

**Northeastern Association of Business, Economics and
Technology**

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Northeastern Association of Business, Economics and Technology

NABET 2018 CONFERENCE PROCEEDINGS

Editors Page

Throughout the 41 year history of the NABET/APUBEF Conference, we have striven to compile and publish the authors' papers which were presented at each of the respective conferences. Since 2010, the Proceedings has been upgraded to peer-reviewed status. Throughout the history of the NABET/APUBEF Proceedings, we have benefited from the services performed by an exceptional group of reviewers and editors.

For the 2018 Conference Proceedings, several attendees at the conference volunteered to participate in the review process. From these volunteers, we selected five individuals to participate in the peer-review process. Each of these reviewers worked diligently and selflessly in the arduous task of meticulously reviewing the various scholarly works that are presented in this Proceedings publication.

The editors acknowledge the dedication, hard work and the excellent result in which the reviewers' efforts resulted. The reviewers of the 2018 NABET Peer-Reviewed Conference Proceedings are:

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- Joshua M. Chicarelli, California University of Pennsylvania
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INTRODUCTION

The Northeastern Association of Business, Economics and Technology is in its forty-first year of existence. It was formerly known as APUBEF, the Association of Pennsylvania University Business and Economics Faculty. It was founded by a group of economics and business professors from the fourteen state universities comprising the Pennsylvania System of Higher Education. Their goal was to provide a platform for sharing and encouraging scholarly work among the business faculty of the fourteen state universities. As a result of their efforts, the organization has grown and has sponsored an academic conference each year for the past 41 years.

Since 2006 NABET has been regional in scope and we plan to become national in scope for the 42nd Annual Meeting and beyond. At the 41st Annual Meeting the scholarly work of authors from fourteen states, Portugal, Spain and Sweden representing 74 colleges and universities were presented.

At NABET, we encourage conference presenters to complete their papers and submit them for publication in this Peer-Reviewed Proceedings publication. Of the 113 papers, workshops and discussion panels presented at the 41st Annual Meeting, the following pages contain those papers that were completed by the authors and submitted to the Proceedings editors. Each paper has gone through a thorough review/edit process. *The Official Conference Program* of the 41st Annual Meeting including the abstracts of each paper that was presented at the conference is also included.

The founders also established a referred journal, The Journal of Business, Economics and Technology (formerly the Pennsylvania Journal of Business and Economics). The Journal applies a double-blind review process and is listed in Cabell's Directory. It is published at least once each year, and has a devoted editorial staff supported by an excellent corps of reviewers.

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THE ALL-ELECTRIC VEHICLE: IS IT TIME?
Jerry D. Belloit, Clarion University of Pennsylvania

ABSTRACT

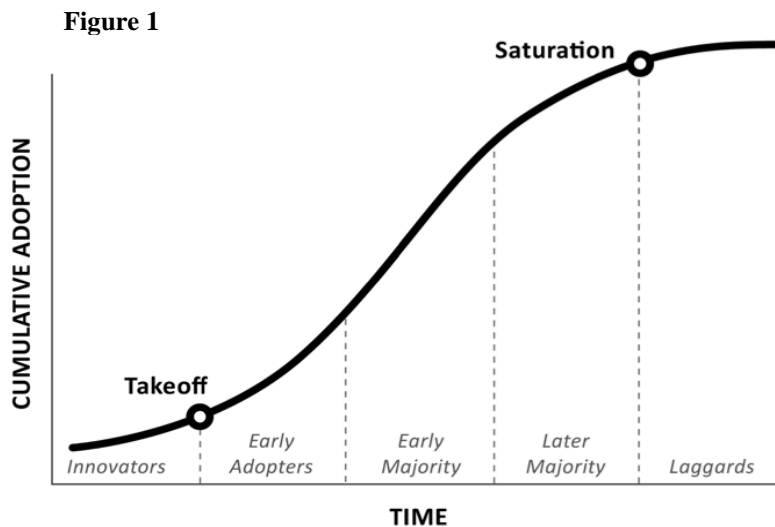
In the summer of 2017, Professor Tony Seba gave a compelling presentation on disruptive technologies. In it, he suggested that the convergence of changes in battery technology, Doppler Lidar, computing power and computer storage, and self-driving vehicle technology will lead to the demise of the internal combustion engine within a decade. At the same time, the automobile industry had introduced several all-electric powered vehicles. This paper will examine the costs and benefits of the move to an all-electric powered vehicle relative to gasoline-powered vehicles, along with a cost-benefit analysis of the additional solar capacity necessary to provide sufficient capacity to provide for powering the vehicle.

INTRODUCTION

On October 6, 2018, the Intergovernmental Panel on Climate Change adopted a report (IPCC) on Global Warming of 1.5°C warning of dire consequences of an increase above the current projected rate of 1.5°C if human carbon emissions are not reduced. Currently, the study suggests that human post-industrial human emissions have resulted in a 1°C at the present time with an expected increase in that warming of .2°C per decade. At that current rate, the report suggests significant future impact on ocean sea levels, ecological systems, and ocean acidification. The report suggests continued governmental actions to reduce global emissions from fossil fuels.

It is estimated that transportation currently accounts for over 50% of the total oil demand (Carbon Tracker, 2018). Adoption of electric vehicles, at the current projection, could reduce demand by 2 million barrels per day—a rate significant enough to disrupt the gasoline markets. In the summer of 2017, Professor Tony Seba of Stanford University made a presentation to the Colorado Renewable Society on Clean Disruption—Energy and Transportation where he argues that the Electric Vehicle (EV) will be widely adopted within the next decade (Seba, 2017). In fact, he goes further to predict that the Internal Combustion Engine (ICE) will quickly fade away shortly thereafter.

In his pivotal model, Bass (1969) suggested that the adoption of an innovation (like the EV) will look something like the following graph adopted from Gal’s Innovation (2015)



Mathematically, this graph may be expressed as:

$$\frac{f(t)}{1 - F(t)} = p + \frac{q}{M} [A(t)]$$

When:

m = the potential of the market; the number of people that will actually use the product

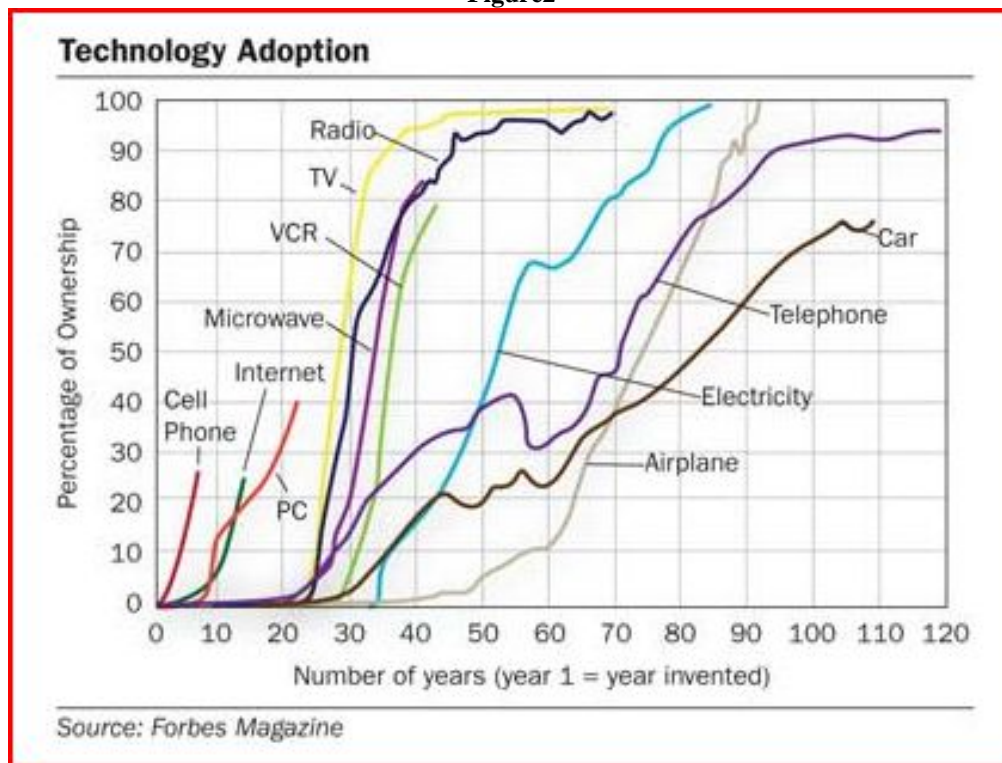
p = the coefficient of innovation (external influences); the likelihood that a non-current customer will change its behavior due to mass media coverage or other external factors

q = the coefficient of imitation (internal influences); the likelihood that a non-current customer will change its behavior due to Word-Of-Mouth, or other influences from people who already use the product.

$A(t)$ = the cumulative adoption function (Gal's Innovations 2015)

The challenge in this model is to estimate p and q and to some extent m . In the case of the electric car adaptation, m would normally be assumed to be the market for personal transportation. Below is a chart of technology adoption curves (Theurer, 2009) from various industries that shows a wide difference between the initial innovation and when the innovation begins to make significant penetration into the market.

Figure2



As can be seen in the above graphic, the period of time from the initial innovation until the beginning of widespread adoption varies from a few years to cell phone adoption to over 40 years for airline adoption. Seba suggests that a reason for this adoption difference is the convergence of various technological innovations upon the product that impacts its price and public perception (Seba 2017). The more technological innovations converging, the shorter the period of time and the steeper the adoption curve.

Adoption of the EV has several advantages. First, it has zero emissions while operating. Second, its basic operation is very simple—it is just an electric motor and requires no significant powertrain transmission. Third, because of its simplicity and resulting few moving parts, maintenance is very low compared with the ICE. It is estimated that the brushless electric motors should last over 1,000,000 of usages compared with 200,000 miles for an ICE. Finally, at current gasoline and electric power rates, the EV has about a 3:1 competitive operating cost advantage relative to the ICE.

IMPEDIMENTS TO WIDESPREAD ADOPTION OF THE EV

The primary impediments to the widespread adoption of the EV are range, battery charging time on longer trips, availability of charging stations on longer trips, fear of lithium fires, fear of car crash because of being light weight, and cold weather battery performance. These factors will be examined more carefully.

Range

The range on a single charge has been improving quickly as battery technology improves. According to the United States Office of Energy Efficiency and Renewable Energy (USOEERE) quoting the Federal Highway administration (USOEERE, 2018), “a range of 80 miles would be sufficient for 90% of all household vehicle trips. While most EVs have a range exceeding 80 miles, most EVs are seen as only a second car option because of wanting a vehicle for longer trips. In the latest model year, there are four vehicles that have ranges of over 200 miles—the Chevy Bolt and the three Tesla models with the larger battery packs (USOEERE, 2018). With ranges over 200 miles, these vehicles may be suitable for longer range trips, especially the Tesla models. The Tesla models offer super-charging stations where the recharge takes under 30 minutes. For most drivers on longer trips, a break after 3 hours of driving is normal

Battery Charging Time

Normally battery charging time is not an issue for most EV drivers unless they are on trips. Most household trips in a day do not exceed the range of the EV. Putting the EV on a charger at the end of the day is sufficient for a full charge by the following morning. According to the information on the Tesla website (Model X, 2018), on a road trip, the Tesla Supercharger will charge to 58% of the battery capacity in 30 minutes. It takes about 52 minutes for a full charge. For the Chevrolet Bolt, a 30-minute charge will get about 90 miles of range according to the Chevrolet website (Bolt, 2018).

Charging Station Availability

One of the bigger impediments to solving the charging station availability issue is that company provided charging stations typically are adapted for their own vehicles. If other companies’ car owners wish to use those charging stations, they must have the proper adapter for their vehicle if the company will allow others do use their charge stations at all. Fortunately, there are a growing number of hotels and shopping centers that offer charging stations and with careful planning, a long trip may be possible. Currently, only Tesla vehicles have an adequate domestic charging station network to accommodate longer trips. With the Tesla supercharger, the recharge time is not a significant impairment to a normal trip.

Fear of Lithium Battery Fire

The difficulty in assessing the actual risk of lithium battery fires in EVs are the very few occurrences. The latest statistics from 2015 indicate that there were 174,000 vehicle fires in the United States (National Fire Protection Association, 2016). Of those there were no EV battery fires (Isidore, 2018). There is a risk from EV battery fires in accidents. They are much more difficult to extinguish. Unlike fossil fuel fires, however, lithium battery fires ignite much more slowly. With proper battery temperature monitoring, lithium battery fires, from unknown damage from road debris, can be mitigated.

Fear of Lightweight Car Crash

All smaller vehicles run a greater risk of harm to the occupants from a collision with a larger vehicle. EVs are no exception. This risk may be mitigated in the near term with self-driving vehicles. In addition, collision risk is mitigated in all vehicles with level 1 autonomy (collision avoidance and lane departure).

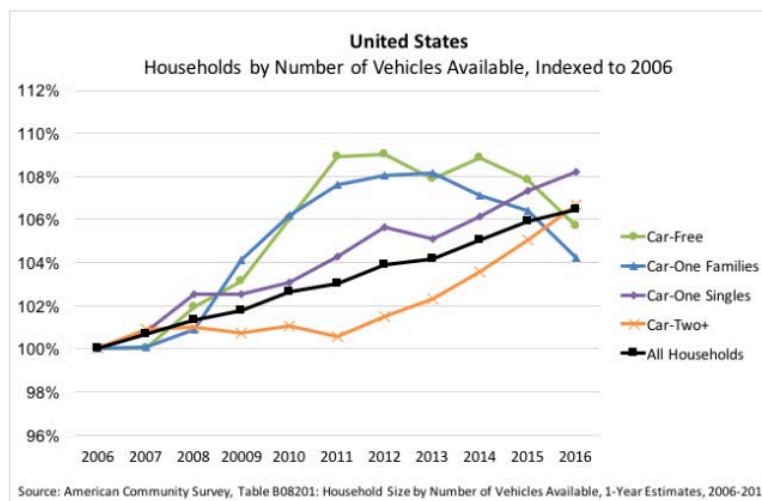
Cold Weather Battery Performance

All batteries have reduced performance at cold temperatures. Lithium batteries perform a little better than their lead-acid counterparts. At -20°C lithium batteries have only about 60% of retentive capacity (Turner 2009). In extreme climates, EVs will have a much shorter range and may not be as functional.

Analysis of the Impediments to Adoption of the EV

Perhaps the most significant impediments to the adoption of the EV are the interaction between the range and the charging time. Currently, EVs are simply not quite ready for trips exceeding the vehicles base range less a “safety factor.” Most people driving an ICE will not drive until the low fuel light comes on. To be safe, most will begin to look for a fueling station whenever the fuel tank reserves fall below a quarter to an eighth. Likewise, the EV driver will likely want to recharge somewhere near that same level if for no other reason than their experiences with the ICE. In addition, unless the driver of the EV knows that there is a charger available at their destination, there may be reluctance to drive the EV more than the round-trip distance below the vehicles range less the safety factor. Since recharging stations, even when available, would require stops of about an hour or more, assuming a supercharger was available.

Currently, the issue of using the EV for longer trips currently would clearly be an insurmountable impediment for a one-car family. For the families with only one vehicle, the perceived loss of flexibility to be able to go on longer trips would likely result in the rejection of an EV as a replacement for an ICE vehicle. In 2016, 33.6% of families had only one vehicle. If you exclude the 9% of families who do not have cars, 36.9% of families owning a vehicle have only one vehicle (DADS, 2010). However, that means that 63.1% of families that own a vehicle own more than one. Thus, the current market for purchasing an EV is about 63.1 percent of the total market of households owning vehicles. The popularity of Uber and other ride sharing opportunities has reduced the pressure on families to own multiple vehicles; however, the improving economy seems to indicate a rise in vehicle ownership rates as seen by the following graphic (American Community Survey, 2016):



FACTORS PROMOTING THE ADOPTION OF THE EV

There are also several factors that promote the adoption of the EV. EVs have zero emissions while operating. They are quiet and require little maintenance. Their engines have significantly longer lives and lower operating costs. Finally, they are powerful and lose little energy generating that power.

Zero Emissions While Operating

During the operation of the EV, there are zero carbon emissions. Depending upon how the power is generated for charging the EV, there may be carbon-based emissions during the production of the electricity used for charging. In regions with significant solar hours, the charging may be through solar power. In regions with appropriate wind or water power, all or some of the power may be generated without carbon emissions. Even when the power is generated through fossil fuels, the net emissions are still significantly lower. It is interesting to note that it takes about 8 KW of power to deliver one gallon of gas to the pump for an ICE (Norby 2011). This would be enough energy to power an EV for over 30 miles before the gallon of gas would be used by the ICE.

With the publicity surrounding climate change, there will be increasing social pressure to adopt the EV. A current negative concern about the “greenness” of the EV is the current use of the Lithium and other heavy metals in the EV battery. Newer battery technologies are showing promise to replace lithium. In addition, the EV batteries are being recycled to provide storage for PV arrays.

Another significant benefit from the lack of toxic emissions from EVs is the increase in air and water quality. Toxic emissions from the ICE impose significant costs on air and water quality. In larger urban areas, air quality is sometimes so poor that it impairs the quality of life of the residents and increases the frequency and severity of lung disease, imposing additional health care costs. Runoff from roadways require significant water conditioning to return the water to potability also imposing significant public costs.

Noise

EVs make little noise. As such, they need no mufflers consequently nor do they need heavy metals to reduce exhaust emissions. As EVs become the dominate mode of vehicular transportation, the noise levels along public highways will be significantly reduced. Eventually this will lead to reduced cost for sound reduction adjacent to roadways.

Engine Life and Maintenance

Electric motors in general have very long economic lives and require very little maintenance. The Tesla motor is expected to have a useful life of about a million miles (Lambert, 2017). When motor failure does occur, it is more likely to be the bearings that can be replaced (Huger 2014). Assuming an ICE engine with proper maintenance will last about 200,000 miles, this is still a five times improvement in useful life.

Both EVs and ICEs have some common maintenance items in common. Tires and wiper blades need to be maintained on both. Both need to be greased although the grease needs of an EV are less. Brake pads need to be replaced in both although most EVs have regenerative braking that significantly reduces the wear on the brake pads while generating additional power for the motor.

EVs are much less expensive to maintain relative to ICEs however (Douris, 2017). They need no oil, no antifreeze, no timing belts, no engine air or water filters, no gaskets, or no spark plugs. In addition, ICEs have many more parts that are subject to failure relative to the EV.

Efficiency

Electric Vehicles are considerably more efficient than their ICE counterparts. Newer EVs operate between 80-90% efficiency as compared to the ICE efficiency of about 40%. If charging is done by an AC charger, the EV loses a little more efficiency. Conversion from AC to DC loses about 10-15% of the energy.

THE S-CURVE FOR THE ELECTRIC VEHICLE

Unfortunately, the takeoff (or tipping) point (see Figure 1) and steepness of the s-curves cannot be identified with certainty until after the technology is fully adopted. However, early in the adoption there can be some evidence that the takeoff point has been reached. Likewise, the steepness of the s-curve slope cannot be known in advance. However, some evidence of the slope early in the adoption of the new technology can be estimated.

Has the Takeoff Point Been Reached by the EV?

There is substantial evidence that the takeoff point for EVs has indeed been reached. Initially Tesla was the first big entry into the market for EVs. General Motors soon joined with the Chevrolet Volt. Those early EVs were priced well above their ICE counterparts and sales were slow. With Tesla's success with reservations for the Model 3, other automobile manufactures came out with their own lines but sales were still not robust. In 2017, ranges increased and more infrastructure in the form of charging stations were found. More companies have or are beginning EV offerings in 2018. According to the Office of Energy Efficiency and Renewable Energy, there are a total of 19 EVs with ranges over 100 miles from nine different companies (OEERE, 2018). The IRS tax code has a provision for a \$7500 tax credit for the first 200,000 EVs sold per company. Tesla has already reached that limit in 2018. To date, no other manufacturers have reached their 200,000 limit. Perhaps the biggest announcement that suggests that the takeoff point has been reached was by Volvo when they announced in 2017 that by 2019, every new car the company launches will have an electric motor (Thompson Reuters, 2018). The company has clarified that statement to mean that some will be hybrids and that by 2025 they expect 50% of their sales will be fully electric (Lambert, 2018). Likewise Volkswagen announced that it would make two EVs in the US (Siujul, 2018).

Slope of the S-Curve

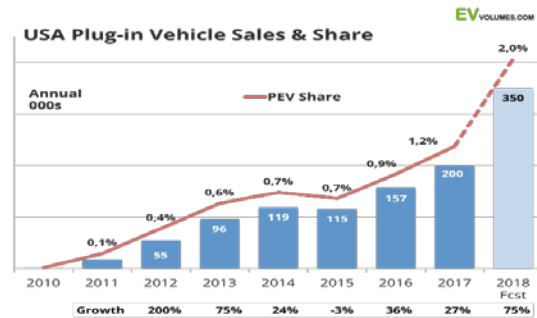
From an examination of the historic S-curves for technology adoption from figure 2, it would appear that most of the products had a steep slope averaging about 10 years. In trying to figure out the steepness of the slope of EVs, an examination of the number of automotive companies are entering into the market over time.

Table 1

Year	# of Companies	Names of companies (EV models)
2015	1	Tesla (8)
2016	3	Tesla (18), Nissan (1), BYD(1)
2017	8	Tesla (15), Nissan (1), BYD(1), BMW (1), Ford(1), Chevrolet(1) Hyundai (1), Volkswagen (1)
2018	9	Tesla (10), Nissan (1), BYD(1), BMW (1), Ford(1), Chevrolet(1) Hyundai (1), Volkswagen (1), Kia (1)

In 2019, the number of companies will increase with Porsche (1), Jaguar (1), Auston Martin (1), Audi (1) Mercedes (1), Volvo (2), Fisker (1), Sabaru(1), GM (1), Honda (1) and Byton (1) entering the market (Matousek, 2018). This will show an increase to at least 20 companies in the marketplace and is an indication of an increasing slope of the s-curve. As a result of the increasing numbers of options available in the EV market sales are increasing. The following graph of sales growth for EVs showing the beginning of a steep slope S-curve (EVvolumes.com, 2018).

Figure 3



Looking at the number of firms entering into the EV marketplace and the rapidly increasing market share of the EV, it would appear that the slope of the EV technology adoption curve is looking similar to that of the cell phone, PC, or radio. This would suggest that the time period for significant adoption within the market place is less than ten years.

New Technology Potential Impacts

There are almost daily changes to battery technology other energy storage innovations. These technologies work to increase the energy storage densities which will potentially increase the range of EVs. These technologies also include metal-air technologies which reduce the weight of the batteries as well as use fewer problematic materials like zinc, aluminum, iron, and other metals (Edlestein, 2017) (Penn, 2018). These technologies also will tend to increase the slope of the technology adoption curve for EVs.

Another really promising technological breakthrough for the EV is the Ultra-capacitor. The Ultra-capacitor has many significant benefits over traditional lithium ion batteries. These include a much longer life and a faster recharge cycle (20-30 seconds per 31-62 miles of range) (Blain, 2018). The biggest problem with the capacitors is their inefficiency in holding a longer-term charge due and its reduced capacity to store as much energy per weight of storage due to its reduced energy storage density. However, when combined with a lithium battery, the capacitor could continue to recharge the lithium battery even after the vehicle leaves the charging station. In addition, because of the very fast recharge cycle, the capacitor has the ability to greatly increase the efficiency of the regenerative braking system found in hybrids and EVs. With only lithium batteries, regenerative braking can only recapture about 20% of the energy lost through braking. With the capacitor, up to 90% of the energy can be recaptured. In addition, the ability of the capacitors to rapidly discharge can significantly increase the available power to an electric motor (Blain 2018). This ultra-capacitor alone has a tremendous potential to radically increase the slope of the S-curve adoption for EVs. With the hybrid lithium ion/ultra-capacitor, the major range and recharging limitations is effectively eliminated. In fact, due to its faster “refueling” relative to fossil fuels, EVs may be preferred. Commercial production of the Ultra-capacitor is expected to begin in 2019 and may be expected to be in EVs by 2021.

The Decline of the ICE

The last factor that could impact the slope of the S-curve for EV adoption is the potential decline of the ICE vehicle. The ICE vehicle has significant pressure on its continued use. Concern over the environmental impacts on fossil fuel emissions, as well as the current rising price of fossil fuels, could lead to a rapid decline in the numbers of ICE vehicles used for transportation. As UV adoption accelerates and becomes a completely viable alternative to the ICE, the ICE may be taxed for the carbon pollution. In addition, it is quite possible that the increasing numbers of EVs may disrupt the delivery of fossil fuels for the ICE fleet. The current average gas station earns about \$.03/gallon net profit on its gas sales. For the average gas sales per station of 4000 gallons that results in only about \$120 per day profit (Katz, 2018). It is easy to see why over 80% of the gasoline sold in the United States is sold at convenience stores or a few other related vendors (such as Sam’s Clubs or Walmart). The number of stand-alone gas stations has significantly declined as the traditional gas stations are unable to compete with the subsidized operations from convenience stores. As EVs increase, the volume of fossil fuel sales will decline and the profits for the stations will also decline. The result may also see the extinction of the stand-alone stations but also in the closures of significant convenience store operations who survive on the refuelers buying convenience items while refueling. As the availability of refueling

stations for the ICE declines, it may become more difficult for the ICE vehicle owner to find fuel. This will then likely increase the adoption rate for the EV causing further pressure on refueling station profits, resulting in fewer refueling stations, resulting on more conversions to EVs, and the adoption curve for EVs continues to grow steeper.

