Air Transportation Stabilization Act of 2001 was the fear that the airlines might not survive extensive lawsuits (Lascher and Powers, Holt, 2004). Much earlier, Feldmus proposed an airline liability compensation fund that would “adequately” compensate the victim of a terrorist attack while mitigating the burden on the airline for providing total compensation (1987).

The Victim Compensation Fund created in the Air Transportation Stabilization Act provided relief to victims of the 9/11 attacks. No similar fund was created for victims of earlier terrorist attacks or for victims of man-made or natural disasters. Testifying before Congress, the Special Master for the Fund raised the issue, asking why just this disaster (Feinberg, 2007). Arguing against a broad-based victim compensation fund as national policy, Dixon and Reville (2006) maintain that compensation for victims of terrorism impacts national security and because of that, equating natural disasters with terrorism obscures issues of national security.

Nonprofit aid agencies also play a role in disaster relief. However, scandals involving some of the most prominent nonprofit agencies, such as the American Red Cross, have brought into question the suitability of nongovernmental entities’ assuming responsibilities for comprehensive aid in disaster situations (Sinclair, 2002, Schwinn, 2008). Criticism of how various relief funds have been managed has eroded public confidence in nonprofit organizations (Perry, 2008). Of course, scandals involving nonprofit organizations are not limited to relief organizations (Gibelman and Gelman, 2000), but the failures of aid agencies during 9/11 and Hurricane Katrina continue to reverberate (Perry, 2008).

Governmental aid is, ultimately, taxpayer aid. For the legislation that provides for such aid to be enacted, the opinions of voters are critical for eliciting legislative and other necessary support. Similarly, for the many nonprofit organizations that rely heavily on donations, how donors view them is critical to an organization’s survival.

The two studies which form the basis for this analysis focused on the attitudes of people in Louisiana and Pennsylvania toward compensation for victims of disasters – natural and terrorist – and toward the respective roles of the government and nonprofit organizations in disaster relief. In both samples, more than half lived in a disaster area. Whether or not the respondent lived in a disaster area was used as the independent variable when testing for significance within each of the two samples with regard to the attitudes toward the compensation issue and toward the respective roles of government and nonprofits.

RESEARCH QUESTIONS

We posed three research questions to frame the analysis:

RQ 1: Should victims of terrorism and natural disasters be compensated for their losses?

RQ 2: Are attitudes toward compensation for disaster victims related to whether respondents live in a disaster area?

RQ 3: Are attitudes toward the respective roles of government entities and nonprofit organizations in disaster relief related to whether respondents live in a disaster area?

METHODOLOGY

Sample

To examine views toward compensation for victims of natural disasters as well as of terrorist attacks such as those on 9/11, Louisiana State University at Shreveport undertook a telephone survey of adult residents of Shreveport and its surrounding parishes in 2002. Two hundred and fifty people (250) comprised the LSUS sample.

To explore whether the Louisiana results would be similar to those of people in another part of the country, researchers contacted colleagues at Robert Morris University (RMU) in southwestern Pennsylvania for the purpose of conducting a similar study in Pennsylvania.

In 2006, researchers at RMU surveyed entrepreneurs, other business owners, and university faculty using the same questions posed by LSUS researchers, but employing a web-based survey (attached as Appendix A). The forty-six questions from the LSUS survey were grouped into a twenty-six item web survey which included twenty-one demographic questions and twenty-five attitude questions. After deleting responses from those under the age of eighteen to be consistent with the LSUS sample, the RMU sample consisted of two hundred fifty-seven (257) usable responses.

Measures

Both studies relied on a survey instrument to gather data. In its study, LSUS conducted two hundred and fifty telephone interviews. RMU used an e-mail list of three thousand four hundred and thirteen. Of these, two hundred sixty-five people responded to the e-mail. In both samples, we deleted responses from those who were not U.S. citizens because we were interested in how voters responded. Responses from people who, at any time, worked for disaster relief organizations were deleted as well because of the inherent bias. The resulting LSUS sample was two hundred and thirty-three (233). The RMU sample size was two hundred and thirty-nine (239).

To adjust for the sampling methods and to allow us to generalize to the populations from which the samples were drawn, we weighted the samples by gender. Weighting gave us three hundred and sixty-seven (367) in the LSUS sample and three hundred and twenty-three (323) in the RMU sample, for a total weighted sample of six hundred and ninety (690).

Using SPSS tools, we ran t-tests to determine the relationship of the independent variable, residence in a disaster area (as determined by the respondent), to the two dependent variables, whether compensation should be made and what roles the government and nonprofits should play in disaster relief. For the independent variable, we combined questions 10-13 (“do you currently live in an area that is affected by (10) hurricanes, (11) earthquakes, (12) floods, (13) tornadoes?”), eliminating duplicate responses, into one variable, “do you live in a disaster area?”

The first dependent variable was question 14, “Should victims of natural or terrorist disasters receive compensation?” For the second dependent variable, role of the government and nonprofit organizations in disaster relief, we used questions 17b, 17c, 17f, 19a, and 19c.

If the response to question 14, “Should victims of natural or terrorist disasters receive compensation?” was affirmative, we wanted to know how long the respondent thought compensation should be received. To determine how long compensation should be received, we used crosstabs analysis and noted the comparison between the two populations. See Table 1.

We ran independent samples t-tests on the question 14, the first dependent variable, and on the five questions making up the second dependent variable to see if there were any significant differences within the two samples (tables 2 and 3) between the two sample populations (tables 4 and 5).

RESULTS

RQ1: Should victims of terrorism and natural disasters be compensated for their losses?

Within the LSUS sample, two hundred and twelve agreed that victims of natural and terrorist disasters should receive compensation, one hundred and twenty-eight disagreed and twenty-seven did not know. In the RMU sample, two hundred and seven people agreed that victims of natural and terrorist disasters should receive compensation, seventy disagreed and forty-six did not know.

To compare the two samples, we ran an independent samples t-test. There was a statistically significant difference of .004 between the LSUS sample and the RMU sample with regard to people’s attitudes toward whether victims should be compensated.

In both samples, we used crosstabs on question 15, “How long should they receive compensation after the disaster”, to determine the recommended length of time for victim compensation. Table 1 illustrates the opinions on the time period that compensation should be received of those in the LSUS sample (204) and the RMU sample (207) who responded “agree” to the initial question of whether there should be compensation and who responded to question 15 on the time period.

Table 1: How Long Should Victims of Natural and Terrorist Disasters Receive Compensation?

	LSUS		RMU	
	N	%	N	%
1 Year	114	55.9	123	59.4
2 Years	43	21.1	50	24.2
3 Years	39	19.1	19	9.2
Unsure	8	3.9	15	7.2
Total	204	100	207	100

RQ2: Are attitudes toward compensation for disaster victims related to whether respondents live in a disaster area?

There were three hundred and sixty-seven weighted responses in the LSUS sample, three hundred and twenty-three in the RMU sample. In the Louisiana sample, two hundred and twenty-five or 61.3% of the total said that they did live in a disaster area. One hundred and forty-two or 38.6% said they did not. In the Pennsylvania sample, two hundred and twenty-five or 69.6% of the total said that they did live in a disaster area. Ninety-eight or 30.3% said they did not.

With whether or not the person lived in a disaster area as the independent variable, we ran independent samples t-tests on the attitudes toward compensation within both sample populations. Both samples were weighted by gender.

There was a statistically significant difference at the .01 level in the LSUS sample between those who lived in a disaster area and those who did not with regard to the question of whether victims of disasters should receive compensation. Those who lived in a disaster area responded more strongly (mean of 1.6) in agreement that victims should receive compensation than those who did not live in a disaster area (mean of 2.04) where 1 = agree, 2 = do not know, and 3 = disagree.

By contrast, in the RMU/PA sample there was no significant difference between those who lived in a disaster area and those who did not with regard to the question of whether victims of disasters should receive compensation. The mean for those who did live in a disaster area was 1.58. The mean for those who did not live in a disaster area was 1.56.

There was a statistically significant difference at the .001 level in the combined sample of those who lived in a disaster area (450) and those who did not (240) with regard to the compensation question. Respective means were 1.59 and 1.84.

RQ3: Are attitudes toward the respective roles of government entities and nonprofit organizations in disaster relief related to whether respondents live in a disaster area?

We ran independent samples t-tests on opinions toward the respective roles of government and nonprofit organizations within both sample populations. We used five questions from the survey to capture that information. The dependent variable was whether or not the person lived in a disaster area. Both samples were weighted by gender.

In the LSUS/NEL sample there were statistically significant differences between those who lived in disaster areas and those who did not on three of the five questions measuring opinions on the respective roles of government and nonprofit organizations in disasters:

- “A ‘Superfund’ should be established in the U.S. to aid victims of disaster and terror.”
- “All natural disaster areas should be patrolled and made safe by the National Guard.”
- “The government should secure food, first aid, and temporary shelter for natural disaster victims.”

Note that the assumption is made that respondents thought that the superfund would be initiated and maintained by the federal government. The table below presents the results from the LSU/NEL sample where the scale was 1= “agree”, 2= “do not know”, and 3= “disagree”.

Table 2: Opinions on the Respective Roles of Government and Nonprofit Organizations

LSUS Sample	t-test for Equality of Means			Mean	
	N	t	Sig. (2-tailed)	Live in disaster area	Do not live in a disaster area
In times of disaster, the government should focus on repairing the infrastructure which would include ensuring passable roads, a safe water supply, and the soundness of buildings.	364	-3.09	.758*	1.11	1.12
In times of disaster, nonprofit organizations should focus on providing temporary assistance for persons.	364	-2.75	.783*	1.15	1.16

A "Superfund" should be established in the U.S. to aid victims of disaster and terror.	365	4.223	.000**	1.52	1.22
All natural disaster areas should be patrolled and made safe by the national guard.	365	4.117	.000**	1.32	1.11
The government should secure food, first aid, and temporary shelter for natural disaster victims.	365	3.517	.000**	1.17	1.04

*Equal variances assumed

**Equal variances not assumed

In the RMU/PA sample, there were no statistically significant differences on any of the five questions measuring opinions on the respective roles of government and nonprofit organizations.

Table 3: Opinions on the Roles of Government and Nonprofit Organizations

RMU Sample	t-test for Equality of Means			Mean	
	N	t	Sig. (2-tailed)	Live in disaster area	Do not live in a disaster area
In times of disaster, the government should focus on repairing the infrastructure which would include ensuring passable roads, a safe water supply, and the soundness of bldgs.	320	1.820	.063**	1.10	1.04
In times of disaster, nonprofit organizations should focus on providing temporary assistance for persons.	321	.597	.551*	1.09	1.06
A "Superfund" should be established in the U.S. to aid victims of disaster and terror.	319	-.533	.594*	1.81	1.87
All natural disaster areas should be patrolled and made safe by the national guard.	320	1.152	.250**	1.45	1.36
The government should secure food, first aid, and temporary shelter for natural disaster victims.	318	.784	.434*	1.20	1.15

*Equal variances assumed

**Equal variances not assumed

Other Findings

There were significant differences when comparing the two weighted samples against each other. For example, in research question one there was a significant difference between the two studies with regard to whether or not victims of disasters should receive compensation. Responses to the RMU survey were significantly more positive on this issue than those in the LSUS sample as table 4 illustrates. 1= agree, 2= do not know, 3= disagree.

Table 4: Opinions on Compensation

	t-test for Equality of Means			Mean	
	N	t	Sig. (2-tailed)	LSU	RMU
Compensation refers to money or any other form of assistance. Should victims of natural or terrorist disasters receive compensation?	690	2.913	.004**	1.77	1.58

*Equal variances assumed

**Equal variances not assumed

Responses to questions on the respective roles of government and nonprofit organizations in disaster relief indicate statistically significant differences in four of the five areas as shown in Table 5 below. LSUS responses to the question of nonprofits providing temporary relief were more in agreement than those in the RMU sample. In the remaining three areas involving the government's role, the LSUS sample was significantly more in agreement with the questions than the RMU sample.

Table 5: Opinions on the Respective Roles of Government and Nonprofit Organizations

	t-test for Equality of Means			Mean	
	N	t	Sig. (2-tailed)	LSU	RMU
In times of disaster, the government should focus on repairing the infrastructure which would include ensuring passable roads, a safe water supply, and the soundness of bldgs.	687	.688	.491*	1.10	1.08
In times of disaster, nonprofit organizations should focus on providing temporary assistance for persons.	688	2.197	.028**	1.14	1.08
A "Superfund" should be established in the U.S. to aid victims of disaster and terror.	686	-7.163	.000**	1.40	1.83
All natural disaster areas should be patrolled and made safe by the national guard.	687	-3.893	.000**	2.23	2.42
The government should secure food, first aid, and temporary shelter for natural disaster victims.	685	-2.112	.035**	2.11	2.19

*Equal variances assumed

**Equal variances not assumed

DISCUSSION AND CONCLUSION

There were statistically significant differences between the two samples in all but one of the six questions analyzed which was, "In times of disaster, the government should focus on repairing the infrastructure which would include ensuring passable roads, a safe water supply, and the soundness of buildings".

Within the Louisiana sample, there were significant differences in the attitudes of those who lived in disaster areas and those who did not toward both dependent variables: whether victims of natural and terrorist disasters should receive compensation and the respective roles of government and nonprofit organizations in disaster relief. This was not true of the Pennsylvania sample. Are the differences attributable to the geographic area and/or to the differences in the two samples? Or are the differences due to the differences in the survey techniques or to the four-year time difference between the administration of the two surveys? The most logical explanation may be the difference in the sample populations themselves. Differences in income and education were considerable as were age; marital status and home ownership to a lesser degree (see Appendix B).

Results show significant differences in the attitudes of people in one of the two samples toward whether or not victims of natural and terrorist disasters should receive compensation and toward the respective roles of government and nonprofit organizations in disaster relief. There were also significant differences between the two sample populations. The demographic profiles of the samples were significantly different; consequently, it is difficult to generalize from sample results. Nonetheless, we suggest that the studies add to the body of knowledge that is forming the basis for the public debate.

Sample Population: Composition

The combined participant sample was composed of two hundred and fifty males and two hundred forty-eight females. The majority of the LSUS sample was female. The majority of the RMU respondents were male. The majority of both samples who responded to the question about racial or ethnic identity, self-reported as Caucasian. The majority of RMU respondents were between the ages of thirty-five and sixty-four. The LSUS sample was more evenly divided among age groups. However, there were striking differences in the sample populations in the areas of education and income. The RMU sample reported higher educational levels and greater household incomes than did the LSUS sample.

Timing

The Louisiana survey was conducted in 2002, when national attention was on the administration of the September 11th Victim Compensation Fund and in the wake of the widely publicized failings of the Red Cross. The LSUS survey preceded the 2005 hurricane season in which large areas of Louisiana and surrounding states were destroyed. Responses to the LSUS survey might well have been different post Katrina.

The RMU survey was administered in 2006, after the state-wide flooding in 2004 caused by Tropical Depression Ivan, after the tsunami in Southeast Asia that killed more than 225,000 people in eleven countries, and after the hurricanes of 2005 that ravaged Louisiana and surrounding states. Also, it should be noted that one of the airplanes hijacked on September 11th crashed in southwestern Pennsylvania.

Design

While the sample sizes were large enough to generalize, we hesitate to do so when comparing the results of the two surveys because of differences in the administration of the survey and because of the ambiguity of some of the questions. This article reports on just six of the forty-six items in the surveys.

The differences in the types of survey - telephone versus a web survey - could have influenced the responses. If the interviewee was confused or had a question, the interviewer would have been able to

elaborate. Additionally, with a telephone survey, the respondents could not be assured of anonymity. This might account for the larger number of “refused” responses. Some of the questions combined “terrorism” with “natural disasters” which meant we could not say if there were different sentiments with regard to one over the other.

While there were differences between the sample populations, there was also agreement on the traditional role of government in maintaining the infrastructure. Responses within the sample populations were dissimilar most likely based on the differences with the sample populations themselves. What is shared is the interest in the debate, a debate that continues.

FUTURE RESEARCH

The issue of whether compensation should be provided to future victims of natural disasters and terroristic attacks, how it should be provided and at what levels for what length of time remains an important consideration for policy-makers. It is a complicated issue, one that is already under discussion in the public forum. Survey research is an appropriate means to gain information helpful to the legislative process, as it is to understanding the roles of government and nonprofit organizations. These studies have helped identify some of the issues. Additional research could be built on what we have learned. To do that, a more targeted and specific questionnaire should be developed in order to better understand what the respondent means and to the extent possible, researchers should control for the characteristics of the sample populations. A more rigorous investigation of the subject could be expected to yield more generalizable results.

APPENDIX A

Victim Compensation Survey

The Massey Center for Business Innovation and Development at Robert Morris University is conducting a survey of opinions toward compensation of victims of natural disasters and terrorism attacks. Your responses to the following questions will provide us with valuable input for our research.

There are no foreseeable risks associated with this project, nor are there any direct benefits to you. This is a confidential questionnaire. Your responses will not be identifiable in any way. The confidential responses will be analyzed by me and my research colleagues alone. Responses will be aggregated for the purpose of dissemination to the academic community.

This study is being conducted by Dr. Michele Cole, cole@rmu.edu, and Dr. Jeff Guiler, Guiler@rmu.edu, if you have any questions.

The survey will take less than five minutes to complete. You may stop at any time without penalty to you. You must be more than eighteen years of age to participate in this survey.

1) Are you over the age of 18?

- Yes
- No

2) Are you a U.S. Citizen

- Yes
- No

3) Were you born in the United States or are you a naturalized citizen?

- Native Born
- Naturalized

4) Do you work for a disaster relief organization?

- Yes
- No
- Not currently, but in the past

5) Have you or your family received any form of assistance due to a natural or terrorist disaster?

- Yes
- No
- Don't know

6) Which one?

- Natural Disaster
- Terrorist Attack
- Both
- Other
- N/A

7) Has this occurred within the past 10 years?

- Yes

- No
- N/A

8) In the past year, have you or anyone in your home donated money or goods to an organization that handles disaster relief?

- Yes
- No
- Don't know

9) Do you think terrorism insurance should be made available to everyone?

- Yes
- No
- Don't know

10) Do you currently live in an area that is affected by hurricanes?

- Yes
- No
- Don't know

11) Do you currently live in an area that is affected by earthquakes?

- Yes
- No
- Don't know

12) Do you currently live in an area that is affected by floods?

- Yes
- No
- Don't know

13) Do you currently live in an area that is affected by tornadoes?

- Yes
- No
- Don't know

14) Compensation refers to money or any other form of assistance. Should victims of natural or terrorist disasters receive compensation?

- Yes
- No
- Don't know

15) How long should they receive compensation after the disaster?

- One year
- Two years
- Three years
- N/A

16) Rate the following using the terms *greater than*, *no change*, or *less than* compared to how things are now based on your own knowledge.

	Greater Than It Is Now	No Change From How It Is Now	Less Than It Is Now
a. <u>Long term</u> cash compensation amount given to future victims of <i>terrorism</i> should be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. <u>Long term</u> cash compensation amount given to future <i>natural disaster</i> victims should be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. <u>Short term</u> cash compensation amount given to future victims of <i>terrorism</i> should be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. <u>Short term</u> cash compensation amount given to future <i>natural disaster</i> victims should be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17) Rate the following statements with strongly agree, agree, uncertain, disagree, or strongly disagree.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
a. Victims should receive more than just temporary assistance for an immediate crisis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. In times of disaster, the government should focus on repairing the infrastructure which would include ensuring passable roads, a safe water supply, and the soundness of buildings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. In times of disaster, nonprofit organizations should focus on providing temporary assistance for persons.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Guidelines should be established for short term assistance to persons who are victims of disaster.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Guidelines should be established for long term assistance to persons who are victims of a disaster.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. A "Superfund" should be established in the U.S. to aid victims of disaster and terror.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. The U.S. government should establish a fund and accept additional contributions to compensate victims of terrorism in other parts of the world.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18) Using a scale of 1 to 5, 1 being the most likely and 5 being the least, how likely would you be to contribute to a fund for disaster victims in these places?

	Very Likely	Likely	Uncertain	Unlikely	Very Unlikely
Copenhagen, Denmark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leningrad, Russia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manchester, England	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tel Aviv, Israel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cairo, Egypt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Beijing, China	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bangkok, Thailand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

19) Rate the following statements with strongly agree, agree, uncertain, disagree, or strongly disagree.

Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree				
a. All natural disaster areas should be patrolled and made safe by the national guard.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Nonprofit organizations should only contribute money to natural disaster victims.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. The government should secure food, first aid, and temporary shelter for natural disaster victims.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. It was fair for victims of the World Trade Center disaster on September 11th to receive awards from \$250,000 upwards.				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20) What is your gender?

- Male
- Female

21) Would you describe your main racial/ethnic group as:

- White or Caucasian
- Black or African American
- Hispanic or Latino
- Asian
- Other (please specify)

If you selected other please specify:

22) What is your age?

- 18 - 24
- 25 - 34
- 35 - 49
- 50 - 64
- 65 - 79
- Over 80

23) What is the highest level of school you completed?

- Less than High School
- High School Diploma/GED
- Some College or Technical School
- College Graduate
- Graduate or Professional School
- Refused

24) What is your marital status?

- Single
- Divorced
- Widowed
- Separated
- Married
- Refused
- Other (please specify)

If you selected other please specify:

25) Do you currently own or rent your home?

- Rent
- Own
- Refused
- Other (please specify)

If you selected other please specify:

26) Yearly income is the amount earned from all sources. Last year was your household income:

- Less than \$10,000
- Less than \$25,000
- Less than \$50,000
- Less than \$75,000
- Over \$75,000
- Refused

Thank you for your time and cooperation.

APPENDIX B

Demographic Data

	LSUS/NEL		RMU/PA	
	N	%	N	%
Male	100	40	166	64.8
Female	148	59.2	90	35.2
Caucasian	126	50.4	219	86.2
African-American	104	41.6	24	9.4
18-24	53	21.2	3	1.2
25-34	48	19.2	28	10.9
35-49	52	20.8	77	30.1
50-64	41	16.4	127	49.6
65-79	33	13.2	20	7.8
HS/GED	74	29.6	8	3.1
Some College/Tech.	75	30	47	18.4
College Grad.	76	30.4	75	29.4
Grad/Prof. School	12	4.8	125	49
- \$10,000	39	15.6	0	0
- \$25,000	61	24.4	6	2.4
- \$50,000	65	26	38	14.9
- \$75,000	22	8.8	40	15.7
+ \$75,000	24	9.6	129	50.6
Single	155	62	67	26.5
Married	89	35.6	182	71.1
Rent	135	54	19	7.5
Own	22	8.8	229	89.9

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Best Practice Solution to Reduce Patient Falls and Increase Patient Satisfaction

By

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Track:

Public Sector Social and Ethical issues

Abstract

The number of times that patients experienced falls on the Medical/Surgical Unit at a small, rural hospital was at an all-time high in the first quarter of 2007. Hospital administration took immediate action in an effort to decrease this trend, and reduce the number of incidences of patients falling during their stay at the hospital. An ad hoc group was formed to address the concerns of the administration and staff physicians. The “Rounding Quality Improvement Team” (the Team) was formed and began meeting in early 2007. The Team’s charge was to develop a set of procedures that were to be followed by all nursing staff members and hopefully would decrease the number of falls experienced by patients on the Unit. These guidelines were created and fully implemented after staff in-service training in April of that year.

A reduction in the patient fall rate was noted immediately and has continued to remain near the national average since the project implementation began over one year ago.

At the same time, Patient Satisfaction scores were plummeting. As members of the Patient Satisfaction Team noticed the reduction in falls, they determined that rounds might also help with patient satisfaction. The rounding process was begun in May 2008, and so far patient reaction to the visits has been outstanding.

Introduction:

The Fitzgibbon health care organization is comprised of a 60 bed acute care hospital; a 99-bed long term care (LTC) facility; the Buckner Wellness Center; a Rural Health Clinic; and specialty clinics. The Hospital is located on a 72-acre campus on the south side of Marshall, Missouri. It is a rural private, not for profit, community hospital licensed by the State of Missouri Department of Health and Senior Services Bureau of Hospital Licensing and Certification, and the Centers of Medicare and Medicaid Services. The organization serves portion of eight counties with an approximate population of 35,000.

Background:

The number of times patients experienced falls on the Medical/Surgical Unit at the small, rural hospital was at an all-time high in the first quarter of 2007. During a Patient Care Council meeting in the first quarter of 2007, it was noted that the Med/Surg Unit's patient falls had risen to an average of 12.23 per patient days. This number far exceeded the national average of 4.21 falls a day. Data was collected for 6 quarters beginning with the 3rd quarter of 2005 and ending with the 1st quarter of 2007. The average patient falls for the time period was 8.7 with a low of 3.38 and a high of 12.23. The nursing staff found this to be very unacceptable; it interfered with the normal flow of patient care and left little time for communication among the nursing staff. They took direct action in an effort to decrease this trend, and reduce the number of incidences of patient falls during their stay at the hospital. A Task Force was formed to address the concerns of administrators, staff physicians and the nursing staff.

The "Rounding Quality Improvement Task Force," (The Team) was charged with developing a fall prevention plan. The Team researched the topic and found studies indicating significant improvement in reducing patient falls and increasing patient satisfaction. Meade et. al. (2007) determined that, specific nursing actions performed during set intervals rounds can reduce falls, increase nurse satisfaction, and reduce the frequency of call light use. Gurney (2006)

found a significant reduction in patient falls as a result of a one hour rounding protocol. The nursing staff instituted the practice of Rounding Protocols which would create a culture of safety (Moran-Peters 2007). Specifically, based on the data, Nursing Round visits to a patient's room just to visit, not a response to a call light, were developed. Nursing rounds differ from ward rounds in that the primary function is the improvement and progression of nursing practice rather than to aid the medical decision-making process. (Jarman & Shopland, 2007)

Procedure:

The Med/Surg Unit developed a rounding procedure based on a Best Practice solution described by Meade et. al., (2006). The premise being that more contact with patients would lower the rate of patient's falls. The Med/Surg staff consisting of RNs, LPNs, TECHs, would all make visits to all patients every hour during the day from 8AM to 6PM and every two hours from 8PM to 8AM.

During the rounding visit the following activities were accomplished:

- Assessed for pain/comfort;
- Offered help for toileting;
- Repositioned – if needed;
- Straightened room;
- Provided personal items within reach;
- Assured communication board was accurate;
- Prior to leaving they asked, "Is there anything I can do for you before I leave? I have time while I am in the room"
- Told patient, " _____ Will be back in about an hour to check on you."

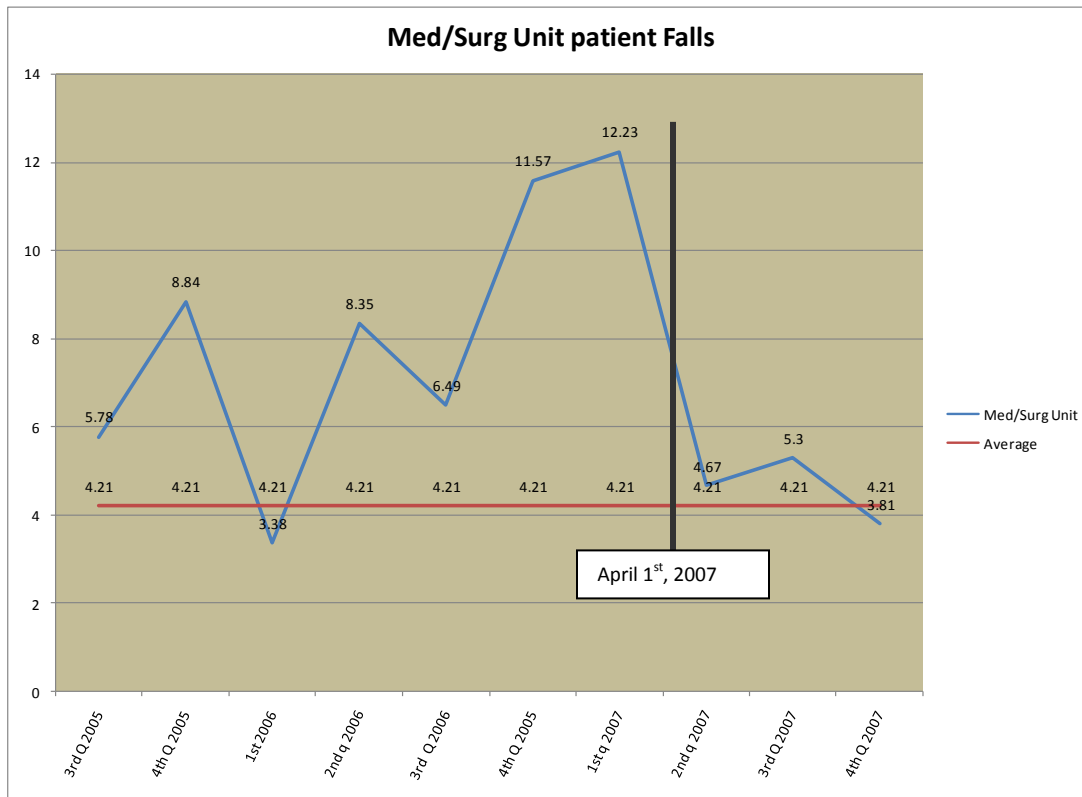
This procedure began April 1st of the first quarter 2007 and continues today.

Results:

As can be seen in Figure 1, because of the rounding procedure that began on April 1st, the number of patient falls dropped tremendously for the 2nd Quarter of 2007.

Figure 1

Med/Surg Unit Falls



With the success of the Med/Surg Unit’s rounding program, the program was expanded to a new program called Service Rounding. The purpose of the Service Rounding is to improve overall patient satisfaction scores.

Patient Satisfaction scores began to stagnate and decline in late 2007. Hospital administration took direct action in an effort to decrease this trend. The Patient Satisfaction Team found that the barriers to high patient satisfaction scores

were: inconsistency, staff compliance and negative attitudes. The strategy used to improve patient satisfaction scores is called Service Rounding.

Service Rounding can take two forms. In one, executives take turns interacting with patients and staff by rounding for a few hours each week. Another form involves nurse managers rounding daily on all patients to encourage them to voice any concerns or complaints. The goal of the practice is to identify and promptly resolve problems while increasing the visibility of executives and accountability of floors nurses for the satisfaction of patients under their charge. Service Rounds are not about catching staff doing things wrong. They're about helping Fitzgibbon Hospital decision-makers learn first-hand how patients perceive their care and services, and finding ways to improve (Vital signs 2007).

There are several factors to a Successful service-rounding program. The first is:

1. The development of a workshop for all involved to educate them on purpose, procedure and reporting of outcomes.
2. Commitment of senior executives and service leaders to stay dedicated to the rounding schedule.
Senior executives will round 4 hours per month with at least one executive rounding every week. Service leaders will round 1 hour per day.
3. Timely and effective follow-up on patient complaints revealed during rounding.
4. Communication to staff regarding the purpose of creating proactive service rounding.
5. The creation and publishing of a rounding schedule.
6. After rounding, any concern will immediately be sent to the appropriate Service Leader. A complete Rounding report is collated and presented at the monthly Patient Care Council Meeting where Patient Satisfaction Scores are reviewed.

The second factor is a few, Tips for Conducting Service Rounding:

- Ask permission of the charge nurse prior to entering;
- Point your toes to patient;
- Sit down;
- Communicate sincerely.

The third is the an acronym WARMTH

- W** **Wear a smile**
- A** **An open posture**
- R** **Rise and lean forward**
- M** **Make eye contact**
- T** **Touch (break zone by talking with hands)**
- H** **Head nodding**

The fourth factor to a successful service-rounding program is SCRIPTING: The following is an example of the scripting being used.

“Good morning/Hello, Mrs. Jones, I’m name, I’m the role. I want to be sure that we do everything possible to exceed your expectations during your hospital stay. Please let me know of any opportunity where we can exceed your expectations. Is there anything I can do for you before I leave? I have time.”

RESULTS:

A preliminary review of the month/quarterly Patient Satisfaction scores indicated that the scores on a majority of the categories are improving.

Discussion:

The Med/Surg rounding exercise demonstrated significant improvements in the decline of patient falls. Nurses were able to spend more time with their patients and had uninterrupted time for charting and patient education. A preliminary review of patient satisfactions scores indicates that there is an upward movement of satisfaction scores. The success of the service rounding procedure will continue and a review of the program will be conduct during the coming year.

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**Importance-Performance Analysis:
Helping Your Community Partners Walk Their Talk**

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ABSTRACT

This manuscript presents both an operating philosophy and assessment tool for use at your university and with your community partners. Specifically, we advance a particular tool (Importance-Performance Analysis) and discuss its potential application in student service-learning projects (such as the projected outlined here). This effort may serve as a template for similar work at other academic institutions and with other partners.

INTRODUCTION

Business Schools accredited by AACSB International seek to continually improve their efforts while assessing outcomes against mission-driven criteria. So, student performance is assessed continuously and changes in the curricula and/or instructional methods are introduced based on this feedback. The level of scholarly output, both quality and quantity, are constantly monitored to ensure the faculty are keeping their research credentials current to ensure an up-to-date curriculum. Service contributions to our communities are assessed against the backdrop of the commitments made by the Business School in its mission statement.

Ultimately, an AACSB accreditation effort (for both initial accreditation and the successful maintenance thereof) is a function of mission fulfillment:

- Has this Business School fulfilled its mission?
- In the fulfillment of its mission, has the AACSB member satisfied the accreditation standards to achieve/maintain this important external quality indicator?

The maintenance of a Business School's accredited status could be viewed as, to use a catch-phrase ... "Walking the Talk." In essence, we have done what we said we would do. If you look around your community, you likely see lots of community partners (for-profits, not-for-profits, and governmental entities) that could benefit from a process similar to our AACSB evaluation.

The purpose of this manuscript is to advance both an operating philosophy and assessment tool you could use to enrich organizations in your community. Most universities, particularly state-supported institutions, seek to fulfill their public service responsibility to their community. One way a Business School can deliver on this expectation is to develop applied service-learning projects with its students. For instance, students developing business and/or marketing plans or students conducting marketing research gain an active learning experience (an important item for AACSB accredited schools) while concurrently providing a value-added service to community partners. We will advance a particular tool (Importance-Performance Analysis) and discuss its potential application in student service-learning projects. Next, we'll overview an example use of this tool at a state-supported university. Finally, we'll

provide you an Action Plan to help organize similar efforts and/or possibly replicate this effort with a community partner in your marketplace.

AN OVERVIEW OF IMPORTANCE – PERFORMANCE ANALYSIS

In general, there is compelling evidence that studies which focus on the assessment of outcomes may suffer from two major drawbacks; namely, they tend to either focus solely on performance or importance (see, for example, Ortinau, Anderson, and Klippel 1987; Shipp, Lamb, and Mokwa 1993) While these are both clearly vital areas of analysis, consumers of these research results have reported difficulty in converting findings expressed in terms of such things as "coefficients of determination" and "latitudes of acceptance" into practical courses of action (Martilla and James 1977). The use of Importance-Performance Analysis can help to avoid these potential problem areas and demystify the results in such a way that decision-makers may use them for developing specific action steps for their organizations.