The Adoption of Solar Power

As solar power cost continues to decline, more home and system solar power adoption will occur in areas with adequate solar hours per day. This will create an opportunity for the homeowner to supply much of the transportation energy needed for the EV. This will allow the homeowner to purchase additional solar installation to power the EV and thus “lock-in” the future costs of “fuel” isolating the homeowner from increases in costs. With a solar power system life in excess of 25 years, this will be an attractive reason to adopt an EV

CONCLUSIONS AND IMPLICATIONS

It appears that the widespread adoption of the EV is coming sooner than later. This is obviously good news for those who are concerned with climate change and global warming. It may well be the gamechanger that the environmentally concerned have been waiting. There may be other transformations and adjustments related to the rise in EV adoption.

Just as the space program led to several technological innovations such as TANG and transistors, the EV technology and innovation has led to some changes in our world as well. One of the largest technology innovations related to EVs has been Tesla’s work on the self-driving vehicles. Uber has also been active in pushing the self-driving technology. Perhaps the biggest indication of impending disruption in the transportation industry is a current bill allowing self-driving trucks (HB 3388 that passed) and Senate bill (SB 1885 that has not yet come up for a vote) (Courtney, 2018). While self-driving technology is available for both ICE and EVs, it is technologically less expensive for EVs due to the fewer moving parts and the interface being all electronic rather than less reliable electro-mechanical. Adoption of the self-driving technology will also likely be quickly adopted as well. Already adoptive cruise control and lane departure features are widely available on new model vehicles. Level 4 self-driving is likely not long from now. The biggest common complaint about self-driving technology is that it is not yet perfect. The issue, however, is not perfection, but rather, performance that is better than humans. The major rationale for self-driving trucks is the number of lives it would save right now. Self-driving trucks would not be limited in the hours driven by a human driver, fatigue, substance abuse, texting distraction, etc.

Another interesting change from self-driving vehicles is likely to be a significant reduction in the number of vehicles on the road. Most vehicles are used only a small part of each day and remain idle the rest of the time. Currently, according to the U.S. Department of Transportation, the average American spends just under an hour a day behind the wheel. With self-driving vehicles, the vehicle could drop off the owner at work and immediately depart as an Uber type of service. This would not only drop the cost of ownership but also drop the cost of using ride sharing. Thus the actual demand for vehicles would drop and the congestion on the roads. This would also free up the demand for parking spaces.

An interesting unintended consequence of widespread EV adoption would be the significant loss in road tax revenue. Clearly, the funding system for the road system will need to be revised as fossil fuel sales decline. On a more positive note, because the EVs will be lighter, there will be less wear on the roads. In addition, with self-driving vehicles, there will be less hard braking and less jack-rabbit starts that increase the wear on the road systems.

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COMPARATIVE ANALYSIS OF STEP THERAPY PROTOCOL HEALTH CARE LEGISLATION

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ABSTRACT

Health insurance companies impose management practices known as step therapy protocols, or fail first protocols as part of their health coverage approval process. These control measures stipulate that prescription drugs may only be utilized in a specific sequence in order to receive authorization or payment of health care benefits for needed services. The step therapy business strategy enables the insurer to deny coverage for effective medications basing decisions on cost rather than patient need. In response to consumer health advocacy concerns, states have introduced legislation to regulate these insurance management practices. The legislative initiatives enable the prescribing provider to override the step therapy protocols of the plan sponsor. If the patient and the prescribing provider comply with certain conditions, the plan sponsor is mandated to authorize coverage for the requested prescription drug. The latest account indicates that such reform legislation has been approved in eighteen states and is pending in ten additional states (American Academy of Dermatology, 2018). Prior research to examine provisions associated with the regulation of the step therapy practices within the United States has been limited. To address this gap in the literature, this paper will examine the regulatory exceptions to step therapy practices including clinical review criteria, patient protection measures, explicit and transparent process requirements, conflict of interest disclosure and exemption provisions.

This paper presents a literature review and critique of the various aspects of step therapy or fail first override legislation to understand the emerging health care trends. Under existing federal law, no unapproved drug is permitted to be introduced into interstate commerce (21 U.S.C. 355). Traditionally, access to prescription drugs is controlled by federal regulations that are enforced by the United States Food and Drug Administration. In order to control spending on medications, health insurance plans have promulgated step therapy protocol measures as a tool to restrict the access to costly prescription drugs. However, the practice has potential risks. To reverse this past precedent, eighteen states have recently passed legislation to protect the ability of the patient to receive appropriate care that is prescribed by the physician American Academy of Dermatology (2018). This study evaluates the various state statutes and summarizes the similarities and differences of the step therapy override exception laws that have been adopted by the states. This paper attempts to examine important aspects of current state legislation that enables step therapy exceptions. In addition, the paper proposes further provisions to augment the standard model for access to appropriate prescription drugs for specific clinical circumstances and conditions.

EXISTING REGULATORY UTILIZATION MANAGEMENT PROCESS

In order to review the step therapy concept, this paper reviews the relevant regulatory utilization management process for brand drugs and generic drugs. Prescription drug coverage is available by private and public health insurance plans for prescription drugs and medications. However, access to these coverages is not automatic. The physician must recommend a particular drug for the patient and submit a written order for the desired drug product. However, the cost of prescription drugs is expensive for the insurance plans. Therefore, the public and private insurers deploy utilization management practices in drug benefit programs to limit access to the more expensive treatments (Worthy, McClughen & Kulkarni, 2017).

Insurers have instituted various cost saving techniques to reduce prescription drug spending. Some of the utilization control measures that reduce prescription drug spending include generic drug substitution, adverse tiering, nonmedical switching, prior authorization, narrow networks and clinical pathways (Worthy, et al., 2017). In addition, insurers and states utilize the step therapy approach to reduce prescription drug spending. Step therapy protocols can play an important role in controlling health care costs, if based on scientific standards and administered in a flexible manner that takes into account the needs of the patient (RSMo. 376.2029).

Medicare Act Requirements

Under Title XVIII of the Social Security Act, the Medicare Act establishes a federally subsidized health insurance program for the elderly and disabled (42 USC 1395). The Centers for Medicare and Medicaid Services (CMS), a component of the Department of Health and Human Services, administers the Medicare program by contracting with private insurance company plan sponsors, known as prescription drug plan sponsors, to offer drug plans to Medicare beneficiaries (42 USC 1395w-112).

The Medicare Act requires the plan sponsors to provide specified benefits and substantially carry out the contract terms in a manner consistent with the efficient and effective administration of the program and substantially meet the Medicare conditions of participation (42 USC 1395w-27(c)(2)). If a Medicare enrollee seeks an exception to the Medicare drug plan requirement to try another drug before obtaining access to the prescribed drug, the patient is required to submit a Medicare prescription drug coverage determination request to the plan sponsor along with supporting documentation from the prescribing physician (Medicare Exceptions and Appeals Process).

Under the Medicare Act, CMS is not permitted to interfere with this negotiation process between the drug manufacturers and the plan sponsors nor institute a price structure for the reimbursement of covered drugs (42 USC 1395w-111(i)). Medicare allows these private plan sponsors to determine the price to pay (Kirkwood, 2016).

Medicaid Act Requirements

In 1965, Congress created the Medicaid program under Title XIX of the Social Security Act. The purpose of the Act is to enable each state to furnish medical assistance to persons whose income and resources are insufficient to meet the costs of necessary medical services (42USC 1396). State participation is optional, but participating states need to submit a plan that fulfills the requirements of the Medicaid Act (Sobky v Smoley).

The Medicaid Act contains specific compliance provisions that insurers need to follow. According to the Medicaid regulations, the state agencies are required to set standards for the timely provision of early and periodic screening, diagnostic and treatment services which meet reasonable standards of medical practice (42 C.F.R. 441.56(e)).

The Medicaid regulations also stipulate that the state agencies are required to furnish services to beneficiaries without administrative delay (42 CFR 435.930(a)). Under New York state law, recipients are guaranteed the right of free choice of medical care and health services from any institution, agency or person qualified to participate under the Medicaid program (Altman v County of Westchester).

FDA Requirements

The Federal Food, Drug and Cosmetic Act was enacted in 1938 by Congress to regulate the interstate commerce of prescription drugs. In order to protect patients from premature, ineffective and unsafe medications and treatments, the United States Food and Drug Administration (FDA) has established an approval process for new drugs, biological products and devices. According to the Act at 21 U.S.C. 355 (a) and (b), no new drug may enter interstate commerce unless the FDA has approved an application with full reports of investigations, which show that the drug is safe and effective.

Before commercialization of a pharmaceutical product, a pharmaceutical manufacturer is required to submit a New Drug Application form containing scientific evidence (21 CFR 314.50). The drug review process facilitates the approval of new drugs shown to be safe and effective (21 CFR 314.2). Once the FDA approves a new drug, the NDA-approved drugs are generally referred to as brand-name or brand drugs (Schneiderman v Actavis).

Hatch-Waxman Act

The Drug Price Competition and Patent Term Restoration Act that is often referred to as the Hatch-Waxman Act promotes competition from generic substitute drugs in order to lower drug prices (Pub. L. No. 98-417, 98 Stat. 1585). The manufacturer of a new generic version of a drug must first file an application with the FDA in order to receive permission to market the product. The sale of a generic version of a drug is conditional on the approval by the FDA. The FDA at 21 U.S.C. 355 (j) permits a generic manufacturer to file an abbreviated application for the approval of a new generic substitute drug. The FDA at 21 C.F.R. 314.94 has established rules for conducting the review of a new generic drug. A generic manufacturer is required to submit an Abbreviated New Drug Application with the FDA for review (21 CFR 314.94). The ANDA needs to contain information to show that the new generic version is bioequivalent to the brand drug (21 USC 355j (2)(A)(iv)).

Patent Exclusivity

Any application to the FDA for approval of a new drug needs to contain information for each patent that claims the drug (21 CFR 314.53). When the manufacturer of a brand drug product holds a patent, the patent term may be adjusted beyond the initial permitted regulatory review period (35 USC 156). The Hatch-Waxman Act provides an incentive for brand manufacturers to innovate through patent extensions affording the brand manufacturer with the ability to extend their exclusivity period beyond the initial standard 20- year patent term (Schneiderman v Actavis).

State Drug Substitution Laws

In the Schneiderman v Actavis case, the court recognized that all 50 states and the District of Columbia have drug substitution laws. These state drug substitution laws permit pharmacists to dispense a therapeutically equivalent, lower-cost generic drug in place of a brand drug (Schneiderman v Actavis). For example, under the Pennsylvania drug substitution laws, a pharmacist is permitted to dispense a generically equivalent drug for a brand name drug (Pa. Act 259 of 1976). The New York drug substitution law requires a pharmacist to substitute a less expensive drug product containing the same active ingredients, dosage form and strength as the prescribed drug product (N.Y. Educ. Law 6816-a(1)). All state drug substitution laws prohibit pharmacists from substituting generic drugs that are not therapeutically equivalent to the brand drug (Schneiderman v Actavis).

STATUTORY REFORM MEASURES TO ENCOURAGE ACCESS TO APPROPRIATE TREATMENT

The Patient Protection and Affordable Care Act of 2010 (ACA) promotes the access of patients to therapies by specifically prohibiting the Secretary of Health and Human Services from promulgating any regulation that creates any unreasonable barriers to the ability of individuals to obtain appropriate medical care. The ACA prohibits the Secretary of Health and Human Services from promulgating any regulation that impedes timely access to health care services. In addition, the ACA prohibits the Secretary of Health and Human Services from promulgating any regulation that interferes with communications regarding a full range of treatment options between the patient and the provider.

Prior Recourse to Judicial Intervention

A review of the relevant case law is necessary in order to trace the development of the step therapy protocols and the utilization management process for brand drugs and generic drugs. Since a patient may have adverse consequences following a step therapy protocol, legal action is necessary to preserve the right of the physician to make treatment decisions in the best interest of the patient. These claims attempt to protect patient rights and to obtain the timely access to insurance coverages. In the past, patients have sought to obtain timely access to brand drugs by challenging the public and private insurance management practices of barring the sale of brand drugs. Courts have considered claims to mitigate unfair, burdensome and discriminatory insurance practices (Worthy et al., 2017).

Imminent and Serious Risk to Health

A health insurance plan has a contractual obligation to provide access to medically necessary drugs for serious medical conditions. In a case involving the termination of a Medicare contract by CMS, the court found that the health insurance plan sponsor failed substantially to carry out the contract (Fox v Centers for Medicare and Medicaid Services). The carrier had imposed unauthorized step therapy as conditions on various drugs without any written internal compliance procedures, lack of standards of conduct and no internal auditing or monitoring of its business operations. Under the Medicare Act (42 USC 1395w-27(h)(2)), the court recognized that CMS may terminate a contract immediately where the delay in treatment would pose an imminent and serious risk to the health of individuals.

Current Conventional Reform Proposals within the Existing Regulatory Framework

State legislative bodies have proposed reform measures that appear to work within the existing regulatory framework. The health insurance industry supports the current conventional framework. However, the vast community of patients and community continue to pursue an alternative approaches to obtaining options to the mandatory step therapy process.

House Bill 1293 was introduced in the Pennsylvania General Assembly. This proposed state legislation would regulate health care preauthorization programs by utilization review entities within the Commonwealth. The legislation would protect the physician-patient relationship from third-party intrusion and bar utilization practices that would hinder patient care or intrude on the practice of medicine. A third-party utilization review entity would not be permitted to require a health care practitioner to participate in a step 1 therapy protocol. In addition, health care practitioners would not be required to first obtain a waiver, exception or other override determination when the step 1 therapy protocol is not in the best interest of the patient. Another provision of the legislation would bar an insurance company from imposing a penalty on a health care practitioner for recommending or issuing a prescription that may conflict with the step 1 therapy protocol of the health insurer or health insurance plan.

Features of Step Therapy Exception Legislation

Numerous step therapy override laws have been enacted by states to restrict and regulate the use of step therapy protocols for prescription drugs by health insurance companies in order to protect the public health and safety of patients and to ensure patient access to particular prescription drugs. Step therapy requirements may cause serious negative patient outcomes. Therefore, several states have intervened to regulate the implementation of these practices. The step therapy override statutes have many similarities and unique specific provisions. In this paper, the statutory differences are documented for comparative analysis.

Definition of Step Therapy Protocols

The Maryland Statute (Md. S.B. 919) defines step therapy or fail-first protocol as a sequence of prescription drugs to be used by an insured or an enrollee before a prescription drug ordered by a prescriber for the insured or the enrollee is covered. The Connecticut statute (Ct. H.B. 5962) and the New York statute (NY S. 3419-C) define step therapy as a protocol or program that establishes the specific sequence in which prescription drugs for a specified medical condition are to be prescribed. The Kentucky statute (Ky. KRS 304) is similar but inserts an additional caveat that the prescription drug is medically appropriate for a particular patient. The Missouri statute (RSMo. 376.2029) combines both factors for a specified medical condition and medically appropriate for a particular patient. The Indiana statute (Ind. SEA 41) defines a step therapy protocol as a protocol that specifies the order in which certain prescription drugs are used to treat a covered condition.

Definition of Step Therapy Drug

The Maryland Statute (Md.S.B. 919) defines a step therapy drug as a prescription drug or sequence of prescription drugs used under a step therapy or fail-first protocol.

Clinical Review Criteria

The Missouri statute (RSMo. 376.2029) has very specific clinical review criteria requirements in order for the health plan to establish step therapy protocols. The clinical review criteria needs to be based on clinical practice guidelines that are developed and endorsed by a multidisciplinary panel of experts, the use of a methodologist to facilitate consensus and provide objectivity in data analysis and ranking of evidence, and the ability to rate the quality of the evidence supporting the recommendations. In Missouri (RSMo. 376.2029), the clinical review criteria may be based on peer-reviewed publications and high-quality studies, research and medical practice.

Under the New York statute (NY S. 3419-C), clinical review criteria needs to follow recognized evidence-based and peer reviewed criteria that is appropriate for the medical condition of the patient.

Conflict of Interest Disclosure

Being very concerned about potential conflicts of interest in establishing the step therapy protocols, the Missouri legislature (RSMo. 376.2029) and the New Mexico statute (NMSA 13-7-18) established procedures to minimize biases and conflicts of interest. Members of the multidisciplinary panel of experts that create the clinical review

criteria are required to disclose any potential conflict of interest with any entity including pharmaceutical manufacturers and recuse themselves from any vote on the panel if they have a conflict of interest (RSMo. 376.2029).

Atypical Patient Populations and Diagnoses

The Hawaii house bill (H.B. 1289) and the New York statute (NY S. 3419-C) require clinical review criteria used to establish a step therapy protocol to take into account the needs of atypical patient populations and diagnoses. However, the statutes do not define these populations and diagnoses. In the Missouri statute (RSMo. 376.2029), the clinical review criteria used in step therapy protocols is expected to consider relevant patient subgroups and preferences.

Exigent Circumstances Provision

The California statute (Cal. A.B. 1353) addresses the health condition of the patient. If a patient is suffering from a health condition that may seriously jeopardize their life, health or ability to regain maximum function, the California statute regards the patient to have an exigent circumstance, which warrants immediate response by the health plan to the patient exception request. Under the Ohio law (Ohio S. B. 56), if exigent circumstances exist, the health plan issuer is required to respond within twenty-four hours of receipt however, exigent circumstances are not defined in the statute.

Under the California statute (Cal. A.B. 1353), a plan or health insurer needs to establish an expeditious process to respond to an exception request within 24 hours if exigent circumstances exist. Under the Ohio law (Ohio S. B. 56) and the New Mexico statute (NMSA 13-7-18), if exigent circumstances exist, the health plan issuer is required to respond within twenty-four hours of receipt.

Standard Time Frame/ Time Limitation Provision

The time frame for processing an override of the step therapy restriction varies among the statutory provisions. Under the California statute (Cal. A.B. 1353), a plan or health insurer needs to respond to a patient exception request within 72 hours following receipt of the exception request. Under the Ohio law (Ohio S. B. 56), the health plan issuer is required to promptly respond to a step therapy exemption request or an appeal for routine matters within seventy-two hours of receipt. According to the Indiana statute (Ind. SEA 41), the state employee health plan is required to make a determination concerning a protocol exception request or an appeal of its denial in an urgent care situation within one business day and in a nonurgent care situation within three business days. Under the Kentucky statute, (Ky. KRS 304), the insurer or the pharmacy benefit manager is required to grant an override of the restriction within forty-eight hours if all necessary information to perform the override review has been provided. Under the Louisiana statute (RS 46:460.34), the managed care organization is required to expeditiously grant an override of the restriction.

Deemed Status Provision

A health care plan needs to respond promptly to all exception requests. Under the California statute (Cal. A.B. 1353) and the Missouri statute (RSMo. 376.2029), if a health care plan fails to respond to an override exception request within 72 hours, or within 24 hours if exigent circumstances exist, the exception request is deemed to have been granted. Under the Ohio law (Ohio S. B. 56) and the New York statute (NY S. 3419-C), if the health plan issuer fails to respond within the stipulated time frames, then the exception or appeal request is deemed granted without health plan approval.

Notice of Denial Provision

Under the California statute (Cal. A.B. 1353), the health care plan needs to provide the patient with a notice of the reasons for the denial of an override exception request and indicate that the patient may file a grievance with the plan if the patient objects to the denial. According to the Indiana statute (Ind. SEA 41), if the state employee health plan denies a protocol exception request, the patient and the treating health care provider need to be informed of the denial, including a detailed, written explanation of the reason for the denial and the clinical rationale to support the denial. The Texas statute (Tex. Bus. & Com. Code 1369.0546) provides for an expedited appeal of an adverse determination

of an exception request. The Minnesota statute (Minn.Stat. 62Q.184) affords the enrollee an appeal of the denial of a step therapy override request.

Override Exemption Determination Process

Under the Kentucky statute (Ky. KRS 304), an override of the step therapy protocol restriction entails a determination process in which permission is granted by the health care plan to deviate from the required sequence if the physician prescribes another drug that is medically necessary.

The Kentucky statute (Ky. KRS 304) requires the health plan to enable the prescribing practitioner to have access to a clear and convenient process to request an override of the restriction from the insurer. Under the Louisiana statute (RS 46:460.34), the managed care organization needs to provide access to a clear and convenient process to expeditiously request an override of the restriction.

Supporting/Pertinent Medical Information

The statutes do not require a physician attestation but they do require specific documentation by the physician. Under provisions in the Indiana statute (Ind. SEA 41), the state employee health plan can request a copy of relevant documentation from the medical record of the patient in support of a protocol exception request. Under the New York statute (NY S. 3419-C), the utilization review agent is required to grant a step therapy protocol override determination upon receipt of information that includes supporting rational and documentation from a health care professional demonstrating one or more of the standards under the law.

Clinical Statement

The Kentucky statute (Ky. KRS 304) and the Louisiana statute (La. RS 46:460.34) stipulate the prescribing practitioner needs to demonstrate with sound clinical evidence that the treatment under the step therapy protocol has actually been ineffective in the treatment of the disease or medical condition of the patient.

The standards under the Kentucky statute and the Louisiana statute differ slightly if the practitioner expects that the treatment would be ineffective. Under the Kentucky statute (Ky. KRS 304), the prescribing practitioner may initiate an override of the restriction if the request is based on sound clinical evidence or medical and scientific evidence that the treatment under the step therapy protocol is expected or likely to be ineffective or will cause or likely cause an adverse reaction or other physical harm to the patient. Under the Louisiana statute (RS 46:460.34), the physician has the discretion to base the determination on the known relevant physical or mental characteristics and medical history of the patient and known characteristics of the drug regimen or will cause or likely cause an adverse reaction or other physical harm to the patient.

Condition of Coverage Determination

According to the Indiana statute (Ind. Act 41), as a condition of coverage the patient is required to first follow a step therapy protocol in order to qualify for succeeding treatment with another prescription drug.

Precedent Conditions

The Indiana statute (Ind. SEA 41) defines a preceding prescription drug as a prescription drug that is first used to treat a covered condition and because of the treatment the drug is determined to be inappropriate to treat the covered condition of the patient.

The Indiana statute (Ind. Act 41), the Washington statute (Wa. S.B. 5757), the New York statute (NY S. 3419-C) and the Missouri statute (RSMo. 376.2029) recognize precedent conditions to satisfy exceptions to the step therapy protocols of the health plan. If the preceding prescription drug is contraindicated or likely to cause an adverse reaction or physical or mental harm to the patient, the health plan is required to grant a protocol exception. If the preceding prescription drug is expected to be ineffective or has been discontinued due to the lack of efficacy or effectiveness, a diminished effect or an adverse event, the health plan in Indiana is required to grant a protocol exception. In the Missouri statute (RSMo. 376.2029), the Washington statute (Wa. S.B. 5757) and the New York statute (NY S. 3419-

C), the override exception request is to be granted if the patient is stable on a prescription drug for the medical condition under consideration.

The Illinois statute (Ill. Stat. 099-0761) stipulates that the step therapy requirement exception request be approved if the required prescription drug is contraindicated, the patient has tried the required prescription drug and demonstrates evidence of failure or intolerance, or the patient is stable on a prescription drug selected by the provider for the medical condition.

Under the Mississippi statute (MS Code 83-9-36), an override of a restriction is warranted if the step therapy has been ineffective, the circumstances are based on sound clinical evidence or medical and scientific evidence, expected or likely to be ineffective, or will cause or will likely cause an adverse reaction or other physical harm.

Protocol Exceptions

Under the Indiana statute (Ind. SEA 41), a protocol exception implies that a health plan made a review of supporting documentation and determined that a step therapy protocol was not medically appropriate for the treatment of a particular condition.

Under the California statute (Cal. A.B. 1353), a health plan is required to grant an exception request if the patient was previously prescribed the prescription drug within 100 days prior to enrollment in the health care plan or the prescription drug had within 100 days prior to the exception request, been previously approved for coverage by the plan for the same medical condition. If the physician continues every 100 days to prescribe the same drug for the same condition and the patient is medically stable, the health plan is also required to grant an exception request.

Patient Protection

The Indiana statute (Ind. Act 41) and the New York statute (NY S. 3419-C) protect the patient whenever a preceding prescription drug is not in the best interest of the patient. A protocol exception may be indicated if the preceding prescription drug could cause a significant barrier to compliance of the patient to the plan of care, worsen a comorbid condition, or decrease the ability of the patient to achieve or maintain reasonable functional ability. Similarly, the Missouri statute (RSMo. 376.2029) and Washington statute (Wa. S.B. 5757) protect the patient if the step therapy required prescription drug is not in the best interest of the patient based on medical necessity.

In order to protect the interests of the patient, the Louisiana statute (La. RS 46:460.34) limits the duration of any step therapy protocol to no longer than the duration of action for the medication as described in the pharmacokinetics section of the package insert approved by the FDA whenever the prescribing physician demonstrates that the medication is clinically ineffective. The Kentucky statute (Ky. KRS 304) and the Mississippi statute (MS Code 83-9-36) stipulate that the duration of the step therapy protocol is limited to no longer than a period of thirty (30) days if the treatment is deemed and documented as clinical ineffective.

Illness Status

The Indiana statute (Ind. SEA 41) contains an urgent care exception to the step therapy protocol. To qualify as an urgent care situation, the delay in treatment for the patient's injury or condition could seriously jeopardize the patient's life, health or ability to regain maximum function or subject the patient to severe pain that could not be adequately managed.

Treatment Options and Potential Outcomes

According to the Missouri statute (RSMo. 376.2029), the clinical review criteria that is created through an explicit and transparent process is expected to explain the relationship between the treatment options and the patient outcomes.

Reimbursement

If the patient does not follow the step therapy protocol of the health plan, the insurer is not required to reimburse the patient. If a determination is granted to override the step therapy protocol, the New York statute (NY S. 3419-C) and the Washington statute (Wa. S.B. 5757) require the health plan to authorize immediate coverage for the prescription drug prescribed by the treating health care professional.

Medical Necessity Eligibility

In Missouri, health plans must meet an appropriate standard of care that is medically necessary to improve or preserve health, life or function, to slow the deterioration of health, life or function or for the early screening, prevention, evaluation, diagnosis or treatment of a disease, condition, illness or injury (RSMo. 376.2029).

Procedural Transparency

The Missouri legislature (RSMo. 376.2029) has declared as a matter of public interest that health insurers afford patients access to a fair, transparent and independent process for requesting an exception to a step therapy protocol.

Public Comment

In the development of the step therapy process by the multidisciplinary panel that establishes the clinical review criteria, the Missouri statute (RSMo. 376.2029) requires the panel of experts to offer opportunities for public review and comment.

Legal Recourse

Under the New York statute (NY S. 3419-C) and the Washington statute (Wa. S.B. 5757), the step therapy protocol override determination is eligible for appeal and does not impair or prevent a patient from having the right to appeal.

Relevant Medical Condition

In the proposed Georgia House Bill (Ga. H.B. 965), the standard of care for prescribing physicians is defined as being consistent with best practices for the treatment of cancer drugs and supported by peer reviewed medical literature.

The Indiana statute (Ind. SEA 41) bases the determination of an urgent care situation on a prudent layperson's judgment whether the injury or condition could seriously jeopardize the life, health or ability to regain maximum function without access to a prescribed therapy.

Dissemination of Information

In accordance with the Indiana statute (Ind. SEA 41), the state employee health plan publishes an agency website with pertinent information on the procedure for the use in requesting a protocol exception. Under the Missouri statute (RSMo. 376.2029), the request process needs to be disclosed to the patient and the provider and easily accessible on the health plan website. The West Virginia legislation (W.Va. Code 33-161-1) stipulates that the health plan must make available on its website the clear and convenient process to request a step therapy exception determination.

Safeguard

The Maryland Statute (Md.S.B. 919) stipulates that the plan sponsor may not impose a step therapy or fail-first protocol on an insured if the step therapy drug has not been approved by the FDA for the medical condition being treated.

Grandfathering Provision

Under the Maryland Statute (Md. S.B. 919), the plan sponsor may not impose a step therapy or fail-first protocol on an insured if the prescriber ordered the prescription drug within the past 180 days and provides supporting medical information that in the professional judgment of the prescriber the drug was effective in treating the disease or medical condition of the enrollee.

Duration of Medical Exception Request

Under the Illinois statute (Ill. Stat. 009-0761), the health plan is required to honor the approval of a medical exception request for 12 months following the date of the approval or until renewal of the plan.

Explicit and Transparent Review Process

Under the Missouri statute (RSMo. 376.2029), the health plan is required to design a medical exceptions process that affords the patient and the provider access to a clear, convenient and readily accessible process to request a step therapy override exception determination.

Annual Filing Requirements

According to the Missouri statute (RSMo. 376.2029), the insurer or health plan is required to certify annually in the rate filing documents that the clinical review criteria used in step therapy programs meets the statutory requirements. In addition, clinical review criteria is required to be continually updated through a review of new evidence, research and treatments.

Agency Accreditation Process

In the Missouri statute (RSMo. 376.2029), the insurer or health plan is required to submit any clinical review criteria for its step therapy program to the state department of insurance for review, approval and accreditation prior to implementation.

Access to Cancer Drugs

The Georgia House Bill (Ga. H.B. 965) is unique. The bill specifically prohibits any health benefit plan from limiting or excluding coverage for the treatment of stage four advanced, metastatic cancer by mandating that the patient first fail to successfully respond to a different drug or prove a history of failure of a prescribed drug by the physician. This bill is known as The Honorable Jimmy Carter Cancer Treatment Access Act.

The Maryland Statute (Md. S.B. 919) bars the insurer from imposing a step therapy or fail-first protocol on an insured for a prescription drug that is approved by the Food and Drug Administration for the treatment of stage four advanced metastatic cancer and is consistent with the FDA approved indication or the National Comprehensive Cancer Network Drugs & Biologics Compendium indication and is supported by peer-reviewed medical literature. The Connecticut statute (Ct. H.B. 5962) prevents an insurance company from requiring the use of step therapy for any drug prescribed for cancer treatment to an insured who has been diagnosed with stage IV metastatic cancer.

Insurance Exclusion Provisions

The Maryland Statute (Md S.B. 919) does not require coverage by the sponsor plan for a prescription drug that is not covered by the policy or if not required by law to be covered. The Illinois statute (Ill. Stat. 099-0761) does not require the medical assistance state agency to approve, supply or cover prescription drugs. The Missouri statute (RSMo. 376.2029), the Washington statute (Wa. S.B. 5757), and the New York statute (NY S. 3419-C) do not prevent the insurer, health plan or utilization review organization from requiring the patient to try an AB-rated generic equivalent drug prior to providing coverage for the equivalent branded prescription drug.

Criminal Sanctions

Under the California statute (Cal. A.B. 1353), the step therapy override provisions are a state-mandated obligation and willful violation of the statute are considered a crime.

DISCUSSION

The existing statutory and regulatory framework for the access to prescription drugs for treatment creates a dilemma for the administrative agency, the health insurance company, the pharmaceutical manufacturer, the patient and the treating physician. Step therapy override determination legislation needs to encompass a balanced approach which takes into consideration the various perspectives of the interested parties. The state statutes need to incorporate the broad range of perspectives in order to reconcile these competing interests.

The FDA has the responsibility to authorize access to prescription drugs for treatment use while also being charged with protecting patient safety and considering product effectiveness. However, the FDA does not set the price for prescription drugs. Also, the FDA does not rank, priority or recommend the particular use of prescription drugs. These choices are reserved for the private practice of medicine under the patient-physician relationship doctrine. Unfortunately, the step therapy protocols usurp the ability of the physician and the patient to make informed health care decisions.

Step therapy protocols do not eliminate the right of a patient to obtain treatment. The step therapy protocols provide a controlled access to more expensive alternatives of treatment. Ultimately, the decision to use prescribed drugs is made by the patient in consultation with the patient's health care provider and the patient's health care team.

In a well-functioning marketplace, the consumer is free to select and pay for a product after evaluating the price and quality of the product (Schneiderman v Actavis). However, the prescription drug market is different. The doctor selects the drug for the patient writing a prescription for a particular drug that the pharmacist dispenses. The doctor may not be aware nor concerned about the cost of the drug. The payment is made by the patient or a third party payor such as a public or private insurer. If the coverage of a prescription drug for the treatment of a medical condition is restricted for use by the health plan, then states with override legislation expect that uniform policies are in place so that patients receive the equivalent or most appropriate treatment.

The state drug substitution laws were enacted to shift the drug selection process to the pharmacist in conjunction with the public or private insurer. However, the selection process may be influenced by extenuating factors such as profit margin, financial incentives and discount measures. Under this model, the interest of the patient are not always a priority. Other influences may be interfering in the proper selection of the best product for the patient. Therefore, the prescription drug step therapy override legislation has been enacted to provide extra safeguards for the patient.

Treatment decisions are typically made between the patient and the physicians under the doctrine of the right of self-determination. The step therapy process abrogates this right by imposing barriers to health care access. By establishing a step therapy model, the insurer assumes the role of the decision maker and the arbiter of treatment options.

In the future, step therapy protocols may be challenged in the courts under theories of tortious interference with a contact and business relationship between the physician and the patient. The patient may argue that the practice is a breach of a contract between the patient and the insurance company.

Step therapy protocols are problematic in their current condition and require further modification to address shortcomings. One of the criteria that requires more specificity is the exceptions process for patients with terminal illness. In a typical insurance protocol, the condition of the patient is not mentioned. The criteria has already been predetermined that are based on current medical information and the recommendations of the pharmacy and therapeutics committee of physicians, pharmacists and other experts.

Under a typical step therapy protocol, the insurance company computer system performs an automated review of the patient's drug history to determine whether the patient has tried a preferred alternative first for the patient's condition.

The meaning of the condition is vague. If condition means the ICD code, clearly the clinical history of the patient is not part of the business determination to avoid expensive drugs.

The insurance plan coverage criteria seems to focus on protections for the carrier with little attention to safeguards for the patient apart from the most reasonably priced prescription drug requirement. If the FDA has approved a drug to be safe and effective, the insurance company is not really conducting an independent clinical trial of the drug's safety and effectiveness. Surely, the purpose of insurance plan coverage criteria is to achieve the less expensive option.

In the past, courts have recognized the right of the patient to informed consent in the treatment decision-making process. The step therapy insurance protocol takes the patient out of the decision-making process.

A typical step therapy insurance protocol requires documentation by the physician that the patient had a trial and experienced treatment failure or intolerance of a generic alternative. The insurance carrier should be required to report adverse events of its step therapy insurance protocol requirements to the state insurance department, the FDA and the manufacturer and report modifications to its utilization program because of the failed coverage criteria.

The step therapy override statutes do not contain provisions to afford the providers or insurers immunity from civil liability for any adverse actions or outcomes resulting from the patient's use of the alternative drug instead of a brand drug. The step therapy override laws do not prohibit the patient from suing an insurer that refuses to help the patient obtain the brand name drug. The statutes do not protect the physician or insurers from arrest or prosecution for compliance with the statutory provisions.

By declaring specific medications as first choice drugs, the insurance carrier could be subject to accusations of favoritism and cronyism. By having a special list of drugs that require step therapy, the insurance company clouds the status of a particular drug with predetermined clinical criteria that is untested and subject to challenges of clinical rigor.

The insurance step therapy protocols may overreach the authority granted by the insurance department in selling approved policies in the jurisdiction. By exposing the patient to delays in proper treatment, the insurance company may be unnecessarily increasing risks to the patient, which were unforeseen in the administrative approval process.

Implications

The issue of access to prescription drugs for treatment raises many competing concerns from numerous constituencies with a broad spectrum of supportive and negative viewpoints. If step therapy override laws are enforceable, the physician and patient will still need to have a thorough discussion about the financial burden, and potential benefits and risks of treatment.

Opponents to access restrictions may assert that step therapy protocols result in patients being potentially exposed to risky and ineffective agents. The lack of safety and effectiveness information could expose patients to potentially harmful outcomes by restricting patients from access to prescribed drugs.

Another view of step therapy protocols questions the fairness of access to prescribed drugs. Manufacturers may maintain that the selection process could compromise fairness in the access to prescription medicines. If patients with superior status obtain access to prescribed drugs outside of the insurance plan coverage, other patients who are sicker or better candidates for the same prescribed treatment may be disadvantaged from access creating inequities. The needs of the patient may supersede the financial interests of the insurance companies. Furthermore, society is interested in the preservation of appropriate therapies to treat illnesses and diseases.

FUTURE CONSIDERATIONS AND CONCLUSION

The current insurance industry framework for providing access to prescription drugs appears to be limiting and tedious. Recently, state governments have taken measures to clarify and streamline the regulatory process for access to prescription drugs.

Future research may examine the merits of state substitution laws. The justifications for state substitution legislation should be considered. In addition, other aspects of state substitution laws may be studied including the procompetitive benefits of generic competition and the anticompetitive harms that impede competition (*Schneiderman v Actavis*).

The impact that the utilization management practices has on the quality of patient care should be considered in future research. Measures of performance require intense analysis, which is especially challenging in the health care environment.

Further research is needed to determine if the practice of step therapy by insurers actually results in an overall reduction in health care costs or merely postpones expenditures.

The use of step therapy measures may be proven to create inefficiencies in the health care system through additional administrative burdens.

Step therapy mechanisms could inhibit physician productivity by interfering with routine physician workload in clinical care as well as a decrease in performance for nonclinical tasks. Preliminary research of the physician work environment has been reported in the literature concerning several factors that create a decline in physician productivity (Shanafelt et al., 2017). Future research on the impact of step therapy practices on the physician work environment may also be considered.

The opposition position toward this proposed legislation expresses the view that step therapy protocols are necessary to control the rising cost of health care. However, step therapy protocols may increase costs and create additional administrative burdens on physicians. The patient should not have to consider all other treatment options before having access to the prescribed drugs of choice.

Paramount in the decision making process is the need to develop regulatory policies that uphold the best interests of the patient. To protect the patient, the statutes should require monitoring to avert potential toxicity complications. Another safeguard for inclusion in the legislation is a requirement for a second independent evaluation by a board certified physician in an appropriate specialty.

Individuals responsible for the formulation of health care policies should uphold the right of patients to make their own autonomous health care decisions.

The health insurance industry needs to recognize the fundamental right of a patient to preserve or attempt to pursue the preservation of their own life by obtaining their treatment of choice.

Courts have long recognized the special relationship between the patient and the physician. Statutory frameworks need to uphold the preservation of the patient-physician relationship. The patient with a terminal illness should be afforded the right to make a treatment decision in consultation with the physician. The government or the insurance company should not make this decision unilaterally.

If patients do not have direct access to preferred prescription drugs, strong warnings by the insurance plans of uncertain adverse events are imperative for informed consent.

The physicians and patients are being coerced into accepting less preferred treatment despite the possibility of unknown risks and unforeseeable consequences.

The results of these trial and error encounters by the insurance companies need to be documented in the medical literature for the advancement of science.

The physician is being pressured to determine that the probable risk to the patient from the least preferred drug is not greater than the probable risk from the illness if the patient response is less favorable.

The statutes should clearly state that a state agency or regulatory board cannot revoke a physician license based solely on the physician's recommendation to prescribe a drug of choice.

Our society has championed the principles of the patient-physician relationship and the right of self-determination. Clearly, our society should be entitled to augment these social policies with a corresponding right to seek medically appropriate treatment in the best interests of the patient and affording them a right to obtain the appropriate standard of care.

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ENDING THE GREAT INFLATION

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ABSTRACT

This paper has seven sections. The first three are background. The last four follow historic events. Part 1 describes major problems of 1979: Disintermediation from the banks, stagflation (high unemployment, high inflation, and high interest rates), Banks leaving the Federal Reserve System, and zombie S&Ls (bankrupt on a mark to market accounting basis as opposed to historic cost). Part 2 discusses economic thought prevalent in 1979: Keynes, incomes jawboning policy, the Phillips Curve, and McChesney Martin's punchbowl approach. Part 3 discusses the problems of measuring money caused by the invention of NOWs (negotiable orders of withdrawal) and money market fund balances. Were they savings, transactions balances, or a hybrid? Money-GNP regressions are conducted. Part 4 shows that the old policies of Part 2 were not working and that a new one was needed. Part 5 describes Volcker's new plan to control money growth along with its flaws. Inflation regression results are presented. Part 6 resumes the quarterly historic narrative of 1979-83 events featuring the back to back recessions of 1980 and 1981-2. Part 7 analyzes the end of the Great Inflation and recovery.

PART 1: FINANCIAL INSTITUTIONS BACKGROUND

In 1979 the economy was in a mess with high inflation, high unemployment, and low growth which was called stagflation. Other problems appeared. The simplest problem was that commercial banks were leaving the Federal Reserve System and re-chartering as state banks because the Fed's high reserve requirements along with high interest rates were imposing high opportunity costs. A major problem was disintermediation which had started in 1966 with more severe episodes in 1969-70 and 1973. The flow of funds to money market funds which were essentially paying interest on checking accounts had been an irritant to the banks but not life threatening. But in 1979 the money market mutual fund (MMF) idea took off in spectacular fashion. See Exhibit 6-10. The MMFs took deposits from the banks relentlessly until the October 15, 1982 Garn-St Germain Act allowed the banks and S&Ls to issue money market deposit accounts (MMDAs) as of December 15 to compete with the money market funds. See Economic Perspectives of Mar/Apr 1983, Chicago Federal Reserve Bank "The Garn - St. Germain Act of 1982".

The S&L business model of lending long (mortgages) and borrowing short (deposits) was not sustainable in a period of prolonged high interest rates. Why is discussed below. In a decade the whole S&L industry would collapse despite five governmental rescue attempts. The first attempt was DIDMCA of 1980 which allowed the S&Ls to diversify their assets. The second was the Economic Recovery Tax Act of August 13, 1981 (Kemp-Roth Tax Cut) which authorized S&Ls to issue All Savers Certificates: Interest was tax free (up to \$1000/taxpayer) and 70% of the rate on 1-year Treasury Bills. The idea was to supply needed deposits to the S&Ls. The third attempt to help the S&Ls was the 1982 Garn-St. Germain Act. Along with the authorization of MMDAs a notable feature of Garn-St. Germain was the authorization of "Net Worth Certificates" (NFCs). The FDIC and FSLIC were authorized to issue NFCs to troubled S&Ls in exchange for promissory notes and let the distressed institutions COUNT THE NFCs AS EQUITY on the balance sheet. This was the beginning of phony accounting known as RAP (Regulatory Accounting Procedures) discussed in the next chapter. Phony accounting did not save the S&Ls and in 1989 the FSLIC itself became insolvent and was liquidated. Commercial banks would survive the onslaught of the MMFs with some casualties. The S&Ls were doomed by the disintermediation and the "lend long and borrow short" business model that could not survive inflation and high interest rates. By the way, the lending long and borrowing short problem would kill Bear Stearns and Lehman Brothers in 2008 and lead to a run on money market funds. Indeed, the lending long and borrowing short problem has been around since bank runs in Andrew Jackson's day and before. Details of the demise of the S&Ls are in the next chapter.

A Simple Example of the Required Reserves Problem. Suppose XYZ National Bank was a member of the Federal Reserve System in 1979 and had \$950 million in deposits and \$50 million in equity capital (common stock). Total liabilities and net worth = \$1000 million = total assets. Now suppose the reserve requirement on deposits is 10%. This means that XYZ has to keep \$95 million as required reserves earning no interest. A third assumption is that the Treasury Bill rate was say 11% meaning that the bank was foregoing \$10.45 million in income ($95 \times 11\%$). A last assumption is that if the bank re-chartered as a state bank the reserve requirement was only 4% which means the bank would have to keep only \$38 million in required reserves freeing up \$57 million ($95 - 38$) for investment. If the \$57

million was put into 11% Treasuries, it would earn an extra \$6. 27 million a year. This explains why many banks were giving up their federal charters and Fed membership to convert to state banks in 1979. This upset the Fed which believed that this lowered the Fed's ability to manage money and credit in the economy.

Bank and S&L Asset Values and Marking to Market. A second problem caused by inflation and high nominal interest rates is that asset and liability values on bank and S&L balance sheets become distorted. This led to an alternative method of accounting known as "marking to market". If there were no markets for the various assets, then they would be "marked to financial models" or as CNBC commentator Larry Kudlow often said "marked to fantasy". This procedure would be used also in the CDO (collateralized debt obligations) debacle at the heart of The Great Recession of 2008-9. Conventional accounting valued assets on the balance sheet at historical cost. But The Great Inflation and increase in interest rates made the actual market value substantially less. Here is a numerical example of valuing an actual mortgage.

Valuing a Mortgage at Historical Cost and Marking to Market. On August 25, 1972 Carlson took out a 25 year (300 months) \$24,500 mortgage at 6. 75% (. 005625/month). Payment was \$169. 27/month (this can be found using the Bankrate mortgage calculator on the internet). On August 25, 1979 (after 7 years or 84 payments) the remaining balance owed to Mt Lebanon Federal S&L on the mortgage was \$21,133. 64. The Bankrate calculator on the internet calculates \$21,133. 68 in its amortization table.

Marking to Market. The mortgage rate prevailing in August 1979 was 12. 15% not 6. 75% (higher due to the higher inflation rate and the Fisher effect). Discounting the value of the remaining 216 payments at 12. 15% rather than 6. 75% gave a "marked to market" value of only \$14,820. 62 (calculations below). This meant that while the S&L carried the mortgage on its balance sheet at \$21,133. 64 it really was worth only \$14,820. 62, 30% less than the historical cost basis. Many other assets on bank and S&L balance sheets also were overvalued on a historical cost basis. As a result, the net worth of many of these institutions was overstated. Indeed, on a mark to market basis many had negative net worth and were technically bankrupt. They even got the name of the living dead or "zombies". See Mishkin and Eakins 6th Ed. (2009 p. 488). We learned what happened when the Fed let banks collapse in the 1930s. So, many were kept on life support until the Resolution Trust Corp. solution of 1989-95. The collapse of the S&Ls and many banks is discussed in the next chapter.

Mortgage Calculations. To calculate the monthly mortgage payment of \$169. 27 Google "mortgage amortization schedule calculator" from bankrate.com and put in 24,500 mortgage, 25 yrs, and 6. 75%. Then click on "show amortization table" and count down 7 years or 84 months and read \$21. 133. 68. The algebraic formula that calculates these numbers is: $RemBal = (Pmnt/i) [1 - 1/(1+i)^N]$. The formula needs monthly entries in decimals so $N = 300$ months and $i = .0675/12 = .005625$ ($RemBal = 24,500$) getting $Pmnt = \$169. 27$. To get \$21,133. 68 within roundoff error use $N = 216$ months (25 years minus 7 years to 1979) with $i = .005625$.

Bankrate cannot analyze changes in interest rates. To find the marked to market value of the 216 remaining payments we use the present value $RemBal$ formula with $N = 216$, $Pmnt = 169. 27$, and $i = .1215/12 = .010125$. We can check this by Googling "value of annuity calculator" by pine-grove.com. Enter 169. 27, 216, 6. 75, make sure the first cash flow date is exactly 1 month later than today's date, frequency is monthly, and compounding is monthly. Answer is \$21,133. 27 for the historical remaining balance. Next, change the interest rate to 12. 15 and recalculate the mark to market value of \$14,820. 62. Or use the $RemBal$ formula of the previous paragraph.

THE DIDMCA SOLUTION

To solve the bank exit problem and help the S&Ls, Congress in 1979 began work on the DIDMCA (The Depository Institutions Deregulation and Monetary Control Act signed on March 31, 1980). It had a brute force solution to the bank exit problem. The MCA portion of the act extended reserve requirements to all depository institutions: commercial banks, mutual savings banks, savings and loans or S&Ls, and credit unions. The DID portion of DIDMCA was a complicated attempt to give some relief to the banks and S&Ls.

NOWs (negotiable orders of withdrawal) had been which had been restricted to New England, New York, and New Jersey were allowed nationwide starting on December 31, 1980 to help the banks and S&Ls compete with the MMFs. This was a way around Regulation Q's restriction on the payment of interest as discussed in the last chapter. A goal was the orderly dismantling of Reg Q by 1986. It should be said that Reg. Q was a truly bad idea, but it gave the Fed

power and we know that it is very difficult to get people and organizations to give up power. The FDIC insurance level was raised to \$100,000 from \$40,000. S&Ls were allowed to issue credit cards.

The DID portion of DIDMCA also tried to give specific relief to the S&Ls. Details are in the next chapter so only a quick summary is given here. Making long term mortgage loans at low rates (lending long at relatively low rates such as those of 1972) and paying higher deposit rates in 1979 (due to the inflation premium and pressures to get rid of Reg Q) was not a sustainable model. The consequence of deposit rates being held down by Reg Q was massive disintermediation (deposits withdrawn and placed in high yielding unregulated markets). But if Regulation Q had been taken off completely in 1979 savings rates which are a banking and S&L cost would have soared leading to huge losses. The S&Ls were truly between a rock (disintermediation) and a hard place (high deposit rate costs). They were a slow-moving train wreck. After three more acts (the next would be the Garn-St Germain Act of Oct. 15, 1982) designed to help the S&Ls survive, most were liquidated or merged by the Resolution Trust Corp. in the 1990s. The main feature of DID was letting the S&Ls put up to 20% in consumer (but not business) loans, commercial paper, and corporate bonds (desperate for high yields some S&Ls bought "junk" bonds with unfortunate consequences). Many firms facing bankruptcy took on very risky projects with the idea that if they were going to go bankrupt why not do it in grand style. There was a considerable amount of fraudulent behavior.

Junk Bonds and Michael Milken. The origin of the junk bond market that was frequented by many S&Ls has been the topic of many books and articles. The main creator of the market was Michael Milken with his first deal raising funds for Texas International in April 1977 (William D. Cohan Institutional Investor May 2, 2017). A summary of this market is given in the appendix.

Inflation Accounting. Inflation makes the reporting of earnings and the valuation of the firm much more difficult. Inventory changes value, replacement cost of equipment does not equal historical cost and depreciation expense is inadequate, interest expense can be deceptively low until low coupon bonds issued at low interest rates in the past are refinanced with high coupon debt. Just picking an appropriate price index to measure inflation was a problem along with many more. There was a need for inflation adjusted accounting so that investors could get a better estimate of company performance than that provided by conventional accounting. After much controversy and still with many arguments unresolved the Financial Accounting Standards Board (FASB) issued SFAS 33 (Statement of Financial Accounting Standards) "Financial Reporting and Changing Prices" in September 1979. Confusion and controversy were not eliminated and would not be until inflation subsided in 1982.