Descriptions of the methodology involved in the use of Importance-Performance Analysis are well documented (Bacon 2003). Briefly, it consists of measuring the IMPORTANCE and the PERFORMANCE of a stimulus on its salient dimensions and then creating a graphical display of the results on a two dimensional (i.e., 2x2) "action grid," an example of which is reproduced in **Figure One**. This graph serves two important purposes. First, it obviously offers an easily-interpreted visual display of the results of the analysis. Secondly, and perhaps more importantly, it also provides a basis for strategy formulation.

Reference to **Figure One** shows that the upper half of the matrix is representative of stimulus dimensions which are perceived as more important by the subjects, while the bottom half are those dimensions which are considered less important. The right-hand side of the matrix contains attributes for which performance is perceived to be positive. Specifically, attributes in the upper right quadrant are those where importance and performance are perceived to be high and, of course, should be maintained. The left-side of the matrix presents those attributes for which performance is perceived as being less positive. Strategically, the upper left quadrant presents the most challenging aspect for the organization in that it represents attributes which respondents consider important, but perceive performance to be below average. Obviously, this would suggest areas for future focused efforts.

Figure One
Importance-Performance Grid

HIGH Importance	A. Concentrate Here	B. Keep Up the Good Work
LOW Importance	C. Low Priority	D. Possible Overkill
	LOW Performance	HIGH Performance

Whenever a graphical representation of research results is used, it is always helpful if the resulting graph tells a story that can be easily interpreted. In order to enhance the ability of the graph associated with Importance-Performance Analysis to tell the most meaningful story, we have followed conventional methodology which suggests that the axes be positioned in such a way that they intersect at their midpoints (Hawes and Rao 1985). This allows for the drawing of a 45-degree line through the B and C quadrants which represents an iso-rating diagonal. When presented in this manner, all attributes which plot *above* the line have an importance rating which exceeds performance and might be called a "market opportunity." Conversely, those which plot *below* the line represent "satiated needs."

When interpreted this way, strategic directions become fairly straightforward, even if strategies themselves do not. As an example, it is possible that the organization in question is devoting too many resources toward attributes which are satiated; e.g., something which respondents find fairly unimportant at which the institution appears to excel. In much the same way as the standard BCG Growth Share Matrix suggests strategic directions for both Cash Cow and Dog items in the organization's product portfolio (see, for example, Haspeslagh 1982), resources should be redirected toward the attributes perceived as more important. While this is a fairly simple and perhaps even obvious conclusion, care needs to be exercised here in the sense that regardless of how certain attributes are perceived, simply ignoring them in favor of others is a potentially perilous course of action. In other words, no matter how informative the story told by this analysis tool is, knee-jerk strategic reactions are, as they probably always are, ill-advised.

Importance-Performance Analysis has been used to evaluate outcomes in a variety of industries. For example, it has been applied in positioning restaurants (Keyt, Yavas, and Riecken 1994), business school education delivery (Ford, Joseph, and Joseph 1999), membership offerings of a professional association (Johns 2001), perceptions of bank services (Matzler, Sauerwein, and Heischmidt 2003), evaluating e-business effectiveness (Levenburg and Magal 2005), and analyzing components of highway transportation services in Taiwan (Huang, Wu, and Hsu 2006). Clearly, this method is widely used and robust. Further, software programs that utilize either means or top-box percentages to create quadrant charts, biplots, correspondence maps, and multi-dimensional scaling maps have been developed to explore importance-performance relationships (Cantrall 2006).

Deja Vu for You?

If you are part of an AACSB accredited Business School, you may have seen a version of this tool used previously. Many Business Schools use the services of Educational Benchmarking (EBI) to monitor student perceptions and attitudes. By administering an exit examination to graduating seniors, participating institutions monitor student satisfaction with their undergraduate experience. Areas of strength are noted while areas for improvement are identified.

As part of its reporting, EBI provides schools a Priority Index, a 2x2 matrix presenting the interaction of two variables: (1) Predictor of Overall Program Effectiveness (Importance) and (2) Relative Performance by Institution (i.e., what the students say about your performance). This measurement method flows from Importance-Performance Analysis. By assessing both importance and performance for the same dimension, researchers can assess whether decision-makers are focusing their efforts on those items of greatest importance. To put it another way, are decision-makers "Walking their Talk?"

IMPORTANCE-PERFORMANCE ANALYSIS AND SERVICE-LEARNING PROJECTS

You likely have many organizations in your community that could benefit from an analysis of their actions to date. They need to continually monitor their performance to determine:

- Are we doing the right things?
- Are we doing the right things well?

This is particularly true for not-for-profit organizations. Member-driven organizations such as Arts Supporters, Youth Sports Associations, and even some Churches can benefit from asking their members such questions:

- **Importance** – Are we doing the right things?
- **Performance** – Are we doing the right things well?

We find many opportunities to serve important stakeholders in our community by providing such support for their leadership. And, we've been able to incorporate such research projects into our undergraduate courses. When doing so, the following end-states are realized:

- We provide an active learning experience for our students.
- We provide value-added services to our community partners.
- We fulfill our public service obligation to our community.

You may seek similar outcomes at your institution. This manuscript provides some direction for you to do so.

AN EXAMPLE PROJECT FOR YOUR CONSIDERATION

In the sections that follow, we present an overview of a representative project for your consideration. The results of the study allowed leadership of our community partner to evaluate two very important questions:

- **Importance** – Are we doing the right things?
- **Performance** – Are we doing the right things well?

The results of their study are proprietary and their own. We won't violate their confidence by reporting them here. But, the methodology used (including the analysis tool, Importance-Performance Analysis) could be very useful to you.

Framing the Research Study

The Executive Director of a Community Arts and Cultural Council sought assistance to establish a baseline of member perceptions of the organization's work to guide current strategic planning efforts. Stephen Covey, author of the widely-read *Seven Habits of Highly Effective People*, encourages us to "begin with an end in mind." In essence, select a desired end-state and channel your efforts to get there. Unfortunately, many organizations lack an accurate and clear understanding of their existing position before selecting their desired position (i.e., their end-in-mind). The purpose of our work was to help them establish their present position. Background information on our community partner is presented in **Figure Two**.

Figure Two
Research Partner Profile

Cultural Council

Mission

The Cultural Council is a nonprofit 501(c)(3) organization devoted to acting as a catalyst and partner with the County's arts and cultural organizations to expand their audiences.

Overview

"Our County has a richness of arts and cultural institutions. The Council will be a catalyst and partner to help coordinate, promote and market their wonderful assets - for the joy of both local residents and tourists. Our activities include sponsoring Artists Residencies in local schools, funding youth music scholarships as part of the Community Youth Arts program, offering emerging artists the opportunity to display their work in our gallery, developing and maintaining a Portal for Arts/Cultural Events on our Web site, and generally working to create events for audiences and create audiences for the arts and culture."

Executive Director

Developing a Survey Instrument

The Executive Director developed a list of 15 critical outcomes sought by the Cultural Council. Our role was to see if, in fact, they were "walking their talk."

- **Importance** – Are we doing the right things?
- **Performance** – Are we doing the right things well?

Scales were developed to measure IMPORTANCE and PERFORMANCE for each of the 15 critical outcomes sought. Survey directions and scales are provided below.

"Below is a list of outcomes we seek to achieve as your Cultural Council. Please tell us the RELATIVE LEVEL OF IMPORTANCE of each outcome, in your opinion, to our mission. Next, please tell us your RELATIVE LEVEL OF SATISFACTION with our efforts to achieve each outcome to date."

Importance	Performance
<p>How <u>Important</u> Should Each Outcome be to the Cultural Council?</p> <p>1 = Not Important at All 2 = Not That Important 3 = Neutral 4 = Somewhat Important 5 = Very Important</p>	<p>How <u>Satisfied</u> Are You With Our Current Efforts to Achieve Each Outcome?</p> <p>1 = Very Dissatisfied 2 = Dissatisfied 3 = Neutral 4 = Satisfied 5 = Very Satisfied</p>

1. Sponsoring Arts education in local schools
2. Providing Arts education for adults
3. Providing youth music scholarships (Youth Arts program)
4. Providing artists the opportunity to display their work in our gallery
5. Delivering musical events for our communities
6. Delivering theatrical events for our communities
7. Working to create audiences for our Arts and cultural events
8. Providing broad-based cultural festivals for our communities
9. Providing grants to area Arts-related organizations
10. Maintaining our website for communicating about Arts & Cultural events in our community
11. Providing merchandise for sale to support the Arts
12. Providing merchandise for sale to show Cultural Council membership and support
13. Providing business and organizational education to support artists and arts-related businesses
14. Soliciting financial support for Arts programs from interested INDIVIDUALS
15. Soliciting financial support for Arts programs from interested ORGANIZATIONS

Data Collection

For this study, the sampling group consisted of arts supporters who voluntarily pay membership fees to support the Arts in their community. Further, artists who receive financial and promotional support (as well as exhibit space) from the organization were also included. Data collection was done via an online survey developed using VOVICI software. The Executive Director of the Cultural Council developed a cover letter and emailed the letter to the sample group with a link to the survey embedded. Respondents linked directly to the survey. Data input occurred as respondents responded.

Data Presentation

Data tables (means and standard deviations) were prepared and distributed to the Executive Director to allow for easy dissemination to the Board of Directors and other interested parties. These mean values were also graphed in the 2x2 Importance-Performance grid (referenced earlier) with four quadrants:

1. **Concentrate Here** – High Importance, Low Performance
2. **Keep Up the Good Work** - High Importance, High Performance
3. **Low Priority** – Low Importance, Low Performance
4. **Possible Overkill** - Low Importance, High Performance

The results of the study are proprietary. We will not violate the trust of our partner. We can tell you they were encouraged to 'keep up the good work!'

WORKING WITH YOUR COMMUNITY PARTNERS

The research effort outlined here represents a mission-driven effort to combine the teaching, research, and service efforts of faculty colleagues. A synergy can be created by leveraging our efforts accordingly. The project outlined here achieved the following mission-driven outcomes for this author team:

- We enhanced student learning by embracing active learning.
- We used technology (online survey software) to facilitate data collection and provided an active learning experience.
- We collected input from important stakeholders (professionals in the Arts and Cultural community) and allowed our students to see how the constituents of such an organization evaluated its work. This process reinforced the need for accountability of professionals for mission-driven results to their constituents.
- We provided a value-added public service to an important community partner.

Finally, the inclusion of this study in the annual meeting of Southeast INFORMS allows the authors to make a contribution to our portfolio of intellectual contributions. We conducted applied research for a community partner and now we bring forward applied pedagogical-oriented scholarship for your consideration. We "walked our talk" as academicians by helping a community partner "walk their talk." We invite you to do the same with a partner organization in your community.

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PRIVACY POLICIES: AN INVESTIGATION INTO BEST PRACTICES FOR INFORMATION SECURITY AND DATA PROTECTION

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Abstract

This paper overviews the concept of privacy and the evolution of laws relating to privacy policies. A sample of privacy policies from several companies (n>100) is reviewed on clarity, and readability. Several individual policies are highlighted and critiqued. Policies are also discussed as they relate to ethical criteria and privacy issues as outlined in Holtzman's (2006) "Seven sins against privacy."

Introduction:

Any consumer who has a bank account, investment account, credit card, customer loyalty card, or utility account has received one of the now ubiquitous slips of paper outlining a privacy policy. Nearly every website visited also has a privacy policy link. While there are no doubt many customers who carefully read these policies and make decisions based on the information contained therein, there are many more who give them at best a cursory glance before filing them away for future reference or who simply ignore them and/or toss them into the trash. This paper briefly overviews the concept of privacy, the evolution of some laws relating to privacy policies, and looks at a sample of privacy policies from several companies (n>100) in order to critique the policies and their presentation. Several criteria are used as the basis of the critique of these policies. Policies are also discussed as they relate to ethical criteria and privacy issues as outlined in Holtzman's (2006) "Seven sins against privacy."

Definition of Privacy

The definition of privacy varies with many factors including age group, culture and shifting social standards. What is considered private information by one person or group may be considered as fair game by another. Holtzman (2006) presents three basic views of privacy. Seclusion – the right to be hidden from the perceptions of others, Solitude – the right to be left alone and, Self-determination – the right to control information about oneself (Holtzman, 2006, 4) The purpose of a privacy policy is related to each view in some way. The most direct relationship is with the third view – that of self-determination, however companies which share information with others may potentially violate the first two views of privacy as well as the information becomes part of a target marketing or data mining process. A privacy policy therefore should address information that is openly given to a firm through transactions or filling in forms, as well as information that is gathered indirectly (e.g. in the process of searching a website or by seeking information from a salesperson.)

Brief Evolution of Privacy Policy Law (some key legislation)

The complete evolution of legislation and common law applicable to privacy policies is too complex to be fully explored in this paper; however there are several key turning points and pieces of legislation that are worth note and are examined. There is no "right to privacy" guaranteed by the constitution although the 3rd and 4th amendments regarding the quartering of soldiers and search and seizure respectively are sometimes seen as establishing related rights.

Supreme Court Justices Warren and Brandeis published a seminal piece in the Harvard Law Review in 1890 arguing for the development of a right to privacy.

“The intensity and complexity of life, attendant upon advancing civilization, have rendered necessary some retreat from the world, and man, under the refining influence of culture, has become more sensitive to publicity, so that solitude and privacy have become more essential to the individual; but modern enterprise and invention have, through invasions upon his privacy, subjected him to mental pain and distress, far greater than could be inflicted by mere bodily injury. Nor is the harm wrought by such invasions confined to the suffering of those who may be the subjects of journalistic or other enterprise. In this, as in other branches of commerce, the supply creates the demand.” (Warren and Brandeis, 1890)

Warren and Brandeis recognized over a century ago that a supply of private information would create a demand for that information, and such has certainly been the case. In their conclusion they recommend that laws to protect individual privacy should be established to bring the protection of criminal law to the issue of preventing invasions of privacy.

While many privacy protections were established at the state level over the following years, the most comprehensive legislation protecting privacy at the federal government level was the Privacy Act of 1974. (5 U.S.C. § 552a). In 1996 the Health Insurance Portability and Accountability Act of 1996 (HIPAA) (Public Law 104-191) created a set of guidelines for gathering, protecting, transmitting and sharing health related information.

The most relevant legislation related to company privacy policies is the Gramm-Leach-Bliley Act (Public Law 106-102; 1999) regarding consumer information. This legislation addressed numerous financial institution issues, however for the purposes of this paper only those related to privacy policies are discussed.

The Gramm-Leach-Bliley Act (1999) defines six distinct types of privacy notices.

Initial: To customers not later than when relationship is established; To consumers prior to sharing nonpublic personal information

- Opt-Out: To consumers and customers prior to sharing information
- Short-Form: To consumers who are not customers, in lieu of full initial notice, prior to sharing nonpublic personal information about them
- Simplified: To customers if don't share NPI about current or former customers with affiliates or nonaffiliated third parties outside exceptions 313.14 and 313.15
- Annual: To customers for duration of the relationship
- Revised: To consumers, customers, and former customers (FTC, 2008)

According to the Gramm-Leach-Bliley Act (1999) privacy notices must be clear and conspicuous, reasonably understandable, and designed to call attention. As presented on the FTC website these terms are defined as follows:

- "Clear and conspicuous" means that a notice must be reasonably understandable and designed to call attention to the nature and significance of the information in the notice.
- "Reasonably understandable" means clear and concise sentences, plain language, active voice.
- "Designed to call attention" means using headings, easily read typeface and type size, wide margins. On website: use text or visual cues to encourage scrolling down the page to view the entire notice; place notice on a frequently accessed page or via a clearly labeled link; ensure that there are no distracting graphics or sound. (FTC, 2008)

Sins Against Privacy

The legislation above is intended in part to address privacy and information concerns. These concerns are what Holtzman (2006) identified as the seven sins against privacy. This taxonomy develops a clear categorization of privacy violations. A given incident may violate multiple categories. The seven sins are:

- Intrusion – the uninvited encroachment on a person’s physical or virtual space.
- Latency – the excessive hoarding of personal information beyond an agreed upon time.
- Deception – using personal information in a way that was not authorized by the person involved.
- Profiling – misusing data derived from raw personal information.
- Identity Theft - pretending to be someone else with the intent of harm or personal gain.
- Outing – revealing information about a person that they would rather remain hidden.
- Lost Dignity – revealing information (or failing to protect information) that may bring humiliation and a loss of self respect on an individual. (Holtzman, 2006, Chapter 1).

Types of information addressed by privacy policies

There are several types of information that can be obtained by companies as outside users access information from the company: Site Access information, Actively Provided information and Inactively Provided information. In addition each of these types can be categorized being Personally Identifiable information (PII) or non-PII.

Site Access information is the information required for a user’s computer to access information provided by a company’s web server. This primarily consists of IP addresses and Cookies used to facilitate site access. Cookies may do more than facilitate site access, and may provide the company with some PII and non-PII. In and of itself an IP address does not contain personally identifiable information but it may be possible to connect a user to the individual IP address of the computer they use.

Actively Provided information is user provided information openly provided to the company through user actions. These actions may simply be selecting certain links, or may be more identifiable such as filling out some sort of form providing requested information like names, e-mail addresses and demographic information. Much of this type of information is clearly identifiable with the user (PII) and is of the opt-in variety. A user only provides this type of information voluntarily through action. This type of information may be combined with site access information and retained on either the user’s computer as a cookie or other type of file or by the company’s computer.

Inactively Provided information is information provided by the user’s computer to the company as the user accesses the site. This type of information may be accessed by the company through cookies or web-beacons and is often collected without the users active knowledge. Examples of this information may include information based on previous visits to the company’s web site, or tracking information collected as a user goes from site to site. For instance if a user accesses a site through a search engine the company’s server may track that information to determine how users find their sites. This type of information may be combined with site access and/or actively provided information and retained on either the user’s computer or the company’s server.

Method

Privacy policies are readily available and easily accessible. For the purposes of this study 120 privacy policies were collected and reviewed. These policies came both printed policies and policies available on the companies’ web sites. Several categories of firms supplied these policies including banks and

financial institutions, retail sites, social networking sites, consumer credit sites, public institutions (libraries, motor vehicle divisions etc.) and utilities. The policies were of multiple types according to the criteria established by the Gramm-Leach-Bliley Act (1999). The policies to be analyzed for readability were downloaded from the companies' web sites.

Each policy, was assessed by the researcher according to its meeting the clear and conspicuous, readability and attention criteria set forth by the act. Prominence (a policy should be clear and conspicuous) was determined by its placement and accessibility from the home page of a firm, or in the case of a printed policy its position within a mailing. Readability (a policy should be reasonably understandable) was determined by entering the policy into a Microsoft Word document and measuring the policy's Flesch Reading Ease, and the Flesch-Kincaid Grade Level. While these tests may not be universally reliable they will provide an internally consistent measure for this study. The formulas used to determine readability are:

$$\text{Flesch Reading Ease test} \\ 206.835 - (1.015 \times \text{ASL}) - (84.6 \times \text{ASW})$$

$$\text{Flesch-Kincaid Grade Level test} \\ (.39 \times \text{ASL}) + (11.8 \times \text{ASW}) - 15.59$$

where:

ASL = average sentence length (the number of words divided by the number of sentences)

ASW = average number of syllables per word (the number of syllables divided by the number of words)

The readability test used is similar to the method used in a study by Proctor (2008) which found that the average reading level was above the 13th grade.

The number of and clarity of headings in each policy was also be recorded as a measure of the policies structure (design to call attention.)

In addition to these measures each policy was assessed on critical content relating to the protection of personal information including the type of information gathered, the length of time information is kept, policies for sharing information, disclaimers and other criteria to be developed.

Findings

The findings based on the review of the policies were not surprising based on the highly charged and regulated environment in which these policies are created. The vast majority of the policies reviewed were either of the initial or short form variety. The Annual policies reviewed connected to financial institutions (Banks, Investment Firms and Credit Cards) tended to be substantially longer and more complex than the web site policies for social networking and most type of web sites. All the policies seem to be conspicuous and designed to call attention. Links were available on the home page of nearly every company reviewed, although there were a few that were listed as "Legal Notices" rather than privacy policies, and several (approximately 5% of those reviewed) required more than one click to access the full policy. One policy in particular, the web-policy for Wachovia Bank, was structured as a series of separate pages (within a frame) and required multiple clicks to read through the entire policy. It is of interest to note that the page for SEINFORMS does not have a privacy policy linked either on the website or on the conference paper submission form.

Clarity of the policies reviewed varied widely. BEA systems presents a clear concise policy that is fairly readable in less than 160 words, although the Flesch-Kincaid reading level was just under the 12th grade

level (11.58). KPMG at the 13th grade level was also quite readable and understandable, although the word count was fairly high at 1820. The range for word count was 158 (BEA systems) to 5461 (Sprint). ATT was the next largest at 5313. The mean for word count was 1831, and the mean reading level was 13.7. Of the policies analyzed for readability (n=110) only 10 had a reading level score less than the 12th grade level, and only two were below the 11th (Accenture and Specialized Bicycles.)

BEA respects your right to privacy and your right to limit information exchanges to only those you initiate, if you so desire. We do acquire certain personal information from private individuals in the course of business, and may at times share this personal information with our partners. We use this information to better serve you and facilitate your use of our web site.

BEA may also acquire a private individual's personal information from registration forms, product order information, or e-mail messages to us. The BEA web server also records visitor IP addresses and domain names for reporting and site usage analysis. This information is reported internally and then purged when required.

If you supply BEA with your e-mail address, postal address or phone number through our site you may receive promotional or informational communications from BEA or one of our partners. To manage your profile or opt-out from BEA communications, please fill out this request form.

BEA Privacy Policy
Accessed 8/2/2008 from www.bea.com

Readability scores tended to track reading level scores (.87 correlation) and ranged from a high (most readable) of 55.85 to a low (least readable) of 19.42 with a mean of 40.38. The most readable policy again belonged to Specialized Bicycles. The least readable was Northrop Grumman's.

An excerpt from Specialized Bicycles policy shows how the policy is not only readable, but targeted for the intended audience.

Introduction

We're bike geeks. We live and breathe bikes and cycling. We believe the only thing better than going on a good ride yourself is helping others have the ride of their life. That's what Specialized is all about. For that reason, we thought you might want to know what our Privacy Policy is, and what it means to both of us.

The Overview

Our number one goal is to keep you psyched on cycling and stoked on Specialized. So, we responsibly use technology to help us learn more about what you like, and what you don't, so we can get you the right products at the right price at the right time.

Specialized respects your privacy. The only information that we collect about you is that which you choose to submit to us either through a product registration form, signing up for our Rider Club, by placing an order, submitting a résumé or through other interactive forms. We will always give you an opportunity to decline to receive further information.

The Nuts and Bolts (and cookies)

Our site does contain links to other sites. If you are concerned with their privacy practices, please check their sites individually. We are not responsible for their privacy practices.

Excerpt from Specialized Bicycle's Privacy Policy
Accessed 8/2/2008 from www.specialized.com

Relationship of Privacy Policies to Holtzman's Seven Sins

The seven sins against privacy outlined by Holtzman (2006) are Intrusion, Latency, Deception, Profiling, Identity Theft, Outing, and Lost Dignity. Most privacy policies reviewed do not specifically address all of these issues, however several are addressed indirectly. The majority of companies specifically state that any information provided by the individual to the company is voluntary, so Intrusion is avoided. Latency, on the other hand, is rarely addressed. Information provided to a company is often kept well beyond its usefulness to the company. For instance, Social Security Numbers, which may be needed to initially check the credit-worthiness of a customer, may be retained indefinitely. In and of itself this may not pose a problem, but in the event of a breach of data security, this information may be obtained by outside entities. Most privacy policies contain some sort of disclaimer that protects them in the event of such a security breach, and the remedy is usually limited to the notification of the breach to the customer.

The sin of Deception is usually addressed in privacy policies by language that allows the company to use the information in various ways. It is unlikely, however, that most customers knowingly authorize every way that a company may use the information. While the language of the privacy policies legally avoids deception, there may be ethical arguments depending on the individual company's use.

The sin of profiling is more difficult to address from a corporate standpoint, as it is the misuse of derived data that is addressed. Data Mining may allow companies to use derived data to provide improved products, services and communications to customers. Often customers are given an opt-in or opt-out opportunity by the privacy policies regarding the receipt of communications related to these offers, however the privacy policies often indicate that the customers data will be used to facilitate the development of the new offerings.

The last three sins addressed by Holtzman, Identity Theft, Outing, and Lost Dignity, are typically not issues that are of direct concern but rather arise from the failure to protect gathered and stored data. As mentioned before many companies use language in their privacy policies to hold themselves harmless in the event of such a data breach. An example of such language is below:

All information gathered on our website is stored within a database accessible only to Comcast and its specifically authorized contractors and vendors. However, as effective as any security measure implemented by Comcast may be, no security system is impenetrable. We cannot guarantee the complete security of our database, nor can we guarantee that information you supply won't be intercepted while being transmitted to us over the Internet.

Excerpt from Comcast Privacy Policy
Accessed 8/2/2008 from www.comcast.com

Conclusions and Recommendations

The purpose of this investigation was to assess privacy policies according to certain ethical and legal criteria. Legislation requires privacy policies to be clear, accessible and readable. While privacy policies as they now exist may meet most legal criteria, that determination can only be made by the courts and the legislative process. From an academic perspective, however, there is room for improvement especially in the readability of the policies. Many are quite lengthy and the reading level is quite high. Shorter more straightforward sentences may make the policies more understandable to the consumer.

The content of the policies could be improved as well. Many companies collect more information than they need to facilitate either information sharing or transactions. In addition to gathering the information much of it is retained longer than needed, allowing future opportunities for misuse of the information to exist.

When creating policies for gathering information companies should ask themselves what information is needed, for what purpose, and for how long; then construct appropriate policies and clarify for the consumer the reasoning behind the policies.

Recommended Best Practices

- 1: Connect Privacy Policy to Mission
- 2: Collect only data that is needed
- 3: Limit the retention of data
- 4: Use appropriate language – Avoid unnecessary complexity
- 5: Provide examples of how data might be used
- 6: Clearly identify who has access to data, and why.

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ENROLLING THE STUDENT WITH DISABILITIES: A CONTENT ANALYSIS OF PENNSYLVANIA HIGHER EDUCATION WEBSITES

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ABSTRACT

This paper presents the results of a study done as part of the MS program in nonprofit management at Robert Morris University. Focusing on access for prospective students with disabilities, we examined 105 Pennsylvania higher education websites for content pertaining to disability supports policy and service delivery environments. Our results were consistent with other studies that found differences in scope and prevalence of supports; more frequent listings of less expensive supports as opposed to assistive technology, self-advocacy, and time management supports. For the majority of institutions, neither their mission statements, nor their campus maps included references to students with disabilities' needs. Only seven institutions' disability services web pages included images of students with disabilities.

INTRODUCTION

This descriptive content analysis examines communication content in Pennsylvania higher education websites, pertaining to disability supports policy and service delivery environments. Increasingly, higher education websites are a significant communication medium for the education planning of prospective students with disabilities, as they are for prospective students overall. One higher education consultant in marketing and public relations, asserts that college choice is "driven by the Web", with more than one out of three Internet users crediting on-line information for their choice of a postsecondary institution (Cox-Otto, 2004).

Students with disabilities are entering higher education in unprecedented numbers as a result of their rights and entitlements having been secured by the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and more recently, the 1997 and 2004 amendments to the Individuals with Disabilities Education Improvement Act, commonly referred to as IDEA (Fleischer and Zames, 2001; Denbo, 2003, Sharpe and Johnson, 2001). Between 1978 and 2005, the number of first-time, full-time students with disabilities entering postsecondary education rose from three percent of the entering student population to 17% (Stodden, Whelley, Chang, and Harding, 2001; Christ and Stodden, 2005). As prospective students with disabilities aspire to meet admissions requirements, higher education websites are an important information source in this process.

The students with disabilities who are transitioning into higher education in 2008 came of age in the post 1960s Civil Rights era. They exhibit an entitlement sensibility that is clearly evident in increasing numbers of self-disclosures and accommodations requests seen in the postsecondary setting. For example, the percentage of college freshmen who reported having a disability increased from three to nine percent during a twenty year period from 1978-1998 (Stodden, Roberts, Pickelsimer, Jackson, and Chang, 2006). The increases in disclosures and requests for services, supports and accommodations have been accompanied by a corresponding rise in the range and complexity of disabilities, adding further clamor to a profession that aspires to "best practices" and "codification" of disability support services philosophy (Shaw & Dukes, 2005).

As students with disabilities enter postsecondary education, they are required to present their disability credentials anew. The combination of determining their eligibility (whether or not their disability qualifies for support) and their subsequent level of support (what is a reasonable response as dictated by ADA and Section 504 parameters) comprise the essence of the changed entitlement to civil rights climate (Stodden et al., 2006; Stodden, Whelley, Chang, and Harding, 2001; Janiga and Costenbader, 2002; Madaus and Shaw, 2006; Sharpe and Johnson, 2001).

Thus, prospective students with disabilities encounter the postsecondary education institution as applicants and self-advocates. The degree to which they have accomplished their personal, social, and academic objectives will determine their success as applicants. In turn, the extent to which they have mastered self-advocacy will influence their transition and academic outcomes, once they enroll in a higher education institution (Janiga and Costenbader, 2002; Stodden, Whelley, Chang, and Harding, 2001; Sharpe and Johnson, 2001; Shaw and Dukes, 2005; Madaus and Shaw, 2006).

Though numbers of students with disabilities in higher education are increasing, other trends suggest that their recruitment merits ongoing higher education admissions priority. Students with disabilities evidence almost a ten percent lag in enrollment in higher education, compared to students without disabilities, complicated by less successful outcomes (Tagayuna, Stodden, Chang, Zeleznic, and Whelley, 2005).

Establishing a baseline for higher education admissions' departments is important to enabling both the prospective student with disabilities and the institution of higher education to help eliminate the disparate results noted above. With the internet an increasingly utilized college search resource, website analysis permits improved understanding of how disability supports are presented.

LITERATURE REVIEW

Research in this area falls into two central categories. The first relates to the disability policy environment, as a creature of legislation associated with the higher education institution. How has research informed our understanding of the higher education policy environment with respect to disability supports? Topics include program standards, systemic models, and performance indicators. The second category includes research on the nature and scope of disability supports. Topics include assistive technology, self-advocacy, accommodations, and the need for shared professional vocabulary.

The Disability Services Policy Environment

Legislation

As students with disabilities enter postsecondary education, they move from the protection of IDEA entitlement legislation that underlay their Individualized Education Program (IEP), to a civil rights framework, anchored by the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 (Madaus and Shaw, 2006; Janiga and Costenbader, 2002). This civil rights orientation requires that postsecondary institutions provide "reasonable accommodations" only if they are requested (Tagayuna et al., 2005).

Madaus and Shaw (2006) note that for the disability services professional, the paradigm shift outlined above will impact key areas of their responsibility involving a student's eligibility to receive accommodations (e.g. re-evaluation, transition documents, and transition planning). There exists the potential for inequity and conflict – increasing numbers of students with disabilities, increasing numbers and types of accommodations requested, shrinking budgets, lack of empirical data to evaluate postsecondary disability supports, and lack of consensus about disability support services "best practices"

(Tagayuna et al., 2005; Shaw and Dukes, 2005; Christ and Stodden, 2005; Stodden, Whelley, Chang and Harding, 2001).

Hurtubis-Sahlen and Lehmann (2006) afford a telescoping view of this environment from the individual student's perspective: 1) the legal responsibility of the postsecondary institution (as framed by federal, public and private entities); 2) the legal responsibility of the student with disabilities (as framed by their assessment documentation or responsibility to ask questions and clarify understandings); 3) the context of the postsecondary institution (i.e. – are policies clearly stated and has good faith effort been made?); 4) the context of the student with disabilities' request (as informed by what has or has not worked in the past); and, 5) the course request context (does the accommodation requested “mesh” with the course content?).

Levels of Service Delivery

Scott (1996) cites Brinckerhoff, Shaw and McGuire's early model for examining a higher education institution's disability supports policy and services environment. In that model, the researchers designated four levels of disability services delivery: 1) *Decentralized and limited*, 2) *Loosely coordinated*, 3) *Centrally coordinated*, and 4) *Comprehensive*. Each level represents a varying mix of the following elements: a) contact person; b) accommodations provided; c) policies; and d) other support.

At one end of the continuum, a *decentralized and limited* higher education institution will lack a formal contact person, offer limited accommodations, be without any formal policy statement regarding disability services, and rely on the kindnesses of “sympathetic” faculty. The higher education institution with “comprehensive services” occupies the other end of the continuum and will feature multiple staff with expertise in disability supports accommodations, an institutional track record with, and budget allowances for, accommodations of many varieties.

The *comprehensive* institution will have a fully articulated policy statement, and other supports that enrich students with disabilities' quality of life and success with their academic goals on campus. In between, the other two categories are gradated by the level of formalization with which the disability support staff, policies and expanded supports are envisioned and implemented. For Scott (1996) the dividing line between a reactive and proactive approach to disability supports occurs when moving along the continuum, from *Loosely Coordinated* (Level 2) to *Centrally Coordinated* (Level 3), and *Comprehensive* (Level 4) services. As discussed below, a proactive environment is one that tends toward “best practices” and students' self-determination of services, as opposed to a reactive environment, that responds to legislation (Shaw and Dukes, 2005).

Program Standards and Performance Indicators

Prompted in part by evolving legislative and institutional policy climates, disability service professionals have recognized the need for general professional benchmarks or principles to guide their practices. In the 1990s, efforts were underway to develop professional standards and outcomes for the disability supports profession to address a knowledge gap regarding best practices in the disability services field (Shaw and Dukes, 2001). In 2004, a survey of 1,353 postsecondary disability service providers revealed that more than 80% of respondents felt they needed more guidance on professional best practices from their field (Harbour, 2004).

By 2005, Shaw and Dukes combined a comprehensive review of the disability support services literature with a multi-phased Delphi study, in which they presented 31 service components and 129 performance indicators to disability support services professionals for peer review. The resulting program standards and performance indicators span the higher education institutional setting, from policy development to the

disability supports practitioner. These standards were adopted by the Association on Higher Education and Disability (AHEAD) as professional benchmarks to facilitate evaluations of outcomes, service delivery, student satisfaction and areas of need, along with identifying resources and follow-up data.

Systemic Disability Services Models

DO-IT, which is a program based at the University of Washington has as its mission, to improve successful outcomes for persons with disabilities in postsecondary education and employment. DO-IT publishes numerous resources for distribution to higher education disability supports professionals. One such publication for admissions officers suggests the following as baseline accessibility and disability services topics: Legal Issues; Universal Design; Information Resources; Computers, Software and Assistive Technology; Recruitment, Events and Campus Tours; Applications and Disclosure; Evaluation of Applications and Appeals; Informing Applicants and New Students about Accommodation Resources; Special Admission/Review Programs; Orientation; Readmission Requests or Applications; Checklist Updates, and Additional Resources (<http://www.washington.edu/doi/>).

Among their most recent publications, a manual titled “Building Capacity for a Welcoming and Accessible Postsecondary Institution” (2007) examines systemic change in higher education institutions. Their approach entails a comprehensive blueprint for promoting systemic change processes through *Communities of Practice (CoPs)* and *Capacity Building Institutes (CBIs)*. Systemic change may be internal and/or external in origin and occur at the institutional and individual levels (p. 1). Perhaps most important, disability supports require a holistic approach, one that receives support from the level of the President/Provost and involvement at all levels and across many divisions of campus life (DO-IT, 2007).