The reason this problem is of concern is that we think stock prices were lower than they would have been otherwise due to the financial uncertainties. Lower stock prices raise the cost of capital (the E/P ratio) to business making it more expensive to finance new projects slowing economic growth. Historically, stocks have sold at an average of about 15 times earnings (the P/E ratio) for the S&P 500 stock index. But, from 1977 to August 1982 when the market began a spectacular rise, the P/E ratio was in the single digits. See Exhibit 5-1 of Chapter 5.

For these reasons and perhaps others, 1979 was a tipping point where the pain of getting rid of inflation (a recession and unemployment) was less than letting it continue. Meltzer (p. 1010) cites a September poll showing concern about inflation exceeded that of unemployment by 67% to 21%. What was needed was the right person at the Fed with the right procedure. This was a problem because there were a number of conflicting economic theories and solutions being argued in 1979.

PART 2: ECONOMIC AND FINANCIAL IDEAS OF 1979

Keynesians believed that fiscal policy (government spending and taxes) could solve the problem along with "incomes policy" aka "jawboning". A precedent was the Kennedy brothers' confrontation with U. S. Steel in April 1962 when they forced Chairman Roger Blough to rescind a 3% steel price hike. A side effect of that confrontation was the second half of the 1962 "waterfall" stock market crash. In 1979 Nobel professor James Tobin of Yale advocated price and wage "guidelines" (Meltzer p. 1015). Tobin thought this process would take 10 years to eliminate inflation. Even with a false start Volcker did it in three.

The Phillips Curve Theory says that there is a tradeoff of inflation and unemployment. Economist A. W. Phillips found a negative relation between inflation and unemployment in England. Wikipedia (Google: Phillips Curve) shows his graph for 1913-1957. The implication was that unemployment could be lowered by allowing a higher rate of

inflation. Another implication is that high inflation and high unemployment ("stagflation") should not exist simultaneously. Phillips theory appeared to work in 1965 in the U. S. But then matters got out of control as described in Chapter 4. By 1976-79 there was stagflation which was not supposed to happen. Unemployment averaged 6.6% and CPI inflation 7.8%. But what we call "Reverse Phillips" seems to hold. Reverse Phillips begins with a question: has anyone found a way to get rid of non-trivial inflation without a recession and increased unemployment? The answer is no as far as we know. Paul Volcker did not know of another method either. If he did, presumably he would have used it. Reverse Phillips says that to get rid of inflation the economy has to suffer increased unemployment through recession. This idea was not unknown. The recessions of 1937-8, 1953-4, and 1957-8 provided ample evidence. This theory may explain at least in part why Martin "chickened out" in 1967 after the 1966 restraint, and again in 1970 after the 1969 restraint. Arthur Burns chickened out after the restraint of 1974. Neither Martin (Johnson, Nixon) nor Burns (Nixon, Ford) wanted to be blamed for a more severe recession or anger a president.

The "Punch Bowl" procedure of W. McChesney Martin, Fed Chair 1951-70. The idea was to take away the punch bowl when the party got started. Or to raise interest rates when the economy started booming to head off inflation. This was the standard procedure prior to 1979. Martin was 2 for 4 with the procedure, succeeding in 1953-4 aided by the ceasefire in Korea which lowered defense spending needs and 1957-8, but failing in 1966 and 1969. Burns added another failure in 1974-5 which was complicated by faulty analysis of the oil crisis. There is a difficulty with using interest rates as both a policy variable and indicator. As Meltzer has argued many times the idea that high interest rates are tight and restrictive and low interest rates easy and stimulative is overly simplistic (just like the original Phillips Curve). Interest rates are affected by many things. The state of the economy has an effect: in booms expanded business investment and consumer loan demand tends to push interest rates higher. In recessions reduced loan demand lowers interest rates (see Tables 6-11 and 6-15). Inflation affects interest rates through the Fisher Effect (see Exhibit 6-1). Expectations based on observed inflation may persist even when the trend has changed meaning that the timing may be lagged and the lags may vary. Increases in money growth may temporarily lower interest rates as more money is available and decreases contribute to higher rates (and disintermediation as in 1966, 1969-70, and 1973-4 as explained in Chapter 6). War financing is a factor as the Treasury wants to issue bonds without raising interest rates which was the major factor in WWII, the Accord battle of 1951, and Vietnam under Johnson and Nixon. January 2015 is giving us an example of international influence as deflationary forces in Europe and Japan have led to extremely low interest rates in places like Italy and Spain (about 1.7% on 10-year securities) even lower than the U. S 10 year which some of us think is crazy. Denmark .6%, Germany .5%. With all these possible cross currents and timing differences the idea of high is tight and low can be wrong and lead to wrong decisions.

A Monetarist View. Keynesians thought that fiscal policy (government spending and taxes) was the primary determinant of economic behavior and that the money stock was relatively insignificant to the point that during the Great Depression monetary stimulus was considered to be "pushing on a string". Monetarists such as Milton Friedman, Karl Brunner, and Allan Meltzer thought that money was important. In the November 1968 issue of the St. Louis Federal Reserve Review Leonall Andersen and Jerry Jordan (A&J) published "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization" which evolved into the St. Louis Model. Its heart was a regression showing that changes in the money stock had a greater influence on changes in GNP than fiscal spending and taxes. The Federal Reserve itself conducted an Andersen-Jordan type analysis published in the January 1979 Federal Reserve Bulletin. A table of their result is in Exhibit 7-7. These results set off a firestorm of controversy as Keynesians attempted to debunk A&J. The original A&J data base was 1Q52 through 2Q68. A graphical view of the strong money GNP relation is shown in Exhibit 4-8 (1952-58 missing because the St. Louis FRED data base of money goes back to only 1959). For those interested in the debate which continues to this day just google "Andersen and Jordan 1968" and follow the trail of articles. Since we now know what happened we can say that A&J were basically correct. Managing the growth of the money stock would be the answer. See the quote at the head of this chapter.

How to control the money stock was another problem. From the "The Role of Operating Guides in U. S. Monetary Policy" article in the Sept. 1979 Federal Reserve Bulletin p. 687-8: "Federal Reserve efforts since 1972 to control growth in the monetary aggregates have sometimes been frustrated because the ratio (or multiplier) between bank reserves and M1 tends to vary. In practice the Open Market Committee has been unwilling to seek - close short-run control over growth in the money supply. This reluctance reflects the belief that the short run volatility in market interest rates likely to result from such a policy would risk greater disruption to the economy than the short-run instability in money growth rates the policy was seeking to avoid". In other words, interest rate stability trumped money control (until Volcker!). On October 27, 1978 the Humphrey-Hawkins Act was passed requiring the Fed to

report to congress twice a year regarding monetary policy. An example of money targets comes from the July 11, 1979 Open Market Committee meeting: M1 1.5 to 4.5%, M2 5 to 8%, M3 6 to 9%. These ranges are quite wide. There was a federal funds interest rate (the rate banks charge each other for overnight loans mainly to meet reserve requirements) target of 9.75 to 10.5%. The control problem remained.

Controlling Reserves, the Eccles Argument 1951. As described in Exhibit 4-18 Fed board member Marriner Eccles argued that the Fed could peg the value of government debt (to finance the Korean War) by buying the debt but the cost would be expanding bank reserves, the money stock, and feeding inflation. Or it could fight inflation by restricting reserves but that would mean the Fed could no longer peg the value of bonds and hold interest rates down. In other words, the Fed could hold interest rates down or fight inflation but it could not do both. In the 1951 Accord the Fed was freed from Treasury control (imposed during WWII) to control reserves and fights inflation. Interest rates were set free to go where they may. The Eccles argument is important because it would be used (without giving credit to Eccles) on Oct 6, 1979.

This has been a summary of ideas. For more details about Fed operating procedures see "The Role of Operating Guides in U. S. Monetary Policy: A Historical Perspective" by Henry Wallich and Peter Keir in the September 1979 Federal Reserve Bulletin. Their footnotes discuss another problem, what exactly is money in a world of NOWs, money market funds, automatic transfers, and many categories of savings. This leads to the question: what is money.

PART 3: CONFUSION: WHAT IS MONEY?

In 1969 there were two basic definitions of money. M1 was the sum of currency held by the public (Cp) plus demand (checking) deposits (Dp). At the time banks were prohibited from paying interest on demand deposits. Hence M1 was basically held for transactional purposes only. M2 was M1 plus interest bearing savings accounts (T). Savings were passbook savings (Tsv), ordinary non-negotiable certificates of deposit with an interest rate to be paid over a specified period of time (Tcd). Large \$100,000+ negotiable certificates of deposit (NCDs in the last chapter) are not included in M2 (see p. 14 January 1979 Federal Reserve Bulletin).

As long as free market rates on Treasury Bills and commercial paper were below Reg Q ceilings the 1933-1969 money categories were stable. But when inflation pushed those rates above Q ceilings NOWs and MMFs increased, becoming significant in 1979 as shown in Exhibit 7-1. Exhibits 7-2 and 7-3 show the instability of various money categories. Unfortunately, the FRED data base categories do not match those of the Federal Reserve Bulletin exactly (FRED does not break out MMDAs for example) but the gyrations are clear. Table 7-4 shows the major components of money quarterly 1975-85. The problem of defining what money is comes from the hybrid nature of NOWs and MMF balances. Since they receive interest, they belong partially in the savings section of M2 but do not belong in M1. But checks can be written on NOW and MMF balances giving them a transactional role properly included in M1. They are not fully transactional because they were subject to minimum balances and limited to 4 checks or so per month.

Our regressions are shown below using an adjusted money series. It is M-1a plus 2/3rds of Other Checkable Deposits as compiled by the St. Louis Fed FRED data base. This recognizes the hybrid nature of the NOW-ATS balances. Could other ratios have been used? Of course, and we encourage researchers to do more experiments.

There was a debate about using M1 or M2 for analysis. Exhibit 7-4 (as opposed to Table 7-4) shows two graphs. The top graph show M1 and M2, 1959-84. Notice that M1 tracks pre-1980 and 1981-82 recessions, but M2 does not. This is why we prefer to use M1 in our regression estimates. The middle graph shows the long run (135 years) relation between M2 growth and inflation compiled by Xi Wang of Washington University of St. Louis. The bottom graph shows a problem of adjusting data in 1980.

Exhibit 7-5 contains comments from Meltzer's History of the Federal Reserve showing how monetary innovation caused problems for the Fed. Key phrases such as "innovation added to the difficulty of choosing a (monetary) path", "made aggregates difficult to interpret", "difficult to separate portfolio shifts from policy changes", "uncertainty about seasonal adjustments", "the degree to which NOW accounts were used for transactions", the All Savers Certificate problem, "money supply data - - it was not very reliable" basically led the Fed to abandon its non-borrowed reserves targeting procedure for interest rate targeting in the Oct. 5, 1982 FOMC meeting. There were other reasons as well described below.

More Andersen-Jordan type Regression Results. In the November 1968 Federal Reserve Bank of St. Louis Review Leonall Andersen and Jerry Jordan published "Monetary and Fiscal Actions: A Test of Their Relative Importance". For convenience Exhibit 7-6 shows their results which have already been discussed. The January 1979 issue of the Federal Reserve Bulletin contains an article "A Proposal for Redefining Monetary Aggregates" by the staff of the Board of Governors. Exhibit 7-7 shows the reduced form regressions run by the Fed staff. We really need to focus on only the top regression which happens to be the best of the group. Its M1 is M-1a in our money data table Exhibit 7-4 and the staff M1+ is essentially M-1b. The adjusted R2 is .492 (A-J R2adj was .60 for regression 1-3). The staff study is consistent with the A-J results. The money explanators are strongly positive with a t-statistic of 6.133. High employment expenditures have a significant t-statistic of 3.031 but less than that of money (A-J's comparable t-statistics were 7.25 for money and .54 for high employment expenditures).

The bottom half of Exhibit 7-7 shows a graph of real GNP versus money rather than nominal GNP from Meltzer. Accordingly, our regressions are in the Meltzer format. We have run two regressions of changes in real GDP (using NIPA data table 1.1.6 2009 price base) versus changes in the adjusted (see above) money stock contemporaneously and 1 to 5 lags (similar to the staff study) for 1973-80 and 1978-84. The regression results are in Exhibit 7-8. The R2 adjusteds are greater than the staff study but slightly less than that of A-J. The F-statistic is extremely significant as is money. Readers are invited to add fiscal and other explanators. Exhibit 7-9 contains the data used for the 1973-80 regression. To see how well the regression results tracked actual real GDP the regression results \hat{Q} hat were cumulated to get Qhat.

Exhibit 7-9b plots actual real GDP (the black line) versus the regression estimation (the red line). Most notable is how well the regression tracks the 1980 recession. It does less well with the 1973-5 recession. The regression path turns down ahead of the actual recession which bobbles around the last half of 1973 and first half of 1974. The regression downturn also is less than that of the actual recession which was made worse by the OAPC oil boycott and price increases as a consequence of the Yom Kippur War. Exhibit 7-10a contains the data for the 1978-84 regression. Exhibit 7-10b graphs actual GDP versus that generated by the regression. This regression captures the 1981-2 recession quite well but underestimates the 1980 recession. There is a giant increase in actual GDP in 2Q78 which seems to be an outlier. Looking at GNP figures originally reported in the Survey of Current Business, 2Q78 the increase is far less. Again, data problems are not unknown. In the December 1981 Federal Reserve Bulletin article "Season Adjustment Methods for Monetary Aggregates" p. 881, it is called, "intervention adjusted series". Back in undergrad days we called it "fudging the data". Exhibit 7-10c plots the results on a first differences basis.

PART 4: VOLCKER BECOMES HEAD OF THE FEDERAL RESERVE

In the summer of 1979 the economy and the fortunes of the Carter Administration were floundering. New ideas were needed and on July 25 the president nominated Paul Volcker, then president of the New York Fed, to replace G. William Miller as Chairman of the Federal Reserve. He took office on August 6. The crucial event leading to the policy change came on September 18.

Using the traditional method of McChesney Martin taking the punch bowl away (raising interest rates) to combat inflation, the Federal Open Market Committee raised the discount rate from 10.5% to 11% on September 18, 1979. The problem was that the vote was only 4 to 3. The financial markets interpreted this close vote as a weakening will to fight inflation. Commodity prices jumped sharply (Meltzer p. 1022). Volcker determined that he needed a new procedure to get money growth under control. Gold had risen from \$300/oz to \$426 in six weeks (Meltzer p. 1025). It was at this point that he came up with the thought heading this chapter about inflation being caused by too much money. Volcker assigned staff members Stephen Axelrod and Peter Sternlight the task of preparing new operating procedures to improve the control of money, replacing the management of the federal funds rate.

One consequence of the new procedure was that interest rates would set new records and be more volatile. See Exhibit 7-3. The Fed wanted the market to be blamed for this behavior, not the Fed itself. On October 4th, the Federal Reserve Board was told that there would be a special meeting October 6th to implement new procedures.

PART 5: THE VOLCKER PLAN TO MANAGE THE MONEY STOCK

On August 6, 1979 President Carter appointed the president of the New York Federal Reserve Bank, Paul Volcker, to be the Chairman of the Federal Reserve. Volcker determined that he needed a new procedure to get money growth under control and it was unveiled on Saturday October 6, 1979. From Meltzer p. 1027, "Volcker recognized that to control money growth, the System had to control total reserve or monetary base growth. Non-borrowed reserves (seasonally adjusted) were the operating target because, Volcker said, they could not directly control borrowing or currency demand". Most monetarists, particularly those on the Shadow Open Market Committee, disagreed and thought that the Fed should target the monetary base. In terms of the Brunner-Meltzer money stock formula here is the difference between the Volcker and monetarist plans:

$$M = (1+k/k+rr+re) Ba \quad M = (1+k/k+rr+re)(NBR + BR + Cp).$$

The first formula has been developed in previous chapters. $(1+k/k+rr+re)$ is the money multiplier with $k = Cp/Dp$ the currency deposit ratio, rr the reserve requirement ratio, and re the excess reserve ratio. Ba is the monetary base equal to currency held by the public plus reserves (currency held as vault cash and currency held by banks at Federal Reserve Banks in electronic form). Ba is the total amount of currency issued in physical and electronic form and is easily controlled by the Fed through open market operations (sale or purchase of TBills, or repos). The second formula breaks the base into its components: currency held by the public (Cp), non-borrowed reserves held by the commercial banks (NBR), and borrowed reserves held by commercial banks (BR). It seems clear that the base would be more highly correlated with money than NBR . The source of error in the Base-Money relation is the money multiplier. The NBR -Money relation has two additional sources of error, borrowing BR and currency Cp . An assumption was made by the Fed that demand for currency was stable and should not be a serious problem.

But there were problems with the borrowing factor BR . One issue had to do with the discount rate versus the TBill rate. Suppose the TBill rate is 14% and the discount rate is 9%. Would you borrow at 9% to get a free 14%? Of course. And so would banks. But the "privilege" of borrowing from the Fed is not a right and is not supposed to be for profiteering. But the banks did it anyway. We ran a regression 1979-82 monthly: Borrowing from the Fed ($BORROW$ from St. Louis Fed FRED data base) as a function of the 3moTBill rate ($TB3MS$) minus the Fed's discount rate ($MDISCRT$). The coefficient is highly significant with a t-statistic of 6.31, with a p-value of .00001. The banks gamed the system and the Fed did not control it. A proposed solution was to peg the discount rate say .10% over the Bill rate but such a procedure meant that the Fed would give up the power to set the discount rate, and institutions are loath to give up power. An analog: had the Fed set Regulation Q ceilings say .20% or so above TBill and commercial paper rates the distortions of disintermediation probably would have been avoided. But the FED did not want to give up Regulation Q power and Exhibit 7-11 shows what a monstrosity Regulation Q became. Another problem was that some members and staff of the Fed retained elements of faulty 1920s style Riefler-Burgess concept which stated that increased borrowing from the Fed was contractive when in fact it was expansive (see the money formula and Meltzer p. 1030).

The Lagged Reserves Problem. Current required reserves were not based on current deposits (contemporaneous) but calculated on deposits of two weeks prior. Hence, if deposits grew in two weeks the banks would need more required reserves which might have to be borrowed. In other words, lagged reserve requirements led to borrowing instability.

There is one important reason why the Fed went to reserves targeting from interest rate targeting. To defeat inflation the Fed would have to raise interest rates to unprecedented heights which would cause a political firestorm. By switching to reserves control the Fed could blame the market for the high rates reached (Meltzer p. 1033).

Predictions. From Meltzer p.1028 Monetarists argued that the new procedure, with its borrowing and reserve requirement flaws would make interest rates and monetary growth more volatile. Exhibit 7-12 shows that both short- and long-term rates ($i3mo$, $idisc$, $i10yr$) did become more volatile. The bottom half shows money volatility.

A Quick Perspective: The 1980 and 1981 recessions were so close together that they can almost be considered to be one disconnected recession. Exhibit 7-13 shows the unemployment rate and the 1980 and 1981-2 recessions almost appear to be one recession with a hesitation part way through. As the end of 1980 runs into the beginning of 1981-2 some parts of the normal recession cycle are short circuited. A consequence of the quickness of events means that a quarter may be too long to capture notable events. Accordingly, a supplemental data table on a monthly basis has been prepared. Table 7-14 shows the quarterly behavior of money, GDP, prices, interest rates and other variables. In prior chapters the GDP related figures were presented using the 1972 price deflator. In the 1980s the BEA (Bureau

of Economic Analysis) switched to a 1982 basis. Currently the BEA has 2009 base data conveniently available on its website, so we are switching to that data source for the overview table. The money measure used is the adjusted money series of the Exhibit 7-8 regressions.

Overview of Money and the Recessions of 1980 and 1981-2: The appendix contains money and GNP-GDP tables for the recessions of 1937-8, 1948-9, 1953-4, 1957-8, 1960, 1969-70, and 1973-5. Exhibit 7-14 continues the tables for the recessions of 1980 and 1981-2. The general pattern of behavior is that sustained declines in the money growth rate (red vertical line next to the gM column) followed in about two quarters by recessionary behavior of real GDP (the Q column). After a short delay as business cuts overtime and shorten the workweek business then lays off and fires workers causing unemployment to rise (the U column). Wages tend to fall or rise less rapidly. Then decreased employment cuts back on consumer spending and inflation eases (the Infl column(s) marked in green). See Holt, Modigliani, Muth, and Simon "Planning Production, Inventory, and Workforce" (HMMS).

The 1980-82 situation is more complicated because the recessions run into each other with sustained stop and go behavior of both money and GNP-GDP over a 4-year period. It appears that there is an unofficial "near recession" in the first half of 1979. The situation is complicated enough that we use three different colors to show the money-real GDP declines. Growth rates are annualized. X marks a yield curve inversion. The Near Recession of 1979 is marked in orange. From 2Q78 to 1Q79 money growth dropped from 10.19% to 4.11% (down 6.08%). This is quite similar to the 7.14% to 1.7% drop (down 5.97%) in 1966 preceding the 1Q67 slowdown (considered to be a mini-recession at the time). GDP growth was .64% in the first half of 1979 (.11% using 1972 based data with 2Q79 slightly negative). The Recession of 1980 is marked in red. The money stock drop that preceded and accompanied it had two drops. The first from 10.50% to 2.74% in the last half of 1979, a one quarter bounce and then another sharp drop from 7.12% to -2.84%. The 1980 recession was sharp and short with drops of 7.87% and .61% (down 9.03% and up .77% with 1972 based data) in mid-1980. The 2Q80 drop was exacerbated by an ill-considered credit control program discussed below. Then, just as Martin and Burns had been afraid of unemployment and "chickened out" in 1967, 1970, and 1975, the Fed "chickened out" again as the money stock (adjusted) shot up 13.52% and 9.22% in the final quarters of 1980. The Recession of 1981-2 is marked in purple. It is a messy recession with quarters going down (2Q81), up, down, down (4Q81-1Q82), up, down (3Q82), flat. These down periods are preceded by irregular money growth declines in 4Q80-1Q81, 3Q81, and 2Q82. Nitpicking note: the NBER (National Bureau of Economic Research) says the recession of 1981-2 runs from July 1981 to November 1982. This means that the down quarter of 2Q81 is its own event, after the 1980 recession but before the NBER defined 1981-2 recession. We disagree with the NBER and include the down quarter of 2Q81 as part of the greater 1981-82 recession. Increases in unemployment associated with the various GDP declines are shown in the U column and lag a bit as expected. At the end of 1982 the unemployment rate reached 10.67%, a post-depression peak.

Inflation: How Volcker tamed inflation is the main topic of this chapter. The method is simple. Throw the economy into a recession. From 1929 on all recessions except the WWII reconversion have led to a lessening of inflation. It is a painful process but so far no one has figured out a painless alternative. Exhibit 7-13 shows the Volcker solution led to an unemployment rate of 10.67% at the end of 1982, a post-depression peak. This is not a criticism. Former chairmen Martin, Burns, and Miller started the Great Inflation, made feeble attempts to halt it, but then "chickened out" as they saw the unemployment price.

A problem is how to measure inflation: An obvious choice is the GDP deflator (NIPA Table 1.1.4) but as Exhibit 7-15 shows it is not as sensitive to GDP changes as is the CPI (consumer price index - FRED CPIAUCSL). Another alternative is the PCE (Personal consumption expenditures deflator - FRED PCEPI). Meltzer (St Louis Fed Review Mar/Apr 2005 "Origins of the Great Inflation" p. 145-6) notes that the Iranian oil crisis of 1979-80 had an effect on inflation as did the subsequent mild price declines. This suggests the CPI ex food and energy (FRED - CPILFESL), the PCE ex food and energy (FRED - PCEPILFE), and the West Texas Intermediate Barrel Spot Price (FRED - WTISPLC). Exhibit 7-14 has three measures of inflation: GDPDEF, the CPI, and the PCE ex food and energy. The green vertical lines mark periods of declining inflation. The GDP deflator shows inflation relief in 1979 but the others do not. In 1980 the CPI and PCEexfe show some relief but the GDP deflator does not. The patterns are similar for 1981-2 but not exactly the same.

The Money HMMS Sequence: We have already presented real GDP - money regressions (Exhibit 7-8). Exhibit 7-16 gives a longer view. The next step is to link employment to real GDP. They should be closely related but there should be a slight lag as work week length and overtime schedules are adjusted before more expensive hiring and firing costs

are incurred. Exhibit 7-17 shows the relation 1949-2014 (printer chopped off 2015-7). Notice that the employment series is less volatile than the GDP series. The 1973-2Q85 regression is shown. If the turbulent price control oil boycott years 1973-5 are left out the R2 and R2adj values go to .9413 and .9361. The last step in the HMMS sequence is relating inflation and employment. But first there is the effect of the Iranian oil crisis mentioned by Meltzer. The West Texas Intermediate Spot Price (WTISPLC on FRED - the only oil price series going back that far) went from \$14.85/bb at the beginning of 1979 to \$39.50 in mid-1980, then declining irregularly to an average of 27.97 in 1985. Exhibit 7-18 shows the oil price compared to the CPI, PCE, and GDPDEF. The three oil crises, all associated with recessions, are shown: The 1973-4 OAPC boycott and price rise due to U. S. support for Israel in the October 1973 Yom Kippur War, the 1979 Iranian oil crisis due to the overthrow of the Shah by Ayatollah Ruhollah Khomeini, and the August 1990 invasion of Kuwait by Saddam Hussein of Iraq. This suggests looking at two other price indexes: the CPI and CPE both ex food and energy. Exhibit 7-19 shows all five price indexes along with the crude oil spot price.