However, often campus disability supports are impeded by an absence of empirically based professional standards. Disability supports service delivery occurs amidst inadequate budgets and staffing (Tagayuna et al., 2005). This situation has also manifested in the absence of services even when needs have been demonstrated. The preceding study cited found that only 25% of students with disabilities who self-identified and requested disability related services actually received them. Within that same study sample, 22% reported they did not receive any services (p. 14).

DO-IT suggests that “buy-in” at the highest levels of campus administration is more likely to result in favorable outcomes in a number of areas: disability services budget levels; instructional / assistive technology planning processes; collaboration among administration, staff, academic, and related campus units; commitment to universal design (instruction, physical accessibility, curriculum, instruction); and encouragement of input from student’s with disabilities (2007).

For the disability supports professional, the challenge (and benefit) of recognizing the hallmarks of a shared professional framework is enhanced understanding of the vocabulary, performance standards and institutional action plans that will move higher education institutions from reactive to proactive stances in their disability policy / supports planning and service delivery (Scott, 1996; Shaw and Dukes, 2005; DO-IT, 2007).

Nature and Scope of Disability Supports

Assistive Technology Indicators

A bellwether for students with disabilities is a higher education institution’s budget and planning for assistive technology equipment and services. Assistive technology is defined in the Assistive Technology

Act of 1998 as “any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional capabilities of a person with a disability” (www.ericdigests.org/2003-1/assistive.htm). One study noted that an assistive technology evaluation is the logical starting point for any student with a disability who has utilized or may now require assistive technology supports (Stodden et al., 2006). Most higher education institutions do not offer this evaluation on a routine basis, and would be within their legal rights to refuse to accept documentation from a prospective student if their assessment portfolio were deemed “outdated” (Madaus and Shaw, 2006).

Stodden, Whelley, Chang and Harding (2001) noted that access to assistive technology devices and services play a pivotal role toward students with disabilities’ academic success. Yet, they say numerous studies convey a sense that assistive and instructional technologies occupy tenuous ground in the programs and services of higher education institutions.

A survey of 977 postsecondary institutions revealed that fewer than 50% had a policy or an institutional level approach to evaluating technology planning and acquisition. Of those with policies in place, only half of them involved students with disabilities and/or the campus disability services professionals in making technology decisions (Michaels, Pollock-Prezant, Morabito, and Jackson, 2002). Comparisons between the importance and achievement of effective assistive technology planning and service delivery were associated with the following factors: 1) Overall assistive technology awareness by disability support professionals, 2) Overall assistive technology awareness by faculty, 3) Availability of assistive technology, and 4) Training in assistive technology.

With assistive technology a key area of concern for many students with disabilities, there is a leadership role for the higher education institution (especially one that engages in research on teaching and learning and/or technology) to help set the “assistive technology agenda” (Michaels, Pollock-Prezant, Morabito, and Jackson, 2002). Instructional technology will only be as accessible as departmental budgets, faculty awareness and training, and policy level commitments warrant. The increasing reliance upon instructional technology in higher education institutions raises responsibilities for the disability services office to be proactive in bringing accessibility issues to policy level discussions (Shaw and Dukes, 2005).

Self-Advocacy as Proactive

National focus groups conducted with students with disabilities identified self-advocacy skills-training and organization, time management skills and coordination of supports as deficit areas in disability services offerings (Tagayuna et al., 2005; Stodden, Whelley, Chang and Harding, 2001). Others have employed metaphors, such as survival training or bridge building, to underscore the importance of collaboration between secondary and postsecondary institutions to ensure transition readiness (Michaels, Pollock-Prezant, Morabito and Jackson, 2002; Janiga and Costenbader, 2002).

While advocacy is the role most often associated with disability services professionals, even the tenor of this role is under professional review. Shaw and Dukes (2005) have placed a shift in disability services philosophy at the forefront of their recommendations. Their *Standard One Performance Indicator* establishes the preferred role for the disability services office as an advocate for issues, not individual students. Similarly, they emphasize self-determination as an objective in three of their eight total standards. Stodden, Whelley, Chang, and Harding (2001) noted that the lack of self-advocacy training programs in the postsecondary setting bespoke a professional mindset that is best remedied by “teaching students to advocate for themselves” (2001).

To be clear, the solution is not merely one of offering more services but to better understand the effectiveness of services delivered. Sharpe and Johnson (2001) observed that further research is needed

on the linkage between higher education institutional capacity and short and long term outcomes (p. 170). As students with disabilities increasingly come to rely on higher education websites for information about prospective schools, consistency in communication content about disability support services is a key factor toward producing a good match between student and institution.

The National Center for the Study of Postsecondary Educational Supports (NCSPEs) is a consortium of four universities that supports a national workgroup of researchers. NCSPEs research conducted in 1999 and 2001 represented a first-time effort to analyze higher education disability support services, and has provided baseline data for subsequent research.

Five studies noted in our research (Stodden, Whelley, Chang and Harding, 2001; Sharpe and Johnson, 2001; Tagayuna et al., 2005; Christ and Stodden, 2005; and, Stodden et al. in 2006) analyzed the 1999 and 2001 NCSPEs data which identified testing accommodations, note takers, personal counseling, and advocacy assistance as among educational supports most commonly offered. Advocacy was reported among NCSPEs respondents as “commonly offered”, yet a separate national focus group project found that students with disabilities consider the type and timing of advocacy assistance in postsecondary education as “problematic” (Stodden, Whelley, Chang and Harding, 2001).

Similarly, NCSPEs respondents reported contrasting responses related to disability supports in the areas of study, memory, communication, organization and time management skills, and meta-cognitive strategies. While NCSPEs respondents considered these supports to be offered “more than 75% of the time”, the national focus group project characterized organization, time management, and coordination of supports as lacking in higher education (Stodden, Whelley, Chang and Harding, 2001).

Career related supports were commonly reported, but the researchers found little comfort in the disparate employment participation among students with disabilities and their non disabled peers upon graduation, citing 56% and 90% rates respectively. A key consideration in students with disabilities post graduation employment success is the higher education institution’s role in facilitating the transfer of supports to the employment setting. In the NCSPEs data reported in 1999, only 13% of disability support services coordinators reported such capabilities (Stodden, Whelley, Chang and Harding, 2001).

Service Delivery Capacity

Sharpe and Johnson (2001) analyzed the 1999 NCSPEs data using 20/20 analysis. This statistical analysis approach enables the researcher to separate the “high 20% from the low 20% of a distribution” (p. 170). They found that approximately equal numbers of institutions fell along the two ends of the distribution which they designated by the constructs *high capacity* or *low capacity*, determined by the frequency of occurrence of service provision. The *high capacity* group numbered 126, while those that offered supports on a less frequent basis, classified as *low capacity*, numbered 133. What was notable in their research was the representation of public versus private institutions in each category. Of the *high capacity* group, 84% were public institutions, compared to 16% private. In the *low capacity* group, the numbers were evenly split between public and private, or approximately 50% representation by each kind of institution.

Tagayuna et al., (2005) compared the 1999 and 2001 data collected by the NCSPEs. They reported a “national increase in the provision of postsecondary educational services, supports, and accommodation services from 1999 to 2001”. While the increase was indicative of “heightened awareness and advocacy”, the researchers noted other trends that were less heartening. Similar to the 1999 findings, the top four services most likely to be offered in postsecondary education are: testing accommodation services, note takers, personal counseling, and advocacy assistance (as distinct from self-advocacy skills training). These supports amount to a “minimalist approach”, readily offered by higher education

institutions because they are less costly and less complicated to deliver. Further, students with disabilities who require more costly or complex supports or accommodations may fare less well in this kind of educational setting. Other areas of concern were the decline in summer orientation programs, greater need for inter-institutional and community cooperation, and teacher and staff training. Areas of most improvement were “common generic supports, educational and instructional accommodations, and assistive technology” (p. 20).

Defining Baseline Disability Services

Christ and Stodden (2005) applied exploratory factor analysis to the NCSPEs data (1999 and 2001), in order to determine if the supports reported by disability support coordinators in the two studies “grouped together into meaningful constructs” (p. 25). Key among their findings was the clarification that a majority of the 34 NCSPEs survey items did group in a statistically reliable way into four constructs: 1) *Strategies*, 2) *Assistive Technology*, 3) *Accommodations*, and 4) *Vocation / Work*.

Employing the above constructs to investigate patterns among two and four year institutions during the years 1999-2001, researchers found a difference between the type of institution and the availability and level of supports offered. For example, assistive technology was available more often at two-year institutions and the provision of such supports increased during 1999-2001 (Christ and Stodden, 2005).

Stodden et al. (2006) also conducted an analysis of the NCSPEs data. Their findings noted the primacy of two-year schools and large, urban, public higher education institutions with respect to the provision of assistive technology supports to students with disabilities. Institutional members of AHEAD also performed well in these rankings. The lowest rankings were exhibited by private, smaller, rural postsecondary institutions. They observed that along with the trend toward increased enrollment by students with disabilities in higher education, there is a need to “build a knowledge base” that can aid higher education institutions in serving multiple needs, namely increased demands for assistive technology and distance learning.

RESEARCH QUESTIONS

Where do Pennsylvania’s institutions of higher education fall in the continuum of disability supports policy and services environment? To look at that issue, we posed two research questions to help guide a descriptive website content analysis:

1. What patterns in Pennsylvania higher education websites’ communication content of disability services are seen at the census level?
2. What patterns in Pennsylvania higher education websites’ communication content of disability services are seen by type of institution (two and four year public and two and four year private institutions)?

METHODOLOGY

Although Neuendorf (2002) cautions that most content analyses do not test formal research questions, we did rely on descriptive content analysis to examine the two research questions. Content analysis may use either theory or past research for variable collection (p.102). This study relied on prior research to construct the variables used in the analysis of Pennsylvania higher education websites. Questions had to be developed for the analysis to proceed. Question design is an iterative process, an aspect that is magnified in the case of website content analysis (Neuendorf, 2002; Cox-Otto, 2004).

The internet is a communication medium in which navigation uses organizational, functional or visual metaphors (Cox-Otto, 2004). The design involved developing research-based questions to analyze related communication content in higher education websites, while allowing for inherent variation in the internet as a communication medium. The initial, working document became refined through an iterative process, in which web pages and/or topical areas were selected for their relevance as prospective disability policy / supports environment indicators. During the iterative process, the question format moved from a linear (organizational) premise to a nonlinear one (topical).

Instrument

The design process began with a research basis for identifying the themes, higher education organizational areas, and website content areas most relevant to this descriptive content analysis. Neuendorf (2002) terms this correspondence of units of analysis as “third-order” linkage: “A third-order linkage is simply a logical link, using evidence from source or receiver studies to provide a rationale for a content analysis or using a content analysis as motivation for source or receiver studies” (p. 62).

The web site review covered the following ten areas:

- 1) Website Accessibility,
- 2) Images of Campus Life,
- 3) Institutional Identity Statements,
- 4) Universal Design and Accessibility of Learning,
- 5) Accessibility of Campus,
- 6) Resources for Incoming Students,
- 7) Accommodations Disclosure,
- 8) Disability Services Contact Information,
- 9) Disability Accommodations Procedure, and
- 10) Disability Supports.

Sample

The descriptive content analysis included a census of 105 Pennsylvania higher education websites selected by the following criteria:

- 1) Type of institution: two or four year public or private college or university,
- 2) Location: All counties in Pennsylvania were eligible locations,
- 3) Only main campus eligible in cases of multiple sites, and
- 4) Broad academic offerings.

All content analyses were conducted using the same Dell Inspiron E1505 equipment and software. The analyses were begun on January 27, 2008 and concluded on March 16, 2008. Each content analysis took approximately 20-30 minutes.

The delineation of the study census for this descriptive content analysis as Pennsylvania higher education institutions’ websites, is consistent with legislative and research parameters. IDEA (2004) amendments provide that standards for a “Summary of Performance” (SOP) to mark transitions from secondary to postsecondary education and into adult life will be promulgated at the state level (Madaus and Shaw, 2006). In addition, the Pennsylvania Department of Education and NCSPES categories for higher education institutions are compatible (e.g. two and four year public institutions and two and four year private institutions).

Variables

We used 48 variables. Five of which were nominal and 43 of which were ordinal. The ordinal levels were based on the CONTINUUM MODEL in Scott (1996) and Shaw and Dukes' (2005) PROGRAM STANDARDS AND PERFORMANCE INDICATORS which flesh out the disability services components that signal transition from a reactive environment to a proactive one. Other conceptual frameworks built on these. As discussed in the literature review, the CONTINUUM MODEL specifies four levels of disability services delivery in a higher education setting, with a comprehensive level of service delivery most closely akin to a proactive disability policy environment. The nominal variables were: Case ID, Date, Coder ID, County ID, and type of higher education institution.

Data Analysis

To analyze the data, we used descriptive statistics, frequencies and cross tabulations. Descriptive statistical analysis of frequencies was used to present the primary demographic characteristics of the census. This data included the total number, county location, and type of higher education institution. Descriptive statistical analysis of frequencies was also used to analyze the following variables: diversity images; diversity definitions; physical campus accessibility; orientation; accommodations disclosure, and disability services contact information. Descriptive statistical analysis of cross tabulation was used to analyze the co-occurrence of key variables in comparison to NCSPEs 1999 and 2001 findings. This data included types of higher education institutions grouped by variables identified in NCSPEs studies as disability services delivery environment indicators: orientation, assistive technology, self-advocacy, pattern of disability supports.

The content analysis included 105 higher education institutions, of which 34 were public (18 four year and 16 two year institutions) and 71 were private (69 four year and 2 two year institutions). Of 47 Pennsylvania counties eligible for inclusion, there were 39 counties from which higher education institutions met the criteria discussed above. Four of these counties, Allegheny, Delaware, Montgomery, and Philadelphia, accounted for 35 higher education institutions (33%) from the census. The next 21 higher education institutions (20%) were grouped in the counties of Berks, Cumberland, Lackawanna, Lehigh, and Luzerne. Higher education institutions were not included in this content analysis from the following 8 Pennsylvania counties (17%): Armstrong, Blair, Clearfield, Fayette, Jefferson, McKean, Shuylkill, and Venango.

To measure the variable, *Website Accessibility*, we used Etre's Accessibility Check, an internet-based technical website tool, to assess web pages for WAI Priority 1, 2 and 3 errors. Each error category was assigned a level of response needed. Priority 1 issues were assigned the most urgent level of attention, and were given the status of "must be fixed" to provide the most basic level of accessibility.

RESULTS

Research Question 1

Research Question 1 examined the patterns noted in the higher education websites in the context of the themes and trends noted in the research on disability services. Of the 105 higher education websites analyzed for this study, there were 21 institutions (20%) for which the disability services page could not be located. This finding is highly significant, given Shaw and Dukes (2005) emphasis on the need for a shared professional vocabulary, standards and best practices. One of their key purposes for developing the performance indicators was to provide students with disabilities and their families with a "baseline regarding what to expect from postsecondary disability services" (p. 12). Clearly this objective is impeded when, as in this case, 20% of the census disability services web pages could not be located,

though efforts included search engines, site indexes, and recognized terminology such as: “disability services”, “disability accommodations”, “accommodations”, “ADA”, “students with disabilities”, and “special needs”. The patterns observed are set forth below by content area:

Website Accessibility: Priority 1 errors measured zero for 88% of the public higher education websites and 80% of the private, on the Home Page. Zero errors were found on 63% of the private and 88% of the public at the disability services page level.

Images of Campus Life: There were inclusive images of students with disabilities found on the disability services page on five public higher education websites, while 19 of the institutions in this group did not feature any images at all on this web page level. Of the private higher education institutions, 33 websites did not include any images on the disability services web pages. These findings suggest a significant “missed opportunity” for higher education institutions to make their websites inclusive with minimal effort, that is, by including students with disabilities on the web pages students are likely to utilize frequently during their enrollment.

Diversity: Of the 105 higher education websites analyzed, two had mission statements that included students with disabilities in the definition of diversity. There were 39 higher education websites in which the mission statement discussed diversity but did not provide any details or definitions. These findings are consistent with earlier studies. Additionally, where higher education institutions can signal an institutional commitment to diversity, how diversity is defined will have a direct bearing on whether students with disabilities are beneficiaries of that institutional climate (DO-IT, 2007).

Universal Design & Accessibility of Learning: Overall, 56% of the higher education websites included boilerplate language defining information literacy as an institutional goal, within the purview of campus library services. Yet, only ten percent or eleven of the higher education websites included information about assistive technology supports on or linked to their library web pages. This finding is highly relevant to the research of Michaels, Pollock-Prezant, Morabito and Jackson (2002) which included campus library accessibility and technology infrastructure among their indicators of disability services offices involvement with technology issues and concerns (p. 11). They provided further insight into this area in their findings related to disparities between the importance assigned to knowledge about information literacy and information technology issues as related to students with disabilities, and actual capabilities as manifested in faculty and staff.

Their finding is mirrored in this study’s analysis of *faculty* resources for assistive technology and instructing students with disabilities as part of library services. Of 105 higher education institutions in the study, only four (three public and one private) had links to faculty resources. There were 97 institutions (92%) among the census that did not include any information about this topic.

Accessibility of Campus: There were 61 higher education websites in which the campus map did not provide accessibility information of any type. There were 29 higher education websites in which either “Level 1” or “Level 2” responses were noted, including information about routes, building access, and parking for students with disabilities. These findings were divided among 13 public and 16 private higher education institutions. The preponderance of institutions that did not include any accessibility information on their campus maps also fails to meet the priority given this area by Shaw & Dukes (2005) and DO-IT (2007).

Resources for Incoming Students: At the disability services web page level, there were six public and five private higher education institutions that provided information or links regarding orientation for incoming students. Tagayuna et al., (2005) noted that summer orientation programs were the least likely support service to be offered to students with disabilities (p. 20).

Accommodations Disclosure: None of the higher education institutions' undergraduate admissions web pages included information about students with disabilities' duty to self-disclose in order to determine eligibility for services.

There were links visible from the undergraduate admissions web page to the disability services web pages in 13% of the websites analyzed. These were found most often public higher education institutions (24%), whereas, private higher education institutions only included these links in .08% of the websites visited. The absence of notification about initiating the eligibility process, as a characteristic of the postsecondary transition, is well documented in the research (Madaus and Shaw, 2006; Janiga and Costenbader, 2002). Notably, students with disabilities were provided encouragement to self-disclose their disability (a Level "1" response) on 74% of the public higher education websites and 56% of the private websites. The disparity between public and private institutions, with public institutions' showing a proactive notification stance more frequently, is also consistent with earlier research (Sharpe and Johnson, 2001).

Disability Services Contact Information: Of the 105 higher education websites analyzed, we found 45 which included a disability services staff with exclusive responsibilities in that area. Of the 45, 68% were on public higher education websites; 31% were found on private higher education websites. The number of disability supports staff with professional specialization found in public institutions has been linked to higher staff-to-student ratios and other indicators of institutions' capacity to deliver disability supports to a larger number and for a greater variety of disabilities (Sharpe and Johnson, 2001; Stodden, Whelley, Chang and Harding, 2001).

Disability Accommodations Procedure: Our study found that the disability services process was presented in detail at the disability services web page level on 88% of the 34 public and 51% of the 71 private higher education institutions analyzed. This kind of information supports a welcoming and accessible campus sensibility. Sharpe and Johnson, in their 2001 study of high and low capacity institutions, noted the connection between staffing and disability categories served as signal characteristics of an institution's capability. In their findings, public institutions overwhelmingly dominated the high capacity category. Assistive technology supports were listed, discussed, or described on 71% of the public higher education disability services web pages, compared to 27% of the private institutions.

Disability Supports: In our study, self-advocacy was emphasized in 32% of the public higher education institutions at the disability services web page level, and in 21% of the private institutions. Shaw and Dukes (2005) place self-advocacy awareness and proficiency at the forefront of their "Performance Indicators" as opposed to the tendency of disability services professionals to advocate for students with disabilities, rather than teaching self-advocacy skills.

Sharpe and Johnson (2001) also noted that a wider range of supports will generally be found at public institutions. Overall, the level of supports was consistently higher among the public institutions, for each and every kind of support. The most commonly reported supports and accommodations were "testing accommodations, advocacy services, notetakers and readers, personal counseling services, tutors, interpreters and transliterators" (p. 173). These supports are among the most often reported because they tend to be available to all students, whether or not they have a disability (Christ and Stodden, 2005). Though these categories were the highest for both public and private institutions, Sharpe and Johnson found differences in their "magnitude" of availability at public versus private institutions. These differences are also evident our study. The two highest categories are *Learning/Study* and *Scheduling/Testing/Notes*. The highest percentages are reported by the public institutions, at 56% and 82% respectively, whereas private institutions' websites included communication content 38% and 45% of the time. Alternatively, organization and time management skills were offered less often in both public

and private institutions, confirming national research findings that this area is often deficient in disability services programs (Stodden, Whelley, Chang and Harding, 2001).

Research Question 2

Research Question 2 examined the census patterns found in the NSCPES data and discussed the Stodden, et al. (2006), Tagayuna, et al. (2005), Sharpe and Johnson (2001), and Christ and Stodden, (2005) studies involving disability supports in higher education. These were used as benchmark data for our content analysis of two-year, four-year, public and private Pennsylvania higher education institutions' websites. Our results were consistent with the patterns found by others when examining the NSCPES data. That is, the level of disability supports and the services environment for students with disabilities was more evident on web sites of public institutions of higher education in Pennsylvania than on corresponding web sites of private institutions of higher education in Pennsylvania on higher education. Assistive technology was more available at two year institutions than at four year institutions. The table below summarizes these findings

Table I: Research Question 2

National Center for the Study of Postsecondary Educational Supports (NCSPES) Summary of Research Findings by Type of Institution 1999-2001
<u>Large, public 4-year higher education institutions</u>
<ul style="list-style-type: none"> ▪ The area of least offering was that of AT Evaluations (Stodden et. al., 2006) ▪ Summer orientation programs least likely to be offered (Tagayuna et. al., 2005) ▪ Assistive technology offerings higher at 4-year public institutions (Stodden et. al., 2006) ▪ Public institutions disproportionately <i>high capacity</i> category (Sharpe & Johnson, 2001) ▪ Wider range of supports available at large, public institutions (Sharpe & Johnson, 2001)
<u>Small, private 4-year higher education institutions</u>
<ul style="list-style-type: none"> ▪ The area of least offering was that of AT Evaluations (Stodden et. al., 2006) ▪ Summer orientation programs least likely to be offered (Tagayuna et. al., 2005) ▪ Accommodations and supports more often limited in nature (Sharpe & Johnson, 2001)
<u>Two-year community colleges</u>
<ul style="list-style-type: none"> ▪ Summer orientation programs least likely to be offered (Tagayuna et. al., 2005) ▪ The area of least offering was that of AT Evaluations (Stodden et. al., 2006) ▪ Public institutions disproportionately <i>high capacity</i> category (Sharpe & Johnson, 2001) ▪ Greater number and range of assistive technology supports (Stodden et. al, 2006) ▪ Assistive technology supports higher than 4-year institutions (Christ & Stodden, 2005)

DISCUSSION AND CONCLUSION

This study examined parallels between the scholarly research and communication content of higher education websites with respect to disability services. The process of developing the questions was iterative, and allowed the opportunity to test various questions and content areas for their applicability to this content analysis. Many revisions occurred early in the process, as the format changed from an

organizational orientation to a topical one that allowed different website environments to be analyzed using a common instrument. As noted above, the absence of a shared vocabulary pertaining to the nomenclature used to identify disability services was reflected in this study's finding that 20% of the higher education institutions' disability services web pages could not be located for purposes of this descriptive content analysis.

Two content areas will require additional work in order to more effectively realize the potential of research linkage. The section, *Universal Design and Accessibility of Learning*, was intended in part to explore communication content that reflected collaborative partnerships among disability services, information technology, as well as library services and admissions divisions in campus communities. Research indicates that there will be a lack of policy level cooperation found in higher education institutions with respect to information technology, instructional technology, assistive technology and accessibility issues across these areas (Michaels, Pollock-Prezant, Morabito, and Jackson, 2002). The results in this area were certainly indicative of that, but the explanation might be related to question design. For example, Universal Design is a complex and elusive concept to measure via this method. Universal Design can be applied to instruction, services, information technology, and physical spaces. As the website analysis moved forward, the fluidity of this definition proved problematic in terms of developing a reliable and consistent set of Universal Design indicators.

The content area, *Resources for Incoming Students*, used undergraduate admissions and disability services web pages to examine communication content pertaining to orientation and peer supports for students with disabilities. Research cites a paucity of summer orientation programs for students with disabilities (Tagayuna et al., 2005). However, it was evident from this content analysis that many higher education institutions report their orientation programs as part of other web pages, such as "First Year Programs" or "Accepted Students". Therefore, clarification of this content area is needed to permit accurate analysis.

As the development process moved forward, it became apparent that additional work is needed to ensure intercoder reliability of the research instrument, to permit its wide-based use as a website content analysis research tool. Though preliminary spot checks were conducted on the data, a fuller assessment is needed once the instrument is further refined.

Future Research

As we have seen, growing numbers of students with disabilities are seeking access to higher education. Access for many begins with the institution's website. The extent to which students with disabilities are empowered to ask relevant questions and make informed choices will greatly affect their quality of life on campus, academic performance, and long term success. Additional research is needed to develop a research-based website assessment tool that identifies disability supports policy and service delivery environment indicators. The instrument developed for this website content analysis is a step toward the development of such a tool.

We hope the study proves to be relevant as a policy assessment tool for higher education administrators. For the prospective student with disabilities, a sharpened awareness can improve the quality of the campus visit and interview stages, and result in better alignment between the student with disabilities and the higher education institution. For the higher education disability supports practitioner, the baseline data that this study affords offers new avenues for dialogue and collaboration among disability services and other campus departments and divisions. For senior level policy-makers, the study's comparative data illuminates exemplars in website communication content, and offers potential for institutional self-assessment of website communication content, and perhaps even the disability services policy environment, ostensibly mirrored by the website communication content.

Further research is needed to determine if there is a basis for testing “dashboard indicators” that can be used to glean understanding of a higher education institution’s disability services policy environment. SPSS two-step cluster analysis holds promise for investigation of whether meaningful grouping exists among the variables used in this content analysis. Further refinement of the data is needed to separate outliers and to clarify proactive response levels and reactive ones before undertaking cluster analyses.

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FORECAST THE NEW ONE-FAMILY HOUSING MARKET IN THE U.S.

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ABSTRACT

Since 2007, the U.S. housing market slump has become a major concern among the policy makers, investors, home owners, and the general public. What is the outlook for the housing market in the near future and will this problem be over soon? Based on the selected time-series models, our forecast suggests that the new one-family housing market will remain weak in the second half of 2008.

INTRODUCTION

The housing market has been weak since its recent peak in 2005. Then, the sharp drop in the housing prices in 2007 contributed to the subprime loan crisis [1]. This dramatic change in the housing market not only affects the construction industry, it also may have a significant impact on the whole economy [3]. We are still in the midst of the housing problem with the increase in the delinquency rate and foreclosure rate.

In this paper, the time-series models are specified to forecast the new one-family houses sold in the U.S. and analyze its cyclical movement. Through this research, we try to predict the future development of the housing market.

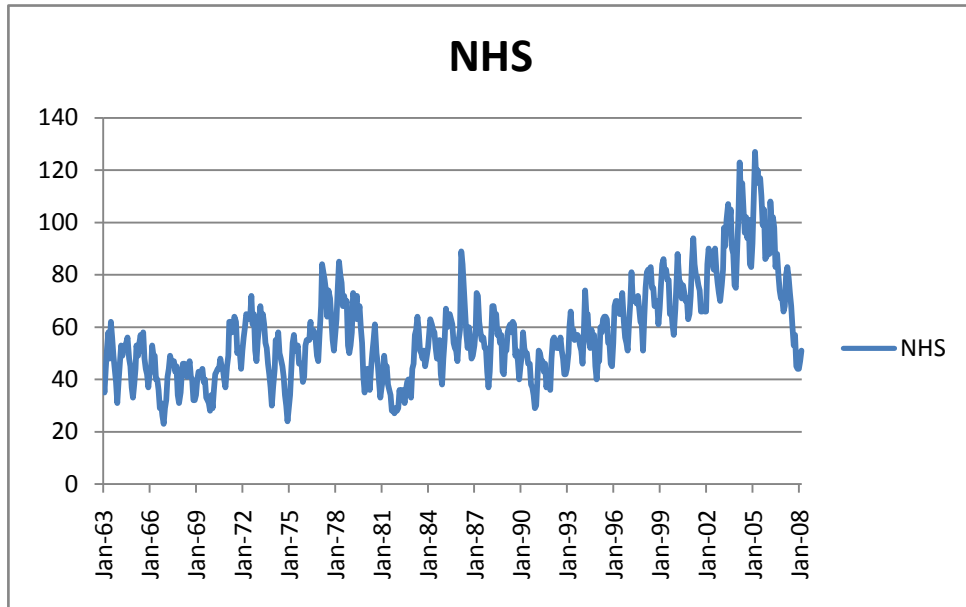
Forecast the new one-family houses sold in the U.S.

Figure 1 shows the non-seasonally adjusted new one-family houses sold (NHS) in the U.S. from January 1963 to June 2008, the most recent data available. From the figure, we can see that NHS data have a trend with seasonality.

To confirm this data pattern of a trend with seasonality, the autocorrelation functions of NHS are calculated and shown in Figure 2. Since they are all significantly different from zero, we have additional evidence of a trend in the NHS data. Figure 3 shows the autocorrelation functions of the first difference in NHS. They are significantly different from zero for lags 12, 24, and 36 months. This implies the existence of the seasonality.

Figure 1

New one-family houses sold (NHS) (in thousands) in the U.S. January 1963 to June 2008



Source: U.S. Census Bureau

Figure 2 Autocorrelation functions for NHS

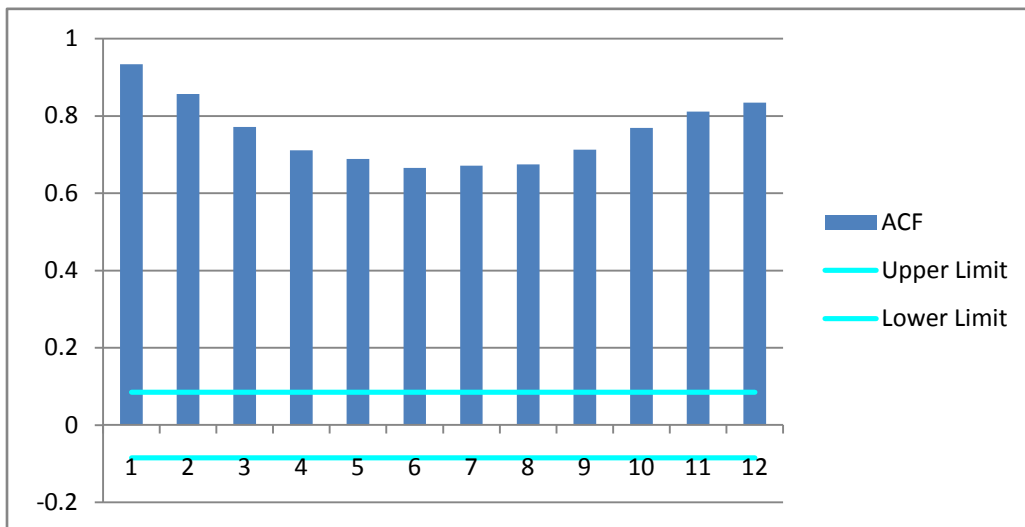
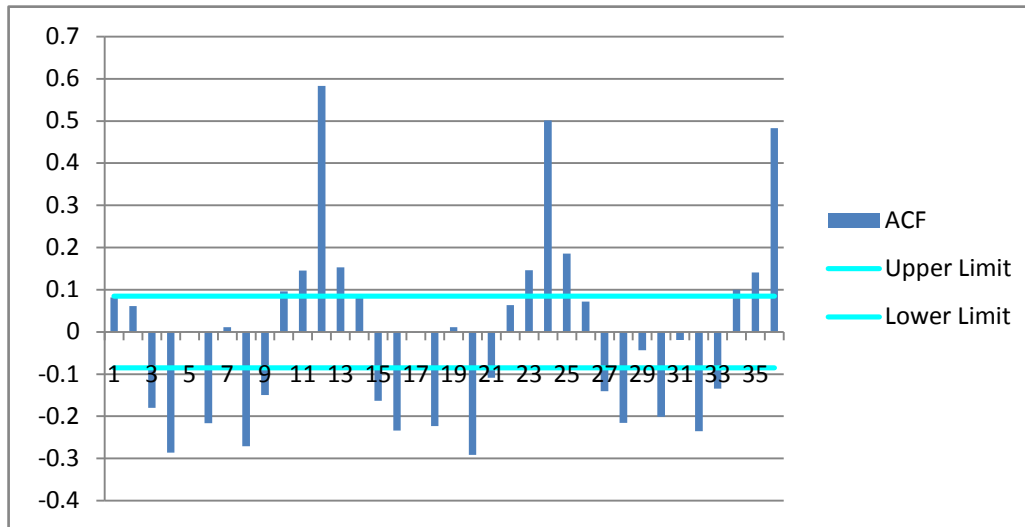


Figure 3

Autocorrelation Functions (ACF) for first difference NHS (DNHS)*

*DNHS(t) =NHS(t)-NHS(t-1)



Since the NHS data have a trend with seasonality, three time-series models are chosen for forecasting purposes: Winter’s exponential smoothing, the multiplicative decomposition, and the autoregressive integrated moving average (ARIMA) [4].

We use the data from January 1963 to December 2007 as the historical period for model specification. The period from January 2008 to June 2008 is chosen as the holdout period in which the actual data are available to compare with ex-post forecast in order to evaluate the accuracy of the model.

We use Excel-based Forecast X software for estimation and forecasting [2]. Table 1 shows two error measurements, the mean absolute percentage error (MAPE) and the root-mean-squared error (RMSE), for different models.

Table 1 MAPE and RMSE

Models	Historical period		Holdout period	
	Jan. 1963-Dec. 2007		Jan. 2008-June 2008	
	MAPE	RMSE	MAPE	RMSE
Winter’s exponential smoothing	6.49%	4.51	16.95%	7.76
Decomposition with linear trend	5.81%	4.31	64.12%	26.82
Decomposition with Holt’s exponential smoothing trend	5.53%	3.96	6.31%	2.03
ARIMA(0,1,1)(2,1,1)	6.69%	4.68	20.05%	8.80

For the historical period, the decomposition model either with linear trend or with Holt's exponential smoothing trend has the smallest MAPE and RMSE, while Winter's exponential smoothing and ARIMA are good models too. However, when we perform the ex-post forecast for the holdout period, all models, except the decomposition model with Holt's exponential smoothing trend, have much larger errors.

We choose the decomposition model with Holt's exponential smoothing trend and the data from January 1963 to June 2008 to forecast NHS for the second half of 2008 shown in Table 2 and the appendix. The forecast suggests that the new one-family housing market will remain weak for the second half of 2008.