The Inflation - Employment Regressions Exhibit 7-20: We tried to get a FRED graph of inflation vs employment rate but it would not scale properly (would need a magnifying glass). Regressions were done for all five measures of inflation. WTI is the west Texas spot price, and ER the employment rate equal to 1-the unemployment rate (1-U in decimals). Minus subscripts denote quarterly lags. Numbers in parentheses are significant t-statistics and numbers below them are p-values. All five of the Employment rate regressions are significant with the CPI regressions being the best as expected. Regressions 6 and 7 replace the employment rate with the growth rate of real GDP and are insignificant. Later, when we discuss the money surge of 4Q82-3Q83 we will show how the surge ruins direct inflation-money regressions.

PART 6: BACK TO HISTORICAL EVENTS

1979: Iran and Oil. On January 16, 1979 the semi-pro Western Shah left Iran for exile in Egypt. Ayatollah Ruhollah Khomeini returned from exile in France (which got little thanks) on Feb 1. On the 11th the army went back to its bases and Iran was on its way to being an Islamic state with enmity to the U. S. that continues to this day. The major economic impact of the Iranian Revolution was the second oil crisis. Exhibit 7-14 shows oil rising from \$15.52 in the first quarter to \$30.83 in the fourth on its way to \$39.50 in 2Q80. To get an idea of the impact of Iran on inflation, CPIex food and energy inflation 1978-79 was 7.26% to 9.74% up 2.48%. The CPI inflation with food and energy was 8.93% to 12.64% up 3.71%. Food and energy apparently caused inflation to go up an extra 1.23% (PCE difference 1.61%). These figures are consistent with Meltzer's estimate that half the 1979 inflation rise was due to the oil crisis.

- 1H79: The Slowdown of 1H79. The money growth rate drop from 2Q78 to 1Q79 of 6.08% was the first of six stop and go cycles from 1978 to 1982 (see Exhibit 7-14). With a 2 to 3 quarter lag similar to past money growth rate declines this decline led to a slowdown in the first half of 1979. The yield curve inverted and remained so to 1Q80. It was not a recession but set the pattern for more declines.
- 2H79: The economy had a mild recovery for the last half of 1979 and the first quarter averaging 1.75% growth with CPI inflation of 12.85% (10.91% less food and energy).
- July 27: Rep Fernand Germain introduces an initial version of the Depository Institutions Deregulation and Monetary Control Act to Congress.
- Aug. 6: Paul Volcker became the new chairman of the Federal Reserve Board.
- Sep. 14: The Board raised reserve requirements with a 4-3 vote. The closeness of the vote led markets to believe the Fed was wavering in its fight against inflation and commodity prices spiked.
- Oct 6: Under a new procedure described above the Fed decided to try to control non-borrowed reserves as a means of controlling money growth. See the chapter heading. Borrowings from the Fed and lagged reserve requirements would cause control problems. Other actions were raising the discount rate from 11% to 12% and raising reserve requirements on larger banks. Over the weekend the 10-year bond yield rose from 9.60% to 9.93%, an estimated 2.10% in value, and hit 11.02% on Oct. 23, a drop of 8.63% in value (assumes

an 8% coupon). Scrolling through FRED daily data beginning in 1962 these drops are far larger than any other which is why it was called the Saturday Night Bond Massacre at the time.

- Oct. 23: The Shah of Iran who had been exiled entered the U. S. for medical treatment from Mexico. Riots broke out in Iran and continued to Nov. 4 when:
- Nov. 4: The Revolutionary Guard in Iran took over the U. S. Embassy and the 444-day hostage crisis began. October West Texas oil was \$29. 00 in 1979; it was \$39. 50 by April 1980.
- 1980: The Recession. The NBER says the recession ran from January through July, but the real GDP figures were negative in the second and third quarters with a weak first quarter. The recession was preceded by the 2Q79-4Q79 drop in money growth from 10. 50% to 2. 74%, a one quarter rebound, and then a severe drop to -2. 84%.
- March 14: Credit Controls. With the 3mo TBill averaging 13. 35% in the first quarter the Carter Administration put on borrowing limits. Angry citizens chopped up their credit cards and the program was abandoned after 3 months. Stacey Schroft in the Richmond Fed Review Nov/Dec 1990 p. 41 found that the drop in consumption accounted for 79. 38% of the GDP shortfall compared to 26. 15, 20. 66, 26. 24, 37. 43, and 26. 26% in the 1948-9 to 1969-70 recessions, 43. 35% in the 1973-5 recession, and 18. 51% in the 1981-2 recession. The average was 34. 75%. If 1980 is adjusted to the average the 1980 recession would have been only half as severe.
- March 27: Hunt brothers' effort to corner the silver market failed and the silver market crashed. See Ch. 2 regarding the Heinze effort to corner the copper market in 1907. Due to the credit control program, banks were reluctant to bail out the Hunts until Volcker approved perhaps setting a pattern for the Long-Term Capital Management bailout in 1998.
- March 31: DIDMCA was signed into law.
- 2Q80-3Q80: The recession quarters. As usual during a recession interest rates fell. Inflation continued to rise throughout 1980 as indicated by the GDP deflator. But the CPI shows a drop to 7. 70% in 3Q80 from 14. 21% in 2Q80. The PCE ex food and energy shows a smaller drop. But the benefit of the recession was lost as the Fed allowed the money stock to grow at a 13. 52% rate, and 9. 22% more in the fourth quarter. This stimulus led to a robust recovery in 4Q80 and 1Q81. In 4Q80 the yield curve once again inverted for a year.
- Dec. 31: NOWs (negotiable orders of withdrawal) were allowed nationally. NOWs and ATS (automatic transfers) allow interest to be paid on accounts with limited checking abilities. Their existence changes M1 into two categories: M1a which is currency plus noninterest bearing (old style unlimited checking) demand deposits and M1b which is M1a plus Other Checkable Deposits (OCDNS on FRED - mainly NOWs). The problem is that it is not clear what are savings and what are transactions accounts. And why are NOWs in M1b but money market fund balances not since checks can be written on both? The situation will become murkier on Dec 14, 1982 when MMDAs are introduced. See below.
- Net effect of the 1980 recession: Meltzer p. 1094, "Although the Federal Reserve began its anti-inflation program in October 1979, it had to start all over again in the fall of 1980". But 1980 was not a total waste because it and the 1979 slowdown increased unemployment. Ultimately, the 10. 80% unemployment rate of December 1982 would slay the inflation dragon. To use a boxing analogy, it would take more than one punch to knock out entrenched inflation. (Automatic cost of living adjustments to wages are a sign of entrenched inflation). Referring to Exhibit 7-14 it took five punches (colored in orange, red, and three in purple) to send the unemployment rate from 5. 70% to a post-depression record of 10. 67%, even greater than that of the great recession of 2008-9. This was sufficient to solve the inflation problem. The 1979 slowdown and 1980 recession started the procedure by pushing the unemployment rate to 7. 40% from 5. 70%. Then the three stages of the 1981-2 recession finished the job.

- 1Q81: Spurred by the strong money growth in the last half of 1980, real GDP rose at an 8.54% rate following 7.62% in 4Q80. Inflation in both quarters went back to double digits. Meltzer p. 1077-9 has a section called "Could Reserve Control Work Better?" summarizing a Fed staff meeting. He notes that lagged reserve requirements and borrowing from the Fed were major problems but nothing was done. Also, the introduction of NOWs nationally clouded the definition of what were savings and what were transactions balances. These problems help to explain the stop and go, stop and go, and stop and go nature of money and GDP growth (the purple section of Exhibit 7-14).
- The 1981-2 Recession: According to the NBER the 1981-2 recession began in July 1981 (the third quarter). But 2Q81 was a down quarter. If it is not part of the 1981-2 recession and by definition not part of the 1980 recession it is an orphan down quarter. We disagree with the NBER and think that 2Q81 is the start of the 1981-2 recession. With this definition the recession of 1981-2 has the quarterly GDP pattern of down, up, down, down, up, down, flat.
- 2Q81: The growth rate of the money stock dropped from 13.52% in 3Q80 to -2.64% in 1Q81 leading to the 2Q81 drop in GDP of -2.89%. Aided by a small drop in oil prices from \$38.00 to \$37.33/bbl the inflation measures of Exhibit 7-14 declined.
- 3Q81: This was an up quarter in the yoyo behavior of money and GDP. GDP was up 4.67% presumably from the money rebound from -2.64% to 6.08%. GDP inflation rose a bit and CPI inflation went from 8.44 to 11.81% even though oil dropped to \$36.00/bbl from \$37.33. But the PCEexF&Edropped .24%. The yield curve was still inverted implying a coming downturn.
- Sep. 25 Fed Board meeting: Volcker goal: "His aim was to bring down "excessive growth in money and credit to the point where the supply of our dollars does not outrun the supply of real goods and services" ". Meltzer p. 1097. This idea goes back to Martin. From Meltzer p. 70, "Martin, Riefler, and others believed that to avoid inflation, money should grow at about the growth rate of real output. - "excessive money growth was necessary for sustained inflation". These conclusions are implied by the quantity theory of money $MV = PQ$. See 1983 below.
- 4Q81: The downturn came as the money stock dropped from 6.08% growth in 2Q81 to -.27% in 3Q81. With a lag the GDP dropped 4.59% and unemployment jumped from 7.40 to 8.23%. From Meltzer p. 1091, "This was a turning point. With the unemployment rate approaching 8% in the fall of 1981, the Federal Reserve did not ease. Nothing like that had happened in the postwar years. Market participants recognized the change". GDP inflation eased to 7.40% from 7.67% as did the PCEexF&E which went from 7.52 to 7.21%. The more volatile CPI which had jumped to 11.81% inflation in 3Q81 reversed back to 6.66% in the fourth quarter. Money growth was a modest 3.52%, well below the 5.06% rate of growth from the beginning of the 1979 slowdown.
- 1Q82: The recession continued with GDP falling at a rate of 6.52% and unemployment rising to 8.83%. GDP inflation declined from 7.40% to 5.49%. CPI inflation dropped from 6.66% to 3.59% aided by the oil decline from \$35.33 to \$31.30/bbl. The money stock continued its go and stop behavior by rising at an 8.10% rate.
- Feb. 10: Volcker to the House Banking Committee, "he dismissed arguments based on a tradeoff between unemployment and inflation, insisting that lower inflation would bring lower unemployment rates. He dismissed the Phillips Curve as a guide. "More inflation has been accompanied not by less, but by more unemployment and lower growth". From Meltzer p. 1099.
- March 29-30 Fed meeting: Meltzer p. 1102, "April's money growth was a major concern. - Apparently the seasonal adjustment was inaccurate. - The wide range on M1 growth reflected the great uncertainty about the monthly seasonal adjustment and the degree to which NOW accounts were used for transactions". Money growth jumped to 8.10% leading to the last go stop cycle.

- 2Q82. GDP was up a modest 2.19% but unemployment, which usually lags, rose to 9.43%. Inflation measured by GDP and PCEexF&E declined by about .5% but CPI inflation bounced back to 5.92% from the low value of 3.59%. At the end of the quarter the three measure of inflation were 5.04%, 5.43%, and 5.92%. Compared to the end of 1979 with inflation at 8.08%, 8.60%, and 13.26% progress had been made.
- May 16: The Drysdale case. Drysdale was a small securities firm that made a huge bet on a holding of reverse repos and owed \$120 million in interest which it did not have. Chase Bank denied responsibility but the Federal Reserve Bank of New York brokered a settlement.
- May: The Penn Square Bankruptcy. Penn Square of Oklahoma City had made many risky oil loans and rumors there was trouble caused depositors to withdraw some funds. On July 2 there was a classic bank run as depositors tried to withdraw funds. On July 5 the bank was closed. Penn Square had sold many of its loans to Continental Bank of Illinois which later needed a bailout from the Fed and was the first major example of the "too big to fail problem". This case is featured in the next chapter.
- 3Q82: Money growth dropped from a growth rate of 8.10% to 3.01% from 1Q82 to 2Q82. The result was a final GDP decline of 1.43% with unemployment rising to 9.90%. Strangely, inflation rose perhaps due to its lagged behavior. Interest rates fell, short term rates quite sharply from 12.42% to 9.32%. Political pressures were building because midterm elections were coming in November. Fortunately, the Fed was able to keep the growth rate of money to a modest 3.69%.
- 4Q82: GDP growth was a miniscule .39% probably due to the modest money growth of the previous two quarters. Unemployment averaged 10.67% hitting a peak of 10.80% in November and December. Interest rates declined sharply due to reduced loan demand in the recession. Inflation dropped as well, especially the volatile CPI which rose at a rate of only 1.23%. Unemployment averaged 10.25% in the first half of 1983 and the year over 10% was enough to break the back of inflation. But there was an inflation scare coming.
- October 5: Meltzer p. 1117: In a Sep. 29 staff meeting staff member "Axelrod discussed the difficulties of forecasting or even interpreting M1. The All Savers Certificates, NOW accounts, and other changes created the problem. - - The Oct. 5 FOMC meeting was a turning point: the FOMC ended monetary control". p. 1119, "would restore the M1 target once the All Savers Certificate and the new instruments (money market deposit accounts) allowed by the (pending) Garn-St. Germain legislation permitted transaction accounts to settle down. - - we were getting boxed in by the money supply data. . . We came to the conclusion that it was not very reliable. . . so we backed off that approach".
- Dec 14 Garn-St. Germain: Referring back to Exhibit 6-10 it can be seen that money market funds were taking a huge amount of deposits from banks and S&Ls beginning in 1979. Garn allowed banks to issue MMDAs (money market deposit accounts) with characteristics similar to money market fund accounts so that the banks could compete and stem the flow of deposit losses. As can be seen MMDAs were successful and grew rapidly after being allowed on December 14, 1982.

Summary: The 1979 slowdown and the recessions of 1980 and 1981-2 sent the unemployment rate from 5.6% in May 1979 to 10.8% in December 1982, a post WWII peak that still is a record. It was enough to break the back of the Great Inflation. Credit must be given to Paul Volcker and Presidents Carter and Reagan for not wavered as unemployment increased, unlike prior attempts which ended when the unemployment pain became too intense. But the end of the 1981-2 recession in 4Q82 was not the end of the inflation fight. Exhibit 7-14 shows a huge increase in money growth starting in 4Q82 marked in black outline. With a 2-quarter lag real GDP also rose sharply, also marked in black outline. There was a fear in 1983 that this surge in money growth would cause inflation to come back. Indeed, the foremost monetarist Milton Friedman made such a forecast. See Edward Nelson "Milton Friedman and U. S. Monetary History 1961-2006" p. 159, 163-4 in the St. Louis Fed Review May/June 2007.

PART 7: THE RECOVERY AND END OF INFLATION

Meltzer p. 1133 says it is not possible to pinpoint the exact end of the Great Inflation but on p. 1195 he indicates that the spring of 1986 is as good as any. The major problem remaining is explaining why the 4Q82-3Q83 surge of money

growth did not bring inflation back as similar surges after the restraints of 1966, 1969, and 1974 did. We have tried direct regressions of quarterly inflation on the growth rate of money, contemporaneously and with lags (and with oil prices to account for the exogenous effect of the Iranian oil crisis). 1973-80 worked well, 1973-81 and 1982 less so but still with significance. But the 1973-83 regression was a statistical disaster. The high money growth values of 2Q82-3Q83 caused the regression to estimate rates of inflation far higher than the actual rate. These regressions agree with Friedman that inflation should have returned. There are several potential explanations why the money surge did not undo all the benefit of the 1979-3Q82 restraint period. We have explored them. But it turns out that, but for two data points, the quantity theory of money QTM gives a solution.

The Quantity Theory of Money (QTM): The equation is $MV = PQ$ where M is money, P the price level and Q real GDP. V is velocity. Velocity is an analog to inventory turnover. If company sales per year are 100 units and inventory is 25 units then inventory turns over 4 times a year. Now if interest rates are high inventory becomes more expensive, so you want to hold lower inventories, say 20 units meaning a turnover of 5 times a year. So, inventory turnover (or inventory velocity) is a positive function of interest rates. The same is true for money velocity. There is a classic article on this called "The Transactions Demand for Cash: An Inventory Theoretic Approach" William J. Baumol QJE Nov 1952. Solving for P: $P = (M/Q)V$. This equation can take a linear form by taking logarithms (use natural logs for a reason given in the next step: $\ln P = \ln M - \ln Q + \ln V$. Trying to avoid autocorrelation problems we take first differences: $\ln P - \ln P - 1 = \ln M - \ln M - 1 - \ln Q - \ln Q - 1 + \ln V - \ln V - 1$ or $\Delta \ln P = \Delta \ln M - \Delta \ln Q + \Delta \ln V$. Now first differences of natural logarithms are growth rates so an alternate version is $gP = gM - gQ + gV$ where gP is the growth rate of prices which is inflation, gM the growth rate of money, etc. This equation agrees with the Friedman-Volcker comment of Meltzer p. 1016 "Following Milton Friedman, they (monetarists) argued that inflation could not be reduced unless money growth declined relative to growth of real output, a proposition accepted by Volcker".

This brings us back to the money growth surge of 4Q82-3Q83. The money surge was followed by a similar surge of real GDP two quarters later 2Q83-1Q84. It seems reasonable to match the money surge quarters with the GDP surge quarters, matching GDP growth to M growth of two quarters earlier. Ignoring V for the moment, the QTM formula becomes: $\Delta \ln P = \Delta \ln M - 2 - \Delta \ln Q$ or $gP = gM - 2 - gQ$. Exhibit 7-21a is a table of natural logarithms of M and Q from Table 7-14. Exhibit 7-21b is a graph of $\Delta \ln M - 2 - \Delta \ln Q$ (lower plot) and GDP inflation (upper plot). They match well except for the 3 outliers. GDP growth in 2Q78 was an astounding 16.48%. The August 1978 SCB shows the initial estimate of 2Q78 real GNP to be \$1380.0 versus \$1359.2 for 1Q78, a growth rate of 6.26%. Accordingly, we ignore this point with the dashed line.

The 2Q80 outlier is the subject of two articles. The Stacey Schroft Richmond Fed article showing that about half of the 2Q80 real GDP decline was due to the credit control program has already been discussed. The December 1981 Federal Reserve Bulletin article "Seasonal Adjustment Methods for the Monetary Aggregates" p. 881 shows that demand deposits were substantially underestimated (the "intervention" process). These adjustments help but this point still hurts the regression.

The third problem is caused by the model being out of phase. The assumption is that the M-GDP lag is two quarters. The 1Q81 $\Delta \ln M$ drop of -.0067 should have been followed by a down GDP result two quarters later but the actual result was up. Tinkering with velocity might mitigate some of the outlier problems but the size of the discrepancies is large enough that minor adjustments cannot make a significant improvement. But: The surge problem has been solved. The 4 dots of Exhibit 7-21b marked in green show that once the high growth of money is offset by the high growth of real output as implied by the QTM and the Friedman-Volcker comment in Meltzer, the money surge was not inflationary.

The Recovery and the Friedman forecasting problem: It would be nice to find a significant price-money regression for say 1973-84 with significant t-statistics for the money explanators. We do find one for 1973-80 and acceptable results for 1973-3Q82 but extensions into 1983-4 fail. The reason is the year-long 4Q82-3Q83 bulge in money growth averaging 11.09% circled at the bottom of Exhibit 7-14. With a 2 quarter lag the monetary stimulus led to a strong recovery averaging 8.55%. But the money surge ruins price-money regressions. For comparison, after the 1966 money restraint 2Q67-4Q67 money growth averaged 7.15% and inflation reaccelerated. After the 1969 restraint 4Q70-3Q71 money growth reaccelerated to 7.51% and inflation came back despite Nixon's wage and price controls-possibly indicating a communication problem between the President and the Federal Reserve. And after the 1974-1Q75 restraint of 3.71% money then grew at 5.66% the following year and 8.13% in 1977 and inflation went into

double digits. So, it is not surprising that a growth rate of 11.09%, greater than any previously, would lead analysts to expect inflation to reappear once again including the foremost monetarist Milton Friedman.

From "Milton Friedman: Contributions to Economics and Public Policy" (Robert Cord, Daniel Hammond, Oxford Univ. Press 2016 ISBN0191009423) "By July 1983 Friedman told the president he expected inflation to increase in 1984. In September he published his thoughts in the Wall Street Journal ("Why a Surge in Inflation is Likely Next Year" September 1). Critics of monetarism and Friedman made much use of the decline to claim that monetarism was unreliable. At the July 1984 PEPAB meeting, Friedman repeated his warning about inflation - - (events would prove him wrong)". Also see Edward Nelson "Milton Friedman: U. S. Monetary History 1961-2006" St Louis Fed Review May/June 2007 p. 163. Note: All Tables and Exhibits referenced here are found in the attached Appendix or can be obtained from the authors.

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THE RELATIVE VALUATION OF INCOME TAX AVOIDANCE METHODS AND THE MODERATING IMPACTS OF COMPANY SIZE

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ABSTRACT

This research explores whether corporate size has a moderating effect on the valuation of alternative income tax avoidance methods. It expands on the work of Inger (2013), who determined that shareholders value alternative methods of income tax avoidance differently. Specifically, this research aims to determine whether there is an optimal income tax position, which can be determined based upon corporate size. Utilizing a multivariate regression model for both large and small companies in this sample, this research does not find evidence supporting an optimal income tax avoidance position based upon size. The findings are useful to practitioners as they fail to support the proposition that income tax avoidance methods are valued by shareholders and the extent to which they are valued.

INTRODUCTION

The purpose of this research is to extend the work of Inger(2013) who concluded that shareholders differentially value alternative methods of income tax avoidance. Specifically, this research aimed to determine if firm characteristics, such as size, impacted the valuation of different methods of income tax avoidance. By doing so, this research seeks to determine the optimal income tax avoidance position using discriminating corporate characteristics.

A large portion of the prior income tax avoidance research has focused on agency theory, and the risk that managers will engage in income tax avoidance to benefit themselves, as opposed to shareholders (Armstrong, Blouin, Jagolinzer, & Larcker, 2015; Desai & Dharmapala, 2009b). Building upon this research, Inger(2013) researched different methods of income tax avoidance and concluded that shareholders differentially valued each method of income tax avoidance due to the risk of the benefits being diverted from shareholders to management. This research extends the work of Inger by including a corporate specific variable, size, to determine if the size of a corporation may dictate an optimal income tax avoidance position.

METHODOLOGY

This research employs a multivariate regression model in which the independent variables, income tax avoidance through stock option compensation, income tax avoidance through accelerated depreciation, income tax avoidance through permanently reinvested earnings and other income tax avoidance were regressed against the dependent variable, firm value.

The companies within the data set were separated by size, using the median annual sales revenue as the size determinant. All companies with annual sales equal to or greater than the median annual sales amount were considered large companies, and all companies with sales dollars less than the median were considered small. The multivariate regression model was employed on both the large companies and the small companies. The purpose of performing this analysis on both large and small corporations was to determine how shareholders value different income tax avoidance methods for companies of different sizes. It was hypothesized that the size of a corporation, as well as the method of income tax avoidance would both influence the perceived value of the income tax avoidance to the shareholder.

LIMITATIONS

The main limitation of income tax avoidance research in general is the confidential nature of income tax filings requires the researcher to estimate income tax rates and avoidance using publicly available information, which may lead to measurement errors (Hanlon, 2003; Desai & Dharmapala, 2009a). While some researchers alleviate this limitation by focusing on firms convicted of tax sheltering (Wilson, 2009) or by obtaining confidential IRS data (Lisowsky, 2010), this research estimated income tax avoidance through the usage of financial statement data. An additional limitation of this study was the timeframe. This model was applied to firms during the period of 2004 and 2006. Numerous corporate income tax changes have occurred since this period, which may hinder the ability to

generalize the results of this study to corporations today. In addition, due to the fluid nature of tax law, numerous corporate income tax changes occurred prior to this time period limiting the comparability of this study to prior studies.

Finally, this study, as with any statistical study, included the risk of a Type I or Type II error. A Type I error is when the researcher rejects a null hypothesis erroneously, while a Type II error is when the researcher fails to reject a null hypothesis erroneously. Despite these limitations, this research was anticipated to contribute to the growing stream of income tax avoidance literature.

LITERATURE REVIEW

Corporate income tax avoidance literature to date has tried to determine if shareholders value income tax avoidance by a corporation, and if so, to what degree. Thus far, the literature has focused on the agency costs of income tax avoidance, lumping many different methods of income tax avoidance together as a single variable, income tax avoidance (Desai & Dharmapala, 2009b; Dyreng, Hanlon, & Maydew, 2008). Other literature has studied distinct methods of income tax avoidance, including but not limited to tax shelters or corporate inversions, without respect to firm characteristics (Lisowsky, 2010; Wilson, 2009). Finally, researchers have found that investors differentially value alternative income tax avoidance methods (Inger, 2013). This paper extends the work of Inger, to determine the impact that firm specific characteristics, namely size, and alternative methods of income tax avoidance; including stock option compensation, accelerated depreciation and permanently reinvested foreign earnings have on firm value.