Table 2 Forecast NHS in thousands for July-Dec. 2008

2008	Actual value	Fitted value	Forecast value
January	44	44	
February	48	47	
March	49	53	
April	49	49	
May	51	47	
June	49	43	
July			39
August			38
September			32
October			29
November			24
December			20

The cyclical movement in the new one-family housing market

The cyclical factors (CF) in the NHS data, shown in Figure 4, are estimated by using the decomposition method with linear trend. According to the CF data, the new one-family housing market had its recent trough in January 1991 with the cycle factor of 0.64 and reached its recent peak in April 2005 with the cycle factor of 1.37. We specify the ARIMA (2,0,0)(1,0,0) model to forecast CF. Table 3 shows the actual values of CF for 2007 and the first half of 2008, and the forecast values of CF for the second half of 2008. Since the forecast values of CF are around 1.0, using the historical CF data as a guide, this housing slump may not be over soon.

Figure 4 The cyclical factors (CF) of NHS

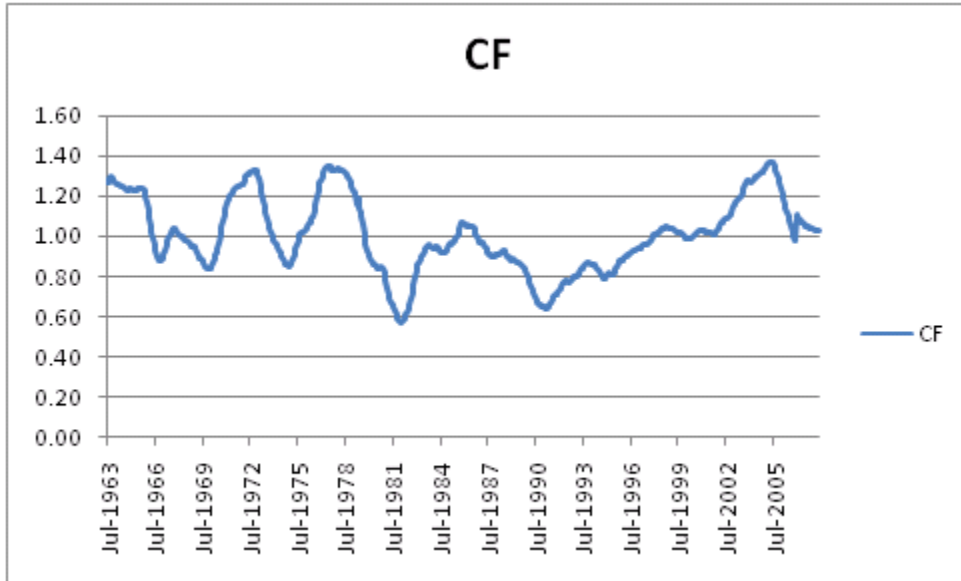


Table 3 The cyclical factors (CF) of NHS 2007-2008

2007	CF	2008	CF
January	1.11	January	1.04
February	1.10	February	1.04
March	1.09	March	1.03
April	1.08	April	1.03
May	1.07	May	1.03
June	1.06	June	1.03
July	1.06	July	0.92
August	1.05	August	0.92
September	1.05	September	0.93
October	1.05	October	0.93
November	1.04	November	0.93
December	1.04	December	0.93

CONCLUSION

What is the outlook for the housing market in the near future and will this problem be over soon? In this paper, we focus on the new one-family houses sold in the U.S. Base on our forecast and the analysis of the cyclical movement, it seems that this market will remain weak in the second half of 2008.

Appendix

The forecast output for the second half of 2008 based on the decomposition model with Holt's exponential smoothing trend

Forecast -- Decomposition Selected			
Date	Forecast		
	Monthly	Quarterly	Annual
Jul-2008	39.07		
Aug-2008	37.58		
Sep-2008	31.60	108.25	
Oct-2008	29.10		
Nov-2008	23.86		
Dec-2008	20.41	73.37	181.62
Avg	30.27	90.81	181.62
Max	39.07	108.25	181.62
Min	20.41	73.37	181.62

Summary Comments	
The forecast has an average error of	5.53%
The data has a standard deviation of	18.51
The forecast exceeds the accuracy of a simple average by	95.43%

Audit Trail - Summary Analysis

Audit Trail - Statistics

Accuracy Measures	Value	Forecast Statistics	Value
Mean Absolute Percentage Error (MAPE)	5.53%	Mean	57.99
R-Square	95.43%	Standard Deviation	18.51
Root Mean Square Error	3.95		
Theil	0.62		
Method Statistics	Value		
Method Selected	Decomposition		
Basic Method	Double Exponential Smoothing-Holt		
Alpha	1.00		
Gamma	0.00		
Decomposition Type	Multiplicative		

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Is a Binomial Process Bayesian?

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ABSTRACT

This paper discusses whether a binomial process for a dichotomous variable with π as the probability of success can correctly be modeled as a Bayesian process. The question of interest is whether the value of π remains fixed for the phenomenon being observed or whether the value of π actually varies and has its own probability distribution. If the later is the case then the process can be modeled mathematically as a Bayesian process with a prior distribution for the probability of success a binomial conditional distribution. The paper considers two example situations where Bayesian modeling could be applied. One is shooting free throws in a basketball game and the other is shooting a missile at a military target. Graphical and ad hoc testing methods are proposed and tested using the basketball example. These methods were not able to support the modeling of free throw shooting with a Bayesian model.

INTRODUCTION AND OVERVIEW

The primary focus will be on a dichotomous variable for which there are two possible observed outcomes that can be modeled with a binomial distribution using π as the probability of success. In many such situations one can present a credible rationale to state that the probability of success can vary and as such has a probability distribution. One example we will examine will be shooting of free throws in a basketball game. The popular phrase “when you are hot you are hot and when you are not you are not” supports the concept of a varying probability of success. Another example would be shooting a missile at a military target. In this case one can also rationalize that there are forces which vary from situation to situation so that the probability of hitting the target would vary and qualify this situation for Bayesian modeling. However, for something to be worthwhile one must show that going through the extra effort to do calculations based on a Bayesian model actually adds value to a decision making process. Hence this paper addresses identifying circumstances for which knowing that a process is Bayesian would be of value. It also addresses how one could use actual data from a process to determine if there is evidence that the process is Bayesian. The methodology used in this paper can be used to address numerous processes but we will focus on the two shooting examples.

In a Bayesian process there is an observable variable denoted by X . The probability distribution for X denoted by $f(X|\theta)$ depends on one or more parameters with one of the parameters being

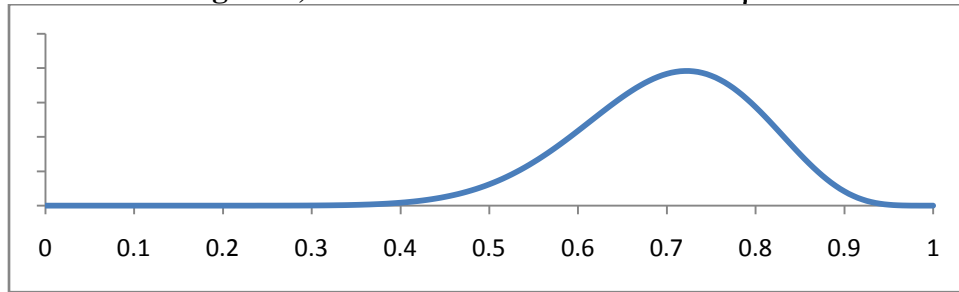
θ . Hence the value of X is conditional on the value of θ . For a Bayesian situation, θ has a probability distribution denoted by $g(\theta)$ and is referred to as the prior distribution, because this is the distribution of θ prior to obtaining any knowledge from an observable X . The joint probability distribution for X and θ is $f(X,\theta) = f(X|\theta) * g(\theta)$. In similar fashion, the joint probability distribution for X and θ can be expressed as $f(X,\theta) = f(\theta|X) * f(X)$. Using this expression then $f(\theta|X) = f(X,\theta) / f(X)$, and using the first expression to replace $f(X,\theta)$ one gets $f(\theta|X) = f(X|\theta) * g(\theta) / f(X)$. This distribution, $f(\theta|X)$, is referred to as the posterior distribution because it is the distribution of θ after or posterior to observing a value of X . If g is a continuous variable then $f(X) = \int f(X|\theta) * g(\theta) d\theta$.

If the conditional distribution $f(X|\theta)$ is some known probability distribution then one would like to find a prior probability distribution so that the posterior distribution is also some known distribution. Such a prior distribution is referred to as a conjugate prior distribution. For example, if the variable X is a continuous variable and follows a normal distribution with mean denoted by μ_c and standard deviation denoted by σ_c with the value of μ_c being the parameter that has a prior probability distribution then the form of the conjugate prior is also a normal distribution. If the prior mean is μ_p and standard deviation is σ_p , then the posterior distribution mean is $(\sigma_p^2 * X + \sigma_c^2 * \mu_p) / (\sigma_p^2 + \sigma_c^2)$ and the variance is $(\sigma_p^2 * \sigma_c^2) / (\sigma_p^2 + \sigma_c^2)$. The standard deviation is the square root of the variance for this normal posterior distribution.

If the conditional distribution $f(X|\theta)$ is the binomial distribution then the parameters are the number of trials denoted by n and the probability of success on a single trial denoted by π . Since X is a discrete variable taking on integer values then one can directly calculate the probability of a specific integer value of X and the distribution will be denoted using a P rather than an f . For the binomial, $P(X|\pi, n) = n! / [X! * (n - X)!] * \pi^X * (1 - \pi)^{(n-X)}$. π will be assumed to be constant for a set of n trials but will be subject to varying from one set of trials to another set of trials.

If the beta distribution is used as a prior for the binomial distribution then mathematically it can be shown that the posterior distribution is also a beta distribution. Hence the beta is a conjugate prior for a binomial distribution. Values for the beta distribution vary over the range from 0 to 1 and the parameters are denoted by α and β , which must both be positive. The beta can take on a variety of shapes over the range of 0 to 1. For $\alpha=\beta$, the beta distribution is symmetric and if $\alpha=\beta=1$ then the distribution is a continuous uniform from 0 to 1. For α and β both less than 1, the distribution is U-shaped. For either α or β less than 1 and the other greater than 1, the distribution is strictly decreasing ($\alpha < 1$) or strictly increasing ($\beta < 1$). For α & β both greater than 1, the distribution is unimodal with a peak between 0 and 1. In Excel, one can easily find beta probabilities with the BETADIST function or beta quantile values with the BETAINV function. These characteristics make the beta a reasonable probability distribution to use for π . Figure 1 below shows a beta distribution with $\alpha=14$ and $\beta=6$. For this beta distribution, the mean is .70, mode is .72, standard deviation is .10 and skewness is -.36.

Figure 1, Beta Distribution with $\alpha=14$ & $\beta=6$



The mean of the beta distribution is $\alpha/(\alpha+\beta)$ and the variance is $\frac{\alpha\beta}{[(\alpha+\beta)^2(\alpha+\beta+1)]}$.

The coefficient of skewness for the beta distribution is $\frac{2(\beta-\alpha)\sqrt{\alpha+\beta+1}}{(\alpha+\beta+2)\sqrt{\alpha\beta}}$. From this expression for skewness one can see that the skewness measure for the beta distribution is zero when $\alpha=\beta$, which indicates that the distribution is symmetrical with mean = .5. If the mean of the beta is greater than .5, $\alpha > \beta$, then the distribution is skewed left and correspondingly if the mean is less than .5, $\alpha < \beta$, then the distribution is skewed right. If the prior distribution is beta with parameters α and β and if x successes have been observed in n trials for a binomial variable then the posterior distribution will be a beta distribution with parameters $\alpha+x$ and $\beta+(n-x)$. Hence the mean of the posterior distribution is $(\alpha+x)/(\alpha+\beta+n)$ and the variance of the posterior distribution is $\frac{(\alpha+x)(\beta+n-x)}{[(\alpha+\beta+n)^2(\alpha+\beta+n+1)]}$.

The value of the posterior mean ends up being a weighted average of the mean of the prior distribution and the observed value from the conditional distribution used to estimate the parameter. For the normal conditional distribution, if the sample information is used exclusively then x would be the estimate of the mean. If the prior is the only information used for estimating the mean then the estimate would be μ_p , the mean of the prior. For the binomial conditional distribution, $p=x/n$ would be the estimate of the proportion π exclusively using the observed sample information. The mean of the beta prior distribution is $\alpha/(\alpha+\beta)$, which would be the estimate if only the prior is used. The posterior means for the two different situations are shown below in a format that illustrates that the posterior mean is a weighted average of the estimate using only the prior and the estimate based on the sample from the conditional distribution.

Expressing the posterior mean as $\frac{\sigma_p^2}{(\sigma_p^2+\sigma_c^2)} * x + \frac{\sigma_c^2}{(\sigma_p^2+\sigma_c^2)} * \mu_p$ for the normal makes this clear.

The sum of the two weights is one. Correspondingly the posterior mean for the binomial situation can be expressed as $\left(\frac{\alpha+\beta}{\alpha+\beta+n}\right) * \left(\frac{\alpha}{\alpha+\beta}\right) + \left(\frac{n}{\alpha+\beta+n}\right) * \left(\frac{x}{n}\right)$. As with the previous situation the sum of the two weights is one.

The Bayesian methodology provides a way to combine the previously obtained information that allowed for the specification of the prior distribution with current information obtained from the conditional distribution and is a valid methodology if the parameter for the conditional distribution does truly vary as described by the prior distribution. This means that some assessment must be made from data to try to determine if the data support that the underlying parameter for the distribution is not a fixed value for the observed situations. If it is then one should assess whether using the Bayesian model provides any real practical value.

TWO POTENTIAL AREAS OF APPLICATION

This paper will focus on two potential areas of application for processes that are binomial. One of these is in the sport of basketball. When a player shoots the basketball then the shot is either made or missed. For a series of shots under similar conditions, such as shooting a free throw, one can reasonably say that the process can be modeled by a binomial distribution. Another area would be in a military setting when a weapon is propelled toward or shot at a target. The result would either be that the weapon hit the target or missed the target. For the situation of shooting a basketball, there is a circular goal of fixed diameter and the ball either passes through the goal or does not. For the military situation there is a fixed target. If the launched weapon has an explosive device then the weapon does not have to exactly hit the point that is the center of the target but can effectively be considered a hit if falls in a circle around this center. The diameter of the circle around the target is determined by the power of the explosive in the weapon. Hence this situation with similar conditions for each weapon launch can effectively be modeled by a binomial distribution. The question at hand for both situations is whether they can correctly be modeled with a Bayesian model.

IS THE CONDITIONAL PARAMETER FIXED OR DOES IT VARY?

The real challenge in the situations mentioned is to determine if the process is truly Bayesian with a binomial proportion that varies from one series or set of trials to another series or set of trials. We will consider three different realities that could be the case for either of these applications. One would be that the process is truly Bayesian and the variation in the binomial proportion can be modeled using a probability distribution as has been discussed. Another reality would be that the binomial proportion is essentially the same for all trials and does not change from one set of trials to another. The third reality would one for which the binomial proportion is not always the same from one set of trials to another but the change in proportion can be explained by one or more other factors. For example, the free throw percentage for a player may drop when she injures her hand. This change in value is due to a special cause and not due to random variation as described by a probability distribution. One can imagine numerous situations such as this for which the lack of stability and variability of the binomial proportion would not be appropriately described by a probability distribution.

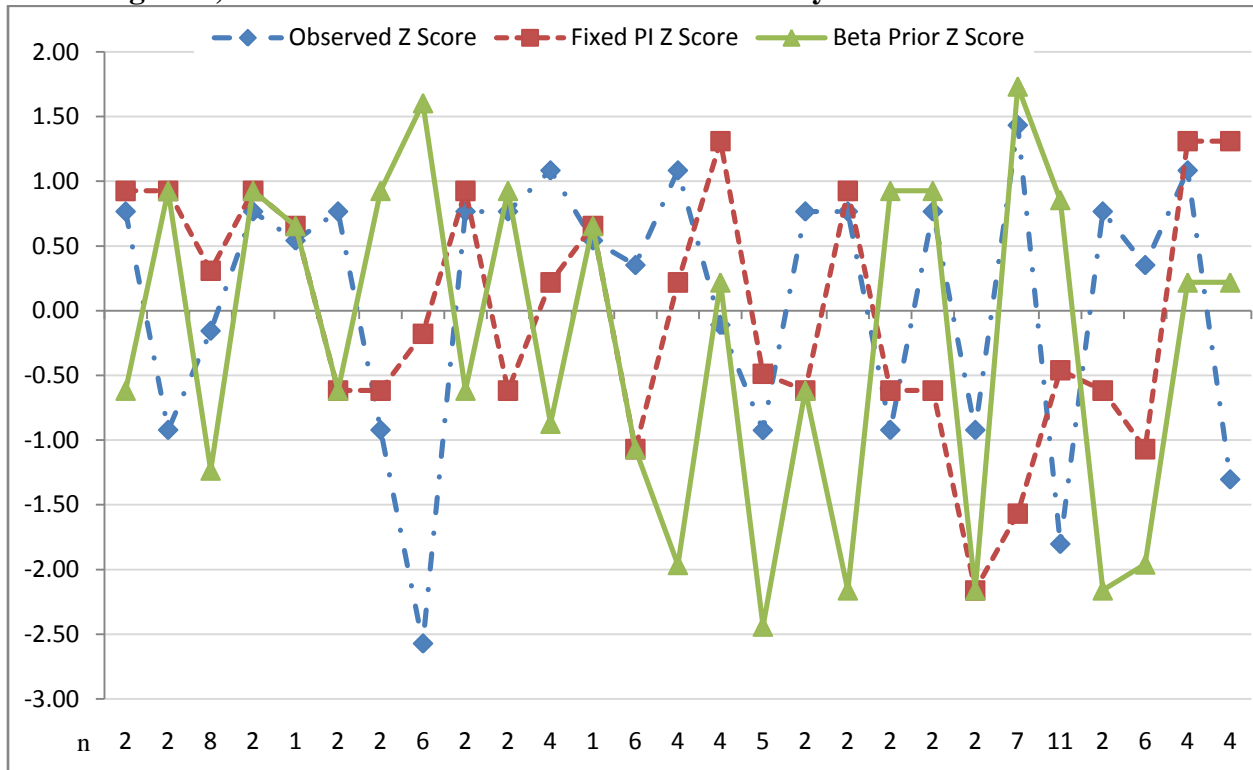
We will begin with an assumption that the value of a binomial proportion has the same fixed value for all sets of trials and will advocate using this model until there is adequate evidence to indicate that the binomial proportion is changing from one set of trials to another. To make a decision about the adequacy of the evidence one can observe the outcomes from several sets of trials to see if the variability is what one would expect if the proportion has the same value for all sets of trials. To do this one must define what constitutes a set of trials. For shooting free throws, we believe that a day should be considered as a set of trials. One could conduct an experiment and have a player to shoot a fixed number of free throws each day and track the number or proportion of observed successes each day. However, the desire would be to create a model that could be used in a game situation and most would agree that player's percentage in a game may be different from the percentage in practice. The number of free throws attempted in each game will vary from game to game. By tracking the proportion or percentage made each game rather than the number made, one has a statistic that is comparable from game to game. However, observing 100% or 0% made out of two attempts does not provide the same evidence

as observing either out of ten attempts. The standard deviation or standard error for a sample proportion for n observations from a phenomenon with π as its proportion of success is $\sqrt{\pi * (1 - \pi)/n}$. Using the mean π and the standard error computed with π and n one can transform each sample proportion p into a z-score that will include the sample size as well as the observed proportion. These z-scores can be plotted to see if any pattern is visually apparent. In particular, are there more extreme scores than one would anticipate? In the Bayesian model there are two primary sources of variability for the observed proportion. One source is the random variation of the observed proportion around the true value of π and this is measured by the standard error of the sample proportion. The other is the variation of π as determined by the prior probability distribution for π . Hence one would expect more variability if the process is truly Bayesian than if the proportion has the same fixed value. We know of no formal test to be able to perform in this situation and use graphs and the distribution of the z-scores. Since the sample sizes will be relatively small the distribution of the z-scores will not be exactly standard normal but they should be somewhat close to a standard normal. Hence we will look at the graphs for any clear patterns in the z-scores and compare the proportions of extreme values with what one would expect for a standard normal distribution. If there are no obvious shifts in the graph and there are clearly more extreme values than anticipated then we will consider this evidence as supporting the use of a Bayesian model for the overall process.

We also propose an ad hoc testing procedure using the χ^2 distribution. If the value of z follows a standard normal distribution, then the sum of k values of z^2 follows a χ^2 distribution with k degrees of freedom. To apply this testing procedure for free throw shooting data from k games we will square each of the z-scores. The test statistic will be the sum of the k squared z-scores. As was stated above we would expect the distribution of the observed z-scores to be reasonably close to a standard normal distribution if the free throw percentage does not vary from game to game. If there is game to game variability then we would expect more extreme values for the z-scores which would result in a higher total for the sum of squared z-scores. Hence this ad hoc testing procedure will be a one-tail upper-tail test using the χ^2 distribution with k degrees of freedom.

Figure 2 shows a plot of z-scores for three series of data. The Observed Z Score values are the z-scores calculated from the 2007-08 season results for Lawrence McKenzie, a senior guard and leading scorer for the University of Minnesota's men's basketball team. He averaged playing about 28 minutes and shooting three free throws per game with a 77.3% free throw percentage for the season. The Observed Z Score values used .773 for the probability of making each free throw and the individual number of free throws he attempted each game. The line for Fixed PI Z Score used a fixed value for π of .7 which is the mean of the beta distribution shown in Figure 1 and the n for each was the same number of free throws shot by McKenzie. The actual number of free throws made was simulated using the binomial with $\pi=.7$. The z scores were calculated using the simulated number of made free throws for each game, $\pi=.7$ and the values of n for Lawrence McKenzie for that corresponding game. Note that the values of n appear at the bottom of the graph in Figure 2. The line for Beta Prior Z Score used a value for π for each game that was obtained through simulation using the beta prior in Figure 1 with $\alpha=14$ and $\beta=6$. The z scores were calculated using the mean of the beta distribution of .7 as the value for π .

Figure 2, Plot of Z-Scores for 2007-08 Data for a Player and Two Simulations



Our hope was that extra variability introduced by the prior distribution for π would manifest itself in the distribution of the z-scores. However the graph for the solid line showing the distribution with the beta prior does not provide clear visible evidence that its variability is greater than that for the dashed line representing data for a fixed value of π . For the data used to create Figure 2, the standard deviation for the Beta Prior Z Score values is .99 and the standard deviation for the Fixed PI Z Score values is .93. The sum of the squared z-scores for the Beta Prior Z Score values is 26.6, with a 1-tail p-value of .48 and the sum of the squared z-scores for the Fixed PI Z Score values is 23.5, with a 1-tail p-value of .66. To get an idea of the power of this ad hoc procedure to detect when a process was truly Bayesian, 100 simulations were performed for each of these. 6 out the 100 simulations for the Beta Prior Z Score values had a p-value less than $\alpha=.05$. 4 out the 100 simulations for the Fixed PI Z Score values had a p-value less than $\alpha=.05$. These simulation results do not indicate that this ad hoc test is not a valid method for determining if a binomial process is truly Bayesian with a value of π that varies from one set of trials to another.

The spread for the plot of the Observed Z Score values is not visually greater than that for the other two lines. This plot does not encourage the use of a Bayesian model for Lawrence McKenzie's free throw shooting. The 27 observed z-scores ranged from a minimum of -2.57 to a maximum of 1.43 with a mean of .10 and standard deviation of 1.02. These values are certainly reasonable for a sample of 27 observations from a standard normal distribution. The sum of the squared z-scores for the Observed Z Score values is 27.6, with a 1-tail p-value of .43. Neither the plot nor the statistics support the use of a Bayesian model for Lawrence McKenzie's free throw shooting. We also looked at data for a few additional players including some from the

NBA with varying free throw percentages ranging from Steve Nash with a high of 90% to Shaquille O'Neal with a low of 50%. None the information for them supported a Bayesian model for free throw shooting.

SUMMARY

Being able to correctly use a Bayesian model depends on the ability of the user to determine if the binomial parameter π does truly vary from one set of trials to another. Each of us has played basketball and have had the perception that we were “on” in our shooting some days and “off” some other days. If this was really true then the value of π was not constant and varied from game to game. However, we also know that perception and reality are not always the same. We cannot justify using a Bayesian model because of our perception. We were not able to find empirical evidence from the limited data we observed that free throw shooting was Bayesian. However, the problem may be with the methods we attempted to use. These methods were not effective for the simulations when one process was Bayesian with a value of π that varied from game to game according to a prescribed beta prior because out of 100 simulations only 6 had a p-value less than .05. This number is only slightly higher than 4 out 100 simulations with a p-value less than .05 for a process with fixed value for π , meaning that it was not Bayesian. With the data that were readily available for basketball we were not able to affirm that free throw shooting can be effectively modeled with a Bayesian model. Data for the military application are not so readily available. Before working on a Bayesian model for the military application we believe that we need to be able to demonstrate that a Bayesian model can be effective for a somewhat similar situation such as shooting a basketball.

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MINIMIZING THE NORMALIZED SUM OF SQUARE FOR WORKLOAD DEVIATIONS ON IDENTICAL PARALLEL MACHINES

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ABSTRACT

In many organizations, it is desirable to distribute workload as equally as possible among a group of employees or machines. This paper proposes a performance measure, that we call the Normalized Sum of Square for Workload Deviations (*NSSWD*), and studies the problem of how to schedule a set of n jobs on m parallel identical processors in order to minimize the *NSSWD*. The *NSSWD* criterion is relevant where uniformity of wear to machines or of workload to employees is desirable. An algorithm, called Workload Balancing (WB), is proposed for solving this problem. Moreover, we perform a simulation experiment to evaluate WB against several well-known heuristics in the literature. Lastly, we discuss the computational results obtained from the simulation experiment.

1. INTRODUCTION

Efficient utilization of resources is critical to the operations of any organization and scheduling plays an important role in achieving this goal. One key characteristic of efficient resource utilization is the balancing of work across the production resources given that it allows all resources to be ‘spent’ equally, and eliminates problems caused when one resource is assigned more work than another.

This paper addresses the problem of scheduling n jobs, each job j with process time p_j , in m identical parallel machines with the objective of balancing the work load across machines as evenly as possible. Let C_i be the completion time of the last job in machine i and $C_{max} = \max_{i=1 \dots m} [C_i]$, which is also known as the makespan of the schedule. Let μ be the mean machine completion time (the average completion time for the last job in all machines), $\mu = 1/m \cdot \sum_{i=1 \dots m} C_i$. Note that the value of μ is also equal to $1/m \cdot \sum_{i=1 \dots n} p_j$, which is a constant given a problem instance. A “balanced work load” schedule will be one where all C_i 's are as close to μ as possible.

Figure 1 presents four schedules for the same set of jobs. There are four machines (e.g. $m = 4$) and eight jobs (e.g. $n = 8$) with process times $\{7, 5, 4, 4, 3, 3, 3, 3\}$. The mean machine completion time is 8 time units and shown in the schedules as a dashed line. Schedules 1 and 2 have a makespan of 10, but we propose that schedule 2 has a more balanced loading, thus from a scheduler's standpoint, schedule 2 will be preferred to schedule 1. Both schedules 3 and 4 have a makespan of 9 time units, which is the best possible makespan solution. It is also proposed that schedule 4 is better than schedule 3 given that the loading is more balanced (only 2 machines are off the target μ in schedule 4, versus all machines off in schedule 3). From a load balancing point of view, schedule 4 is the best possible schedule.

The literature only has one previously proposed criterion used to measure the load balancing performance of a parallel machines schedule. This method, proposed by Rajakumar et al. (2004), is called Relative Percentage of Imbalance (*RPI*) and is based on the average error relative to C_{max} . It is defined as $RPI = 1/m \cdot \sum_{i=1 \dots m} (C_{max} - C_i) / C_{max}$. The problem with using this criterion in the case of identical parallel machines is that this measure depends solely on C_{max} , and does not assess workload balancing as shown next:

$$\begin{aligned}
& 1/m \cdot \sum_{i=1 \dots m} (C_{max} - C_i) / C_{max} = 1/(m C_{max}) \cdot \sum_{i=1 \dots m} (C_{max} - C_i) \\
& = 1 - 1/(m C_{max}) \cdot \sum_{i=1 \dots m} C_i \\
& = 1 - \mu / C_{max}.
\end{aligned}$$

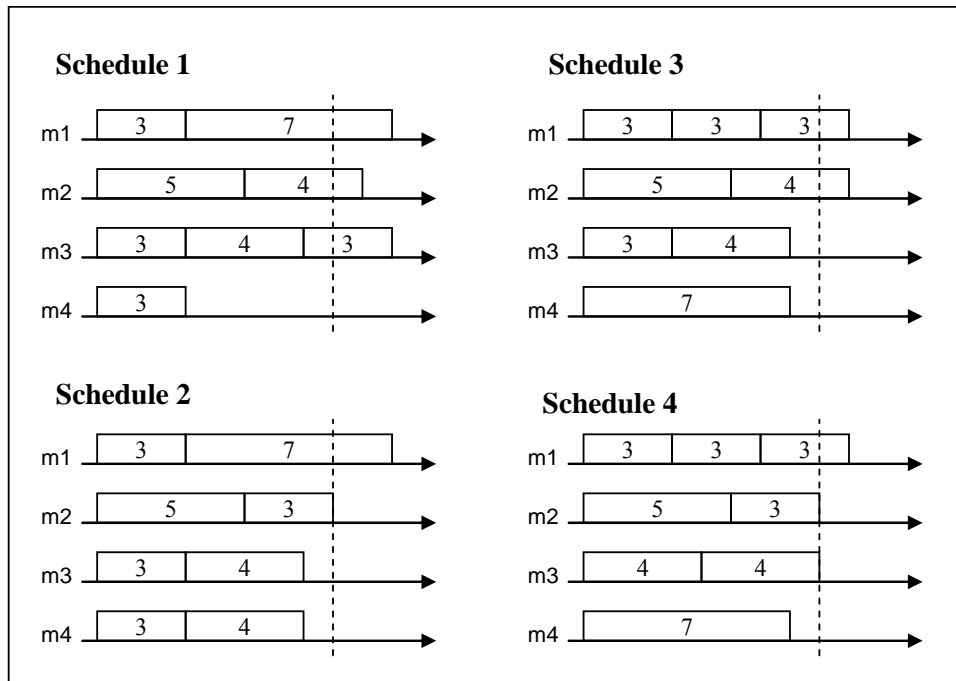


FIGURE 1: EXAMPLE OF THE PROBLEM

Thus, the RPI measure converts to $1 - \mu / C_{max}$, so for the case of the identical parallel machine problem, the RPI criterion is just a transformation of the C_{max} criterion. Despite this, the RPI could be an applicable measure when the machines are not identical, case in which $\sum_{i=1 \dots m} C_i$ may not be a constant. The RPI measure for schedules 1-4 in Figure 1 are 0.2, 0.2, 0.111, and 0.111 respectively.

This paper proposes a new work load balancing measure based on the square errors that can be used in the case of identical parallel machines. Square error measures have been used for many problems, for example in variance determination, regression analysis, forecast errors, and design of experiment (Montgomery, 2005). A measure based on square errors is relevant as it “penalizes” both above and below target results, and the size of the penalty increases quadratically, thus heavily penalizing large deviations. This paper proposes the use of a normalized sum of squared errors measure as a way to characterize the load balancing of a schedule. The concept of the proposed measure is based on the well-established *Sum of Squares Principle* in measuring variability in statistics and serves as a precise and quantifiable measurement criterion.

For a single machine i the square error is given by $(C_i - \mu)^2$, with a total for all machines provided by $\sum_{i=1 \dots m} (C_i - \mu)^2$. Different problem instances usually have distinct characteristics like different number of machines or jobs. Thus, in order to support the relative evaluation of multiple problem instances, a normalized square root of this sum is used in this paper as the measure of load balanced. We propose the Normalized Sum of Square for Workload Deviations (*NSSWD*) criterion as a performance measure that can characterize the load balancing across parallel resources; defined as $NSSWD = [\sum_{i=1 \dots m} (C_i - \mu)^2]^{1/2} / \mu$. Clearly the problem’s objective is the minimization of *NSSWD*. For the schedules presented in Figure 1, the *NSSWD* measure values are 0.728, 0.306, 0.25, and 0.177, respectively for Schedules 1 to 4.

The *NSSWD* problem is a special case of the “assembly-line balancing” problem (Conway et al., 1967) and carries a wide spectrum of general applications in several disciplines, including manufacturing, logistics, and computer science (for example those mentioned in Brown 1971, Ho and Chang, 1991, Dyckhoff and Finke, 1992, Khouja and Conrad, 1995). Examples of relevance today include manual assembly cells often found in the *maquila* industry where it is highly desirable to assign work to parallel production cells in such a way that all work is completed by a common time and that no cell is overloaded and requires overtime. An ideal schedule would assign jobs such that all production cells are assigned the same amount of work and all finish it at the same time. Besides job processing applications, the parallel machine problem is similar to the bin packing problem, thus an application of interest would be the loading of trucks for example, and load balancing would relate to the cargo assigned to each of the trucks in the fleet. Having all trucks assigned equal loads would maximize the overall use of the resources and keep all drivers equally satisfied.

As mentioned earlier, the identical parallel machines load balancing problem is related to the identical parallel machine makespan problem. For comprehensive reviews on parallel machines scheduling research, refer to Cheng and Sin (1990), Lam and Xing (1997), and Mokotoff (2001). A significant amount of research on parallel machines scheduling has been directed towards solving the makespan problem (Graham, 1969, Coffman et al., 1978, Lee and Massey, 1988, Ho and Wong, 1995, Gupta and Ruiz-Torres, 2001, Lee et al., 2006, Akyol and Bayhan, 2006). Although a makespan optimal schedule could be *NSSWD* optimal, as in the case of Schedule 4 in Figure 1, there is no guarantee that this always occurs. For example, Schedule 3 is optimal for the makespan criteria, but not optimal for *NSSWD*. We propose that the likelihood that a C_{max} optimal schedule will not necessarily be a *NSSWD* optimal schedule gets larger as the number of machines increases. Despite this, an optimal or near optimal makespan solution is a good candidate to be close to an optimal or near optimal *NSSWD* solution.

Well-known heuristics for parallel machines scheduling makespan problems include: the Longest Processing Time (LPT) algorithm (Graham, 1969), the Multifit algorithm (Coffman et al., 1978), and the Repetitive Modified Greedy (RMG) algorithm (Lee and Massey, 1988). The LPT algorithm assigns jobs one by one, starting from the unscheduled job with the longest processing time, to the machine having the smallest assigned processing time. The Multifit algorithm uses a bin-packing approach along with a binary search to find the minimum capacity, that is, the minimum makespan. The RMG algorithm modifies the Multifit algorithm in one key respect: replacing the ‘first fit decreasing’ (FFD) criterion by the ‘repetitive modified greedy’ criterion. The Two-Machine Optimal (TMO) algorithm (Ho and Wong, 1995) utilizes the concept of lexicographic search to minimize the makespan for the two-machine case. Ho and Wong (1995) empirically show that TMO outperforms both Multifit and RMG and generally dominates Multifit and RMG in both makespan and CPU time measures. They also develop the extended TMO algorithm, denoted by xTMO, for the m parallel machines makespan problem. Recent uses of LPT based heuristics for parallel machine problems include Lin and Liao (2008) and Koulamas and Kyparsis (2008).