Public perception of corporate tax practices has become a significant concern among large companies, as highlighted in the Ernst & Young tax and risk controversy survey (2014) which indicated that 89% of large corporations were somewhat or significantly concerned with the media coverage of corporate income taxes. The public focus on corporations as tax paying entities stems from events in the early 1980's. During that time period, the United States (U.S.) government witnessed corporate taxes drop to as low as 6% of total federal revenues (Donohoe, McGill, & Outslay, 2014). From the 1940's through the 1970's, corporate income taxes comprised up to 40% of total government revenues and never fell below 20% of total government revenues (Donohoe et al., 2014). Donohoe et al. noted that prior to the 1980's, public focus was typically on high net worth individuals who were thought to be shirking their tax paying responsibilities. When the media began covering the increasing discrepancies between income reported in financial statements and income reported on income tax returns of corporations, the public focus began to shift to corporations as tax paying entities (Donohoe et al., 2014).

As the move to reduce income taxes and increase reported revenues to shareholders progressed during the 1990's, the goal of most corporations' tax departments shifted from compliance to generating additional income by reducing the tax burden of the corporation, thus allowing the entity to report larger earnings to shareholders (Donohoe et al., 2014). These tax departments were forced to become creative to continue to add value. For example, tax credits offered to stimulate investment activity did not benefit corporations consistently reporting taxable losses. In response, the government allowed profitable corporations to purchase these benefits from the corporations sustaining losses. Profitable corporations did so and as a result, were able to drive their effective tax rates down as low as 0% (Donohoe et al., 2014). Income tax avoidance has become a profitable venture for corporations.

Income tax avoidance, from a research perspective, is often times viewed as a continuum which incorporates activities from investing in municipal bonds to participating in income tax shelters (Hanlon & Heitzman, 2010). Given the broad range of activities which may fall under the guise of tax avoidance, it is important to address some of the various measures and theories of income tax avoidance which are discussed in the literature.

Income Tax Avoidance

As noted above, income tax avoidance can take many different forms, each having unique characteristics. Inger (2013) theorized that investors value certain methods of income tax avoidance differently than others based upon various metrics including risk, the duration of the benefits, tax planning costs, implicit taxes and contrasts in disclosure. In her study, Inger examined the relative valuation of stock option compensation, accelerated depreciation and deferral of U.S. tax on foreign subsidiary income.

Prior to Inger(2013), much of the research on income tax avoidance focused on either the construct of tax sheltering (Lisowsky, 2010; Wilson, 2009) or viewed tax avoidance in totality, i.e. investments in municipal bonds were

considered in the same respect as engaging in illegal tax shelters (Desai & Dharmapala; Dyreng, Hanlon, & Maydew, 2008; Hanlon & Heitzman, 2010). For instance, Dyreng et al.(2008) measured income tax avoidance over a ten year period using long-run cash effective tax rates in an effort to ascertain the persistence of income tax avoidance. Using long-run cash effective tax rates as a proxy for income tax avoidance provided insight into overall tax avoidance strategy, however it did not differentiate among the various methods of income tax avoidance (Dyreng et al., 2008). The next section of this paper will address literature focused on a single method of income tax avoidance, such as tax shelters. This section will be followed by a discussion on the literature which researches all income tax avoidance as a single event, not distinguishing one type of avoidance from another.

Tax Shelters

Joseph Bankman (2004) defined a tax shelter as:

A (1) tax motivated; (2) transaction unrelated to a taxpayer's normal business operations; that (3) under a literal reading of some relevant legal authority; (4) produces a loss for tax purposes in excess of any economic loss; (5) in a manner inconsistent with legislative intent or purpose. (p. 925)

Tax sheltering, by this definition, becomes a very subjective construct as noted by the U.S. Treasury Department, who conceded that, given the many different forms that abusive tax shelters may take, it is difficult to define them comprehensively. However, the U.S. Treasury Department did identify nine common characteristics of tax sheltering activity: a lack of economic substance, inconsistent financial and accounting treatment, presence of tax-indifferent parties, complexity, unnecessary steps of novel investments, promotion or marketing, confidentiality, high transaction costs and risk reduction arrangements (U.S. Department of the Treasury, 1999). Making tax shelters even more difficult to identify is the inconsistent treatment of tax positions by the U.S. courts, which provides an opportunity for taxpayers to substantiate a position using favorable court outcomes, even when other courts have ruled against a position (U.S. Department of the Treasury). These characteristics, specifically the lack of economic substance, make tax shelters the most aggressive means of income tax avoidance. While identification of tax sheltering characteristics would seem to make the identification of a tax shelter participant clearer, it is important to note that many of these same characteristics are present in legitimate financial transactions as well (U.S. Department of the Treasury, 1999).

Since researchers have yet to develop an effective means of identifying tax sheltering short of government accusations or self-reporting, much of the research in this area has focused on entities which have been subject to government scrutiny for sheltering or have self-reported certain sheltering transactions (Lisowsky, 2010; Wilson, 2009). Companies are able to self-report income tax sheltering by including an income tax footnote as part of their annual financial statements which details their tax sheltering activities (Lisowsky, 2010) . These entities provide the researcher an opportunity to generate predictive models of tax shelter participation.

Wilson(2009) identified 59 firms accused by the IRS of tax sheltering and then performed a logistic regression on those firms to develop a predictive model for firms engaging in tax sheltering activities. The financial statement characteristics employed in the model by Wilson included book to tax differences (BTD's), discretionary accruals, leverage, size, return on assets (ROA), foreign income and research and development expenses (R&D). Of these variables, BTD's, discretionary accruals, size and ROA are significantly positively related to tax sheltering and leverage is significantly negatively related to tax sheltering. This model allowed the researchers to identify sheltering firms without access to confidential income tax data.

Building upon the work of Wilson(2009), Lisowsky(2010) obtained 267 tax shelter year observations from the office of tax shelter appeals (OTSA) in an effort to incorporate additional variables into a tax shelter prediction model. Lisowsky's model, a logistic regression, employed the same variables Wilson utilized, and also incorporated a number of constructs based upon the framework of U.S. Department of the Treasury(1999), including subsidiaries operating within a tax haven, equity earnings, lag effective tax rates and Big 5 CPA affiliation and litigation.

Stock Option Compensation

Nonqualified stock options allow corporations to take a tax deduction upon the exercise of the options for the difference between the option price and the market price. Prior to SFAS 123R, effective in 2005, companies were permitted to use the intrinsic value method of accounting for nonqualified stock options. SFAS 123R required that corporations only recognize as expense the intrinsic value of the option, calculated as the difference between the market price and the strike price, multiplied by the number of shares issued on the measurement date, which is the grant date for fixed options and the date that the performance has occurred for performance based options (Hanlon, 2003). Hanlon(2003) noted that most option compensation contracts are fixed and the exercise price is the same as the market price on the grant date. Firms would then report no compensation expense related to the option compensation on their income statement. This treatment created a permanent difference between the income reported to shareholder, which would be higher, and the income reported to taxing authorities, which would be lower, due to the stock option compensation. Subsequent to SFAS 123R, companies must recognize an expense on their income statement equal to the fair value of the stock options on the grant date using an appropriate option pricing model. This expense is amortized over the vesting period of the stock options. This leads to a temporary difference at the grant date, and potentially a permanent difference if the value of the option at the exercise date differs from the value of the option on the grant date (Hanlon, 2003). Tax treatment for stock option expense was not impacted by SFAS 123R.

Tax benefits obtained from the exercise of stock option compensation are treated as an increase in additional paid in capital, an equity account, and a reduction to income taxes payable. Since income tax expense is not reduced, the GAAP effective tax rate will be overstated when a company incurs income tax benefits from stock option compensation. For this reason, a researcher must calculate the cash effective tax rate to ascertain the impact stock option compensation on income taxes (Dyreng et al., 2008).

Historically, stock option compensation has acted as a tax shield for many corporations, due to the favorable book and tax treatment of stock option compensation. The tax deduction upon exercise of stock option compensation can be extremely large during an era of rising stock prices. This large deduction is likely to be realized since employees will only be motivated to exercise the options when the stock price rises. For instance, Graham et al (2004) estimated that stock option expense will reduce the marginal tax rate for Nasdaq 100 firms from 31% down to 5% for the year 2000. Graham et al. recalculated marginal tax rates for Nasdaq 100 firms in the year 2000, including the present value of future stock option compensation deductions for options issued in 2000. Since stock options are not deducted for income tax purposes until they are exercised, they are not traditionally included in an annual marginal tax rate calculation. During the same year, Graham et al.(2004) found that S&P 100 firms reported tax deductions of \$640 million related to option compensation expenses. Beyond the size of the tax benefits attainable from stock option compensation, the financial and tax rules governing the transactions make the associated tax avoidance risks from stock options relatively low.

Inger(2013) performed ordinary least squares (OLS) regression on the identified variables and the results show that firm value is positively correlated to income tax avoidance from stock options and that correlation is significant. Based upon the regressive model, Inger concluded that the shareholders appreciate the safety and long-term benefits afforded to them of tax avoidance through stock compensation plans.

Accelerated Depreciation

Accelerated depreciation methods have been employed as a means of deferring income taxes since 1954, when an Internal Revenue Code amendment allowed for deviation from straight line depreciation for income tax purposes. This amendment allowed corporations to “front load” depreciation, reducing the present value of firm income tax liabilities. While accelerated depreciation does not eliminate income tax, it does defer the income tax until a future period, allowing a firm to recover some, if not all, of its capital investment before paying income taxes. This deferral can be especially critical for a start-up company, and can even act as an interest free loan to that company, allowing them to invest additional resources into capital expansion.

Income tax deferrals will impact the cash effective tax rate while permanent income tax avoidance will impact the GAAP effective tax rate due to the recognition of deferred tax liabilities. Much of the previous literature identified the incentives for tax departments to reduce effective tax rates, however not cash effective tax rates (Armstrong, Blouin, & Larcker, 2012). Armstrong et al.(2012) found a negative relationship between executive compensation and

the GAAP effective tax rate, which is significant, however they find no significant relationship between executive compensation and the cash effective tax rate.

Literature on the earnings persistence of income tax avoidance through accelerated depreciation is mixed. Brown(2014) concluded that firms in which there is growth will continue to expand and purchase additional capital assets. The acquisition of these capital assets will offset the reduced depreciation deduction from assets acquired in previous periods. However, Raedy, Seidman, and Shackelford(2011) performed a detailed analysis on 41 different drivers of BTDs and found that BTDs generated by accelerated depreciation methods were negatively correlated to earnings persistence and this correlation was significant.

Firm value has been positively associated with income tax deferrals in general (Ayers et al., 2011). Ayers et al. found that tax deferral in general is positively and significantly correlated with return on assets, firm value, and stock price during the four-year period subsequent to the deferral. While income tax deferrals were found to be positively associated with firm value, Inger (2013) found no significant relationship between accelerated depreciation and firm value. Accelerated depreciation gives rise to additional agency costs, including the risk of unnecessary capital acquisitions, which could negate the intended benefits of accelerated depreciation (Inger, 2013).

Permanently Reinvested Earnings

APB Opinion Number 23 identifies permanently reinvested earnings as undistributed earnings which the foreign subsidiary has invested or will invest indefinitely or will be remitted in a tax-free liquidation. APB No. 23 allows firms to delay recognition of the income tax associated with these earnings until they are no longer considered to be permanently reinvested. Firms do not pay U.S. income taxes associated with foreign subsidiary earnings until the earnings are repatriated to the U.S. parent corporation. Firms do pay income taxes in the country in which the subsidiary resides upon earning the income, they are then granted an income tax credit in the U.S. equal to the amount of foreign income taxes paid, to eliminate the risk of double taxation.

These corporations are required to disclose the future income tax liability to investors. However, companies have significant latitude in how these disclosures are made, and many firms simply claim that the amount of the future liability is not practicable to estimate. By not disclosing the future tax liability to shareholders, income tax avoidance through permanently reinvested foreign earnings may be viewed as a higher risk alternative, due to the unknown future liabilities.

The U.S. tax law incentivizes reinvestment of foreign earnings into that foreign country as long as the tax rate in the foreign country is less than the tax rate in the U.S. As foreign opportunities phase out, companies will invest in financial assets, such as cash, in these foreign countries to continue to defer the income tax on these earnings (Bryant-Kutcher, Lisa, Eiler, & Guenther, 2008). These low return investments actually devalue the benefits of the permanently reinvested earnings, as the firm is forgoing U.S. investment opportunities which may present a much higher yield (Bryant-Kutcher et al., 2008).

Multi-national companies (MNCs) likely realize the opportunity cost of these foreign investments, as a number of these firms took advantage of a tax holiday and repatriated much of these accumulated earnings, totaling in the billions of U.S. dollars, to the U.S. parent corporation under favorable income tax terms.

Political Cost Theory

Throughout the income tax avoidance literature, size has been studied extensively, with inconclusive results. Watts and Zimmerman(1990) use size as a proxy for political attention, and found that larger firms are more likely to employ conservative accounting methods due to the increased scrutiny that they face, known as the political cost theory. Expanding upon this conclusion, a number of researchers have found that larger corporations report larger effective tax rates. A discussion of some of these articles follows.

Noor, Syazwani, and Mastuki (2010) employed a regression model with current effective tax rate as the dependent variable and found a significant, positive relationship between tax rates and firm size, measured by annual revenues. The researchers measured the impact of the independent variables, including size, on the dependent variable on Malaysian corporations, under two different tax regimes, an official assessment system, and a self-assessment system,

and the results were consistent under both tax regimes. These findings indicate that whether the government assumes responsibility for assessing income tax liability (official assessment system) or the corporation bears the burden of determining its tax liability (self-assessment system), the political cost theory holds true.

Zimmerman (1983) used IRS provided data and performed t-tests on the effective tax rates of companies in multiple industries over an extended period of time and found that effective tax rates increase with size, measured by sales, however, only among the largest firms. Furthermore, Zimmerman found that these results were not consistent across industries. In some industries, such as the retail industry, the author found a negative relationship between firm size and effective tax rates. The author noted increased government scrutiny of the time on certain industries, such as oil and gas, and concluded that political costs at that time were higher in those industries, which could explain the findings.

Omer, Molloy, and Ziebart (1993) expanded upon the study of Zimmerman (1983) by employing a Spearman correlation test on various measures of effective tax rates and firm size. The authors found that tax rates increased as firms grew larger for all firms, not only the largest of the large firms. This finding supports the political cost theory as well. There is however, an opposing theory on firm size and income tax avoidance, which posits that larger firms have greater political power and are therefore able to reduce tax rates in ways that smaller companies cannot. Exploration of that literature follows.

Political Power Theory

Firms with larger taxable income will realize a greater benefit, in whole dollars, from income tax avoidance when compared with firms reporting smaller taxable income. This holds true for two main reasons; within the United States, the corporate tax rate is progressive, meaning that tax rates rise as income increases, and taxable income is the base for the calculation. Therefore, it stands to reason that firms reporting larger taxable incomes are more incentivized to engage in income tax avoidance.

Scholes, Wilson, and Wolfson (1992) researched income and expense shifting during the eight quarter reduction of corporate income tax rates in 1986 and 1987. During that time period, there was a significant incentive for firms to accelerate expense recognition and defer revenue recognition, as income tax rates were reduced each quarter. Through this study, the authors found that firms in the largest three quintiles of sample firms took advantage of the lowering income tax rates by shifting income and expenses, while firms in the smallest two quintiles did not. This indicated that smaller firms are less opportunistic in their tax planning activities.

Profitable firms are more likely to engage in tax sheltering and other avoidance activities as the return on investment of income tax avoidance is contingent upon taxable income (McGuire, Omer, & Wilde, 2014; Wilson, 2009). Income tax avoidance can only be beneficial if a tax liability would otherwise have existed, therefore profitable firms are much more likely to benefit from income tax avoidance (McGuire et al., 2014).

MODEL

This research aims to determine the optimal income tax avoidance position for a corporation given specific corporate characteristics, as well as income tax avoidance characteristics. To study the research question, this paper employs a multivariate regression model with firm value as the dependent variable and income tax avoidance from stock option compensation (STOCK AVOID), accelerated depreciation (DEPR AVOID) and permanently reinvested foreign earnings (RESIDUALAVOID) as the independent variables. Firms studied by this model are allocated to two separate groups, large firms and small firms. Consistent with prior literature on income tax avoidance, Tobin's Q is used as a proxy for firm value (Bryant-Kutcher, Guenther, & Jackson, 2012; Desai & Dharmapala, 2009b; Inger, 2013). The regression model used to measure the impact of the various independent variables is

$$\text{Firm Value} = \beta_0 + \beta_1 \text{STOCK AVOID} + \beta_2 \text{DEPR AVOID} + \beta_3 \text{RESIDUAL AVOID} + \beta_4 \text{OTHER AVOID} + \sum \beta_i \text{CONTROL VARIABLES} + \varepsilon.$$

The companies being studied are grouped into two separate categories based upon size, which is measured by annual sales (Noor, Syazwani, & Mastuki, 2010; Omer, Molloy, & Ziebart, 1993; Zimmerman, 1983). Consistent with this literature, firms will be considered large if their annual sales are larger than the population median and they will be

considered small if their annual sales are less than or equal to the population median. Annual sales data for the sample was provided by Compustat via a Microsoft Excel spreadsheet.

Dependent Variable

While various proxies for firm value have been employed in tax avoidance research, including abnormal returns (Wilson, 2009) and market capitalization (Donohoe et al., 2014), Tobin's Q is considered the standard proxy for firm value in income tax avoidance research (Bryant-Kutcher, Lisa, Eiler, & Guenther, 2008; Desai & Dharmapala, 2009b; Inger, 2013). Consistent with this methodology, Tobin's Q serves as the proxy for firm value. Since Tobin's Q proxies corporate growth, it is an appropriate measure of firm value in tax avoidance research (Brown, 2014).

Tobin's Q was built upon the foundational principle that a relationship should exist between the market value of a set of assets and the cost of those assets (Brainard & Tobin, 1968). When the market value of assets exceeds the cost of those assets, the relationship is favorable and value exists; however, when the cost exceeds the market value, the relationship is negative and there is less value to those assets (Brainard & Tobin, 1968). As such, Tobin's Q is computed as a ratio of market value of total assets to replacement cost of total assets (Brainard & Tobin, 1968). A positive coefficient on any of the independent variables when regressed against Tobin's Q would indicate an increase in market value as compared to replacement cost, and thus an increase in overall firm value. Alternatively, a negative coefficient on any of the independent variables when regressed with Tobin's Q would indicate costs increasing at a higher rate than market value, and thus, a reduced firm value.

For purposes of this paper, when calculating Tobin's Q, the market value of assets is calculated as the book value of assets plus the market value of common equity less the book value of common equity and deferred taxes; the replacement value of assets was calculated as the book value of assets, which is consistent with the approach taken by Kaplan and Zingales(1997). Consistent with Desai and Dharmapala(2009b), deferred taxes will not be subtracted for the calculation of Tobin's Q in this research, as current income tax avoidance may impact future income tax liabilities, creating a false correlation between the income tax avoidance activities and the dependent variable (Desai & Dharmapala, 2009b).

INDEPENDENT VARIABLES

Stock Compensation

Income tax avoidance through stock option compensation, identified as STOCK AVOID in the model, is calculated consistent with Inger (2013), by dividing the tax benefit incurred from stock options by the earnings before tax and special items plus options compensation expense for years after SFAS 123R. This data was hand-collected, utilizing the SEC Edgar website. All data used for stock options avoidance was available on the company 10-K and was disclosed on either the Statement of Cash Flows or in the Notes to the Financial Statements.

The tax benefits derived from stock option compensation can be significant, allowing profitable firms to forego other income tax benefits. Large firms are including equity incentives in executive compensation at a growing rate (Li & Yu, 2011). This type of compensation arrangement rewards management for past performance, as opposed to future expansion. Furthermore, Aboody, Barth, and Kasznik (2004) found that larger firms subject to higher levels of political costs are more likely to recognize expense related to equity compensation in their financial statements, as opposed to simply disclosing the issuance of equity incentives. This approach indicates a higher level of conservatism among these large firms. Consistent with these theories, it was hypothesized that income tax avoidance through employee stock options would decrease firm value for large firms. Based on this analysis, the first hypothesis of this study is:

H_{1a}: Income tax avoidance through stock options for large firms will have a negative effect on firm value.

Inger(2013) noted the ease and relative safe nature of stock compensation as a tax planning strategy. The ease with which corporations can employ this tax avoidance strategy makes it a viable option for small firms which may not have sufficient resources to engage in more complex tax planning opportunities. Furthermore Li and Yu (2011) found that equity compensation of small firms served as an incentive to create future earnings growth. Therefore, it was

hypothesized that income tax avoidance through employee stock options would increase firm value for small firms. Based on this analysis, the second hypothesis of this study is:

H_{1b}: Income tax avoidance through stock options for small firms will have a negative effect on firm value.

Accelerated Depreciation

Income tax avoidance through accelerated depreciation (identified as DEPRAVOID in the model) is calculated consistent with Inger (2013) by dividing the change in the deferred tax liability associated with property, plant and equipment (PPE) by the earnings before tax and special items. Accelerated depreciation, specifically the double declining balance method of depreciation typically used for income tax purposes (Inger, 2013), allows a company to defer income taxes until a later period in an asset's life. This deferral gives rise to a deferred tax liability equal to the future tax liability to be incurred by the firm due to the reduced depreciation available to the firm in the future and this deferral has been found to be value relevant (Sansing, 1998). This finding suggests that the income tax avoidance through the deferral of taxes related to depreciation will have no impact on firm value due to the associated deferred tax liability reported by the firm.

Beyond the deferred tax liability generated by accelerated depreciation, the tax benefit derived from the accelerated depreciation has been included in the price of assets, negating the tax benefits with increased costs (Key, 2008). In addition, income tax benefits have been linked to the acquisition of superfluous assets motivated by income tax considerations rather than business principles (Inger, 2013). Large companies purchasing assets for expansion purposes are, however, more likely to take advantage of accelerated depreciation methods than are small firms as noted by an IRS study conducted by Knitrel (2006). As such, it was hypothesized that income tax avoidance through accelerated depreciation would increase firm value for large firms. Based on this analysis, the third hypothesis of this study is:

H_{2a}: Income tax avoidance through accelerated depreciation for large firms will have a positive effect on firm value.

Amir, Kirschenheiter, and Willard (1997) found that accelerated depreciation had no significant impact on firm value for companies after adopting SFAS 109. In this study, Amir et al. concluded that deferred taxes from accelerated depreciation do not impact firm value because these deferred taxes are unlikely to reverse, as long as the firm continues to invest in capital assets each year. However, investment in overpriced, unnecessary assets will likely reduce firm value. Raedy et. al. (2011) found a significant, negative relationship between earnings persistence and BTDS associated with accelerated depreciation. Furthermore, Knitrel (2006) found that small firms are inefficient in their use of accelerated and bonus depreciation. The author attributed this inefficiency to a number of factors, including the lack of tax expertise and the relative reduction in tax benefits for companies reporting smaller taxable income. It was hypothesized that income tax avoidance through accelerated depreciation would decrease firm value for small firms. Based on this analysis, the fourth hypothesis of this study is:

H_{2b}: Income tax avoidance through accelerated depreciation for small firms will have a negative effect on firm value.

Permanently Reinvested Earnings

Income tax avoidance through residual earnings is calculated by estimating the future income tax liability on residual income, consistent with Bauman and Shaw and dividing that by earnings before tax and special items, consistent with Inger(2013). The significant inverse relationship between firm value and permanently reinvested earnings, as noted above, has been attributed to firms making investment decisions based upon the income tax consequences rather than the business consequences (Bryant-Kutcher et al., 2008). In addition, low foreign investment opportunities will likely reduce firm value. Beyond this, Lenaerts and Merlevede (2015) found that medium sized firms investing in large foreign firms enjoy spillover effects which are not gained in other foreign investments. Therefore, it was hypothesized that residual income tax avoidance (RESIDUAL) would increase firm value for large firms. Based on this analysis, the fifth hypothesis of this study is:

H_{3a}: Income tax avoidance through permanently reinvested earnings for large firms will have a positive effect on firm value.

Maintaining excess cash in foreign countries to avoid the repatriation tax is an inefficient operating strategy. Small firms investing in small or medium foreign investments, do not take advantage of knowledge spillover effects the way that large firms do (Lenaerts & Merlevede, 2015). This lack of spillover will likely cause greater inefficiencies in small, multi-national firms. Therefore, it was hypothesized that residual income tax avoidance (RESIDUAL AVOID) would decrease firm value for small firms. Based on this analysis, the sixth hypothesis of this study is:

H_{3b}: Income tax avoidance through permanently reinvested earnings for small firms will have a negative effect on firm value.

Other Income Tax Avoidance Activities

Other income tax avoidance is calculated consistent with Inger(2013), as the difference between the cash effective tax rate and the statutory corporate income tax rate, established as 35%, which is not attributable to one of the other income tax avoidance methods studied within this paper. Other income tax avoidance could include any number of tactics, including but not limited to participation in a tax shelter or corporate inversion.

Engagement in general tax avoidance activities has been positively associated with firm value when the firm has strong corporate governance mechanisms in place (Desai & Dharmapala, 2009b; Wilson, 2009). Furthermore, larger firms benefit more from income tax avoidance relative to smaller firms, since larger firms are typically subject to more tax (Knitrel, 2006; Scholes, Wilson, & Wolfson, 1992). In addition, larger firms are able to avoid taxes more efficiently due to increased resources (Knitrel, 2006). Consistent with this literature, it was hypothesized that firm value would be positively related to other income tax avoidance (OTHER AVOID) methods for large firms. Based on this analysis, the seventh hypothesis of this study is:

H_{4a}: Income tax avoidance through other methods for large firms will have a positive effect on firm value.

Following the same line of literature, it was hypothesized that firm value would be negatively related to other income tax avoidance methods for small firms. Based on this analysis, the eighth hypothesis of this study is:

H_{4b}: Income tax avoidance through other methods for small firms will have a negative effect on firm value.

Control Variables

Consistent with previous income tax avoidance literature, a number of control variables are employed to isolate the impact on firm value of each individual method of income tax avoidance (Inger, 2013; Wilson, 2009). Furthermore, additional control variables are employed to control for other factors which have been shown by prior research to impact Tobin's Q and the level of income tax avoidance. The control variables specifically related to the various income tax avoidance methods included the estimated stock option expense (OPTIONS) (Desai & Dharmapala, 2009b; Inger, 2013), stock price appreciation (APPRECIATION) (Gaertner, 2014a; Inger, 2013), gross fixed assets (PPE) (Desai & Dharmapala, 2009b; Gaertner, 2014a; Inger, 2013), sales growth (GROWTH) (Desai & Dharmapala, 2009b; Inger, 2013), foreign income (FOREIGN) (Desai & Dharmapala, 2009b; Gaertner, 2014a; Inger, 2013), corporate governance (GOVSCORE) (Desai & Dharmapala, 2004, 2009a; Wilson, 2009) and cash (CASH) (Inger, 2013).

Consistent with Inger(2013) and Desai and Dharmapala(2009b), the value of stock option compensation (OPTIONS) was estimated using data extracted from ExecuComp, specifically the average annual value realized from the exercise of options for the top five executives grossed up by the fraction of options owned by those covered executives. Separation of ownership and control may lead management to shirk its responsibilities to shareholders and seek objectives which do not maximize firm value (Berle, A.A., Jr & Means, 1932; Jensen & Meckling, 1976). As this separation narrows, the associated agency costs are reduced (Jensen & Meckling, 1976).

Consistent with Inger(2013), the stock appreciation over the prior four-year period (STOCKAPPRECIATION) is included as a control variable. The income tax benefits derived from stock option compensation are determined by

the amount of appreciation between the grant date of the option and the exercise date of the option. Furthermore, since Tobin's q factors in the market value of equity as part of the value calculation (Kaplan & Zingales, 1997), stock appreciation will increase the value of Tobin's Q.

Consistent with Inger(2013), gross fixed assets (PPEGROSS) are included as a control variable within this study and are calculated as gross fixed assets divided by total assets for the previous year. High ratios of fixed assets could indicate that a company is also carrying larger amounts of debt due to the fixed assets. In addition, purchasing fixed assets solely for the income tax benefit, could lead to inefficient use of resources, in acquiring assets which are unnecessary to operations.

Sales growth (GROWTH) is measured consistent with Inger(2013), as the three year average sales growth. Consistent with (Desai & Dharmapala, 2009b; Inger, 2013) sales growth serves as a control variable for firm size because of the close relationship between other size controls and Tobin's Q, including market capitalization and total assets (Inger, 2013) . Furthermore, firms showing increased sales growth have additional incentives and capabilities to engage in income tax avoidance activities (McGuire et al., 2014).

Foreign sourced income (FOREIGN), income generated by foreign subsidiaries of U.S. domiciled corporations, is measured consistent with Inger (2013) by dividing pre-tax foreign income by total assets. Levels of foreign activity may impact the incentives of a firm to engage in other income tax avoidance activities (Desai & Dharmapala, 2009b). Furthermore, foreign earnings have been positively and significantly associated with Tobin's Q in the literature (Inger, 2013).

As discussed previously, a number of researchers have addressed the agency issue inherent in income tax avoidance literature (Desai & Dharmapala, 2004, 2009a; Wilson, 2009). Corporate governance is calculated using the governance index from Gompers et al.(2003). This index scores firms based upon the existence, or lack thereof, 24 different anti-takeover provisions in place, assigning a 1 when the provision exists and a 0 when it does not. At that point, the total number of provisions are added together and a high score indicates management insulation from takeover, thus weaker corporate governance; while a low score indicates little management insulation and stronger corporate governance (Gompers et al., 2003).

Consistent with Inger (2013), cash (CASH) is employed as a control variable due to the high reserves of cash created by permanently reinvested earnings. Furthermore, access to cash provides investment opportunity to the firm, as they are better able to act on opportunities in a timely manner.

Control variables which are included to control for Tobin's Q and income tax avoidance levels include risk (Desai & Dharmapala, 2009b; Inger, 2013), firm age (Gompers et al., 2003; Inger, 2013), leverage (Inger, 2013), intangible assets (Inger, 2013) and net operating losses (Inger, 2013).

Risk (RISK) is measured as the 36 month standard deviation of the entity's stock price, consistent with Inger (2013). As noted by Inger, stock volatility is a measurement of the riskiness of the investment.

Consistent with Inger(2013), the term that the firm has been in existence (AGE) is controlled for by using the log of firm age. Inger(2013) found a negative relationship between firm age and Tobin's Q, and attributed this to a lack of growth opportunities for older firms.

Consistent with Inger (2013), leverage is calculated as the total of long-term debt scaled by total assets. Highly levered firms may base decisions on a need for short-term cash flow to meet operating debts, as opposed to long-term growth. In addition, highly levered companies may be highly levered due to poor operating performance.

Consistent with Inger (2013), intangible assets (INTANGIBLES) are measured as the total intangible assets divided by total assets. If no intangible assets existed, then a zero is used in the model.

Consistent with Inger (2013), the existence of a net operating loss carryforward (NOL) is designated with a 1 for companies with a NOL carryforward available during the year of study and a 0 for those companies without an NOL carryforward available. Net operating losses can indicate a riskier investment from previous period losses, however, they also represent an asset which will offset future taxable income. The asset created by an NOL can only be used if

the company generates sufficient income in the future to utilize the loss carryforward, which may lead to overvaluation of the asset.

DATA ANALYSIS

The initial data for this research was collected utilizing the Compustat database, as well as annual 10-Ks retrieved from the SEC EDGAR database. As discussed in the next section, the sample for this study consisted of 261 companies selected using the Microsoft Excel random number generator, from the governance index from Gompers et al.(2003) on which governance data was reported for both 2004 and 2006. For each company, the data in table on page 53 was requested from Compustat for the years ended between January 1, 2002 and December 31, 2006. In total, 27,876 unique data items were collected from Compustat. In addition to the Compustat data, the data in table 4.2 on the next page was hand collected from the annual 10-K for each company for years ending between January 1, 2002 and December 31, 2006, utilizing the SEC EDGAR database. In total, an additional 4,680 unique data items were hand collected from annual 10-Ks.

Sample Selection

To study the impact of different methods of tax avoidance, it was necessary to ensure that all companies being studied have the necessary data availability for the entire time period of 2002 through 2006. The population consisted of 1,600 companies which had corporate governance data available for the years being studied. Thirty companies were eliminated from the population since they did not report the necessary data for the entire time period of this study, reducing the population down to 1,570. Furthermore, there were 25 Real Estate Investment Trust (REIT) companies included in the population. REITs are not subject to taxes within the United States, therefore they were also removed, further reducing the population size down to 1,545. Consistent with Beck (2013), an a priori power test was performed to determine the appropriate sample size at the 95% confidence level.

The appropriate sample size was concluded to be 261 companies. This provides the researcher with access to 522 firm years of data, as each company was studied in both 2004 and 2006. As noted previously, the sample was collected utilizing the Microsoft Excel random number generator.

While collecting the data on permanently reinvested earnings, it was apparent that many companies did not disclose the tax liability associated with the permanently reinvested earnings. Less than 5% of the companies within the sample had disclosed this liability during the time period studied. Due to this lack of data, it was determined that the best results for this study would be obtained by estimating the tax liability on permanently reinvested earnings for all companies, consistent with Bauman & Shaw (2008), who estimated the tax liability on permanently reinvested earnings by dividing the change in permanently reinvested earnings by the foreign effective tax rate multiplied by the U.S. statutory tax rate of 35%.

Regression Analysis

The data collected was analyzed using a multivariate regression. Prior to performing the regression analysis, the data for both large companies and small companies was tested for multicollinearity and homoscedasticity.

To test the data for multicollinearity, a correlation matrix was prepared for both large company data and small company data, see table 1 and 2 for correlation matrices. Consistent with other income tax avoidance literature, a number of the R values in the Pearson Correlation matrices exceeded the critical value (Chan, et al., 2016). In response to the risk of multicollinearity identified in the correlation matrices, variable inflation factors (VIF's) were calculated for each variable, consistent with other tax avoidance literature.

	Gov	Stk	Dep	Res	Oth	App	PPE	For	Cas	Risk	Age	Lev	Int	Nol	Gro	Size
Gov	1.00															
Stk	-0.08	1.00														
Dep	-0.03	-0.02	1.00													
Res	0.12	-0.02	0.10	1.00												
Oth	-0.08	-0.39	-0.56	-0.58	1.00											
App	-0.03	0.06	0.19	-0.02	-0.03	1.00										
PPE	-0.01	0.05	0.11	-0.01	-0.08	0.00	1.00									
For	-0.01	0.09	-0.02	0.10	-0.14	-0.02	-0.10	1.00								
Cas	-0.14	0.18	-0.07	0.07	-0.02	0.17	-0.27	0.30	1.00							
Risk	-0.01	0.02	0.10	-0.05	-0.07	0.05	0.22	-0.06	-0.07	1.00						
Age	0.04	-0.05	0.03	-0.13	0.02	-0.15	0.14	0.15	-0.06	-0.05	1.00					
Lev	0.05	-0.08	0.07	-0.03	0.08	0.02	0.25	-0.27	-0.35	0.11	-0.04	1.00				
Int	0.15	0.03	0.02	0.14	-0.11	-0.05	-0.20	-0.01	-0.24	-0.07	-0.12	-0.02	1.00			
Nol	-0.07	0.05	-0.01	0.03	0.00	0.06	0.04	-0.04	-0.11	0.06	-0.15	0.04	0.16	1.00		
Gro	-0.07	0.01	0.12	0.00	-0.05	0.05	0.08	-0.02	-0.05	0.04	-0.02	0.10	0.02	-0.06	1.00	
Size	-0.16	-0.06	-0.01	-0.03	0.04	-0.06	0.03	0.12	0.01	-0.03	0.09	0.03	-0.11	-0.08	-0.02	1.00

	Gov	Stk	Dep	Res	Oth	App	PPE	For	Cas	Risk	Age	Lev	Int	Nol	Gro	Size
Gov	1.00															
Stk	0.03	1.00														
Dep	-0.01	0.08	1.00													
Res	0.01	0.15	0.06	1.00												
Oth	-0.04	-0.21	-0.67	-0.37	1.00											
App	0.02	-0.08	0.00	-0.04	-0.01	1.00										
PPE	0.10	0.03	0.01	0.02	-0.06	0.00	1.00									
For	-0.01	0.01	0.00	0.00	-0.01	0.03	-0.01	1.00								
Cas	-0.06	0.05	-0.02	0.09	-0.03	-0.01	-0.20	-0.01	1.00							
Risk	0.08	0.02	-0.02	-0.07	0.03	0.08	0.06	-0.03	-0.12	1.00						
Age	0.09	0.00	0.02	-0.07	-0.03	-0.07	0.20	-0.26	-0.19	0.00	1.00					
Lev	-0.05	-0.06	-0.01	-0.04	0.00	0.13	0.05	-0.06	-0.25	0.04	0.02	1.00				
Int	-0.05	0.00	0.06	0.01	-0.03	-0.03	-0.18	0.06	-0.23	-0.04	-0.09	-0.05	1.00			
Nol	0.04	-0.02	0.09	-0.02	0.00	0.03	0.03	-0.04	0.06	-0.08	-0.02	-0.03	0.08	1.00		
Gro	-0.01	0.03	0.02	0.02	-0.03	0.07	0.04	0.05	0.01	0.11	-0.10	0.21	-0.04	-0.08	1.00	
Size	-0.02	0.04	0.02	-0.02	0.01	-0.02	0.19	-0.02	-0.36	-0.07	0.15	0.16	-0.03	0.14	-0.08	1.00

The VIF's for large corporations are reported in Table 3 and the VIF's for small corporations are reported in Table 4. The mean VIF for large companies is 1.48 and the largest VIF for large companies is 4.31. The mean VIF for small companies is 1.38 and the largest VIF for small companies is 2.52. Consistent with Fleischman and Stephenson (2012), multicollinearity is not a concern when all VIF's are below 10. The VIF's in this study are all well below the threshold of 10, therefore the risk of multicollinearity is minimal.

Table 3	
Variable Inflation Factors - Large Companies	
Variable	VIF
G Score	1.02
Stock Avoid	1.77
Depreciation Avoid	2.19
Residual Avoid	2.25
Other Avoid	4.31
Appreciation	1.03
PPE	1.19
Foreign	1.11
Cash	1.46
Risk	0.99
Age	1.05
Leverage	1.16
Intangibles	1.16
NOL	1.00
Growth	0.95
Size	0.98

A Breusch – Pagan test was conducted on both large companies and small companies. For large companies, the data was determined to meet the critical assumption of homoscedasticity. However, the small companies failed to meet this critical assumption. Therefore, the data of the small companies was transformed by reflecting the dependent variable and then taking the log of the reflected number, consistent with (Tabachnick, B.G. & Fidell, L.S.). After transforming the data for small companies, a Breusch – Pagan test was conducted again and the data was then determined to meet the assumption of homoscedasticity.

Descriptive Statistics

Since this model focused on the impact of alternative methods of income tax avoidance on firm value based upon the size of the firm, the data was pooled by size prior to analyzing the characteristics of the data. The data was analyzed using Microsoft Excel and there were 261 observations for each variable reported (n = 261). See Table 5 for the descriptive statistics of the 261 large firms’ observations and Table 6 for the descriptive statistics of the 261 small firms. Upon review of the descriptive statistics, there were no significant reservations regarding the data.

Table 5					
Descriptive Statistics for Large Companies					
	<u>Mean</u>	<u>Median</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
<i>Dependent Variable</i>					
TOBIN'S Q	1.96	1.59	1.14	0.47	10.03
<i>Independent Variables</i>					
GOVSCORE	9.75	10.00	2.41	4.00	15.00
STOCKAVOID	0.04	0.02	0.10	-0.74	0.54
DEPRAVOID	0.01	0.00	0.19	-2.04	1.31
RESIDUALAVOID	.034	0.00	0.21	-.99	2.09
OTHERAVOID	0.06	0.04	0.35	-1.9	2.65
APPRECIATION	0.33	-0.05	0.79	-1.00	6.20
PPE	0.57	0.53	0.38	0.00	1.82
FOREIGN	0.03	0.01	0.04	-0.07	0.23
CASH	0.11	0.06	0.13	0.00	0.68
RISK	8.56	4.50	28.19	0.45	314.98
AGE	3.86	4.19	1.02	0.00	5.16
LEVERAGE	0.27	0.24	0.23	0.00	2.34
INTANGIBLES	0.18	0.11	0.18	0.00	0.76
NOL	0.38	0.00	0.49	0.00	1.00
GROWTH	0.11	0.07	0.22	-0.22	3.06
SIZE	13,872.68	4,021.27	38,376	1,605	345,977

Table 6					
Descriptive Statistics for Small Companies					
	<u>Mean</u>	<u>Median</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Max</u>
<i>Dependent Variable</i>					
TOBIN'S Q	2.08	1.76	1.20	0.36	10.64
<i>Independent Variables</i>					
GOVSCORE	9.10	9.00	2.14	4.00	14.00
STOCKAVOID	0.05	0.03	0.35	-3.92	1.77
DEPRAVOID	0.04	0.00	2.05	-20.44	24.76
RESIDUALAVOID	-0.03	0.00	1.02	-11.08	5.04
OTHERAVOID	0.27	0.08	3.22	-26.08	34.16
APPRECIATION	0.40	0.02	0.73	-1.00	4.61
PPE	0.43	0.33	0.37	0.00	2.10
FOREIGN	0.04	0.00	0.42	-0.19	6.77
CASH	0.22	0.14	0.22	0.00	0.88
RISK	6.91	3.48	15.95	0.00	213.15
AGE	3.35	3.30	0.79	0.00	5.45
LEVERAGE	0.24	0.20	0.25	0.00	1.57
INTANGIBLES	0.20	0.14	0.21	0.00	0.87
NOL	0.44	0.00	0.50	0.00	1.00
GROWTH	0.13	0.08	0.28	-0.25	2.30
SIZE	697.10	646.81	417.89	3.83	1,588

Regression Results

Each independent variable was regressed against the dependent variable in a multivariate regression model. After each regression analysis was performed, the residuals were plotted and approached a normal distribution (Tukey, 1962). Regression results for large companies are presented in Table 7 and regression results for small companies are presented in Table 8.

<u>Variable Pred Sign</u>	<u>Coefficient</u>	<u>T-Stat</u>	<u>Significance p value</u>
Intercept	1.816	4.668	0.000
STOCKAVOID -	1.123	1.365	0.174
DEPRAVOID +	-0.479	-1.063	0.289
RESIDUAL +	-1.063	-2.502	0.013 *
OTHERAVOID +	-0.597	-1.709	0.089
<u>Control Variables</u>			
APPRECIATION	-0.087	-1.140	0.255
PPEGROSS	0.039	0.231	0.818
FOREIGN	10.561	6.893	0.000 *
CASH	3.717	6.513	0.000 *
RISK	0.000	0.140	0.889
AGE	-0.060	-1.019	0.309
LEVERAGE	0.779	2.760	0.006 *
INTANGIBLES	0.605	1.737	0.084
NOL	-0.085	-0.703	0.483
GROWTH	-0.105	-0.403	0.687
SIZE	0.000	-1.571	0.117
GOVSCORE	-0.051	-2.077	0.039 *
Adjusted R ² = 0.371			
* Significant at .05			

Analysis of Results for Large Companies

The only independent variable which was statistically significant in this regression model was RESIDUAL ($t = -2.502$, $p = 0.013$). Interestingly, RESIDUAL had a negative coefficient, which was the opposite of the anticipated result ($\beta_3 = -1.063$). This coefficient indicated that as large firms reduce their income tax rate by 1% through residual foreign earnings, the firm value decreases by 1.063%. This decline in firm value indicated that there is an implicit tax incurred by the large firms in this sample when leaving cash invested in foreign countries for tax purposes.

Four control variables were also statistically significant in this model, FOREIGN ($t = 6.893$, $p = 0.00$), cash ($t = 6.513$, $p = 0.00$), LEVERAGE ($t = 2.760$, $p = 0.006$) and GOVSCORE ($t = -2.077$, $p = 0.039$). The coefficient on FOREIGN was positive and relatively large ($\beta = 10.561$). This coefficient indicated that as foreign income (FOREIGN) increases by 1% for large firms, the firm value increases by 10.561%.

This increase in firm value indicated that foreign investments are profitable, likely due to knowledge spillover. The coefficient on CASH was positive ($\beta = 3.717$). This coefficient indicated that as cash reserves increased by 1%, firm value increased by 3.717%. This increase in firm value contradicted the trapped cash theory. The coefficient on LEVERAGE was positive ($\beta = 0.779$). This coefficient indicated that as debt increased by 1%, firm value increased by .779%. The coefficient on GOVSCORE was negative ($\beta = -0.051$). This coefficient indicated that as governance score increased by 1%, firm value decreased by .051%. This decrease in firm value is interesting, as many researchers have found that corporate governance is critical when a firm engages in income tax avoidance (Desai & Dharmapala,

2004;Wilson, 2009). The adjusted coefficient of determination (adjusted R squared) for this model was considerably low (.371, or 37.1% of the change in firm value was explained by the model).

Table 8
Summary of Multivariate Results for Small Companies

<u>Variable Pred Sign</u>	<u>Coefficient</u>	<u>T-Stat</u>	<u>Significance p value</u>
Intercept	1.046	29.485	0.000
STOCKAVOID +	-0.013	-0.925	0.356
DEPRAVOID -	0.001	0.280	0.779
RESIDUAL -	0.003	0.571	0.568
OTHERAVOID -	0.000	0.142	0.887
<u>Control Variables</u>			
APPRECIATION	-0.032	-4.784	0.000 *
PPEGROSS	-0.006	-0.395	0.693
FOREIGN	-0.001	-0.111	0.912
CASH	-0.117	-4.416	0.000 *
RISK	0.000	0.603	0.547
AGE	-0.011	-1.681	0.094
LEVERAGE	0.065	3.117	0.002 *
INTANGIBLE	-0.016	-0.615	0.539
NOL	0.003	0.262	0.793
GROWTH	-0.025	-1.419	0.157
SIZE	0.000	-1.968	0.050
GOVSCORE	0.002	0.680	0.497

Adjusted R² = 0.150

* Significant at .05

Analysis of Results for Small Companies

None of the independent variables in this model were statistically significant, however three of the control variables were significant, APPRECIATION (t = -4.784, p = 0.000), CASH (t = -4.416, p = 0.000) and LEVERAGE (t = 3.117, p = 0.002). The coefficient on APPRECIATION was negative ($\beta = -0.032$). This coefficient indicated that as the stock price of a company increased by 1%, the value of the firm decreased by .032%. This decrease in firm value indicated that volatility in stock price of a small firm may reduce the value of the firm. The coefficient on leverage was positive ($\beta = 0.065$). This coefficient indicated that as debt increased by 1%, firm value increased by .065%. The adjusted R squared was lower than the adjusted R squared of the large companies, at .150, which indicated that 15% of the change in firm value was explained by the model.

CONCLUSION

The first hypothesis (H_{1a}) was that firm value would be inversely related to income tax avoidance through stock option compensation (STOCKAVOID) for large firms. In the multivariate regression model for large firms, the coefficient for STOCKAVOID was not statistically significant.

This result indicates that there is insufficient evidence that income tax avoidance through stock option compensation impacts firm value for large firms. Given the lack of evidence supporting an impact on firm value for large firms of stock option compensation within this data set, the researcher failed to reject the null hypothesis.

The next hypothesis (H_{1b}) focused on income tax avoidance through stock options (STOCKAVOID) for small firms. This hypothesis was that firm value would be positively related to income tax avoidance through stock option compensation for small firms. In the multivariate regression model for small firms, the coefficient for stock avoidance was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through stock option compensation impacts firm value for small firms. Given the lack of evidence supporting an

impact on firm value for small firms of stock option compensation within this data set, the researcher failed to reject the null hypothesis.

The third hypothesis (H_{2a}) was that firm value would be positively related to income tax avoidance through accelerated depreciation (DEPRAVOID) for large firms. In the multivariate regression model for large firms, the coefficient for accelerated depreciation was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through accelerated depreciation impacts firm value for large firms. Given the lack of evidence supporting an impact on firm value for large firms of accelerated depreciation within this data set, the researcher failed to reject the null hypothesis.

The fourth hypothesis (H_{2b}) was that firm value would be inversely related to income tax avoidance through accelerated depreciation (DEPRAVOID) for small firms. In the multivariate regression model for large firms, the coefficient for accelerated depreciation was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through accelerated depreciation impacts firm value for small firms. Given the lack of evidence supporting an impact on firm value for small firms of accelerated depreciation within this data set, the researcher failed to reject the null hypothesis.

Amir et al.(1997) and Raedy et. al. (2011) found that accelerated depreciation increased firm value prior to the income tax disclosure requirements of SFAS 109, which require that companies recognize a deferred tax liability due to less depreciation being available in future years. The researchers found that disclosure of these liabilities negated the benefits of accelerated depreciation on firm value, which indicated that investors considered the temporary nature of the benefits of accelerated depreciation. The findings of this paper support the findings of Amir et al.and Raedy et al., indicating that investors incorporate future income tax liabilities into the valuation of current income tax savings.

The fifth hypothesis (H_{3a}) was that firm value would be positively related to income tax avoidance through residual foreign earnings (RESIDUALAVOID) for large firms. In the multivariate regression model for large firms, the coefficient for residual foreign income was statistically significant, however it was negative. This result indicates that there is sufficient evidence that income tax avoidance through residual foreign earnings has a negative impact on firm value for large firms. Given the evidence supporting a negative impact on firm value for large firms of residual foreign income, the researcher rejects the null hypothesis.

The findings of this research contradict those of Bryant-Kutcher et. al. (2012), in which the authors found that foreign effective tax rates were inversely related to firm value. Furthermore, these findings contradict the findings of Lenaerts and Merlevede (2015), in which the researchers found that firms become more efficient when engaging in foreign direct investment with medium to large sized firms due to increased levels of knowledge spillover. However, this finding is consistent with Bauman and Shaw(2008), who found that investors incorporate the future income tax liability associated with repatriating the earnings into the valuation of the firm. This finding implies that investors discount the value of the income tax avoidance because they are aware that a liability is created and the tax will be paid in the future. In addition, Inger (2013)noted that income tax avoidance through residual foreign earnings is inherently more risky than other means of income tax avoidance with respect to audit and governmental adjustments, and that investors will consider the additional risk associated with the incometax avoidance when valuing the benefit of the tax avoidance.

The sixth hypothesis (H_{3b}) was that firm value would be inversely related to income tax avoidance through residual foreign income (RESIDUALAVOID) for small firms. In the multivariate regression model for small firms, the coefficient for residual foreign income was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through residual foreign income impacts firm value for small firms. Given the lack of evidence supporting an impact on firm value for small firms of residual foreign earnings within this data set, the researcher failed to reject the null hypothesis.