The remainder of the paper is organized as follows. The next section describes properties of the *NSSWD* measure and establishes the complexity of the problem. Section 3 discusses the proposed algorithm for the *NSSWD* m identical parallel processors problem. The fourth section provides a numerical example to illustrate the proposed algorithm. Section 5 presents the design of our simulation experiment which is used to evaluate the effectiveness of the proposed algorithm. Section 6 discusses the computational results obtained from the simulation experiment. Lastly, the seventh section concludes the paper.

2. PROPERTIES OF *NSSWD* AND PROBLEM COMPLEXITY

This section demonstrates some properties of the *NSSWD* measure and establishes the complexity of $P||NSSWD$.

Proposition 1. In the case of 2 machines, a C_{max} optimal schedule is also an *NSSWD* optimal schedule.

Proof. Let C_{max} and C_k be the completion times for the C_{max} optimal schedule S , where $C_{max} \geq C_k$. Let $C_x = C_{max} + \Delta$ and $C_z = C_k - \Delta$ be the machine completion times of another schedule S' not C_{max} optimal, with $\Delta > 0$ and all completion times also > 0 . Then, $NSSWD(S) = [(C_{max} - \mu)^2 + (C_k - \mu)^2]^{1/2} / \mu$, and $NSSWD(S') = [(C_x - \mu)^2 + (C_z - \mu)^2]^{1/2} / \mu$. Suppose that $NSSWD(S) > NSSWD(S')$. Then $(C_{max} - \mu)^2 + (C_k - \mu)^2 > (C_x - \mu)^2 + (C_z - \mu)^2$, which simplifies to $C_{max}^2 + C_k^2 > C_x^2 + C_z^2$. By substitution, we obtain $C_{max}^2 + C_k^2 > (C_{max} + \Delta)^2 + (C_k - \Delta)^2 = C_{max}^2 + C_k^2 + 2\Delta C_{max} + \Delta^2 + C_k^2 - 2\Delta C_k + \Delta^2$, which leads to $0 > 2\Delta(C_{max} + \Delta - C_k)$. This is a contradiction given that $C_{max} \geq C_k$ and $\Delta > 0$ by assumption. \square

Proposition 2. In the case of $m > 2$ machines, a C_{max} optimal schedule is not necessarily a *NSSWD* optimal schedule.

Proof. Example: Consider a set of 5 jobs with processing times 10, 100, 50, 40, and 10 time units, respectively, to be processed by three identical machines. Let S be a schedule with $C_1 = 100$ (job 2 in m_1), $C_2 = 90$ (jobs 3 and 4 in m_2), and $C_3 = 20$ (jobs 1 and 5 in m_3). Note that S is makespan optimum. Let S' be the schedule that results from assigning jobs 1 and 2 to m_1 ; job 3 to m_2 ; and jobs 4 and 5 to m_3 . The completion times of S' are $C'_1 = 110$ and $C'_2 = C'_3 = 50$. The *NSSWD* value for S is 0.8806 whereas the one for S' is 0.6999. Clearly the makespan optimum schedule S is not *NSSWD* optimum (S' is not *NSSWD* optimum either: just move job 1 to m_2 or m_3 to improve the measure, but the point of this proof is that just because a schedule is makespan optimum, it does not mean it is necessarily *NSSWD* optimum. Schedule 3 in Figure 1 is an example involving four machines). \square

Proposition 3. A non C_{max} optimal schedule can be improved in terms of *NSSWD* by a reduction in its maximum machine completion time.

Proof. Let S be a non C_{max} optimal schedule with machine completion times $C_1, \dots, C_y, \dots, C_m$, where $C_1 > C_y \geq C_m$. Let a modified version of the schedule, S' , have completion times $C'_1, \dots, C'_y, \dots, C_m$ where $C'_1 = C_1 - \Delta$, $C'_y = C_y + \Delta$, and $0 < \Delta < C_1 - C_y$ (otherwise the makespan increases). We propose that $NSSWD(S) > NSSWD(S')$. Suppose otherwise. Then $C_1^2 + C_y^2 \leq C_1'^2 + C_y'^2$. Hence $C_1^2 + C_y^2 \leq C_1^2 + C_y^2 + 2\Delta C_y - 2\Delta C_1 + 2\Delta^2$, which reduces to $C_1 - C_y \leq \Delta$. This contradicts that $C_1 - C_y > \Delta$. \square

Proposition 4. A *NSSWD* optimal schedule is necessarily a C_{max} optimal schedule.

Proof. Comes directly from the proof of Proposition 4. \square

As shown by Bruno et al. (1974) and Garey and Johnson (1979), the makespan parallel-machine problem is known to be NP-hard. From the above propositions it is concluded that finding an optimal C_{max} schedule will be a component of finding an *NSSWD* optimal schedule. Since the $P||C_{max}$ problem is NP-Hard, the $P||NSSWD$ problem is NP-Hard.

3. ALGORITHM WORKLOAD BALANCING

The proposed algorithm, called Workload Balancing (WB), is based on some existing algorithms that minimize makespan because the *NSSWD* and the makespan criteria correlate positively. The WB algorithm consists of two major modules: (1) develop an initial solution by any existing heuristic; and (2) improve the current solution by creating a series of two-machine sub-problems and solving them via Ho

and Wong's TMO algorithm (1995). In module 1, we suggest to employ a quick and simple heuristic, such as LPT, Multifit, or RMG, to obtain a seed solution. In module 2, the TMO algorithm employs a lexicographic search approach to determine an optimal makespan schedule for the two-machine problem. While TMO's worst-case complexity is exponential, it has been shown to be capable of finding an optimal solution quickly.

The following is a summary of notation that will be used in the presentation of the proposed algorithm.

n	the number of jobs
p_j	processing time of job j
m	the number of machines
m_i	machine i
M	the set of m machines
δ	the set of machines of the sub-problem which yields no makespan reduction
σ	the set of unavailable (evaluated) machines
C_i	the completion time of the last scheduled job on machine i

Without loss of generality, processing times are assumed to be integer. The WB algorithm is given below.

WB Algorithm

Inputs: $n, m, p_i, \delta = \sigma = \phi$, an existing heuristic for use in Step 1.

Step 1: If $m = 2$, then
 apply TMO to obtain a current schedule for the problem and go to Step 6;
 else,
 use an existing heuristic to obtain a seed schedule.

Step 2: Find $\min_{i \in M} \{C_i\}$ and $\max_{j \in M} \{C_j\}$.

Step 3: If $(C_j - C_i) \leq 1$, then
 go to Step 6;
 else,
 apply TMO to the sub-problem consisting of jobs assigned to m_i and m_j .

Step 4: If TMO yields a makespan reduction for the sub-problem in Step 3, then
 update the current schedule, set $\sigma = \phi$ and return to Step 2;
 else,
 move machines i and j to δ ,
 find $\min_{\substack{a \in M \\ a \notin \delta, \sigma}} \{C_a \geq C_i\}$ and $\max_{\substack{b \in M \\ b \notin \delta, \sigma}} \{C_b \leq C_j\}$,
 if both machines a and b do not exist, then
 go to Step 6.

Step 5: If $(C_j - C_a) \geq (C_b - C_i)$, then
 update $i = a$;
 else,
 update $j = b$.
 Return to Step 3.

Step 6: Stop. The current schedule is the best schedule identified by WB.

For $m = 2$, Step 1 of the WB algorithm applies TMO to develop a makespan optimal schedule for the problem, then goes to Step 6 for termination. For $m > 2$, Step 1 utilizes a selected existing heuristic to obtain a seed schedule for the problem. Step 2 locates the smallest load machine (m_i) and the largest load machine (m_j). Machines i and j form a sub-problem to be considered in the next step because they represent the best potential to additionally reduce workload deviation.

In Step 3, if it is infeasible to reduce makespan by re-scheduling jobs in m_i and m_j , i.e., $(C_j - C_i) \leq 1$, then WB goes to Step 6 for termination; otherwise, WB creates a sub-problem consisting of jobs assigned to m_i and m_j and applies TMO to the sub-problem. In Step 4, if a reduction on *NSSWD* is achieved in the previous step, then WB returns to Step 2 to restart this process; otherwise, WB locates machines a and b such that $\min_{\substack{a \in M \\ a \notin \delta, \sigma}} \{C_a \geq C_i\}$ and $\max_{\substack{b \in M \\ b \notin \delta, \sigma}} \{C_b \leq C_j\}$, respectively (note that it is possible that $a = b$ if there is only one available machine remaining). If both machines a and b do not exist implying that further improvement in makespan is infeasible, then WB goes to Step 6 for termination.

Step 5 selects the two machines yielding the greatest potential in reducing workload deviation as follows: if $(C_j - C_a) \geq (C_b - C_i)$, then WB creates a sub-problem consisting of jobs assigned to m_a and m_j ; otherwise, WB creates a sub-problem consisting of jobs assigned to m_i and m_b . The WB algorithm now restarts Step 3 to test the termination condition. Finally, Step 6 terminates the WB algorithm and outputs the current best schedule.

For the three or more parallel machines problem, we will use the notation LPT+, Multifit+, and RMG+ to identify the WB algorithm that employs initial or seed solutions from LPT, Multifit, or RMG, respectively. LPT+, Multifit+, and RMG+ are designed with the specific *NSSWD* optimization criterion in mind. We also need to bear in mind that LPT, Multifit, and RMG, and the heuristics that result from adapting the extended TMO algorithm (Ho and Wong, 1995) to them, denoted by xLPT, xMultifit, and xRMG, respectively, are designed to obtain optimal or near optimal makespan solutions. Proposition 2 establishes that a makespan optimal schedule is not necessarily *NSSWD* optimal, but by Proposition 3 an *NSSWD* optimal schedule must be makespan optimal. Because of this, it is not clear how good are the schedules obtained with heuristics LPT, Multifit, RMG, xLPT, xMultifit, and xRMG in terms of the *NSSWD* optimization criterion. In this article we test and compare, with computational experiments, how effective are makespan optimization heuristics in generating good *NSSWD* solutions, and, simultaneously we analyze whether LPT+, Multifit+, and RMG+ are significantly better than makespan optimization heuristics. Before we discuss our computational results, we present a small example next.

4. NUMERICAL EXAMPLE

A small numerical example with twelve jobs and four machines is used to demonstrate the WB algorithm. The processing times of the twelve jobs are generated from a discrete uniform distribution between 1 and 100. They are then sorted in non-increasing order for convenience and re-numbered as 1, 2, ..., 12. Their processing times are: 88, 84, 81, 79, 79, 69, 65, 56, 52, 41, 29, and 14. The WB algorithm is applied to the example using seed solutions obtained by the LPT, Multifit, and RMG heuristics. Nonetheless, we only focus on Multifit as the seed solution here for illustrative purpose.

Let S_i be the set of jobs assigned to m_i , then the seed solution obtained by Multifit is: $S_1 = \{1, 2, 12\}$ with $C_1 = 186$; $S_2 = \{3, 8, 9\}$ with $C_2 = 189$; $S_3 = \{4, 6, 10\}$ with $C_3 = 189$; and $S_4 = \{5, 7, 11\}$ with $C_4 = 173$. The *NSSWD* for the seed Multifit schedule obtained from Step 1 is 0.07175. Step 2 finds that the machines with the largest and smallest loads are 2 and 4, respectively. Since $C_2 - C_4 = 16$ which is $>$

1, the six jobs assigned to m_2 and m_4 , i.e., jobs 3, 5, 7, 8, 9, and 11, form the first sub-problem which is solved by the TMO algorithm in Step 3. Since the TMO algorithm returns a smaller makespan for the sub-problem, the current schedule is updated to: $S_1 = \{1, 2, 12\}$ with $C_1 = 186$; $S_2 = \{5, 8, 9\}$ with $C_2 = 187$; $S_3 = \{4, 6, 10\}$ with $C_3 = 189$; and $S_4 = \{3, 7, 11\}$ with $C_4 = 175$. The *NSSWD* for the updated current schedule is reduced to 0.05914.

As an improvement is made, WB returns to Step 2 and seeks the new largest and smallest load processors, which are m_3 and m_4 , to form the next sub-problem. Applying the TMO algorithm to the six jobs assigned to m_3 and m_4 , WB obtains the following schedule: $S_1 = \{1, 2, 12\}$ with $C_1 = 186$; $S_2 = \{5, 8, 9\}$ with $C_2 = 187$; $S_3 = \{4, 7, 10\}$ with $C_3 = 185$; and $S_4 = \{3, 6, 11\}$ with $C_4 = 179$. The *NSSWD* for this new current schedule is 0.03379. Since an improvement is accomplished, the WB again returns to Step 2 and identifies that the largest and smallest load processors, which are m_2 and m_4 , to form the next sub-problem. However, no improvement is made from solving the sub-problem consisting of jobs assigned to these two machines, WB places m_2 and m_4 in set δ and finds that $a = 3$ and $b = 1$ in Step 4. In Step 5, since $(C_2 - C_3) < (C_1 - C_4)$, WB updates $j = 1$ and returns to Step 3.

TABLE 1: PERFORMANCE RESULTS FOR THE EXAMPLE

Heuristic	<i>NSSWD</i>	C_{\max}
LPT	0.10136	196
xLPT	0.03010	187
LPT+	0.02084	187
Multifit	0.07175	189
xMultifit	0.03379	187
Multifit+	0.02084	187
RMG	0.03942	187
xRMG	0.03942	187
RMG+	0.02589	187

The WB algorithm terminates and yields a final schedule as: $S_1 = \{1, 3, 12\}$; $S_2 = \{5, 8, 9\}$; $S_3 = \{4, 7, 10\}$; and $S_4 = \{2, 6, 11\}$ with *NSSWD* = 14.75. Table 1 presents the *NSSWD* and makespan results for the LPT, xLPT, LPT+, Multifit, xMultifit, Multifit+, RMG, xRMG, and RMG+ methods.

5. SIMULATION EXPERIMENT

A simulation experiment is performed to test the effectiveness of the proposed algorithm. For the two-processor case, we compare the WB algorithm with three of the most common heuristics for the makespan problem in the literature, namely LPT, Multifit, and RMG. For the m -processor case, we also include the extended TMO algorithm (Ho and Wong, 1995) in the evaluation. The number of iterations is set at 10 for both Multifit and RMG so as to make a fair comparison. It should be noted that $(1/2)^{10} \leq 0.1\%$.

The simulation study is divided into two phases. Phase 1 deals with the two processors case only; while phase 2 considers the three or more processors case. In phase 1, we study the effects of two factors; namely number of jobs and variance of processing times, have on LPT, Multifit, RMG, and WB. The numbers of jobs are set at ten levels: 7, 8, 9, 10, 11, 12, 25, 50, 75, and 100. These levels cover both odd and even numbers of jobs. The processing times are assumed to follow a discrete uniform distribution,

$DU(1, b)$, where b is set at three levels: 100, 300, and 500. For more details on data generation see Gupta et al. (2004). These two factors together make 30 problem sets. One hundred replications are performed for each set, which provides a total of 3,000 problems. As we demonstrate in Proposition 1a, WB determines the optimal *NSSWD* for the two machines case. Thus, WB will serve as the standard of comparison for heuristics and provide some insights into the performance of other heuristics.

Phase 2 evaluates nine heuristics – LPT, xLPT, LPT+, Multifit, xMultifit, Multifit+, RMG, xRMG, and RMG+ and considers two factors – number of jobs and number of machines. For $m = 3$ and 4, n is set at four levels: 13, 14, 15, and 16; for $m = 5, 8, 11, \text{ and } 14$, the n/m ratio is set at three levels: 5, 7, and 9. Hence, a total of 20 combinations of n and m values are studied. The processing time is assumed to follow a discrete uniform distribution with parameters 1 and 300. Again, we run 100 replications for each set of problems; this provides a total of 2,000 problems. All methods are implemented in FORTRAN running on a Pentium 4-based microcomputer.

6. COMPUTATIONAL RESULTS

The performance results for the two-processor case are shown in Table 2. Each value in the Table represents the mean *NSSWD* of 100 replications for the respective set as specified by n and b . It should be noted that *NSSWD* is expressed in the percentage form in our computational results. Table 2 confirms that the WB algorithm yields the best performance among all methods as it is optimal. Among the other three heuristics being considered, RMG yields the best overall performance; while LPT has the worst overall performance. The number of jobs correlates negatively with *NSSWD* for all methods. With respect to processing time variability (determined by b), it does not have a major impact on the performance of the three heuristics; but it correlates negatively with *NSSWD* for WB. Moreover, it is interesting to note that while RMG performs significantly better than the LPT and Multifit when n is small (7 – 25), but the opposite holds when n is large (50 – 100).

TABLE 2: TWO-PROCESSOR *NSSWD* (IN %) RESULTS

$n \setminus b$	LPT			Multifit			RMG			WB		
	100	300	500	100	300	500	100	300	500	100	300	500
7	4.1283	4.1541	4.1468	2.9681	3.1931	3.2504	1.6093	1.6273	1.6369	1.2917	1.3334	1.3374
8	2.5684	2.5670	2.5894	2.1336	2.2624	2.2758	1.2294	1.2327	1.2473	0.6236	0.5741	0.5922
9	3.0682	3.0801	3.0658	1.9573	1.9831	1.9979	0.9213	0.8515	0.8630	0.2957	0.2448	0.2352
10	1.9213	1.9724	1.9938	1.4175	1.4245	1.4446	0.7873	0.7847	0.7978	0.2006	0.1609	0.1661
11	1.6644	1.6615	1.6640	1.3350	1.3431	1.3617	0.6667	0.7144	0.7481	0.1343	0.0844	0.0728
12	1.1929	1.2086	1.2137	0.8061	0.7907	0.7958	0.5277	0.5120	0.5398	0.1406	0.0480	0.0444
25	0.3988	0.3943	0.3821	0.2018	0.2149	0.2286	0.1258	0.1643	0.1713	0.0665	0.0181	0.0098
50	0.0710	0.0720	0.0712	0.0533	0.0511	0.0611	0.0873	0.1192	0.1265	0.0285	0.0109	0.0057
75	0.0447	0.0442	0.0449	0.0307	0.0307	0.0342	0.0943	0.1261	0.1310	0.0167	0.0064	0.0038
100	0.0225	0.0205	0.0196	0.0180	0.0121	0.0159	0.1113	0.1286	0.1328	0.0124	0.0036	0.0036

Table 3 gives the CPU time in seconds for each of the 30 experimental conditions of the two-processor case. As shown in the Table, LPT requires the least CPU time; while RMG needs the most CPU time. The CPU time for both Multifit and RMG increases sharply as n increases, but it only increases modestly for LPT and WB.

Table 4 presents the m -processor *NSSWD* computational results for each of the 20 experimental conditions. Among the three heuristics yielding an initial solution, RMG outperforms Multifit in every one of the 20 experimental conditions, which in turn outperforms LPT in all 20 experimental conditions.

The xTMO algorithm is able to significantly reduce *NSSWD* using seed solutions obtained by LPT, Multifit, and RMG in all 20 experimental conditions. Furthermore, Multifit+ (abbreviated as MF+ in Tables 4 and 5) outperforms xMultifit (abbreviated as xMF in Tables 4 and 5) in all 20 experimental conditions; RMG+ outperforms xRMG in 19 experimental conditions and ties in one; and LPT+ outperforms xLPT in 16 experimental conditions and ties in four. For a particular level of *m*, *NSSWD* decreases as the ratio of *n* to *m* increases. This observation is true for all nine heuristics evaluated.

TABLE 3: TWO-PROCESSOR CPU TIME (IN SECONDS) RESULTS

<i>n</i> \ <i>b</i>	LPT			Multifit			RMG			WB		
	100	300	500	100	300	500	100	300	500	100	300	500
7	0.00	0.00	0.00	0.05	0.00	0.05	0.15	0.05	0.05	0.05	0.10	0.00
8	0.05	0.05	0.00	0.15	0.05	0.00	0.10	0.15	0.10	0.00	0.05	0.05
9	0.05	0.00	0.00	0.15	0.00	0.00	0.15	0.05	0.10	0.05	0.10	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.15	0.15	0.05	0.05	0.05
11	0.00	0.00	0.05	0.05	0.00	0.10	0.10	0.05	0.10	0.15	0.10	0.15
12	0.05	0.05	0.05	0.05	0.00	0.05	0.20	0.10	0.15	0.00	0.10	0.15
25	0.05	0.00	0.00	0.10	0.05	0.05	0.60	0.20	0.20	0.05	0.10	0.05
50	0.10	0.00	0.10	0.30	0.25	0.35	0.65	0.50	0.50	0.15	0.05	0.15
75	0.30	0.15	0.10	0.80	0.50	0.40	0.80	0.85	0.90	0.30	0.15	0.05
100	0.25	0.20	0.20	1.25	1.15	0.50	1.30	1.10	1.20	0.25	0.30	0.30
Mean	0.09	0.05	0.05	0.29	0.20	0.15	0.43	0.32	0.35	0.11	0.11	0.10

TABLE 4: *M*-PROCESSOR *NSSWD* (IN %) RESULTS

<i>m</i>	<i>n</i>	LPT	xLPT	LPT+	MF	xMF	MF+	RMG	xRMG	RMG+
3	13	3.2516	0.4251	0.3357	2.3893	0.6062	0.3355	1.4988	0.5660	0.3344
	14	3.0063	0.2944	0.2120	1.8822	0.3459	0.2034	1.1619	0.2634	0.2194
	15	2.5738	0.1387	0.1349	1.7936	0.1937	0.1312	0.9401	0.1838	0.1339
	16	2.2386	0.1125	0.0975	1.4093	0.1428	0.1058	0.8439	0.1360	0.0936
4	13	5.5444	1.9586	1.7424	4.7195	2.3271	1.7554	3.6574	2.6174	1.6620
	14	5.2124	1.6109	1.3872	4.2358	1.4455	1.2859	2.5161	1.5362	1.2662
	15	5.6640	1.0352	0.8196	3.4261	1.1045	0.8121	2.0887	1.1606	0.8075
	16	4.1880	0.6317	0.4654	3.0299	0.7449	0.5036	1.6077	0.6745	0.4354
5	25	3.3543	0.1822	0.1539	1.8016	0.2814	0.1562	1.1276	0.2728	0.1892
	35	1.6319	0.0811	0.0800	1.0630	0.0986	0.0871	0.5579	0.0892	0.0820
	45	1.0605	0.0634	0.0634	0.5901	0.0640	0.0634	0.3652	0.0634	0.0634
8	40	3.7126	0.2252	0.1848	2.0846	0.3311	0.2175	1.2792	0.3262	0.2168
	56	2.1023	0.1081	0.1044	1.0522	0.1266	0.1151	0.6830	0.1328	0.1115
	72	1.2640	0.0810	0.0810	0.6378	0.0844	0.0835	0.5678	0.0862	0.0823
11	55	4.3466	0.2522	0.2055	2.0037	0.3781	0.2417	1.3416	0.3964	0.2615
	77	2.2242	0.1191	0.1173	1.1386	0.1669	0.1272	0.6685	0.1536	0.1274
	99	1.4189	0.0865	0.0865	0.7376	0.0962	0.0874	0.5984	0.0930	0.0877
14	70	4.6954	0.2589	0.2182	2.0011	0.4054	0.3024	1.4598	0.4314	0.2672
	98	2.4338	0.1356	0.1340	1.2768	0.1734	0.1473	0.8507	0.1782	0.1391
	126	1.5249	0.1056	0.1056	0.9434	0.1154	0.1061	0.6359	0.1285	0.1056

Table 5 gives the CPU time in seconds for each of the 20 experimental conditions of the *m*-processor case. Similar to the results obtained in the two-processor case, LPT requires the least CPU time while

RMG requires the most CPU time among the three heuristics generating initial solutions. The additional CPU time required by the xTMO and WB algorithms depends on the particular heuristic providing the initial solution. xRMG and RMG+ take about 50% longer CPU time than that of RMG; on the other hand, xLPT and LPT+ take about 400% more CPU time than that of LPT. For all heuristics, the CPU time generally increases as the n/m ratio increases. It is interesting to note that LPT+ in many experimental conditions is faster than Multifit and RMG but delivers much lower *NSSWD*.

TABLE 5: m -PROCESSOR CPU TIME (IN SECONDS) RESULTS

m	n	LPT	xLPT	LPT+	MF	xMF	MF+	RMG	xRMG	RMG+
3	13	0.00	0.35	0.35	0.05	0.30	0.50	0.30	0.45	0.70
	14	0.00	0.20	0.20	0.05	0.10	0.40	0.25	0.40	0.45
	15	0.05	0.20	0.15	0.05	0.25	0.35	0.15	0.25	0.25
4	16	0.00	0.15	0.30	0.10	0.30	0.25	0.25	0.25	0.35
	13	0.00	0.00	0.15	0.10	0.35	0.20	0.10	0.15	0.20
	14	0.00	0.10	0.15	0.15	0.30	0.35	0.05	0.25	0.20
	15	0.05	0.15	0.20	0.10	0.35	0.35	0.20	0.25	0.35
5	16	0.00	0.20	0.10	0.15	0.40	0.45	0.15	0.15	0.35
	25	0.00	0.25	0.35	0.05	0.30	0.55	0.35	0.75	0.95
	35	0.10	0.35	0.35	0.35	0.70	0.65	0.40	0.70	0.75
8	45	0.05	0.30	0.30	0.30	0.70	0.65	0.70	0.85	0.95
	40	0.05	0.35	0.75	0.20	0.80	0.85	1.05	1.60	1.60
	56	0.20	0.55	0.45	0.40	1.10	1.20	1.50	2.05	1.95
11	72	0.10	0.45	0.50	0.65	1.25	1.15	1.90	2.35	2.40
	55	0.15	0.75	1.45	0.65	1.80	1.95	1.40	1.95	1.85
	77	0.10	0.90	0.70	0.50	2.05	2.05	2.05	2.60	3.40
14	99	0.20	0.40	0.95	0.85	3.17	3.12	3.00	4.35	4.10
	70	0.25	1.25	1.60	0.75	1.65	2.45	2.75	3.65	3.85
	98	0.35	1.25	0.90	1.25	3.10	3.60	3.20	4.80	5.50
	126	0.40	0.95	1.30	1.45	3.92	4.51	5.15	7.20	7.42

7. CONCLUSIONS

We propose an algorithm, called WB, to minimize the sum of square for workload deviations on m parallel identical machines. The WB algorithm is based on the idea from the TMO algorithm (Ho and Wong, 1995) and guarantees an optimal solution when the number of machines is two. We perform an extensive simulation study to test the effectiveness of WB against several existing algorithms, including LPT, Multifit, and RMG, and the extended TMO algorithm. The computational results show that both the WB and extended algorithms outperform the LPT, Multifit, and RMG significantly. Moreover, the WB algorithm, on average, reduces the *NSSWD* given by the extended algorithm by about 25%, while it takes about 15% more CPU time than that of the extended algorithm.

There exist a number of avenues worthy of future investigations. First, it is interesting to study the bi-criteria scheduling involving the *NSSWD* and another performance measure, such as total weighted flowtime. Second, it is useful to investigate the tradeoffs between *NSSWD* and a due-date related criterion, such as the number of tardy jobs, and analyze the Pareto (efficient) solutions. That is, determining how much improvement in the number of tardy jobs can be gained by allowing *NSSWD* to increase by one or more units. Third, it would seem logical and desirable to extend the proposed algorithm to solve the *NSSWD* non-identical parallel machines problem.

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Is the Quality of the American Undergraduate Education Declining? What Responsibility Do Faculty Have for Maintaining Quality?

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SESSION DESCRIPTION

This will be a moderated forum led by the panelists but designed to interact with the audience and include them in the discussion. The panelists have experience leading similar sessions and will begin by presenting their perspectives then those attending will be asked to react to what was said and to present their perspectives. This format has proven to be effective in engaging the people who had enough interest in the title to attend the session. This allows everyone to learn from each other.

There are many issues involved in determining if the quality of university undergraduate education is declining. Most everyone would agree that the American university experience has changed over the last 20 years. We have seen legislators in many states express their concern about the quality of K-12 education and have mandated state-wide testing to assess the quality of education. There is concern that the same will happen for state supported institutions of higher education if we do not maintain the quality of undergraduate educations. What are the characteristics of a quality education? Legislators and others outside of the universities have expressed concern about retention rates at universities and have established retention rates as a criterion to be used to assess the quality for institutions of higher education. As universities focus on retention of students they seek to improve the overall university experience for undergraduates. The amenities provided have changed significantly. Is this pampering of students extending into the academic side or just remaining in the social side? As universities focus on improving retention, is there an increased pressure on faculty to retain students to a degree that faculty are relaxing standards and allowing weaker students to obtain undergraduate degrees?

We know that the skills and knowledge needed to be successful today and in the future are not the same set of skills and knowledge needed 20 years ago due to the changes in technology and other developments. However many would argue the basic necessary reasoning and communication

abilities have not changed just because of the technology available for communication and computation.

The university experience has always been about more than just an academic education. Has the emphasis on other aspects of campus life increased in recent years to the detriment of the academic activities? Universities promote these life-style offerings of the university as they recruits students. Is this a reflection of a change in motivation of the in-coming students? Are they really coming for an academic education? Where is an academic education on their priority list? If an education is not high on their list, then how do we as faculty educate them in a way that will cause them to elevate its importance?

At one time in our educational system K-12 students were given aptitude and IQ tests and then put in tracks such as college prep, vocational, and general—much like systems in Europe and Asia still do and they outscore us in all testing. Beginning in the late 1960s and early 1970s (and continuing to today) this system was changed by the education reformers who argued that tracking negatively affected the self esteem of the students and caused them permanent scaring of their psyches. Thus everyone was allowed to take whatever courses they wanted (or that their parents wanted them to take) and all were encouraged to take SATs and ACTs and apply to colleges. Organizations like Educational Testing Service did not complain as this meant more business for them. Colleges did not complain because this meant more students which meant more revenues. Parents did not complain because they could then brag about their kids being in college. But we are putting more and more students into college who are not prepared for real college level work and who should not be there so we have to do remediation rather than present real higher education just in order to get them to a minimum level of achievement.

This self esteem movement has had serious ramifications for education as seen in grade inflation, social promotions, a lessening of discipline, and the creation of an attitude of entitlement towards higher education in which if you, as a faculty member, do not post a good grade for a student, you are viewed as being at fault and the student is thus a victim of the system. Today's faculty are on the defensive. The quality movement emphasizes satisfying the customer and in higher education the main focus has been on attracting customers (students) by appealing to their immediate wants and wishes. We have not focused on our real customers, society and the future employers of our graduates.

There is media coverage about reports showing that we are far behind in all measures of academic achievement even though we have the world highest percentage of college graduates. We are graduating people who should not have even been admitted into college in the first place, just so we do not hurt their self esteem and lose money at the institutional level.

This session may raise more questions than providing answers. Before one can come with answers, one must first think about the questions. If faculty do not think about these questions then it will be legislators and administrators who will be providing the answers. Our institutions of higher education are world-class because we have had strong faculty leading our academic process. There are no definitive answers but the session will point out that faculty should take responsibility for maintaining quality in their classes. If faculty do not do it then they are abdicating a primary faculty responsibility. Maintaining academic quality should be supported by legislators and administrators but the primary responsibility should rest with faculty.

STUDENT MANAGED FUND HANDBOOK: A COMPREHENSIVE OVERVIEW OF A STUDENT MANAGED FUND

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I. Overview & Goals

The Student Managed Fund at Roanoke College was first started in the spring of 2004 and has been an ongoing class since that time. The main objective of the course is to develop an in-depth understanding of the required research, analytical techniques, and report generation necessary to manage a portfolio of assets. The participants of this class actually make investment decisions and recommend a course of action for a managed portfolio. It is a very unique program that provides students with real life experience and also helps students to develop skills that will be essential in the business world. The main goals of the SMF are to assemble a group of interested and qualified students to successfully and actively manage the portfolio and to provide these students with a hands-on investment learning experience with actual dollars.

Because of the unique nature of the class and the fact that students manage an investment portfolio using \$500,000 of the college endowment, the SMF is one of the most innovative classes on the Roanoke College campus and fits with the aims of Roanoke College to produce knowledgeable, experienced citizens. In addition, the Student Managed Fund has helped to create a unique learning environment for business students. Through the class, students gain a real sense of ownership of their work because the class is student run. Finally, students feel a stronger connection and responsibility to the college because they are managing part of the endowment, enhancing the learning environment.

II. History

Dr. Larry Lynch and Mark Gobble are the original founders of the SMF. They came up with the idea of a Student Managed Fund a few years ago. Dr. Lynch created a proposal and petitioned for a portion of Roanoke College's endowment fund to set up a portfolio that will be actively managed by students under his supervision. Dr. Lynch went through a long process and engaged in many discussions with the board members in order to establish the program.

So far, the SMF has had the following student managers: Andrew Lyles (Spring 2004), Tomasz Jemczura (Fall 2004), Rick Boccard (Spring 2005), John Burkholder (Fall 2005), Keith Petrus (Spring 2006), Steven Costello (Fall 2006), Craig Ultsch (Spring 2007), Andy Gleason (Fall 2007) and Jonathan Herttua (Spring 2008).

The SMF also participated in the Virginia Conference of Student Investment Groups which took place on October 1, 2004 on the Virginia Tech campus. This conference brought together leading students, faculty, and investment professionals in a learning environment to discuss a

wide range of topics and issues facing investment professionals. Student Managed Fund delegated 4 students to represent Roanoke College at the conference.

III. SMF – Structure and Organization

The SMF offers portfolio management experience as a class with a ½ credit per semester on a pass/fail basis. Students may complete two units (four semesters) towards graduation requirements, including one unit toward a concentration in finance. After two full units are accomplished, one can continue with the fund but will not be able to receive credit for it.

The class is composed of primarily junior and senior Business and Economics students. Prerequisites for the SMF include Economics 122 and BUAD 225 (with BUAD 242 recommended), along with an application to the department faculty. The selection criteria for student participation include GPA, faculty references, and interviews. In addition, applicants may be asked to provide an analysis of an assigned company and to make a presentation of their analysis to the departmental faculty. The current members of the class have some input in the recruiting and selection process.

The class is managed by students, with the faculty advisor always present in the class to provide students with support. The faculty advisor is responsible for support, guidance and continuing the educational component for the class. However, all investment decisions are made solely by the students through a majority voting system (50% + 1). One student member serves as general manager of the group. The manager rotates every semester and is also elected by majority votes. Before one can serve as general manager, he or she must first serve as an assistant manager for the duration of one semester, helping the general manager with operations and management. In addition to general and assistant managers, sector managers are elected by compromise and are in charge of in-depth research and analysis of specific sectors.

IV. Course Policies and Student Responsibilities

The most basic course policies, as stated in the syllabus, include:

- Each student is required to complete an analysis of a company for consideration to buy/hold/sell on a regular basis.
- Attendance is mandatory. The **second unexcused absence** will result in a failing grade. Excused absences are solely the decision of the faculty advisor.
- Students will be ready each meeting to openly discuss the pros and cons of a recommended investment.
- Individuals will be called upon to lead discussions. Proposals will be discussed and participation is essential to your grade.

Because of the nature and great responsibility of the class, students are expected to treat membership in the SMF as a real job. Students should be always prepared for class and should be open to learning new strategies and ideas for portfolio management. Acceptance and consideration of others' ideas and thoughts is expected from each member in order to create the best learning environment possible.

The expected readings for the class include The Wall Street Journal and Barron's. Students are expected to read daily and be ready to discuss articles concerning the economy and finance. Students are also expected to read "A Random Walk Down Wall Street."

In addition to daily reading, students are expected to conduct extensive research before making a buy/sell decision using various tools such as Value Line, Bloomberg, S&P, WSJ, Smartmoney and other trade publications. During stock recommendations, members are encouraged to expand on different sources of financial data and should be able to interpret the data. The activity of stock recommendation, whether it is a buy, hold, or sell, is what SMF does for most of the time in class. The level of knowledge and expertise during class discussions is of greatest importance in the decision making process. That is why student analysts must back up their buy/hold/sell recommendations with the research they have done.

Twice a week new recommendations are given by the members of the SMF. These buy/hold/sell recommendations are placed on the 'watch list' and written on the blackboard every class. Before the end of the class period, every student is required to copy the watch list and conduct an analysis of recommended securities (stocks) for the next class period. Only through research and student commitment to the SMF is the group able to make educated decisions.

Finally, members of the SMF are required to provide written or oral reports to the faculty advisor and sometimes the Board of Trustees. At least one quarterly report is to be written by each sector, highlighting performance review and decision making over a defined period of time. The general manager is responsible for revisions of individual reports and the creation of an annual report. The manager might also be asked to present the performance of the fund in person to the faculty advisor and the Board of Trustees.

V. Benefits of the SMF

Since the course was introduced at Roanoke College, it has gained popularity, respect, and attention from students and faculty in the business department and others. It is becoming a prestigious and competitive course. Often, there are more students interested in becoming members of the fund than there are spaces available. Roanoke College is one of the few schools in the state that gives students the opportunity to invest part of the school's endowment.

There are widespread benefits of holding membership in the Student Managed Fund. The SMF provides invaluable experience in "real world" investing. Most students will manage their own investments one day and will have a 401k, IRA, or other accounts to manage, while others might continue their career in the field of finance and wealth management. Financial investment skills are of lifelong need and will be well utilized by the members once they develop those skills in the SMF. Additionally, students are also expected to gain a competitive advantage in the job market and internships because of their experience as portfolio managers.

During the class, members will conduct several presentations as well as participate in class discussions. By that, members of the SMF will have increased confidence in making professional group presentations. Also, the ability to use technical tools and a variety of sources for research will once again give participants greater perspectives. And finally, the SMF may

provide another connection to the college business department after members graduate and become benefactors.

VI. Investment Strategies and Policies

The group continuously utilizes a variety of investment tools and strategies. Up to date, the SMF is able to invest in individual domestic firms that are a part of S&P500 list, corporate bonds with ratings of BB and higher, municipal bonds, treasury stocks, mutual funds and ETF's. For the best educational value, the group is trying to focus on individual investments rather than managed portfolios such as mutual funds.

A summary of the most important and basic investment rules are stated below:

- The stock portion is a core portfolio of both growth and value stocks
- Students shall be limited to the S&P 500 and S&P ADR Index to ensure that they can find adequate information and for liquidity and comparative purposes
- Students may only invest in securities that meet the College's general investment policy restrictions
- The portfolio shall be regulated by the College's endowment investment policy
- Students are limited to invest up to 5% of investment assets in any one security
- Fundamental and Technical Analysis are of the priority in decision making process

As far as individual decision making in the fund, the majority of the decisions are to be made during class time. Extraordinary cases allow trades outside of the class with the assistance of the faculty advisor. The fund is an ongoing process which is why continuous observation and analysis is necessary. Decisions are taken through a majority vote of the group after in-depth analysis and discussion is conducted. The analysis is mostly based on fundamental and technical aspects of the analyzed security. Nonetheless, other aspects are taken into consideration, such as overall shape of the economy, investor sentiment, and news that might affect the company.

During the stock analysis, first the fundamental analysis is conducted. Members of the group present and discuss findings from the financial statements and also look at other ratios such as Price Earnings, Earnings Per Share (EPS), companies and industry ratios. All of the findings are prioritized on the Fundamental Informational Sheet. Technical analysis, on the other hand, is based more on historical data represented in a graphical format. While looking at charts, members of the fund analyze a variety of technical tools including moving averages (12, 50 and 200 day moving averages), MACD, Money Flow, Slow Stochastic, and Volume.

Currently the SMF is benchmarked and limited to the S&P 500 index on the US equity side with maximum investment up to sixty five percent in companies representing this index. Of that sixty five percent, fifteen percent of the portfolio can be invested internationally and benchmarked against MSCI EAFE Index®. It is important to recognize that this fifteen percent is included in the sixty-five percent equity stake and does result in actually reducing part of the domestic stock exposure. On the fixed income side, the Student Managed Fund is limited and benchmarked against the Lehman Brothers Bond Index, up to thirty five percent of the total value of the portfolio, creating a well balanced portfolio. Sector allocation closely follows the 'aggressive growth' model suggested by Merrill Lynch. Of course, individual stock allocations are made by the students.

Recently, the SMF has been granted permission to maximize both financial and educational returns by investing internationally. With the exposure to international markets, SMF is able to invest up to fifteen percent of the portfolio internationally using American Depositary Receipts and foreign Exchange Traded Funds. The guidelines for individual foreign security selection are companies that comprise the S&P ADR Index; however, the benchmark for the international investing is the MSCI EAFE Index®. The MSCI EAFE Index® is recognized as the pre-eminent benchmark in the United States against which to measure international equity performance. By limiting individual foreign holdings to companies from the S&P ADR index, SMF lowers some risks by focusing on some of the larger, more established in international companies.

American Depositary Receipts (ADRs) are foreign companies trading on the US exchanges and are issued by US depository banks. Each ADR represents one or more foreign shares or sometimes fractions of a share, making it very easy for US investors to invest in non-US securities in US dollars. Typically ADRs are listed and traded on US exchanges such as AMEX, NYSE, or NASDAQ. Usually, information and research about ADRs is available through the same sources as domestic companies. Exchange Traded Funds (ETFs) are the second form of international investing that the SMF utilizes to reach the goal of diversification in foreign markets. ETFs are 'securities certificates that state legal right of ownership over part of a basket of individual stock certificates.' After an ETF is established, cleared and authorized, shares of the ETF can be sold to the open market and can be traded by investors on most global stock exchanges. The reason why we favor ETFs over traditional open-end mutual funds is that ETFs trade continually like a stock intraday making them a more liquid asset. Usually they are linked to an index or sector rather than actively managed. Finally, fees on ETFs are typically lower than open-end mutual funds. These qualities provide ETFs with some significant advantages compared to traditional open-end mutual funds.

VII. Performance

Performance of the portfolio is benchmarked and tracked against appropriate indices, but student educational experience is a priority over performance. The ability to manage a portfolio at such significant value is a great opportunity for students to learn and manage risk as well as gain real world experience in securities evaluation. As far as an actual financial return, the SMF has had its ups and downs. From the historical point of view, the fund has closely followed benchmarks. However, there have been numerous quarters when the SMF outperformed its benchmarks.

One of the main goals beyond the educational value for students is for the fund to outperform its benchmark. It is especially challenging during summer and winter periods since there are fewer students available to track the fund and evaluate its holdings. Students have tried to place stop losses and use other tools in order to minimize the downside potential or to minimize the risk. Also, the recent addition of international exposure to the portfolio might make it challenging for the fund to outperform since the group is just starting to learn about international financial markets.

Part of the performance of the fund is limited since the SMF is required to return back to the Roanoke College operating budget five percent of the value of the fund on the three year average for the first three years and after that five percent every year. That is part of Roanoke College's

investment policy that the SMF must follow. Since July 2007 the College has allowed this five percent to remain invested in the fund.

Student management and the faculty advisor closely follow the performance of the SMF. Monthly and quarterly reports are generated by Merrill Lynch and are used by SMF management for reference purposes. Nevertheless, the general manager is required to create a quarterly report about the SMF portfolio. This report is accessible for all members to review and is also used to present the performance of the fund to the business office and the Board of Trustees.

VIII. Outlook for the Future

Every semester, managers and members of the SMF continually press for improvement of the fund through implementation of investment strategies and improvement of existing policies. Recently, the group applied for permission to invest internationally, which is a significant addition to the existing strategy. This addition required the creation of a group that will be responsible for equity investments in international markets. The near future will show how effectively this group can manage international investing and what changes will be required.

There has been some discussion about the possibility of requesting permission to expand the list of stocks available for investment in the domestic market. Currently, US equity investment is limited to S&P500; however, at some point in the near future, the SMF may consider expanding the benchmark to broader indices such as Russell 1000. Some believe that this move will broaden student perspectives and could potentially be very beneficial both financially as well as educationally.

At the end of every semester, the general manager of the SMF usually asks students for confidential comments on the course as well as suggestions for improvement. Those comments are always taken into consideration by management and often appropriate actions are taken in order to implement new strategies and changes. That is what has been occurring since the start of the SMF and that is how most of the structural changes take place. The SMF thrives on the loyalty and commitment of its members and that is why student ideas are always taken into consideration when looking to the future of the SMF.

IX. Advice and Comments from SMF Members

Student Comments about SMF:

“At best SMF empowers students to become mutual fund managers with the opportunity to learn and invest, and prove that we can beat the "professionals." At worst, students make the same mistakes other traders make and that is to not research and make investment decisions on unsound investing principles. It is important to realize that we all make mistakes but let's use the class to educate us to not make the same mistakes other investors typically do.”

Justin Thomas '06

“I was privileged to be a part of the SMF since day one and I was able to watch it grow. Between my experiences as a general manager, energy sector manager, and leader with the technical and international sectors, I have learned more than I could ever imagine. SMF has

become a part of my life and has been a strong motivator to accomplish greater things. I know that all of the concepts and principles of investing which I have learned are thanks to the SMF. I believe that one day I will blame the SMF for future successes.”

Tomasz Jemczura '06

“This class is a great opportunity for students to get involved and learn concepts that will be valuable to them for the rest of their lives.”

Molly Festa '07

“I have learned a lot of valuable information that I see myself using in the real world. Also, it is nice not to have a professor lecturing the whole class, but rather interacting with and learning from other students.”

Anonymous

“Student Managed Funds gave me an opportunity to put my recently learned knowledge to work in a real world environment. It gave me a better understanding of how to invest money wisely and profitably. I had no experience with the Stock Market prior to Student Managed Fund, however, I now feel proficient in stock research, picking, and investing now. The Fund provided a great atmosphere where people of the same mindset can work together and see their progress in dollar signs. Many of the seasoned members are extremely knowledgeable and helpful in all aspects of learning the ins and outs of investing. I built many friendships from times in on out of the classroom with my fellow investors. I found that it provided great experience for personal investment and often became the topic of conversation with others outside of the classroom, with members and nonmembers.”

Adam Fariss '07

“The wealth of knowledge and real-world experience acquired from this course is hard to beat. I have been fortunate enough to have been a part of the fund for five semesters and I valued this course as having been the most helpful and informative part of my academic tenure here at Roanoke College. This course is the closest thing to a real-life position in the business world. It is treated like a job and each member is expected to be professional and have the appropriate research prepared and ready to discuss for each class. SMF is the ultimate preparation for your professional life after college. You are primarily there to learn and gain experience on investments and finance but don't feel like it's all work and no play. Enjoy and have fun with the class, keep the relaxed environment going and talk the faculty advisor into using some of those returns you are making to take you out somewhere nice at the end of the semester. I hope that you will enjoy the course as much as I have over the years and that it prepares you for the next level as it has for me.”

John Burkholder '06

- “Admit you don't know everything about investing
- Ask questions during class: learn passwords and how to access ML & Valueline account
- Use the resources available exclusively to SMF
- Learn what everything is and how to look up everything listed on the recommendation sheet”

Justin Thomas '06

“Really immerse yourselves in the course and you will get much more out of it.”

Molly Festa '07

“I would say to the manager and the older people to give the new people some more help or advice about researching and that sort of thing at the beginning.”

Anonymous

“Appreciate the PE. If you like a company, and want to get an idea of what it should be trading at 1 year from now: take the current PE (multiple) x the forward EPS and as long as the company continues to meet or exceed EPS expectations it should trade at that price one year from today.”

Keith Petrus '06

“Be sure to give it some time because the first few weeks are very challenging. Just stay with it, conduct research, and educate yourself. Always ask questions, for there are many people in the class that are probably wondering about the same thing as you are. Never stop learning about new strategies and tools; there is always something new you can gain knowledge of. After some time with the SMF you have to decide: you love it or you hate it. If you love it, go out there, make some money for Roanoke College and learn how to manage wealth. If SMF is not something you like, at least you now know what investing is like.”

Tomasz Jemczura '06

“Checks stock quotes frequently, research watch-list thoroughly to help stimulate discussion within class. Managers should lead the class discussions differently at times. Often the discussions seemed to mirror one another, which lacked the ability to keep members interested and active in discussion.”

Adam Fariss '07

“Find the best sectors, and then the best stocks. Try not to get emotionally attached to your stocks. Keep in mind we are trading without commissions, and have the flexibility of getting in and out of our positions without penalty.”

Keith Petrus '06

“Diversify, Diversify, Diversify: If you control the downside, the upside will take care of itself. I have always believed that to be the case. But controlling the downside means managing the risk.”

Keith Petrus '06

CONFERENCE MANAGEMENT USING THE Web-CMS

Albert E. Avery, Towson University, Towson, MD

ABSTRACT

The Web-CMS (Conference Management System) has been used by a number of organizations to manage professional academic conferences, including this one. It is a work in progress and constantly evolving into an even more powerful management information system. The session is intended for prospective program chairs and track chair who would benefit from a personal introduction to the system.

INTRODUCTION

The Web-CMS is an outstanding solution to the management of academic professional conferences. These conferences are typically comprised of research presentations of newly developed enhancements to theory, applications of theory to the solution of practical problems and pedagogical developments, where the research has successfully passes a blind peer review process. An internet-based management system is appropriate because submissions arrive from around the world electronically; they are reviewed by experts that may reside in foreign lands; and the conference schedule itself is assembled by a team of people, who are typically not in geographic proximity.

The submissions are normally categorized into tracks or subject areas, and subdivided into presentation sessions of two to four presentations. The sessions are staffed with session chairs and discussants, who have the opportunity for an in-depth review of a submission prior to the beginning of the conference.

The conference itself is typically organized by track, and the presentation sessions are assigned presentation times that enhance the conference participant's ability to see much of what is happening in his or her specialty subject area. The presentation sessions are interspersed among other activities, such as networking opportunities provided by continental breakfasts, coffee breaks, luncheons and receptions, or organizational events, such as board meetings.

A well-run conference will have a printed *Program* and a website that mirrors the contents of the *Program* that is made public at least one month before the conference. If done effectively, these materials will allow an attendee to quickly identify any personal commitments during the conference, and easily identify additional sessions and events that he or she would like to attend. Since a person can only be one place at a time, it is obvious that a successful schedule has no schedule conflicts.

In addition, there is normally a *Proceedings* publication that is distributed at the meeting, most commonly on a CD. The *Proceedings* also must be logically organized, and typically contains much more detailed reports of the research being presented. A fully complete *Proceedings* CD should also document the conference itself by including important parts of the *Program*.

THE Web-CMS

The Web-CMS is tailored to assist organizations and their program chairs to consistently produce outstanding conferences that meet the challenges above. A major key to success is careful management and processing of program data. A second major key is a user interface that is easy to understand and otherwise transparent.

The interface centers around a browser screen called the Desired Action screen, where clickable buttons are presented to accomplish the various tasks the user might like to perform. A prime element in its design is that the only buttons that appear are relevant and the buttons are organized into topical groups. For example, if a user has not submitted something, there will be no buttons to allow editing of a submission. Similarly, buttons needed by the Program Chair only are not visible to a Track Chair or other participant.

The system provides for upload of PDF submissions of papers or paper proposals, and proposals for panels, tutorials and workshops for blind review. The Program Chair or Track chairs can assign reviewers to the submission. After assignment, a reviewer will have a button presented to download the submission and another button to submit a review with recommendations.

Perhaps the most serious problem facing a Program Chair intending to publish in a formal publication information submitted over the web is incorrect capitalization. In absence of a system to assure proper capitalization of submitted titles, names and addresses, much of the submitted work has to essentially be retyped. The Web-CMS will not let a submitter proceed until proper capitalization has been achieved.

After reviews have been received the Program Chair or Track Chair can set flags for accept/reject. Acceptance noted by a Track Chair is normally considered to be a recommendation. The web system can then send out accept/reject notice e-mails in batches.

Either party can then form sessions by assigning papers of similar subject, provide a suitable title and staff with a Session Chair and some number of Discussants. Most organizations assign one Discussant to each paper, so the responsibility to report a critical analysis is clear. However, Discussants can also be treated as having been assigned to the session as a whole.

The Program Chair assembles the array of time slots (day, time, room) that define available presentation times for sessions, as well as time slots for scheduled events, such as registration periods, coffees, etc. Each time slot has designations that allocate the space to the intended purpose only. In other words, a session cannot be assigned to a time slot intended for an organizational meeting only or an event, and visa versa.

Given the current state of development of the Web-CMS, this is the point at which the information is downloaded from the web into a PC-based CMS to actually do the scheduling of sessions into time slots, identification and removal of schedule conflicts and preparation of the conference materials.

For more detail and the capabilities of the Web-CMS coupled with the CMS, please visit <http://www.ConferenceMgt.com>.

MEGA RESORTS: PAST, PRESENT AND FUTURE

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Mega Resorts: Past, Present, and Future

The purpose of this paper is to define, analyze and discuss the historical, present and future operations and development of mega resorts, and their effect on the Hospitality and Tourism Industry. Of the 20 largest mega resorts in the United States, 17 of them are in Las Vegas and of the 22 largest Resorts in the world 18 are in Las Vegas, Nevada.

We define a "Mega Resort" to mean one that is not only large in terms of size (1500+ rooms), but also one that has on-site upscale amenities such as a spa, fitness center, restaurants, shopping, abundant activities, and a fun nightlife. Many include on their premises a city like conglomeration of condominiums, hotel rooms and suites.

In today's travel industry, where money is frequently no object, limitations rarely exist. Hotel perks and services once reserved for the most elite travelers have found their way to any traveler willing to pay.

The resorts along the Las Vegas Strip are most typically thought of as mega resorts because of their gargantuan size and complexity. Las Vegas has been referred to as one of the modern Seven Wonders of the World. Today, Las Vegas is a futuristic city that's rapidly going upscale, with more attractions per square mile than anywhere else on earth, and mega resorts that offer the traveler a glimpse of Paradise.

Even more remarkable is the sheer scale of the development and redevelopment that's going on within the 4.5 miles of the Las Vegas strip. More than \$30 billion is being invested in the development of new mega resorts such as MGM/Mirage's City Center during a period of time when the rest of the country is in a recession.

Basic-Time Line for Mega Resorts

Roman Public Baths

European Spa

Swiss Resorts

American Resorts:

- Spas

- Seaside resorts

- Luxury accommodation in the early 1800s

- Hunting and fishing resorts

- Horse racing and gambling became popular at resorts

First resorts areas develop (Atlantic City)

Railroads provide transportation

Las Angeles was a resort at one time

Hawaii resorts start with the advent of steamships

Ski resorts in America started, and tied to railroads

Development of interstate highway system gave the public to travel more

1950's- Disneyland and theme parks began

Jet service begins- New destination resorts proliferated

At this time many traditional resorts decline (Atlantic City)

1960's Boom in exotic travel within the US – Hawaii, Virgin Islands

Airline (Pam AM) develops resorts (Starts Inter-Continental Resorts)

1970's Development of International resorts

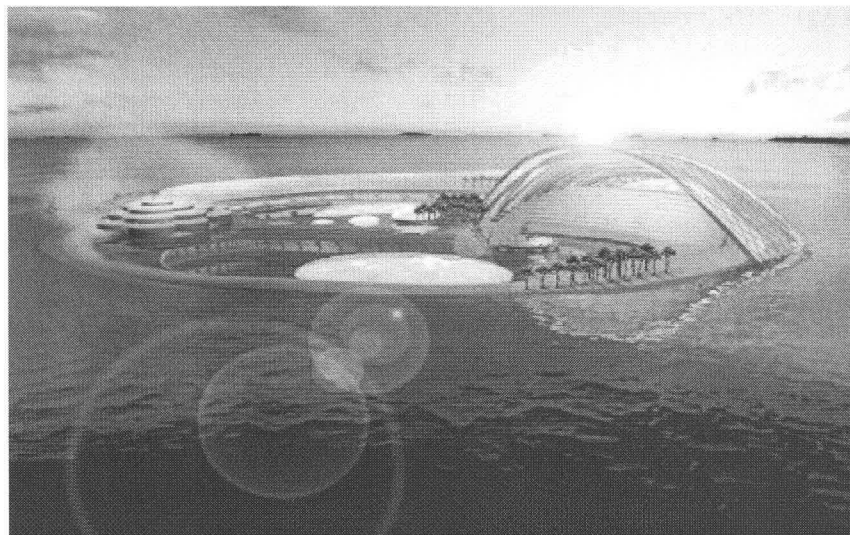
1980's four seasons resorts

Addition of convention segment to resorts market segment

Airline deregulation

1990's – global competition, cruise growth

Future- ?



Hydropolis – largest underwater hotel/ resort

The roots of resorts concept can be traced to the Roman Empire. Extending from the public baths, resorts were initially built in and around Rome before being devolved for pleasure of Roman legionnaires and consuls throughout the empire from North Africa, Greece, Turkey, Germany, Switzerland and even to England. The first baths were small, modest and separated the genders. These baths were large buildings and built at the public's expense. The Roman baths were much like the resorts of today because of all the amenities offered at their locations. The public baths served both health and social purpose and allowed for relaxation, while the sale of food and drink on the premises encouraged social interaction. After bathing the Roman people had always something to do, because most baths included gyms, libraries, snack bars, restaurants, rooms, shops lounges, taverns, museums and theatres. The Roman Empire began to decline at the beginning of the fifth century A.D. Social life at the English resorts languished until the seventeenth century, when it was refueled by improvements in roads and the introduction of the stagecoach.

In Europe, in the year 1326 A.D., Colin le Loup, a Belgian ironmaster, was cured of a long-term illness by the iron-rich waters of a spring near the town of Liege. He developed a shelter at the spring to welcome others. The popularity of the area grew so much that it was renamed Spa, meaning fountain.

The popularity of spas and resorts in England is a result of King Charles II. He did spend time at popular resorts of the day, Bath, Tunbridge Wells, and Harrogate. Thus began the long history of attractions being popularized by the rich and famous, a tradition that continues today. A second factor that made spas popular was the endorsement of the medical profession. Bathing in and even drinking salt water was regarded as a cure for numerous diseases and helped promote a seaside resorts. Popular activities at the baths included gaming, dancing, and other forms

of entertainment, including concerts, grand parades, and the pump room, where health-seekers “took the water.”

With the rise of popularity of the spas in the 1800’s created a demand for more private facilities.

This was directly responsible for the major development of the Swiss resorts industry. At this time period railroads did not exist and guests would travel long distances over poor roads to arrive at their destination. People would stay at the resorts for long periods of time – up to two months to get the best value for their travel expenses. This led to resort facilities being built to accommodate a guest better than an average inn at the time. The Hotel Baur au Lac, built in Zurich was the first resort to utilize the value of a scenic view facing Lake Lucerne.

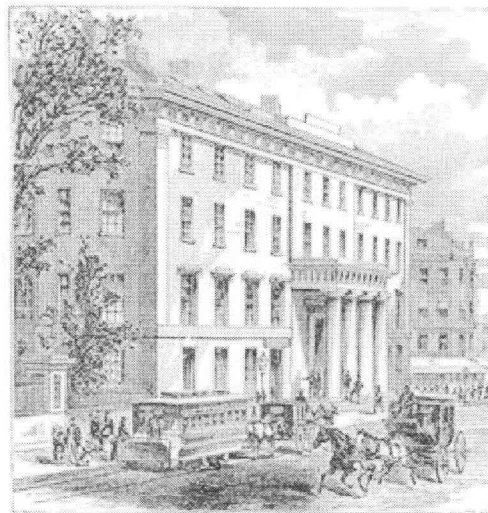
In the early 1800s, Switzerland was known as a summer resort area. However, in the 1860’s, several English visitors were convinced to stay on for the winter to come. Skating was already popular and favorite activity among travelers. In Switzerland guests and travelers were introduced to skiing and tobogganing. While the main attraction of these resorts was the promise of health cures, the popularity of these resorts was due more to the social activities and gatherings that were normally organized by management. One example was the Bains de Monaco, renamed Le Mont Charles (Monte Carlo) in 1863. Operating in the winter months when traditional summer resorts were closed, it offered guests a year-around gambling. While the main high light of the resort was still a health spa, the real sources of the resort’s success was the gambling that came into the resort all year around.

The earliest resorts in the United States were developed in the East and, as in Europe, were established around spas. Resort hotels were opened in Virginia, New York, and West Virginia in the eighteenth century. At approximately the same time, the seaside resort became popular. The latter was a commercial port where molasses was distilled into rum, which was then traded for slaves from Africa. When the slave trade was abolished at the end of the eighteenth century, the

town turned to tourism for its economical future. Wealthy southerners would venture north to escape the heat and malaria of South Carolina in the summer.

Early hotels were rather barren in terms of amenities. The forerunner of many upgraded facilities to be later found in resorts hotels was not a resort hotel itself. The Tremont Hotel in Boston, built in 1829, is credited with introducing a number of innovations in service, including:

- Elegant marble
- Carved walnut furniture in private rooms
- A pitcher and bowl and free cakes of soap in each guestroom
- Gaslight instead of candles
- French cuisine and silver table server that included forks
- Bellboys
- An “annunciator”- the forerunner of the room telephone
- Indoor plumbing
- Indoor toilets and baths
- Reception area
- Locked rooms for the guests



With Civil War in America at this time period, the nature of many Eastern resorts had long catered to southern gentlemen who brought their horses (and slaves) with them to race while they took the waters. The springs popularity declined and resorts had to re-focus on social activities. A new racetrack was built, but ultimately it could not compete with the higher purses at Newport and Monmouth Park in Long Branch, New Jersey. The resorts had to turn somewhere

to produce money and gambling was the answer, and drew some interesting characters until the early twentieth century, but reformists would change all of that.

American's first resort city was Atlantic City. Developed in the late 1800s, it attracted the middle as well as the upper classes. It built the first boardwalk to accommodate those seeking the health benefits of sunshine and fresh air, the first amusement pier that extended over the Atlantic, and the Observation Roundabout- later renamed the Ferris wheel. Railroads would bring day trippers; other guest stayed for the season in boardinghouses and resorts hotels. Today, buses bring day gambles from New York City and other metropolitan cities and surrounding areas.

Into the twentieth century the typical North American resort was a summer operation. Improvements in transportation changed the structure of resorts. The railroad were instrumental in opening up areas of the country were inaccessible. Both railroads and resorts targeted the relatively few very wealthy individuals, who had a great deal of disposable income at their expense. Winter resorts did not become popular until the development of the automobile, which provided access to areas of the country suitable for winter vacations. California, in contrast, was the first area to develop as a warm winter resort, appealing to those looking to escape the winter cold. Florida, as a warm winter resorts, was developed more slowly but soon enough in the 1920, Florida because of more railroads down to Florida surpassed California in popularity as winter retreat for North Americans.

In 1929, the stock market crashed and World War II broke out in the United States. Production and development of resorts were put on hold for the war effort. After the end of the war and rationing, there was a period of economic prosperity. Leisure travel was available to a much broader segment of the population. In the 1950s with the development of the interstate highway system gave the average American great freedom of mobility. The development of Disneyland in California in 1955 was followed by a numerous other theme parks throughout the

country in the 1960s and 1970s. Disney World opened in 1971 in Florida and set the standard for destination for family resorts.

In the mid- 1950s, the development of jet travel was opened up, for North Americans, areas of Europe and the Pacific that were previously inaccessible. Air travel was still costly, however and relatively few could afford it. Soon, air-travel will dominate the travel industry.

In the early 1960s saw the development of the four season resorts. Realizing the risk involved in relying for business on one season of the year, hotels sought to develop year-round attractions. Planned resorts communities, large scale communities with a variety of accommodation options, recreational facilities and infrastructure came about.

The past decade has seen a new type of resort entering into the market- the mega-resorts/ family resorts. These properties are not necessarily the largest of the resorts. Rather they are properties that have upscale amenities on-site such as a spa, fitness center, shopping, recreational activities, and a fun nightlife. Examples include the Hyatt Regency Waikaloa in Hawaii and the Disney and Hyatt Grand Cypress hotels in Orlando, Florida. Because of the high cost of amenities provided an often fantasy themes that are part of the resort experience, the properties require high room rates and occupancies to be financially viable.

By the 1990s there was global competition for resorts to bring more guests and of course resorts were all over the world. From North American, Japan, the Mediterranean, Europe, and the Caribbean islands, there are resorts anywhere and everywhere in today's world. The most mega resorts located in one area can be found in Las Vegas, Nevada. In Las Vegas have seventeen of the largest mega resorts in the United States.

With the history of resorts, history suggests that resorts are completely dependent of transportation. As time continued on, the resort evolved to the demands and wants of the public during the time. From the creation of the stagecoach, the railroad, the automobile, jet-aircraft, the massive cruise ships, all helped the creation of the modern resorts and the mega resorts that most

of the general public can enjoy. In the future, and as transportation develops more, the resorts of today could be unthinkable in the future.

Current Mega Resorts

Mega resort is a type of destination resort which integrates the services offered by a hotel, casino, dining, entertainment, and shopping into a single, large, and highly stylized or themed venue. The Las Vegas strip is best known for these mega resorts due to the number of resorts that are located there. Las Vegas is one of the biggest tourist destinations in the world, and with tourist comes the need to please them to regain their business the next time they came into town. Mega resorts make it very easy for their guests to have a relaxing and very enjoyable stay, regardless of which resort you are staying in. Resorts have come a very long way in just a short period of time, and with the advancements in technology in the service industry, the sky is the limit on what they will be able to do in the future.

We define a "Mega Resort" to mean one that is not only large in terms of size (1500+ rooms), but also one that has on-site upscale amenities such as a spa, fitness center, restaurants, shopping, abundant activities, and a fun nightlife.. If you enjoy a high-energy atmosphere and ample social opportunities Mega Resort's offer the best of all worlds...

Two Las Vegas, Nevada projects in 1969 and 1973^{[1][2][3]} by architect Martin Stern, Jr. and entrepreneur Kirk Kerkorian, the International Hotel (later the Las Vegas Hilton) and the MGM Grand Hotel and Casino (later Bally's Las Vegas), set the standard for such casino resorts. After the International and the MGM Grand, the first megaresort is generally considered^[citation needed] to have been The Mirage given its size and emphasis on non-gaming entertainment options like shopping and fine dining to draw in customers. Megaresorts use the same fantastic or

mythical theme (medieval life at Excalibur, tropical at The Mirage, famous cities, etc.) throughout their properties.

Current resorts are becoming bigger and allow its guest's availability to almost anything imaginable. The Wynn Las Vegas is a prime example of how far the world of resorts has come. It was opened on April 28, 2005, houses over 2700 rooms and suites, and has over 111,000 square feet of casino floor. Wynn Las Vegas is the first casino to include a luxury car dealership. Brand new straight from the factory cars include the Ferrari and also the Maserati brands. The cars on display range in price from a little more than \$100,000 to \$1.6 million. The Wynn Las Vegas also boasts an attraction called "Lake Of Dreams." The Mirage Hotel shows a beautiful water/light show available to any patron walking down the strip in Las Vegas, the Lake Of Dreams attraction the main attraction is a large waterfall behind a large group of rocks in the shape of the mountain facing the strip. The difference between the two attractions is if someone wants to see the Lake Of Dreams, they must actually enter the hotel. The show can be viewed from the Parasol Up which is an upstairs bar/viewing area. You can also watch the show from Parasol Down, where the view is much larger than the Parasol Up. For the people who are eating at the SW Steakhouse or Daniel Boulud Brasserie, where there is also a very good sight of the waterfall. Though new resorts are starting to differ themselves from their predecessors, those same predecessors are a corner stone for what most people consider Las Vegas, "sin city."

The Venetian Resort Hotel Casino is the largest AAA Five-Diamond rated Resort in the Americas, and one of the most popular/busiest in Las Vegas. It was opened on May 3, 1999, cost 1.6 billion dollars to construct, has over 7100 suites, and also contains over 120,000 square feet of casino/gaming area. The hotel is based on a Venice theme, and contains a very large 500,000 square feet indoor retail mall, which guests use gondola rides to get from shop to shop. It is home to over 15 upscale restaurants, including *Bouchon*, which is the vision of Thomas

Keller, America's top ranked chef. Those who stay at The Venetian also have access to the amenities that are offered including the Canyon Ranch Spa, which is a 69,000 square feet fitness center and spa. A new production of Andrew Lloyd Weber's musical The Phantom of the Opera, which runs 95 minutes long and new special effects only seen at the Venetian. The Phantom Theater, where the play takes place, was custom built to resemble the Palais Garnier, the original theatre where the play was performed.

The Luxor Hotel was one of Las Vegas's first themed mega resorts, which is based off an Egyptian motif. The entrance to the hotel makes it one of the most recognizable resorts in the world with a large imitation of The Great Sphinx of Giza above the doors. A theatre and 2000 more rooms were added a few years later to allow concerts/performances, and to also allow more guests to stay and experience the Egyptian themed resort. Some of the more popular attractions at the theatre include Criss Angel, LAX nightclub, and an IMAX theatre.

Not far down the street, sits the miraculous Mandalay Bay. It was opened on March 2, 1999, and cost just under 1 billion dollars at 950 million dollars. It contains over 3300 rooms and over 135,000 square of casino floor. The main draw of guests to the hotel is the amazing pool which covers over 11 acres of land. It holds a beach, 2 heated pools, a topless pool, a wave pool, and a lazy river which travels under a small waterfall. The pool has been honored and rewarded as the best pool in Las Vegas, 7 years running. There are also a total of 24 restaurants at the hotel where great chefs such as Wolfgang Puck and others are all associated with restaurants at the hotel. The Mandalay Bay Events Center is a 12,000 seat indoor arena and home to many music concerts and sporting events including boxing pay-per-views, and also the fast growing and ever popular Ultimate Fighting Championship events. The hotel also includes a saltwater aquarium and the shark aquarium which is currently the third largest tank in North

America. But contrary to most beliefs, not all mega resorts are located in Las Vegas nor are they casino based resorts.

The Bellagio, is an AAA Five-Diamond rated luxury hotel and casino, which has the most famous landmark in the Las Vegas. The Fountains of Bellagio consists of a long line of fountains which are shot up one after another to music, with lighting in the background to make it seem as though the fountains are changing color. It was opened on October 15, 1998, contains 117,000 square feet of gaming space, and costing fewer than 1.7 billion dollars. The Bellagio has been seen in numerous movies, most notably being Ocean's Eleven, and Ocean's Thirteen.

The Big Sky Ski resort is located in Bozeman, Montana. It was originally the idea of an NBC newscaster and was opened in late 1973. The top elevation on the mountain 11,166 feet, with the base elevation being at 6800 feet. There is over 3600 acres of skiable land, on average around 400 inches of snowfall. Borne USA resorts, which now own the land, plans over 400 million dollars worth of upgrades to the resort by the end of 2011. During the summer months though, the Big Sky resort has now become a popular summer attraction as well. Summer activities include horseback riding, rafting and fly fishing in the Gallatin River, and there are tennis courts down at the base of the mountain.

The Disneyland Resort Paris which is located in Paris, France, was opened on April 12, 1992. The resort cost 2.3 billion dollars; seven hotels house a total of 5200 rooms, with a total of 18,200 rooms being built by 2017 at varying distances from the park. Disneyland Paris is made up of two separate theme parks, an entertainment district for those patrons who are over the legal drinking age, and the seven hotels. Though there was a slow start to the visitors at the park, it has slowly increased each year with 2007 having 14.5 million visitors, making it one of France's top tourist attractions.

Future Mega Resorts

Revel Entertainment is unveiling plans to construct a new series of Mega Resorts in Atlantic City. The city planning board granted preliminary site plan approval to Revel Entertainment as the company unveiled architecturally striking plans for its megaresort. Revel plans to build a tower with almost 2,000 rooms and a casino exceeding 168,000 square feet on 20 acres of vacant land adjacent to the Showboat. The total project is expected to cost between \$2 billion and \$2.5 billion.

The typical casino hotel here features a tower with the name of the property plastered high up in bright lights. Revel Entertainment promises no-name towers. The architecture will speak for itself, Revel CEO Kevin DeSanctis told the planning board during the first public presentation about the resort. "We think you don't need anything but great buildings," he said. The board approved preliminary site plans, which allows Revel to proceed with piles, footings and foundations.

The first phase of the project is slated to open its doors in the latter half of 2010, earlier than originally proposed. Each of the 710-foot towers will have 1,936 hotel rooms. "We wanted to add some architecture, a component somewhat missing in Atlantic City," DeSanctis said. "This project will add a terrific dimension to the skyline. The second thing we wanted to do was incorporate the beach," he said.

Revel Beach, a sand playground at the far corner of the complex where it will meet the boardwalk, will include a night club, dining area and retail shopping. Visitors entering the property for valet parking will travel on a rising road that will curve around close to the boardwalk before entering the drop-off area. And a number of locations within the resort will feature windows overlooking the beach and boardwalk.

Entertainment will be prominent within the 5.5 million-square-foot buildings on 20 acres, including 1,000 feet of boardwalk frontage. Revel will house a 5,000-seat event center, with a lobby area overlooking the casino floor, a 600-seat theater and other lounges scattered throughout. "We were empowered to create a large series of 'wows,' " said Michael L. Prifti, an architect with BLT Architects in Philadelphia, which did the principal design work.

Additional features of the Revel project include:

A two-story 168,000-square-foot casino floor will feature a performance venue, dining and retail. A spacious hotel lobby will be on the floor above the casino, and feature a bar, coffee shop and lounge.

A large spa and fitness center will have both indoor and outdoor swimming pools, with terraces outside. 90,000 square feet of dining space and more than 120,000 square feet of retail will be spread throughout the property. Retail shops will line the boardwalk beneath the 7,600-space parking garage between Connecticut and New Jersey avenues. Some 900 spaces will be set aside for the 5,000-6,000 employees expected to be hired.

The entrance to the casino hotel from the parking garage will pass another grouping of retail stores.

Guests will enter the self-park garage to the right just after entering the property on Connecticut Avenue. Visitors will leave the property along a separate road that exits onto Massachusetts Avenue. Additional exits onto New Jersey and Metropolitan avenues will be put into play to accommodate major entertainment and sporting events.

Revel needs to do more work before the final site plan approval meeting set for about six to eight weeks from now.

The planning board had a laundry list of requirements for Revel to complete, including a traffic management plan, changes to the internal roadway to shield the boardwalk from car fumes, and detailed explanations for requested waivers. "This project is a lot more complex than it looks," DeSanctis said.

Revel is also seeking city council approval for a redevelopment plan in the area. "We are asking the city to do certain things," DeSanctis said. Key among them is dealing with roadway infrastructure to allow better access to and from the site. The city owns parcels that will be part of widening the entrance and exits to and from the resort. The plan would eliminate parking on portions of Connecticut and Massachusetts avenues, which will also be one way. The fate of Garden Pier, across the boardwalk from the parking garage, was not discussed. The pier houses the Atlantic City Art Center and the Atlantic City Historical Museum. The rear portion is in disrepair.

"It's disappointing to leave Garden Pier the way it is. But there is a difference of opinion on the valuation," DeSanctis said earlier this week.

Kaleem Shabazz, director of the art center, would love to stay on the city-owned pier. "But if Revel wants to develop the pier, we'd have to move," he said.

Amenities

Mega Resort Hotels are the Cadillac's of hotels and resorts; they are the top of the line and they offer everything anyone can think of and there is something for all age groups to do. While some hotels and casinos offer some of things that can be found in a mega resort hotel, they

do not offer everything and that is why mega resort hotels have become such an elite group. The standards for mega resorts were first started by two men, Martin Stern, Jr. and Kirk Kerkorian. These men designed and built the Las Vegas Hilton and the MGM Grand Hotel which started the idea for a type of mega resort hotel which would include all kinds of entertainment. The Mirage resort on the Las Vegas strip became the first mega resort hotel and included all the amenities such as having over a thousand rooms, a resort theme, world class fitness centers as well as other services that go into becoming a mega resort hotel.

The first thing that goes into being classified as a mega resort hotel is having over a thousand rooms. By having a standard on this aspect it decreases the number of mega resort hotels by a large amount. In order to become one of the best of the mega resorts you need to offer a wide variety of room selections that should be available to all guests. Mega resort hotels need to offer a range of rooms varying on price to accommodate for all guests who are looking for a room. For instance, The MGM Grand hotel on the Las Vegas strip offers eleven different types of rooms. The rooms at the MGM Grand range from very pricey rooms such as Skylofts Penthouse Suites and the Signature at MGM Grand to cheaper rooms such as the Grand Tower and the West Wing. All mega resort hotels put their own twist on the types of rooms they offer but they all have an assortment of rooms to be sure they cover all guests who are looking to stay at their hotel.

The next amenity offered by mega resorts are day spas and salons. When guests stay at resorts of this stature they are looking to enjoy their stay and have a good time. Having the possibility to spend the day getting treatments from trained professional's appeals to many guests mainly which are females. Like with everything associated with mega resorts, variety is also a major issue for spas and salons because they need to accommodate for all their guests. For example, the Luxor on the Las Vegas Strip offers massages, deluxe massages, body treatment,

facials, advanced beauty, and special spa packages. These treatments have a range of costs but can also be given out to guests as complimentary treatment for staying at their hotel. Each mega resort also has a luxurious pool or pools that are designed to accompany the hotel and create help create the theme of the hotel. Some mega resort hotels have indoor pools as well as outdoor pools and with most of the pools comes a type of bar access, sometimes even including a wet bar.

A variety of different bars and clubs gives you an advantage that draws many tourists and guests to stay at your hotel instead of staying at another hotel or resort. The first type of bar all mega resorts should include is some type of sports bar where guests can come in a casual dress and have a couple of drinks while watching sporting events on several very large televisions. Some sports bars, like the Luxor's Playbar have the technology built into the bar so that guests can make wagers on sporting events through programs such as Sports Book. Another type of bar that mega resorts should offer is a wet bar; which is a bar built into the pool so guest using the pool can swim up or walk over to it without having to leave the pool area. This wet bar should be accompanied by employees who walk around to the cabanas searching for people who would like another drink. This service just adds to the high standards of mega resort hotels. Having other unique bars is also very good for making the hotel stand out above the rest and could either reflect the theme of the hotel or be a one of a kind bar that know other place offers. The club scenario also needs to be unique and different from one hotel to another for the same reason as having unique bars. Mega resort hotels should offer clubs for people who are of or over the legal age to consume alcohol and ones for those who have yet to reach that age. The more clubs and variety that are offered give a better chance for every guest to find a club that they can enjoy.

Probably one of the most important amenities offered by mega resort hotels is the type of dining that is offered and the way that it is presented. The presentation of the food could

possibly be the most important aspect of this amenity because every hotel is going to offer steak, seafood, and so on but they will present this food differently which will make guests remember their experience. As a mega resort hotel you need to offer all kinds of dining including room service, upscale dining, and casual dining. The Bellagio in Vegas has all kinds of dining which include fine dining, contemporary dining, casual dining, and quick eats. They also include dining called From the Sommelier, which has been rewarded for having the best wine, and Jean-Philippe which is a European style pastry shop. Having many types of dining services and places to eat gives the guests the opportunities for romantic dinners or casual dining with the family after spending the day at the pool.

Another amenity that is offered by mega resort hotels are world class fitness centers, including steam rooms, saunas, and whirlpools. Every fitness center also includes top of the line cardiovascular workout machines as well as many different types of weight training equipment. Whether it be for pleasure or business guests staying in your hotel will want to stay in shape and to do this these fitness centers need to be available for their use. Other facilities that guests look for in a mega resort are sporting facilities such as tennis courts and basketball courts. Having these facilities available to guests, is just another perk and helps create a positive experience for the guests stay. A major facility that mega resorts should have if they have enough room is a pristine golf course. Over the years playing golf while staying at a mega resort for business or pleasure has increased enormously and many potential guests look for this before they make a reservation.

Other amenities that are offered at all mega resorts are valet parking, concierge service, and having butler and chamber maids for every room. These perks are expected by guests and go into the overall experience of their stay. Having the convenience to be able to drive up to the front door and know that your car will be parked, taken care of, and brought back to you when

you need it is the epitome of classic valet service; which has become a standard in the resort industry. The other amenities stated are standard in all hotels but making sure that this service goes above and beyond expectations is what sets the high standards expected for these resorts.

Having a mall inside or one that is connected to the resort is also beginning to be almost expected when staying at a resort of this stature. Guests enjoy being able to have walk to a mall that is part of the resort and one that offers a variety of shops and stores. Some resorts have their own individual mall but other resorts that are close together are able to share one between them. Having a unique feature to your resort is another way to make it stand out from the rest. An example of a unique feature is having a museum built into the resort itself. Every resort doesn't need to have a museum but it has its advantages to have some type of feature like a museum because of how much it makes the resort stand out from the rest. The goals of amenities are to have the guests enjoy their stay, come back and stay again, and spread their positive experience to their friends and family.

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**A History of the Ski Industry in the United States and Switzerland: An Examination
of Industry Success and Failure**

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Abstract

Throughout the past two decades, the United States ski industry has been in a state of virtual stagnation and more realistically an increasing state of decline. Many industry experts are quick to place the blame on a permanent problem, a reduction in annual snowfall over the past few seasons. By ignoring other possible problems or contributing factors, the industry is potentially setting itself up to repeat the mistakes of the past 25 years while missing possible solutions. While the American ski industry has faced a considerable amount of reduction in total visits, the European market, in particular, the Swiss Market has remained unwavering and at times seen growth. This study of the Swiss and US ski markets may provide some insight and possible solutions to the increasing stagnation and possible problems of the American ski market.

Introduction

Skiing is considered to be one of the world's oldest sports, dating back over 5,000 years, although the development of the alpine ski resort has been a relatively modern phenomenon. The earliest ski resorts began as extensions of summer time travel resorts for the wealthy in Europe, and now have evolved to a capacity of several thousand acres and can also support over a million visitors a year. Today's modern mega resorts have expanded to include retail shopping, real estate development and housing, fine cuisine, summer time activities, and a host of other modern luxuries meeting and in some cases exceeding all economic levels.

The growth of the ski industry originally began around the turn of the 20th century, when a drastic change came in ski technique thanks to a man named Mathias Zdarsky. Zdarsky's invention of the stem ski technique allowed for the ability to teach the average person how to ski in a relatively short time. This new turn technique was quickly adopted by the British and, in the 1910s they introduced alpine skiing, or downhill skiing as it is commonly known today.

As alpine skiing grew in popularity, summer inns and resorts began to stay open all over Europe during the low business winter months (Meijer 2005). By the 1930s, older resorts were expanding and newer resorts were being established. America also saw the introduction of several alpine resorts, especially in the densely populated East coast. Over the next 40 years, resorts would begin to crop up all over Europe and North America. According to J. Rivera and P. Leon, around the mid 1970s an estimated 735 ski

resorts operated in the United States alone (2004). By the late 1970s, there came a slowing of ski resort expansion in the United States thanks to the work of environmentalist groups and an over saturation of the ski resort market. The slow down, combined with a consolidation movement in the early 1980s saw a number of small, privately owned resorts discontinue skiing and shut down completely. According to *Skier* magazine, the past 30 years has seen an estimated 250 US ski resorts shut down completely (Mejer 2005).

In response to this dormant period of ski resort expansion and consolidation, a new trend began to develop in the ski resort industry. Up until the mid 1980s, ski resorts had generally been privately owned and were developed and owned by a family or a small group of community members who had come together to start the resort. In 1986 the founding of Intrawest Corp. a public company, which acquires and operates a conglomerate of resorts across North America, was developed. Since the introduction of Intrawest Corp, several other ski conglomerates have emerged, including American Skiing Company, Vail Resorts Inc., and Booth Creek Ski Holdings Inc.

These new resort conglomerates have brought a fresh face to the ski industry, offering options for skiing at multiple locations on one ticket, the financial backing needed for improvements and renovations, while providing the capacity for expansion of current resort facilities and skiable terrain. Despite the introduction of these conglomerates offering consistent service, modernized facilities, and an expanded offering of nightlife, resort terrain, and non-skier related activities, ski resort visits have continued to remain stagnant or decrease in the past 15 years. It is vital that ski resorts

take the time to examine the ski industry market and make corrections in the near future so this billion dollar industry in the United States does not continue to decline.

Basic Questions and Problem

Facing a potentially dangerous downturn in the skier services market, the industry has largely ignored the ongoing volatility of the past 25 years. Many resorts have recently adopted the stance that the downturn is solely reflective of recent increasing temperatures and lower levels of snowfall. However, this narrow minded approach leads to a general sense of indifference, based upon the problem being linked to an uncontrollable environmental factor. Because increasing temperatures are leading to reduced levels of snowfall, the resorts naturally assume the emotional effects of not seeing snow associate to fewer skier visits. This idea becomes problematic because unless some form of change occurs in the near future, a substantial revenue generator for the hospitality and tourism industry during a typically slow winter period could be lost.

By ignoring other potential factors that could be contributing to the downturn in the skier services industry, should a return to normalcy in climate levels occur the industry will be sent scrambling to find other solutions? Additionally, while climate may be the dominant factor that the industry is facing, many other factors are contributing to the problem. Therefore, it is a necessity that to ensure the long term health of the industry, an in depth study must be conducted in order to determine those factors that are ultimately causing the industry's struggling growth.

Therefore, the United States skiing industry has faced a dramatic downturn from record highs in skier visits during the early 1980s while the European Sector of the

industry has remained relatively strong, Switzerland in particular. Through a comparative analysis of the winter sports market in the United States and Switzerland, it may be possible to explain the most recent decline in the American market, and provide new solutions to help prevent further downturns and the continual closing of properties in this multimillion dollar industry.

Basic Definition of Sports and Recreation Ski Terms

In order to understand the remainder of this study the following terms must be defined:

- Skier Services Industry – the encompassing industry that includes all facets of alpine skiing, including, but not limited to, ski resorts, ski and ski accessory manufacturers, retailers, wholesalers, and non direct affiliation lodging establishments.
- Resort – A place frequented by people for relaxation or recreation.
- Alpine Skiing – The form of skiing where the participants go downhill rather than cross country.
- Winter Sports – Any sport that is performed at a ski resort, such as skiing or snowboarding.
- Uphill Capacity – The total number of winter sport participants a ski resort can transport up the mountain in one hour.
- Season Pass – A one time purchase that entitles a person to use the resort's ski slopes an unlimited amount of times for the specified season.

The United States

Over the past two decades, the winter sports industry has faced a general decline in participation. While the past 2 winters have shown a general increase in the industry

figures, it is still imperative that steps be taken to help correct this decline. In an article by J. Rivera and P. Leon, the authors cite a study by the National Ski Areas Association which states, "For the last 20 years, the number of annual skier-snowboarder visits has remained relatively constant, averaging about 54 million visits per year" (2004). This figure is surprising when one considers that the entire ski sports market has remained stagnant for two whole decades despite increases in population and increased access to travel. Even the conglomerates have felt the sting in recent months. J. Rivera and P. Leon go on to say, "intense competition, price discounts, and large capital investments have kept profits significantly low even for the largest ski resort chains such as Vail Resorts, Intrawest, and American Skiing Company" (2004).

The most recent downturn has been caused by a multitude of events in the history of the ski industry which all seem to have compounded each other, bringing the industry to its current state. The industry has been under pressure by their inability to respond to these changes and take the appropriate actions, which have further driven the business into the state of ineffectiveness it faces today. The problems many resorts face today can be organized into many distinct categories: internal factors, market forces, and environmental factors. Response to the basic factors the industry has struggled with will enable many resorts to adapt their business models to meet future needs.

Basic Factors Affecting Resorts Today

Many problems first began to develop for ski resorts in the early 1980s as the industry moved from the small ski resort for recreation, to a more destination oriented approach. As resorts began to compete for new business, huge expenditures on resort amenities began to occur. "Major areas spent millions of dollars on snowmaking

equipment during the late 1970s and early 1980s. The successful ones left behind other areas that could not keep up with the pace of investment” (Hamilton et. al. 2003).

Resorts began offering snowmaking as a way to extend the season beyond what natural snowfall could provide and a competitive advantage over those resorts without snowmaking emerged. Resorts were now able to open earlier in the year and close far later. At the same time resorts began converting many surface lifts, such as J-Bars and tow ropes, over to ski lifts that allowed a larger uphill capacity and lengthened the skier’s run. These new lifts cost substantially more than the small surface lifts that were traditionally found at ski resorts and soon many resorts were forced to add them or lose out to a competitor. As the 1980’s progressed, resorts began to spend money on high tech grooming equipment that could “manicure” the slopes for the ultimate skiing experience. Many resorts began adding base lodges that include night life, dining services, convention services, and lodging facilities. The capital expenditures became so large that many resorts had trouble keeping pace. As large resorts began adding these extra amenities “...they were really becoming a class ahead. And as the medium size areas... tried to compete, they overextended themselves and [in] light economic downturns or bad snow years they had no reserves to back them” (Hamilton et. al. 2003).

This began to drive many of the mid size resorts out of business, due to either an inability to spend the capital required to advance their properties or an unwillingness to adapt to the changing industry. In fact, according to L. Hamilton, of the 123 shut down ski resorts in New Hampshire, 93 of these resorts were small scale resorts that operated using only surface lifts and today just 2 of the 19 resorts in operation in New Hampshire operate

without a ski lift (2003). On the other hand, the Swiss resorts seem to have not been sucked into this expansion trend.

Those who were able to make it through expansion have been left in a very at risk situation. Still financing the debt undertaken to expand the resort, many resorts were left in a position where one bad winter could potentially bury the company. Also, in an industry where “margins are thin, ranging from 2.8% to 12.4% before interest costs and depreciation...” (McCune 1994) companies have been buried by the amount of debt they have taken to finance their expansion, which has led to further resorts closing. J. McCune found one ski executive who describes the situation as being so dire that "... profits are so slim there's no margin for error" (1994).

Additionally, as resorts all raced to keep up with the latest expansion efforts in the industry, trying to provide the biggest, best, or newest form of entertainment, two major events happened: (1) they entered into the destination market area of tourism, and (2) began to lose brand identity. As the resorts began to add new features, such as alternative forms of recreation, including at some locations, laser tag, snowtubing, and night clubs, the resorts began to leave the niche market and become more all-inclusive destinations. By doing this, resorts attempted to attract customers, not on their original product of skiing, but other attractions as well. The result was that ski resorts found themselves competing with major tourist attractions such as Disney. In fact, R. Lane found ski resorts executives feel you can no longer think of it as a ski business because it is a part of the entertainment/vacation industry (1996). Many resort executives even feel that it is a necessity for their industry to survive. According to David Perry, director of marketing

for Whistler Mountain Ski Corp in J. McCune's article "...since the ski industry isn't growing, we're growing by grabbing market share from others" (1994).

The problem has become that as resorts have expanded, they have all attempted to expand by offering the same services. This leads to the next reason why resorts are failing to attract new winter sports enthusiasts, a failure to brand differentiate. Most full scale ski resorts offer very similar services, including recreation, lodging, retail opportunities, and food and beverage. By failing to provide brand differentiation, the resorts have failed to entice a new market of non skiers to the resort and reduced the potential to attract new participants. Only recently have resorts that have attempted to differentiate themselves from the industry shown positive results, such as Mountain High in Southern California that has had overwhelming success marketing themselves as a snowboard only resort and providing features that snowboarders enjoy (Makens 2001).

Switzerland

While resorts in the United States rushed to expand skiable terrain, many ski resorts in Switzerland stayed true to their market segment. According to the Swiss Tourism website, Switzerland has over 209 ski resorts in their country of all shapes and sizes (Switzerland Tourism n.d.). Of those 209 resorts, 106 are at or under 25 km of skiable terrain, some even as small as just 1 km of skiable terrain. With over 50% of ski resorts in Switzerland at or under 25 km, the country has not forced itself into a competition for the biggest and best equipment and services available thereby, outgrowing themselves.

Recently though, Switzerland has started to expand, but not into additional services. In recent years, Swiss resorts have begun to expand the terrain their mountain

offers. This move toward expansion has been spurred greatly by climate concerns in recent years. In an article by CBS News, they paraphrase a United Nations report that states “estimated temperatures will rise by a range of 2.5 degrees to 10.4 degrees Fahrenheit by 2100, unless dramatic action is taken to reduce greenhouse gas emissions” (Dampf 2003). Many resorts would be greatly affected by this, especially Switzerland, due to the fact that the Alps lie much lower than most US mountain ranges. In fact, most Swiss resorts right now sit in the 4,000-8,000 foot range. Economic Geographer Rolf Buerk, who headed the U.N. Study says that “right now the magic number for ski resorts is 4,265 feet” (Dampf 2003). This means, that at or above this height there is reliable snow for Swiss resorts. Anything underneath this level would be forced to rely on snowmaking equipment and grooming techniques to survive the winter months. The Guardian Newspaper reported a study by Zurich University that stated 70% of the Alps glaciers would be gone within a generation (Hickman 2005). The disappearance of glaciers means no year round skiing for many Swiss residents and the end of numerous resorts that survive solely on the glacier.

In response to recent climate problems, many Swiss resorts are attempting two strategies: (1) diversify into low cost seasonal alternatives or (2) attempt to move higher into the mountains, providing more consistent snowfall. Eduardo Zwissig, marketing director of Gstaad in Switzerland is quoted by CBS News as saying that Gstaad is looking for ways to add new hiking trails that can be used year-round and adding a convention center to their current offerings (Dampf 2003). Ideas such as additional hiking trails are just one of the many alternatives to attempt to attract year round tourists. Other resorts are looking at the possibilities of promoting scenic lakes or bicycling. The

Tour de Romandie is a cycling event that explores the French speaking regions of Switzerland with several stages ending in ski towns throughout the region. The second option is to attempt to move to higher elevations and extend ski lifts to parts of mountains that are, at the current time, inaccessible. Places all over the Alps, not just Switzerland, are trying to be proactive about global warming and attempting to expand to mountains that are untouched and undeveloped. Resorts such as Silvretta on the Swiss/German border is attempting to expand to the Piz Val Gronda mountain peak over 9,000 feet high (Traynor 2005). Traynor reports that Silvretta is poised to invest “8m [Euros] to obtain a further 45 miles of pistes” (Traynor 2005).

The Swiss have not been immune to governmental regulation either. With the most recent push for expansion comes immense pressure from local populations and government officials. “Building of new ski resorts has been banned in Switzerland and Germany” (Traynor 2005). Many governments are responding to pressure from local citizens groups who are opposed to resorts in their backyards. As resorts have expanded and grown throughout the Alps, many local populations have complained of over crowding, increased car traffic, and environmental impacts to name just a few. The countries of the Alps initially reached an agreement back in 1995 trying to curb development issues with the Alpine Convention, but recent bureaucracy has bogged down the organization and allowed developers to run rampant (Traynor 2005).

While the ski resorts have been faced with numerous challenges in the European market, in recent years, ski numbers have remained steady and quite strong. While Switzerland fails to keep statistics on skier visits and lift tickets sold, the government does track the number of lessons administered in regional government ski schools.

According to the Swiss Federal Statistics Office 2005 Tourism Figures, 2,074,321 half day lessons were administered via public ski schools for the 2003/2004 ski year. Additionally, 5 of the 8 provinces of Switzerland have experienced an increase in total number of lessons since the 2000/2001 ski season (Switzerland Federal Statistical Office 2005). With 5 provinces increasing their number of skier visits, these figures suggest the industry is growing in Switzerland. While numbers have dropped off in 3 of the provinces, overall numbers have remained consistent. The Swiss market is beginning to see a shift to increased skiing in several provinces that should provide continued growth for the industry. The unique feature, but pitfall of the ski school lessons statistic is that it only shows new or intermediate skiers. More experienced skiers do not typically require a lesson and, therefore, it is tough to gauge the exact level of skiers in the market, but the statistics on lessons show that there is a market and it appears to be growing in some respects.

Conclusion and Basic Research Questions

Ski resorts all over the United States have fallen on tough times the last two decades. With so many factors impacting the pool of potential skiers, a clear and definitive explanation needs to be made on the following key points:

- Can smaller resorts compete by offering technology or amenities over larger sized resorts?
- Is the recent downturn the product of poor public relations and a negative image of the sport due to the high profile deaths and safety concerns?
- How big of a psychological impact does temperature and snow have on the participant's decision to participate?

- Would differentiating a product to a specific market attract more participants or does differentiation become lost in the core industry?
- To what extent does cost affect the participation of individuals?
- Does the hassle or stress associated with skiing/snowboarding impact the industry, and, if so, to what extent?

By examining these questions, the hope is that United States ski industry professionals can get a better sense of the problems their own market is facing. Then by examining how the Swiss operate their resorts, it may become obvious how American ski resorts can apply various Swiss techniques and hopefully revive the industry.

As stated, the ski industry in the United States has been in a struggle over the past two decades and has shown little sign of hope. Meanwhile, the Swiss have had a strong industry and have managed to keep over 200 resorts of all sizes in operation. When reviewing the two markets, we find many similarities, with most categories being differentiated by less than a full point. However, when examining the top 5 major influences for each market we find some significant differences.

When looking at the top 5 influences on skiing in the United States, either positive or negative, we find that in order: (1) other activities, (2) modern technology, (3) additional terrain, (4) equipment cost, and (5) recent snowfall provide the biggest impact on the US ski market. Throughout the early 90s, many resorts competed against each other to rapidly expand and meet the needs of their customer base. While it did help to steal customers from each other it did nothing to expand the customer base for the entire sport. When viewing the top 5 determinants for infrequent participants in the United States we find that other activities, modern technology, additional terrain, equipment

cost, and participation cost are the largest concerns. The industry has done well to address the top 3 answers, but in doing so has driven industry costs out of control, reduced their profit margin, and made it increasingly harder for participants to partake in the industry.

When looking at Switzerland, we find that they deal with many of the same issues, but have approached them differently. Looking at the Swiss top 5 determinants that affect the entire industry we find that other activities, additional terrain, establishing a destination market, recent snowfall, and differentiation of product are the top priorities. The Swiss have done a nice job controlling costs and making it affordable to everyone to participate. The Swiss Market has done a nice job differentiating themselves with a multitude of resort sizes. The key will be for resorts to not expand too quickly and then pass the cost on to consumers. By preparing for bad winters and only overextending funds when necessary, resorts can remain competitive in the current climate.

Looking toward the future for U.S. ski resorts, they should take that smaller resorts are able to compete by either offering updated technology or additional amenities. Additional terrain is not always a priority as evidenced by the Swiss market. Furthermore, safety does not play as much of an impact in the industry as one might expect. Neither the United States nor Swiss respondents appeared concerned with personal safety on the hill to a great extent. Temperature and climate does have some impact on participants, but not in equal ways in both countries. The United States market needs to focus on ensuring awareness of good skiing during warm temperatures and promoting recent snowfall as selling points. The United States shows a positive response toward destination marketing and differentiation, but not as much as one would hope.

There is a tough battle with destination markets that the Swiss seem to fend off much easier. Therefore, destination marketing may not be the correct direction. To the beginning skier cost is an incredible expense and should be monitored very closely. Rapid expansion has forced slim margins, but also priced people out of the sport from both the participation standpoint and the equipment standpoint. Lastly, the hassle and stress associated with skiing comes mainly from trying to get there. Local resorts that place themselves close to population centers may see increased benefits because they are providing services at a certain level of convenience.

While no research can ever fully get a complete, in-depth retrospective of the industry, this study can provide an initial starting point for further research on the topic and an opportunity for ski resorts to begin focusing on particular areas of study. By providing an initial exploratory study of the topic, further surveying and a more encompassing survey can thus begin. Moving on from here, recommendations for future action would call for a more in-depth look at the industry with greater coverage of survey data. Factors such as region, income, and participation bias all must be considered to get a completely accurate picture. Hopefully some of these results can lead to a stronger future for the ski industry.

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Walking-Your-Talk: Gap Analysis for Student Attendance at Collegiate Athletic Events

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ABSTRACT

Students in the Wall College of Business at Coastal Carolina University surveyed members of the student body to assess the opportunities and challenges of the University's efforts to encourage students to attend the University's Division I collegiate athletic events. By including both measures of importance and satisfaction with aspects of attending athletic events, it is possible to assess whether issues important to students in attending athletic events are producing satisfaction. This technique, known as Gap Analysis, is outlined as a demonstration project for other institutions seeking to assess and model students' perceptions of collegiate athletic events.

INTRODUCTION

A key component of success in today's business climate is the need to analyze the situation to determine the strengths and weaknesses of an enterprise. The notion of a "Strategic Window" being opened as part of the situation and available for a finite time prior to closure is an easy analogy to grasp (Abel 1978). Peter Drucker noted it is more important to "do the right thing" (effectiveness) than "to do things right" (efficiency) (Kotler 2003, p. 69).

Today's college student has a variety of options to choose from when deciding how to spend their leisure time and entertainment dollar. One option is collegiate athletics. In deed, marketing wars are fought to attract students to athletic events and won or lost on the basis of competitive advantage. In the definition of strategy used here, competitive advantage comes from the intersection of focus, flexibility, and sacrifice (Reis and Trout 1986). Here, focus means finding the "hole" in the market or the target market where the product or service has special appeal and exploiting what is important; and, concentrating on winning the marketing battle to get satisfaction. Flexibility means marketers selectively modify the product or service delivery to match the customer needs or requirements as far as possible to build loyalty. So, where important things are not being satisfied, changes must be made. Finally, sacrifice means it is impossible to be all things to all people in all collegiate athletics.

It is contended here that knowing what is in the mind of the customer is the first step in crafting strategy from a situation analysis. In the context of a strategic planning process, we must establish a baseline of customer perceptions of recent performance before determining, what (if any) changes ought to be considered in our products and programs.

The purpose of this manuscript is to outline a research study conducted at an AACSB accredited College of Business in support of the University's Intercollegiate Athletics program. Students in the College of Business (in conjunction with their instructors) crafted this study to seek input from today's student body. Such input will be used by the Athletic Department to critically evaluate past and present efforts to increase student attendance at sporting events and to plan future efforts to do so. Thus, a key component of this study is to identify the critical issues facing the athletic department in getting students to attend events and to assess their relative performance in dealing with such issues by measuring student satisfaction. Known as Gap Analysis (originally advanced by Martilla and James 1977), we can assess whether athletic administrators are "walking their talk." Stated another way, are they focusing their efforts on those items of greatest importance?

This manuscript is organized as follows. First, institutional background is provided along with some context regarding the nature and importance of the athletic program at CCU. Second, the relevant AACSB standards guiding this research effort are outlined. Third, the methodology used to conduct the study is presented. Finally, the results are presented and implications offered. The preparation of this manuscript is driven by the desire to outline a process used by one AACSB member with other institutions similarly interested in active learning and attendance at intercollegiate athletic events. The actual quantitative results are equally important to the dynamics of sharing methodologies and instruments with academic colleagues.

CONTEXT FOR STUDY: INSTITUTIONAL BACKGROUND

Coastal Carolina University is a public comprehensive liberal arts institution located in Conway, South Carolina, just nine miles from the Atlantic coast resort community of Myrtle Beach. Located in one of the fastest-growing metropolitan areas in the nation, the campus primarily serves its immediate operating area known as the "Grand Strand." The Intercollegiate Athletics program at Coastal Carolina University has changed dramatically with rapid growth in enrolled students. Coastal Carolina University currently sponsors 17 sports - eight men's programs and nine women's. Coastal Carolina University is a member of the Big South Athletic Conference ("Big South") and competes at the NCAA Football Championship Subdivision level (previously known as Division I-AA). Here are the mission and vision statements for Coastal Carolina University athletics:

- The Mission: Creating and Inspiring Leadership through Athletics.
- The Vision: Community Involvement, Athletics and Academics Excellence, and Team and Campus Spirit.

Athletic Programs at Coastal Carolina University have enjoyed a successful past. The best macro measure of such programmatic success is the Sasser Cup, an award given to the Big South Conference member who's combined athletic teams achieved the most success (won-loss records and points for conference standings) for that year based on regular season and championship contests, games, or events. Coastal Carolina University has been awarded the Sasser Cup a total of Nine times, a Big South Conference record.

PARTNERSHIP: COLLEGE OF BUSINESS AND ATHLETIC DEPARTMENT

Business Colleges accredited by AACSB – The Association to Advance Collegiate Schools of Business – commit to a program of self- and peer-assessment, continuous improvement, and assessment of outcomes in light of the Business School’s missions. Member AACSB institutions approved a new set of accreditation standards in April 2003 (with revised guidance in January 2004, 2005, 2006, 2007, 2008) to enhance continuous improvement in management education. One paradigm change mandated by the change in Accreditation Standards is the push toward active learning (i.e., engaging students in the discipline of inquiry) (see www.aacsb.edu).

Mission-Driven Activities and Relevant AACSB Standards Guiding This Research Effort

Accreditation by AACSB can be described as a mission-driven program of continuous improvement. Institutions are assessed relative to their performance to published standards in light of the School’s mission. For Coastal, the College of Business is held to the following mission:

The mission of the E. Craig Wall Sr. College of Business Administration is to educate each of our students to have the qualities and attributes essential to his/her progressive and continuing development throughout careers in private, public, and non-profit organizations in a globally competitive and diverse environment. Inherent in this mission is our commitment to the following objectives:

1. Teaching - We will teach the core business functions through applied, experiential, and active learning strategies facilitated by appropriate technologies.
2. Intellectual contribution – We will create and disseminate knowledge in business, which includes learning and pedagogical research, high value added contributions to practice, and discipline-based scholarship.
3. Public service – We will provide professional expertise to benefit the local, regional, national, and international community.
4. Stakeholder involvement – We will actively promote an open and collegial environment that includes input from students, staff, alumni, employers and other institutional stakeholders.

The reader will note the College’s commitment to active learning and stakeholder involvement. These two commitments flow directly from AACSB standards 13 And 15:

Standard 13: Individual Faculty Educational Responsibility	Individual teaching faculty members: (1) operate with integrity in their dealings with students and colleagues, (2) keep their own knowledge current with continuing development of their teaching disciplines, (3) actively involve students in the learning process, (4) encourage collaboration and cooperation among participants, (5) ensure frequent, prompt feedback on student performance.
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Standard 15: Management of the Curricula	Management of the Curricula: The school uses well documented, systematic processes to develop, monitor, evaluate, and revise the substance and delivery of the curricula of degree programs and to assess the impact of the curricula on learning. Curriculum management includes input from all appropriate constituencies which may include faculty, staff, administrators, students, faculty from non-business disciplines, alumni, and the business community served by the school.
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We seek to engage students in the learning process under the assumption that they remember only 10% of what they hear, but remember 90% of what they do. Active learning enables students to create a learning experience and begin to achieve the higher order learning objective of analysis and integration of content at a practical level (Anderson 1997). And, we seek to create active learning projects to be done in conjunction with important stakeholders, both on- and off-campus. Finally, partner projects on-campus allow us to create and reinforce a sense of community and connectedness among various university departments. Collectively, we are Coastal Carolina University.

IMPORTANCE-PERFORMANCE ANALYSIS ... THE FOUNDATION FOR GAP ANALYSIS

In general, studies which focus on the assessment of outcomes tend to focus solely on importance of outcomes or performance toward standards and thus do not provide a complete picture of current activities and mission fulfillment. Evaluating importance of outcomes and performance toward standards are both important. Taken separately, however, it can be difficult to convert such measures into practical strategic responses. The use of Importance-Performance Analysis can help to avoid these potential problem areas and demystify the results in such a way that decision-makers may more easily use them for developing specific action steps for their organizations.

Briefly, Importance-Performance Analysis involves measuring the IMPORTANCE and the PERFORMANCE of a stimulus and then creating a graphical display of the results on a two dimensional (i.e., 2x2) "action grid," such as presented in **Figure One**. This graph serves two important purposes. First, it offers an easily-interpreted visual display of the results of the analysis. Secondly, and perhaps more importantly, it provides a basis for strategy formulation.

Figure One
Importance-Performance Grid

HIGH Importance	A. Concentrate Here	B. Keep Up the Good Work
LOW Importance	C. Low Priority	D. Possible Overkill
	LOW Performance	HIGH Performance

Looking at **Figure One**, you see the upper half of the matrix represents stimulus dimensions which are perceived as higher importance while the bottom half are those dimensions which are considered of lower importance. The right-hand side of the matrix contains attributes for which performance is perceived to be at higher performance levels whereas the left-hand side of the matrix contains items with lower performance levels. The 2x2 Importance-Performance grid presented contains four quadrants:

1. **Concentrate Here** – High Importance, Low Performance
2. **Keep Up the Good Work** - High Importance, High Performance
3. **Low Priority** – Low Importance, Low Performance
4. **Possible Overkill** - Low Importance, High Performance

METHODOLOGY

Students enrolled in Marketing Research at Coastal Carolina University worked with their instructor to gather data and conduct a Gap Analysis for CCU’s Athletics.

Questionnaire Design

The questionnaire used in this study was based upon one developed by McCullough and Fullerton (2008) and appears in the appendix. The finalized questionnaire was posted to a unique Internet address for data collection. A copy of the questionnaire is provided in the **APPENDIX**.

Data Collection

VOVICI software was used to collect information. The email addresses of CCU students were generated through a snowball sampling procedure. A cover letter (sent via email) was used in data collection. It contained a direct link to the survey.

Respondents were offered a copy of the results upon completion of the study to stimulate participation (Goodman 2006). Approximately 1,500 email addresses were used in a seven day field period with 578 responses received from a student population of around 7,800. Assuming a good database of addresses

(and that is an unknown), we received around a 33% response rate with a 78% completion rate. Although with the response and completion rates found there are concerns regarding non-response error, recognition must be made that we did, in fact, live our mission statement: we used active learning to enhance student learning and we help an important stakeholder (our colleagues in Athletics) collect important customer feedback.

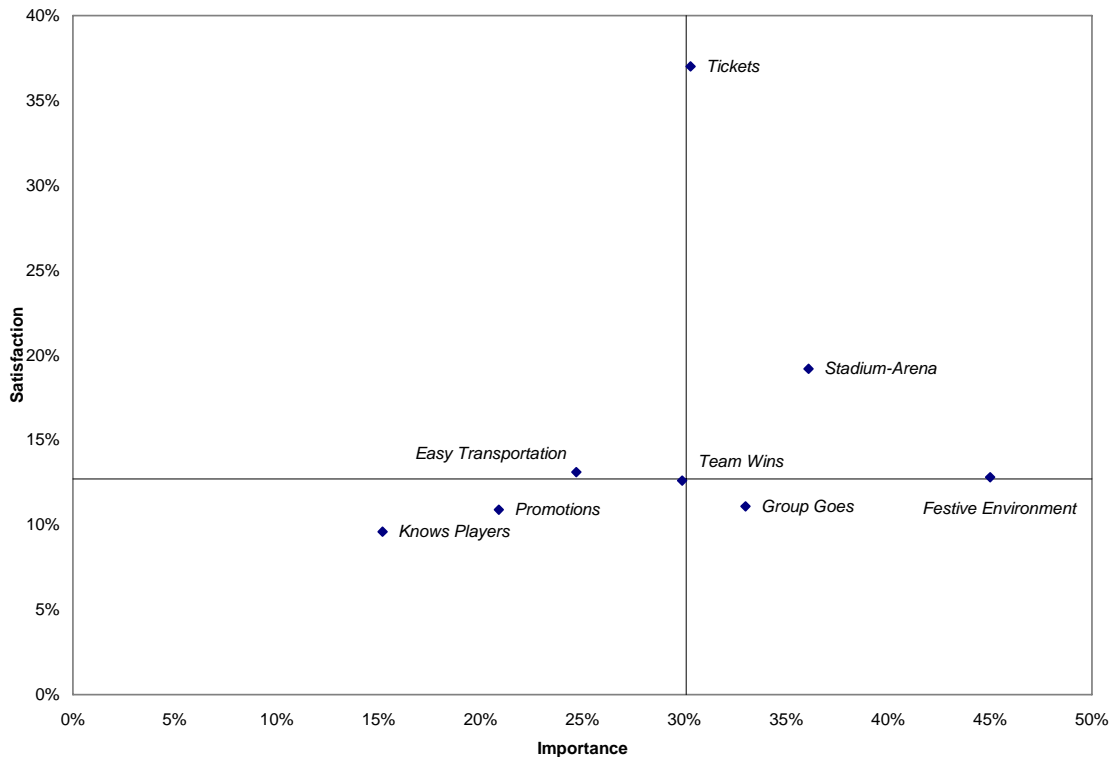
RESEARCH RESULTS

The results are presented in **Table One** and graphically in **Figure Two**.

Table One
Top – Box Importance and Satisfaction Ratings for Eight Attributes

Attribute	Importance	Satisfaction
Tickets	30%	37%
Team Wins	30%	13%
Stadium-Arena	36%	19%
Promotions	21%	11%
Group Goes	33%	11%
Easy Transportation	25%	13%
Festive Environment	45%	13%
Knows Players	15%	10%

Figure Two
Gap Analysis Using a Quadrant Chart



Since a traditional Gap Analysis using Brand Map uses only top – box percentages for both Importance and Satisfaction ratings on each of the eight attributes from the questionnaire, only those data are presented in **Table One** and used to create the quadrant chart in **Figure Two**. A clustering of responses in the High-Importance / High-Satisfaction Quadrant is the desired outcome for the organization being assessed (e.g., keep up the good work!). It indicates they are focusing efforts on important matters. They are “walking their talk.” Such is the evaluation here for only Stadium-Arena where a relatively Important attribute is also relatively high in Satisfaction. Tickets are on the borderline and are highest in satisfaction probably because ticket cost is ‘hidden’ in student fees paid with tuition. Festive environment is relatively high in Importance and relatively low in Satisfaction, presumably due to the no-alcohol policy on campus as indicated by student comments. Improvement could be made in Easy Transportation presumably due to lack of parking near the Football stadium, but this is a relatively low priority item. Game day promotions relationships with players are low in Importance and Satisfaction and therefore not an issue when it comes to improvement. The won-loss record of the team and the tendency of students to attend events in groups are not issues to be addressed since they are near the origin of the map.

The map presented as **Figure Two** is for all students. Similar maps could be constructed for segments of the student body based on the demographics included in the questionnaire.

A DEMONSTRATION PROJECT FOR CONSIDERATION

The research process outlined here represents a mission-driven effort to fuse the teaching, research, and service efforts of the faculty. A synergy can be created by leveraging our efforts accordingly. The project outlined here achieved the following outcomes:

- We enhanced student learning in the Marketing Research class by embracing active learning.
- We used technology (on-line survey software) to facilitate data collection and provided an active learning experience.
- We collected input from important stakeholders (students) for use by the Athletic Department in their planning efforts.
- We provided a value-added public service to an important stakeholder (sharing the results of the study with students and the Athletic Department).

This work is presented here to provide academic colleagues at other institutions subject matter, methodology, technology support, and other research components for consideration at their respective institutions. Replication is possible for a variety of specific sports such as Football and Women's Softball, and so on. Students can evaluate the performance of all 17 collegiate athletics at CCU to address our central question: "are they walking their talk?" In our case, the answer is "yes" in general. More importantly, this fact was illustrated to our students. The outcomes provided many avenues for class discussion and student presentations.

Collectively, this was a successful project for our institution. While we were disappointed with the somewhat surprising low response rate (and have concerns regarding non-response error), recognition must be made that we did, in fact, live our mission: we enhanced a course with active learning and technology; we sought stakeholder input; we provided a value-added public service. We offer our work as a demonstration projects for other institutions seeking similar outcomes.

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APPENDIX

CCU Athletics and You

We wish to understand student attitudes toward attending CCU athletic events. To be sure, this study is only exploratory in nature. We wish to determine the perceptions and attitudes of CCU students which affect their attendance at CCU team athletic events such as Football and Women's Basketball.

Please be candid in your responses. Be assured this is a completely anonymous process. We will be combining the responses to gain a better understanding of existing CCU student attitudes and perceptions on this matter.

Below is a list of items which may influence your decision to attend an athletic event here at Coastal Carolina University. Please tell us the RELATIVE LEVEL OF IMPORTANCE of each item, in your opinion, to our decision to attend a CCU athletic event. Next, please tell us your RELATIVE LEVEL OF SATISFACTION with CCU's efforts to achieve each outcome to date.

NOTE: You should provide TWO responses for each item listed ... an IMPORTANCE measure and a PERFORMANCE (i.e., Satisfaction) measure.

	How <u>Important</u> is Each Item to Your Decision to Attend a CCU Athletic Event?					How <u>Satisfied</u> Are You With CCU's Efforts to Address Each Item?				
	Not Important At All = 1	Not That Important = 2	Neutral = 3	Somewhat Important = 4	Very Important = 5	Very Dissatisfied = 1	Somewhat Dissatisfied = 2	Neutral = 3	Somewhat Satisfied = 4	Very Satisfied = 5
Low Ticket Prices										
A Winning Team										
A Convenient Stadium/Arena										
Interesting Game Day Promotions										
A Big Group in Attendance										
Easy Transportation to the Stadium/Arena										
A Festive Environment										
Knowing the Players										

Gender?

Male
Female

Employment Status?

Full-time student with no job.
Full-time student with a part-time job.
Full-time student with a full-time job.
Part-time student with no job.
Part-time student with a part-time job.
Part-time student with a full-time job.

Housing Arrangements?

I live on-campus in the dormitories.
I live off-campus in CCU housing (University Place).
I live off-campus in non-CCU housing (apartment, townhouse, etc).

Student Status at Coastal Carolina University?

I entered CCU as a first-year student.
I entered CCU as a transfer student from another college or university.

Your Relationship to CCU Student-Athletes (select one)?

I am a CCU Student-Athlete.
I am the friend of a CCU Student-Athlete.
I am NEITHER a CCU Student-Athlete nor a friend of a CCU Student-Athlete.

Organizational Status?

I am a member of a Fraternity or Sorority.
I am a member of a student club.
I am a member of another student organization.
I am NOT a member of a Fraternity, Sorority, student club, or other student group.

Please tell us the LAST NAME of the person who sent this survey to you?

Please feel free to offer any additional information regarding your attendance at CCU Athletic Events in the space below.

Thank you for your input!

FACTORS AFFECTING SELF ESTEEM

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ABSTRACT

Self esteem comes from internal sources. When we have healthy self esteem we feel comfortable with ourselves and do not dependent on anyone else to make us feel good about ourselves. Healthy self esteem allows us to be confident and aware of our strengths and abilities. We understand that everyone has strengths and weaknesses and accept that we are not perfect.

Outside sources can have a negative influence on the internal effects of self esteem which is based on our ability to assess ourselves accurately and still be able to accept and value ourselves unconditionally (Crocker et. al., 2006). This includes being able to realistically acknowledge our strengths and limitations while accepting ourselves as worthwhile. When we have healthy self esteem we may challenge past negative experiences or messages by nurturing and caring for ourselves in ways that show we are valuable, competent, deserving and lovable (Baumeister et. al., 2005). This discussion focuses on healthy self esteem as well as low self esteem and its consequences.

Origins of Self Esteem

An image of ourselves evolves throughout our lives beginning in our childhood. We build images of ourselves based on experiences we encounter with different people in our lives. These images are shaped around how our successes and failures are treated by our family members, teachers, peers, religious leaders, and coaches (Crocker et. al., 2006). Our self esteem is created by how we are treated by others through our experiences and activities.

Self esteem is based on how we feel when we look in the mirror or talk about ourselves. Self esteem is knowing we are worthy of love and respect and accepting our limitations and boundaries (Trzesniewski et. al., 2006). Self esteem is how we see ourselves and how we feel about our achievements.

Healthy self esteem is important because it gives us the courage to try new things and the power to believe in ourselves. It leads to us respecting ourselves, even when we make mistakes. When we respect ourselves, other people usually respect us too (Olson et. al., 2007). Healthy self esteem helps us make good choices about our mind and body. It leads to us valuing our health, feelings and safety. Healthy self esteem helps us know that every part of us is worth caring for and protecting (Olson et. al., 2007).

Low Self Esteem

When we have low self esteem we need positive external experiences to counteract our negative internal feelings and thoughts. Many times the good feelings from our positive external experiences are temporary. For instance, if a high grade is earned in a course, we may temporarily feel that we deserve it. Unfortunately, when we have low self-esteem, our inner voice may punish us by criticizing our accomplishments. Teachers can benefit from identifying students with low self esteem. This can help teachers provide support to students where needed.

Low self esteem individuals tend to view life in a negative way. These negative views can result in a belief that we are worthless (Crocker, 2006). This may lead us to feel hopeless and not put forth much effort because our experiences are seen as pointless (Burke, 2008). Other symptoms of low self esteem include dislike of body image, under-eating, over-eating, and depression. Low self esteem may lead us to think that other people are better than us. This may lead us to lack assertiveness, confidence, and allow others to take advantage of us (Ogle, 2005).

There may be other disorders or illnesses we may be suffering from that are related to low self esteem. Some of these disorders and illnesses include bulimia and post-natal depression. Low self esteem may lead to us wanting to make ourselves feel better through alcohol abuse.

Causes of Low Self Esteem

There are numerous reasons why we may have low self esteem. Low self esteem can be caused by hearing a comment or experiencing an incident that has a negative impact on us mentally and emotionally. The comment or incident may only happen once, but we may tend to repeat it in our memories to the point that it affects our beliefs about ourselves. These beliefs may occur subconsciously over time to the point that we may think that they are normal.

Some of the causes of low self esteem include poor health, being bullied, lack of support from family, friends, and job loss. If we are experiencing verbal and sexual abuse and are in a violent relationship, we may think that is normal and the way we will always be treated. These reasons may lead to feelings of isolation, not feeling valued, loved or wanted (Gyura et. al., 2007). If we are overweight and are having trouble losing weight, this may lead to low self esteem.

Friends, Family, School and Work

Other causes of low self esteem include divorce, dysfunctional family, death and lack of achievement at work and at school. Low self esteem can lead to needs not being met because we feel as though we do not deserve it or are uncomfortable asking. Setting limits and disciplining children can be a problem. Unfortunately, low self-esteem can be passed from parent to child (Diamantopoulou, 2007). If we have parents who are demanding and never satisfied with us, we may think that is normal and the way we will always be treated. The child may model what is

seen as the proper behavior for a parent and in turn treat their child the same way they were treated by their parents (Diamantopoulou, 2007). This could lead to a cycle of abuse.

We may experience low self esteem at an early age because of pressure from our parents, family or friends to excel in school or a particular sport. If we do not perform well our self esteem may be negatively affected. In high school, we may experience low self esteem because we are trying to conform to stereotypes and prove our independence from our parents. In college, we may experience low self esteem because we are trying to acquire skills and find employment. Low self esteem may cause us not to complete our school assignments or tasks at work. We may provide numerous excuses for why we are not able to complete our assignments. These excuses may range from blaming other students in the classroom for making too much noise during an exam, to co-workers who did not explain the tasks completely. Blaming others for our fear of being viewed as a failure can lead to us dropping out of school or prematurely quitting our job.

Low self esteem may cause us to brag about our exploits to our family and friends at school and work. These baseless exploits may be verbalized to mask the true reality of our inabilities. Many times these exploits are eventually discovered to be false. Teachers and employers should be aware that if our self esteem is low, we may display hostility toward authority which can be a way to hide our inefficiency. Teachers also need to be aware that if our self esteem is low and we do not have much in common with our peers that we may end up avoiding school, which can lead to delinquency.

When our self esteem is low, we may have trouble saying no to friends and family. We may end up doing favors we don't want to do and end up going where we don't want to go, with

people we do not desire to accompany us. (Greenberg, 2008). Low self esteem may lead us to believe we have no control over our lives.

Conclusions

When our self esteem is high we view life in a positive way, feel confident, view difficulties as challenges, and are able to be assertive and say yes to what we want and feel and do not allow others to treat us badly (Donnellan, 2005). High self esteem allows us to believe in our self worth and, stand up for ourselves.

Low self esteem can cause us to feel like we are not important and can keep us from trying new things in our lives. It can also be responsible for us not making friends and can affect our performance at work. Low self esteem may lead to negative self talk. These negative comments can be responsible for us believing we are not able to accomplish anything. As soon as we hear negative comments, we need to tell ourselves to stop. This will reduce the power of negative self talk.

Consequences of low self esteem include depression, stress, anxiety and loneliness, problems with our job performance, academics, relationships and friendships (Hill, 2006). These consequences can lead to underachievement and increased vulnerability to drug and alcohol abuse (Zeigler-Hill., V. 2006). Negative consequences of low self esteem can lead to self destructive behavior (Gyura et. al., 2007).

When our self esteem is low we may need to write a list of all the positive things about ourselves such as our strengths and goals. Complimenting ourselves leads to positive thoughts. These compliments should be specific, not general. Focusing on the positive things about ourselves can lead to loving and accepting ourselves. The end result will be a healthy self

esteem, with a positive inner voice that will be reassuring (Sargent, 2006). We can gather support from peers and family which will allow us to know we are not powerless and need to believe in ourselves.

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EXXONMOBIL GOES GREEN

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Abstract

In today's economy, the price of oil impacts many products from gasoline to groceries. The growing use of renewable energy sources, particularly ethanol based fuels, is a potential threat to the gasoline industry. ExxonMobil, the world leader in the oil industry is faced with the decision of expanding ethanol production, and how much to produce and which biomass to use. Public opinion on the skyrocketing price for gasoline and government regulations are the catalyst creating transformations within the industry.

BACKGROUND

ExxonMobil, a world leader in the oil industry, made record profits, 40 billion dollars, for the fiscal year 2007. [3] In today's economy, the price of oil impacts many products from gasoline to groceries. ExxonMobil prides itself on developing proprietary technology that increases the economies of scale and cuts costs of petroleum production. The volatile price of oil and gasoline in today's economy makes a competitive advantage more important to the future success of ExxonMobil. ExxonMobil must prepare to transform with the petroleum industry. The growing use of renewable energy sources is a potential threat to the gasoline industry as it stands currently. Public opinion and government regulations are the catalyst creating transformations within the industry.

The Energy Independence and Security Act of 2007, which sets requirements for 36 billion gallons of bio-fuels (21 billion gallons of non-cornstarch ethanol) to be mixed with gasoline sold by the year 2022, creates a substantial shortage of ethanol in the market. The bio-fuel market created by the Energy Act is an opportunity for ExxonMobil to extend its product line and create a competitive advantage over its competitors. ExxonMobil's research and development is currently focused on refinery efficiencies. ExxonMobil's focus on refinery efficiencies leads to stagnant product lines and limits the company's growth. Currently, ExxonMobil purchases corn-based ethanol for blending on the open market like its competitors. The use of cornstarch ethanol is impacting food prices. To reduce the increase of food prices,

ExxonMobil can find innovative solutions to produce the required product, ethanol, from any carbon-based biomass. Producing non cornstarch ethanol will allow ExxonMobil to reduce its cost and it will decrease the impact cornstarch ethanol is having on the food supply. It should also prove to improve the company's image, while reducing its cost.

With proven oil and gas reserves, as well as efficient production and distribution practices in place, the question is not if ExxonMobil could produce ethanol, but how much to produce and which biomass to use.

BIOMASS TO ETHANOL

ExxonMobil has different options to choose from to solve the above problems. The United States' production of ethanol focuses mostly on the production from corn. However, the following table shows that the corn-based fabrication is not very efficient. Table 1: The Biomass Yield per Acre shows corn-based ethanol has a lower overall annual yield per acre than other biomass sources. Corn-based ethanol also has the least greenhouse gas savings compared to the other biomass sources. There are other sources of ethanol such as switchgrass and woodchips that are much more effective and efficient than corn. [8] In the United States, corn is the easiest and most abundant agricultural crop in use. Farmers, looking for a way to increase the value of their crops, focused on corn. With the increase of food prices, consumers are realizing that using a biomass that is also used for a food source is not such a good idea financially. Understanding the financial impact of corn prices to consumers, researchers have found other biomass that can be used to produce ethanol without impacting food prices.

Table 1: Biomass Yield per Acre

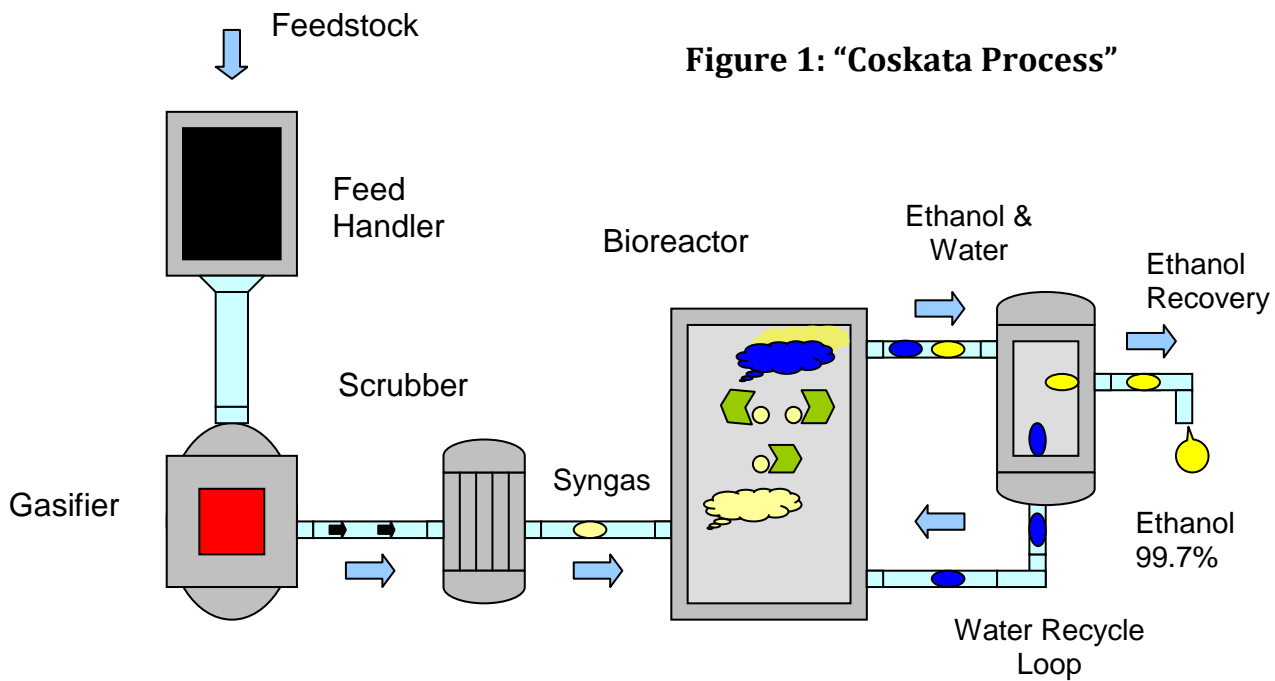
Crop	Annual yield (US gal/acre)	Greenhouse-gas savings (% vs. petrol)
Miscanthus	780	37-73
Switchgrass	330-810	37-73
Poplar	400-640	51-100
Sugar cane	570-700	87-96
Sweet sorghum	270-750	No data
Corn	330-420	10-20

Source (except sorghum):
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To extract ethanol from different cellulose input, ExxonMobil will need to implement specific processes. Our research shows different ways to generate ethanol to include enzymatic conversion and acid hydrolysis. However, after further research, we found an innovative process presented by Coskata, Inc., a biology-based renewable energy company. Coskata's process uses not only switchgrass or corn, but also

woodchips, landfill waste, and even old tires. The process starts with inputting renewable feedstocks and other carbon-based feedstock into a feed handler. From there, the feedstocks go into a gasifier where the process of gasification occurs. The gasifier breaks the chemical bonds in the input and converts it into a gas called synthesis gas, or “syngas.” The syngas passes through the scrubber, which separates potential ethanol and energy. This energy is used to cool the syngas, which goes to the next step of the process, biofermentation. This phase occurs in the bioreactor where microorganisms consume hydrogen (H₂) and carbon monoxide (CO). As a result, the output of the process is ethanol (C₂H₅OH) and water (H₂O). Ethanol recovery, separating ethanol and water, occurs in membranes, reducing the inefficiency of distillation by 50%. The outcome of the process is 99.7% pure ethanol. Up to 85% of that ethanol can be mixed with gasoline. The water is reused in the process to avoid additional costs and waste. The following page presents Figure 1, the process based on the data from Coskata’s Web site. [2]

ExxonMobil maintains economies of scale in oil refining and has the potential to achieve the same economies of scale in ethanol production. Economists estimate bio-fuels can be produced for sale at prices equal to or lower than average gas and diesel prices by 2015. [7] Low marginal cost of production of ethanol and greater marginal revenues are two reasons for ExxonMobil to consider moving into non-corn ethanol production. The automobile market is repositioning engines marketed for flex-fuel vehicles. Toyota, Ford, and Chevrolet are introducing flex-fuel vehicles in the form of cars, trucks, and sport utility vehicles. [4] [5] [9] These industry changes and the mandates by the government have created a large market for ExxonMobil to create an additional competitive advantage through investing.



Current investment allocations are less than 2% of ExxonMobil’s cash flow in research and development and only 4% in exploration. [6] ExxonMobil’s management has a reputation for being conservative in their investment decisions. To align with management’s cost-efficient goals, the bio-fuel production method chosen for our projections allows for ethanol production facilities to be built close to supply terminals where wholesale gasoline is stored. The close proximity of the ethanol plant to the terminals will keep transportation costs for the ethanol at a minimum. Ethanol cannot be transported in the existing gasoline pipelines because of corrosion concerns.

MARKET ENTRY PROJECTIONS

The Projected Investment and Return Schedule (Appendix) is a conservative approach to entering the cellulosic ethanol market. The schedule also includes projected costs and financial profits expected to result from the investment in the cellulosic ethanol production. As mentioned, The Energy Independence and Security Act of 2007 mandates the use of 36 billion gallons of ethanol annually by 2022. The expectations are that 15 billion gallons of cornstarch ethanol can be provided from corn crops in the U.S., the difference must be supplied from non-cornstarch ethanol. The projected entrance schedule allows for ExxonMobil to enter the ethanol market by providing 75% of the 21 billion gallons of non-cornstarch ethanol. The entrance schedule plans for investment and research over the next 14 years, in time to meet the 2022 deadline. Investments in building of ethanol plants, research, and development of the efficiency of ethanol production are included in the schedule. Production will not start until 2010, allowing time for the first plants to be built. The projection schedule plans for ExxonMobil to build four ethanol plants in the first two years, requiring a 1 billion dollar investment. The projection for the third year expects the same financial investments, but due to the learning curve, the schedule allows for six plants to be built during year three. Years four through eight require the investment to increase to 1.5 billion dollars. During this time, ExxonMobil can use the .5 billion dollar increase in invested money to concentrate on improving the efficiency of the production process. The projections allow for 59 plants to be built during the first eight years. Annual output is expected to increase from 100 million gallons to 250 million gallons per plant by 2022. The "Coskata process" currently allows cellulosic ethanol to be produced at a cost of one dollar per gallon. ExxonMobil should be able to reduce these production cost to 79 cents by 2022.

The changing economy presents some unknowns to projecting a production schedule; to adjust for these unknowns we made some assumptions. A fixed 38 cents per gallon production cost for gasoline was used to allow for changes in oil prices. A wholesale price of \$2.40 per gallon was used for E85 (15% ethanol and 85% gasoline) in the entrance schedule. A conservative 12% cost of capital is used for the calculations. Tax savings and depreciation on the plants are not included in the calculations. Total investment would be 6.7 billion dollars, and the present value of the future cash flows is 495.3 billion dollars, leaving a net present value of 488.6 billion dollars for the investment.

The potential financial gains from investing in this bio-fuel process are not the only benefits ExxonMobil could experience. ExxonMobil has suffered a long-standing negative reputation in relation to its environmental record, and leadership has had an uphill battle following the March 24, 1989, 10.8 million-gallon oil spill into the Prince William Sound off the coast of Alaska. [1] Entering the bio-fuel market could be advantageous to its public image in two important ways. The first impact would come from utilizing the Coskata process. It does not pollute the environment, and it actually helps to clean it up by using trash, such as old tires, in the production process. The second impact is reducing the financial pressure on the food industry. The ability to supply 75 % of the cellulosic ethanol required by 2022 from non-corn based biomass would have a direct effect on slowing the escalating price for food. ExxonMobil has made some humanitarian efforts in terms of biodiversity conservation in recent years to buffer the public image of the company. These efforts have not been enough in scale to the 40 billion dollar profit earned in 2007 as evidenced by negative feedback from government officials and consumer rights groups. [3]

Entrance into bio-mass production of ethanol can help ExxonMobil reposition public perception and increase its efforts toward social responsibility while continuing to meet large profit goals. ExxonMobil has to answer to a variety of stakeholders, and the proposed entrance into the bio-fuel production market should satisfy stakeholders while allowing the company to sponsor more humanitarian programs. The bio-fuel production process recommended is the optimal solution to meet both profit demands of stakeholders and conservation demands of the public. ExxonMobil's entrance into bio-fuel production

will help decrease the shortage created by government regulations and by the growth of commercial demand for non-corn based ethanol.

APPENDIX: Projected Investment and Return Schedule

Year		# of Plants Built That Year	Total # of Plants	Year Production Per Plant (MilGal)	Production Each Year (MilGal)	Investment Each Year (\$bln)	Cost Per Gallon (\$)	Total cost (\$bln)	Gas Cost Per Gallon (\$)	E85 Cost Per Gallon (\$)	Cost of Ethanol (\$bln)
2010	after 2	4	4	100	400	1	1	400.00	0.38	0.473	400.00
2011	3	6	10	100	1,000	1	1	1,000.00	0.38	0.473	1,000.00
2012	4	9	19	100	1,900	1.5	1	1,900.00	0.38	0.473	1,900.00
2013	5	10	29	140	4,060	1.5	0.95	3,857.00	0.38	0.4655	3,857.00
2014	6	10	39	160	6,240	1.5	0.92	5,740.80	0.38	0.461	5,740.80
2015	7	10	49	170	8,330	1.5	0.88	7,330.40	0.38	0.455	7,330.40
2016	8	10	59	175	10,325	1.5	0.855	8,827.88	0.38	0.45125	8,827.88
2017	9		59	200	11,800	0.8	0.84	9,912.00	0.38	0.449	9,912.00
2018	10		59	220	12,980	0.8	0.825	10,708.50	0.38	0.44675	10,708.50
2019	11		59	235	13,865	0.8	0.8	11,092.00	0.38	0.443	11,092.00
2020	12		59	243	14,337	0.8	0.785	11,254.55	0.38	0.44075	11,254.55
2021	13		59	247	14,573	0.8	0.775	11,294.08	0.38	0.43925	11,294.08
2022	14		59	250	14,750	0.8	0.769	11,342.75	0.38	0.43835	11,342.75

cost of capital 12%

Gallons of Gas	Cost of Gas (\$bln)	Total Cost (\$bln)	Revenue (\$bln) at \$2.40/gallon	Profit Margin (\$bln)	Year	Investment (\$)	PV of Investment	Profit Margin (\$)	PV of Profit Margin	
2,266.67	861.33	1,261.33	6,400	5,138.67	2	1,000,000,000	797,193,878	5,138,666,667	4,096,513,605	
5,666.67	2,153.33	3,153.33	16,000	12,846.67	3	1,000,000,000	711,780,248	12,846,666,667	9,144,003,584	
10,766.67	4,091.33	5,991.33	30,400	24,408.67	4	1,500,000,000	953,277,118	24,408,666,667	15,512,148,936	
23,006.67	8,742.53	12,599.53	64,960	52,360.47	5	1,500,000,000	851,140,284	52,360,466,667	29,710,734,965	
35,360.00	13,436.80	19,177.60	99,840	80,662.40	6	1,500,000,000	759,946,682	80,662,400,000	40,866,082,149	
47,203.33	17,937.27	25,267.67	133,280	108,012.33	7	1,500,000,000	678,523,823	108,012,333,333	48,859,294,230	
58,508.33	22,233.17	31,061.04	165,200	134,138.96	8	1,500,000,000	605,824,842	134,138,958,333	54,176,475,489	
66,866.67	25,409.33	35,321.33	188,800	153,478.67	9	800,000,000	288,488,020	153,478,666,667	55,345,945,821	
73,553.33	27,950.27	38,658.77	207,680	169,021.23	10	800,000,000	257,578,589	169,021,233,333	54,420,313,549	
78,568.33	29,855.97	40,947.97	221,840	180,892.03	11	800,000,000	229,980,883	180,892,033,333	52,002,137,005	
81,243.00	30,872.34	42,126.89	229,392	187,265.12	12	800,000,000	205,340,074	187,265,115,000	48,066,290,798	
82,580.33	31,380.53	42,674.60	233,168	190,493.40	13	800,000,000	183,339,352	190,493,398,333	43,656,170,288	
83,583.33	31,761.67	43,104.42	236,000	192,895.58	14	800,000,000	163,695,850	192,895,583,333	39,470,258,116	
Total Investment							\$6,686,109,642	Total PV		\$495,326,368,536

NPV \$488,640,258,893

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