The seventh hypothesis (H_{4a}) was that firm value would be positively related to other income tax avoidance methods (OTHERAVOID) for large firms. In the multivariate regression model for large firms, the coefficient for other income tax avoidance was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through other methods impacts firm value for large firms. Given the lack of evidence supporting an impact on firm value for large firms of other income tax avoidance within this data set, the researcher failed to reject the null hypothesis.

The eighth hypothesis (H_{4b}) was that firm value would be inversely related to other income tax avoidance methods (OTHERAVOID) for small firms. In the multivariate regression model for small firms, the coefficient for other income tax avoidance was not statistically significant. This result indicates that there is insufficient evidence that income tax avoidance through other methods impacts firm value for small firms. Given the lack of evidence supporting an impact on firm value for small firms of other income tax avoidance methods within this data set, the researcher failed to reject the null hypothesis.

Previous literature has found that corporate governance dictates the relationship between income tax avoidance and firm value; strongly governed firms reported a positive relationship while poorly governed firms reported an inverse relationship (Desai & Dharmapala, 2004; Wilson, 2009). Other tax researchers have theorized that larger firms benefit from income tax avoidance more than smaller firms because the benefit of income tax avoidance increases as the income tax liability increases (Omer, Molloy, & Ziebart, 1993). The findings in this research contradict those findings as neither large nor small firms significantly benefitted from other income tax avoidance activities.

SUMMARY

Based upon the data analysis within this study, it was concluded that stock options do not impact firm value for small or large firms in the model presented and, further, size does not impact the relationship between income tax avoidance through the issuance of stock option compensation and firm value for the companies included in this data set.

Based upon the data analysis within this study, it was concluded that accelerated depreciation, as a tax avoidance technique, does not impact firm value for small or large firms and, further, size does not impact the relationship between income tax avoidance through accelerated depreciation and firm value for the companies included in this data set.

Based upon the data analysis within this study, it was concluded that large companies reported an inverse relationship between tax avoidance through permanently reinvested earnings and firm value. While this relationship contradicts the hypothesis presented within this paper for large firms, it does support the theory of trapped cash. Furthermore, companies are not required to disclose their tax liabilities which exist from permanently reinvested earnings, making this type of income tax avoidance less transparent to shareholders. Income tax avoidance which is less transparent opens up the risk of a diversion of rents to management from the shareholders (Desai & Dharmapala, 2004, 2009b; Inger, 2013).

Based upon the data analysis within this study, it was concluded that residual tax avoidance strategies did not impact firm value for large or small firms and, further, size does not impact the relationship between other income tax avoidance and firm value for the companies included in this data set. Generally, it was concluded that corporate size does not dictate an optimal income tax avoidance position for the companies included in this data set.

FUTURE RESEARCH

Based upon the work in this study, and, given that its findings contradict findings of prior research, it is clear that additional research is needed to determine a company specific, optimal income tax avoidance position. Additional research may focus on characteristics of the income tax avoidance methods, such as risk involved, the cost, both explicit and implicit, of the income tax avoidance or the duration of the benefits. Also, new research may focus on company specific characteristics, such as age, equity incentives and income tax related financial statement note disclosures.

Future research may also focus on management characteristics, such as tenure, gender, risk aversion, and religiosity. These characteristics may impact both the method and extent of income tax avoidance engaged in by an organization, which may be found to impact the valuation of tax avoidance.

Finally, future research may consider the valuation of income tax avoidance in perspective of the efficient market hypothesis (Fama, 1970). It is possible that investors expect that companies will avoid income taxes when possible, and that expectation is already factored into the company valuation.

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DIFFICULTIES ENCOUNTERED DURING AN UNDERGRADUATE RESEARCH PROJECT

Joseph Cunningham, Wilson College

ABSTRACT

College programs that focus on undergraduate research have grown dramatically over the past few decades. What was once the purview of graduate students with more world experiences is more often falling into the hands of those with lesser experience both inside and outside the classroom. Among the unintended consequences of this occurrence is an important need to plan and manage the resources for a successful experience. The student acts as researcher while the educator acts as a mentor or co-researcher. With proper planning and inclusion of the student researcher, undergraduate research may prove to be a rewarding experience for the institution, educator and undergraduate student.

INTRODUCTION

It was hypothesized that the cost of an Accounting degree in Pennsylvania varied widely among those who attained a Bachelor's degree by either starting in a community college versus entering directly to a traditional program. Other variable costs included transportation and housing costs.

Pennsylvania community colleges and state-affiliated universities were surveyed to gather the costs related to earning a Bachelor's of Science degree in Accounting. These costs included programming costs, housing costs, student fees, transportation costs and others related to living expenses. It was somewhat difficult and frustrating obtaining information at times.

The project was completed and presented the research, but numerous factors had to be overcome; these factors include planning, limited resources, and locating willing participants. Using a researcher with limited experience and having a demanding schedule also presented challenges, at times.

What the Research Opportunity Was

A Small Pennsylvania liberal arts college offers student-led research project over a three week January term. Evans (2010) noted “engaging undergraduates in serious academic activities that a generation ago would have been the province of graduate students is surely an effective way to enhance their learning.” Students are compensated for their work and provided an opportunity to present their project along with their peers. Professors guide the research and are available either as a mentor or co-researcher.

Why Undergraduate Research?

Lopatto (2007) created a systematic quantitative study of the benefits of undergraduate research that has “established a reasonably precise and empirically supported set of benefits for students...”. Students earn the benefits associated with performing research – the opportunity to develop quantitative and qualitative skills that are needed well beyond the class room.

What the Project Was

“Does the Cost of Obtaining an Associate’s Degree in Accounting from a Pennsylvania Community College Significantly Reduce the Cost of Degree Completion From a Pennsylvania State University?” By Emely Tremols and Joseph Cunningham, CPA, MBA.

According to Puente, “a research project must truly be carefully selected to provide an honest “real research” experience...but also one that is meaningful and productive.” The title of the student research project is evident that the researchers were seeking to quantify the cost savings of beginning one’s studies as an accounting major in one of the 14 Pennsylvania State Community Colleges for two years, and transferring to a Pennsylvania State 4-year institution to complete one’s bachelors versus beginning and completing the degree at that Pennsylvania 4-year college or university. Costs taken into consideration were relevant in nature and included tuition, room and board, charges and fees, transportation, books and supplies, and miscellaneous personal expenses.

Important research data was collected that would aid in the college selection process for an incoming freshman and/or a transfer student. Questions that were researched for all of the 14 state, 9 commonwealth, and 14 community colleges included:

The Minimum SAT, ACT, and GPA required for entrance in each school – The questions were more relevant to the 4-year schools rather than the community colleges because the majority of community colleges either require incoming students to take a placement test or waive SAT/ACT scores.

Program Size - To calculate the size of the school and their accounting programs, each institution was asked their total student body headcount as well as the number of students who were enrolled as accounting majors.

Minimum Credit Hours to Graduate - This set of questions asked were, if each school has an Honors Program with honors courses in accounting, what each school's minimum credit hours to graduate were, and if the schools facilitated the students' attainment of their 150 credits required to take the CPA at the undergraduate or graduate level.

Articulation Agreements - Lastly, the schools were asked if they had any articulation agreements for accounting majors with other institutions and we also wanted to know the specific institutions for which the agreements existed. A question asked specifically to the community colleges was whether they had ACBSP Accreditation (Accreditation Council for Business Schools and Programs).

With this comprehensive set of questions we were able to thoroughly conduct the research in hopes to find answers to the aforementioned queries and to be reasonably able to calculate the cost for each track: Track 1: 2 years at a community college with completion at a Pennsylvania State University or Track 2: 4 years in residency at a Pennsylvania University.

Goal to Accomplish

With this research project, the researchers were hoping to provide useful and practical information concerning the costs of beginning one's accounting degree at a community college versus beginning and completing the degree at a four-year school. They were seeking to find out if these costs savings were material in nature as well as provide other useful information regarding the individual institutions. The researchers hoped to quantify these savings so that it becomes easier for the user to make a decision regarding their choice for starting at a community college or starting at a 4-year college or university. This project is beneficial for the personal finances of numerous individuals planning to attain a degree in accounting.

How the Project was Created

This project originated between the shared backgrounds of each researcher: Professor Cunningham was a professor at Harford Community College in Bel Air, MD; Ms. Tremols recently transferred from Reading Area Community College. According to Bird (2018) one of Woynaroski's takeaways for managing undergraduate research assistants is to "involve undergraduates in all aspects of research, from study design to presentation of results. Thus, as an accounting student and an accounting professor, the researchers shared the interest of the transferability of credits for accounting majors as well as the common background of being in a community college and exposure to the process itself.

To organize and gather the data, an Excel workbook was created with three separate worksheets: one worksheet consisted of the 14 Pennsylvania state institutions, the second sheet consisted of the 9 Commonwealth universities, and the third worksheet had the relevant information pertaining to the 14 Pennsylvania state community colleges. The questions listed in the left-hand column, the institutions at the head of each column. The data gathered on each institution was categorized.

How Data Was Gathered

The data for this project was gathered through extensive research of all 37 schools' websites as well as calling each school's admissions counselors, chair of the accounting/business department, and registrar's offices to confirm the information on their websites. It became a very difficult and tedious process trying to locate many of these individuals; they were either not in their offices, were simply too busy, or didn't care to participate in answering the questions. The research gathered from each school's website was confirmed with the phone calls made to ensure that the information online was relevant and up-to-date.

Difficulties Encountered by Student Researcher

Student Researcher had to verify website information from knowledgeable people on each of the 37 community college and university campuses in order to verify information. This is traditionally a slow period for colleges and universities over winter break; people tend to take time for vacation, professional development and for other activities away from campus. Student Researcher sometimes encountered difficulties finding a key person to confirm website information with.

Student researcher's shyness was a barrier at times – especially when making telephone calls. A person who lacks some experience and life skills may not seem rather forceful on the telephone or when writing an email to a college administrator. Even though Pennsylvania has sunshine laws state information, not all administrators took the requests to heart when receiving them. At times the professor stepped in to place calls or make the requests.

A third challenging area encountered by the student researcher was manipulating or converting the data to a common format for 37 different institutions. The data was sometimes presented in a number of different ways. The researchers worked through the numbers or the information to extract what we needed. This did present an opportunity for the professor to teach and explain to the student how to best present the data. Attention to detail had to be observed as to how the colleges and universities presented financial information.

Difficulties Encountered by Professor Researcher

According to panelists Bischof, Furst, Urban, and Raicu, in order to “provide benefits to the students and institutions, the faculty mentors have to design good strategies for overcoming various challenges...” As a 10 year veteran of teaching accounting at the undergraduate level, the professor had experience with assisting students in projects and data collection. Professional experience in this area also was very valuable. Even with well-designed projects, difficulties may be encountered. Some of those included:

- The scheduling/short time frame of the project – 3 weeks' time. Impending internship required losing the student to training for a number of days
- Administrative issues
- A comprehensive report was due one week after completion.

The short time frame was required by the grant-giving committee; student research projects are completed during the interim term. The student researcher was beginning an Accounting internship in January and the firm wanted her available on some days for training. Another requirement of the grantor was a comprehensive report was due one week after completion of fieldwork.

The administrative issues were numerous. An office with a computer and telephone were requested for the project and student researcher. The administrative assistant and co-chair of the department thought it was a bad precedent to give a student an office for a three week period. The professor office was off limits because of FERPA issues. A common office used by adjuncts was the final solution for the student researcher. That was very frustrating; the college hired her to do the research but had difficulty in assigning her space. The goal of Bailey, Budden, and Ghosh-Dastidar was “to provide some insights for handling (and even avoiding) several challenging scenarios that can arise in directing undergraduate research projects.”

With the start of a new semester quickly approaching, the professor was also teaching two 5 week courses in a degree completion program, preparing for the spring semester, overseeing a Volunteer Income Tax Assistance Program

(VITA) while working on this research project simultaneously. It was a hectic period, but that is an expectation by a junior faculty member. Reflecting on this period shows just how busy one can be through an interim term.

The student maintained her poise and professionalism throughout this period, although the demands placed on her were great. She was also exposed to the type of demands she may experience in her professional life as an accountant: contacting clients, gathering data, managing both time and resources effectively. The student researcher performed very well under a deadline.

CONCLUSION

To conclude, both student and professor encountered difficulties. Though challenging, they certainly were not insurmountable. The researchers used the time to plan and design the research prior to the three-week interim term. Spreadsheets were designed and contact information was gathered prior to the research period. This enabled each researcher to work on a flexible schedule, but have access to resources when necessary.

The three-week research experience was a valuable learning tool for each researcher. It was learned approximately how much savings one can experience for those Pennsylvanians who start at a community college and transfer to a four-year school for a degree in Accounting (about \$80,000). The student also learned about professional and personal demands on one's schedule when one agrees to perform a research project.

Lastly, both researchers became aware of the great opportunity the college presents to students and professors by granting and funding joint research projects during the interim. The researchers presented their findings in New York City at the American Accounting Association annual meeting. The conference section was Faculty-Student Collaborations in Accounting Workshop. The presentation was well received. The researchers encourage all colleagues to find a student research project with whom they can work with. It is certainly a rewarding and enjoyable experience.

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EFFECTS OF MANUFACTURING FIRMS' STRATEGIES ON INNOVATION: A HOLISTIC VIEW

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ABSTRACT

This paper examines both theoretically and holistically which of the sixteen strategy-related factors empirically identified in the literature actually represent the primary forces underlying the innovativeness of a manufacturing firm and which ones are secondary. After developing a general systemic theory of why the firm needs to have clearly stated missions and a long-term, unwavering ambition, on the basis of the systemic yoyo model the rest of the paper classifies the sixteen particular variables, regarding the overall strategic orientation, growth strategies, and operational strategies, into primary and secondary forces underlying the innovativeness of the firm. And practically useful recommendations for managerial decision making are provided, showing the potential real-life benefits of this research.

INTRODUCTION

This paper addresses the following challenging question that is of very practical significance and theoretical value: What are the main strategic tactics that underlie the innovative activities of a manufacturing firm? The importance of this question has been known since the time of Adam Smith (1776) when he maintains that innovation is a crucial economic activity to fostering wealth. Within the present economic landscape innovation has become unavoidable for each and every one of the companies that want to develop and maintain a competitive advantage and/or gain profitable entry into different markets (Stock et al., 2002). That explains why this question has been a hot topic for decades for researchers, managers, and policy makers to ponder over. In terms of international economics, innovation stands for an essential factor underlying the competitiveness, productivity, output, and employment performance of nations (Michie, 1998).

Due to the undeniable importance of the previous question, a good number of scholars have empirically checked the effects of sixteen strategic variables on innovation (Rothwell, 1992). However, limited by the methods employed, these authors discover varying degrees of association between these variables and innovation, even when they test similar variables (Souitaris, 2002). So, a theoretical challenge facing the research of the effect of strategies on innovation is: Can a different methodology of reasoning and analysis be introduced to the investigation of the effect of strategies on innovation so that the innovation process can be better understood and the derived conclusions can be reliably employed to improve our understanding of the phenomenon?

The aim of this paper is to meet this challenge and address the question posed earlier by introducing the thinking logic of systems science into the investigation of the effect of strategies on innovation. In particular, through systemic thinking and reasoning, we first develop a general theory of why the firm needs to have clearly stated missions and a long-term, unwavering ambition. On top of this theory, and by employing the intuition of systemic yoyo model, we are able to sort through all the sixteen strategy variables identified by various scholars in the literature in order to classify them into primary and secondary forces underneath the innovativeness of a manufacturing firm, where the secondary forces naturally appear when the primary ones are established first.

Other than introducing a brand new methodology into the investigation of innovation, the most significant contribution this paper makes is the managerial recommendations that can be practically employed in real-life applications. In particular, all the results of our theory in this paper hold true generally, which makes this work fundamentally different from the existing literature, where conjectures are developed on data analysis, data mining, and anecdotes and then suggestions (instead of recommendations) are given. That is because the logic reasoning and holistic thinking employed in this paper does not suffer from the methodological weaknesses of the past data- or anecdote-based works that prevent the decision/policy maker from making generalizations. Methodological weaknesses of empirical studies stem from how variables are measured and how the collected data are analyzed (Becheikh, et al., 2006). The former involves measurement uncertainty (Czichos, et al., 2011), and the latter the limitations of data analysis and data mining (Liu and Lin, 2006).

The rest of this paper is organized as follows. After the section that reviews the literature, we provide all the preliminary information needed for the rest of this paper, including a brief introduction to systems science, the definition of innovation studied herein, and the market calls for innovation. Then we establish the necessity of having clearly stated missions, examining the effects of firms' strategies on innovation from three different angles: Overall strategic orientation, growth strategies, and operational strategies. We provide managerial recommendations for potential applications in real life.

LITERATURE REVIEW

Because this paper investigates strategy-related forces underlying manufacturing firms' innovativeness, this section reviews two different but related literatures. One is about the studies on what explanatory variables explicate the dependent variable innovation, and the other on issues related to competitive advantages, where each competitive advantage is developed on innovations.

First, let us review the literature on innovation. Over two hundred years ago, Adam Smith (1776) acknowledged the importance of innovation by saying that innovation is a crucial economic activity to fostering wealth. The topic of innovation in the manufacturing sector has been well investigated through the years by many scholars, making it a traditional field of study (Aas et al. 2015), because of its close relationship to the prosperity of manufacturing firms (Adner and Levinthal 2001) and being a critical factor for the firms' survival and growth (Damanpour 1991; Visnjic et al. 2016). In the real business world, innovation is mainly characterized by the introduction of original products and processes (Becheikh et al. 2006) that enable manufacturing firms to competitively enter or create new markets (Smith and Tushman 2005).

Innovation has been treated by many as one major factor of long-term performance (Kanter 2001). In terms of innovation strategies, Veugelers and Cassiman (1999) find that high perceived risks and costs and low appropriation does not discourage innovation, but rather determines how the innovation sourcing strategy is chosen. Additionally, they find that small firms are more likely to restrict their innovation strategy to an exclusive make or buy strategy, while large firms are more likely to combine both internal and external knowledge acquisition in their innovation strategy. De Massis et al (2015) show that family businesses are different from nonfamily firms in product innovation strategies and in the organization of innovation processes. They find that manufacturing family firms focus on incremental product innovations by using more external sources, while nonfamily firms more on breakthrough and radical innovation through a predominantly closed approach.

Along with the recent economic globalization and the advent of internet-based technologies, manufacturing firms experience increasing pressures to become more competitive and innovative than ever before (Caputo et al. 2016; Buffington 2016; Zollo et al. 2016), leading to the emergence of new manufacturing philosophies (Caputo et al. 2016; Holmstrom et al. 2016). These new philosophies have redefined the concept of manufacturing and innovation in the manufacturing field (Roos 2015; Wu et al. 2015). The most famous ones are Industry 4.0 and China's manufacturing 2025 (Lee et al. 2015; Li, 2017).

Next, let us review the literature on competitive advantage, which is defined (Porter, 1985) as a function of either providing comparable buyer value more efficiently than competitors (low cost), or performing activities at comparable cost but in unique ways that create more buyer value than competitors and, therefore, command a premium price (differentiation). In this regard, Duez (2012) derives a new paradigm for strategic management thoughts from the school of economic proximity. Saeidi, et al., (2015) consider sustainable competitive advantage, reputation, and consumer satisfaction as three probable mediators in the relationship between corporate social responsibility and firm performance. In the context of Chinese-like emerging economies, Li and Liu (2014) define the concept of a firm's dynamic capability as the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely decisions, and to implement strategic decisions and changes efficiently to ensure the right direction.

Herrera (2015) build a framework that describes factors leading to successful corporate social innovation, which in turn creates opportunities for co-creation, thereby leading to shared value and enhancing competitive advantage if it is integrated into strategy and operations. Leonidou et al (2015) examine the external and internal determinants of green export business strategy and its effects on export competitive advantage and performance. Their result confirms the instrumental role of both external forces (i.e., foreign environmental public concern and competitive intensity) and

internal factors (i.e., top management green sensitivity and organizational green culture) in crafting an environmentally friendly export business strategy. (Forrest and Nightingale, 2017) establish a practical procedure for a firm to transit smoothly into the era of fast strategic changes while its once sustainable competitive advantages have become transient. These authors advance the systemic reasons for why a list of time-honored steps would practically help firms successfully surf through waves of transient competitive advantages by combining previously published conclusions derived on anecdotes and data mining.

In comparison, this work contributes to the literature in three major ways. First, this paper shows the absolute necessity for a manufacturing firm to have clearly stated missions and a long-term, unwavering ambition. Second, this paper holistically evaluates sixteen strategy-related factors empirically identified in the literature and classifies them respectively into primary and secondary forces underneath the innovativeness of the firm. And third, instead of employing anecdotes and various methods of data analysis and data mining, as what has been mostly done in the past, this work employs systems science as the methodology and logic of reasoning. That explains why conclusions developed in this paper can be materialistically applied to guide relevant practices in real life.

PRELIMINARY INFORMATION

In this section, we look at several matters needed for the rest of this paper: a brief introduction to systems science, the concept of innovation in manufacturing sector, market characteristics that invite and stimulate innovation in manufacturing sector, and environmental forces that dominantly affect innovative activities of manufacturing firms.

Basics of Systems Science

System exists everywhere, especially in the investigations of issues of economics and business decision making. For example, each person is a complex biological system, made up of many smaller systems. At the same time, she is also a member of many social and economic systems, such as a family, neighborhoods, communities, etc. And each day she interacts with a range of various systems, such as a car, an ATM machine, retail stores, the company she works for, etc. These systems interact with each other constantly. Hence, other than using numbers and variables to investigate problems and issues of business and economics, which is what is mostly done in the literature, there is an urgent need for us to employ the concept of systems and relevant methods to study economic phenomena in order to obtain brand new understandings and conclusions.

Historically, the concept of systems has been directly or indirectly introduced by scholars in different disciplines. For example, in the area of economics Rostow (1960) wrote that: The classical theory of production is formulated under essentially static assumptions ... to merge classical production theory with Keynesian income analysis ... introduced the dynamic variables: population, technology, entrepreneurship, etc. But ... do so in forms so rigid and general that their models cannot grip the essential phenomena of growth ... We require a dynamic theory ... which isolates not only the distribution of income between consumption, savings, and investment (and the balance of production between consumers and capital goods) but which focuses directly and in some detail on the composition of investment and on developments within particular sectors of the economy. In the area of biology von Bertalanffy (1924) pointed out that because the fundamental character of living things is their organization, the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life. And many others, such as Porter (1985), Klir (1985), Lin (2009), etc., also demonstrated how powerful holistic way of thinking and relevant methodology could be in terms of producing conclusions that are realistically reliable and practically usable regarding organizations, such as business entities, and how these organizations, such as economies or markets, etc., interact with each other. As a matter of fact, since the 1920s, such a holistic view of nature, organizations, and social events has permeated the spectrum of knowledge (Lin, 2009).

Numbers and systems are abstracted out of the physical world from two different and harmonizing angles. When an organization is seen as a collection of unrelated people and properties, numbers come into play, such as n employees, m copy machines, etc. When the organization is seen holistically, then the concept of systems emerges, where such elements as employees, capital, properties, etc., form an organic whole through various relationships, without which the organization does not exist. In other words, all studies in business related disciplines are essentially about systems, be they individuals, see as economic agents, firms, markets, industries, economies, etc. The major differences between numbers and systems include: 1) the former is a small scale local concept, while the latter a large-scale organizational

concept (Lin, 1988; 1999); and 2) numbers exist only post existence, while systems emerge at the same time when physical or intellectual existence comes into being (Lin, 2009). That is the reason why systems methodology is a more appropriate tool than all theories developed on numbers and variables for the investigation of economic entities when their internal structures are concerned with and why the Wall Street still cannot successfully make advanced predictions for imminent economic disasters.

By systems science, it means the totality of all studies of various kinds of systems. In the past 90 some years, the methods of systems science has been widely employed in different disciplines (Klir 2001). Similar to how the Cartesian coordinate system – consisting of the crossing of two or more number lines – plays its role in the development of the traditional science (Kline, 1972), in systems science the role is played by the systemic yoyo model (Lin, 2007) in Figure 1.

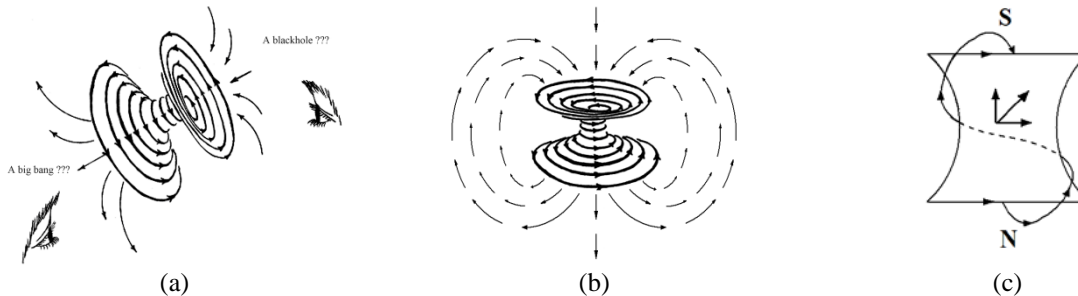


Figure 1. (a) Eddy motion model of the general system; (b) The meridian field of the yoyo model; (c) The typical trajectory of how matters return

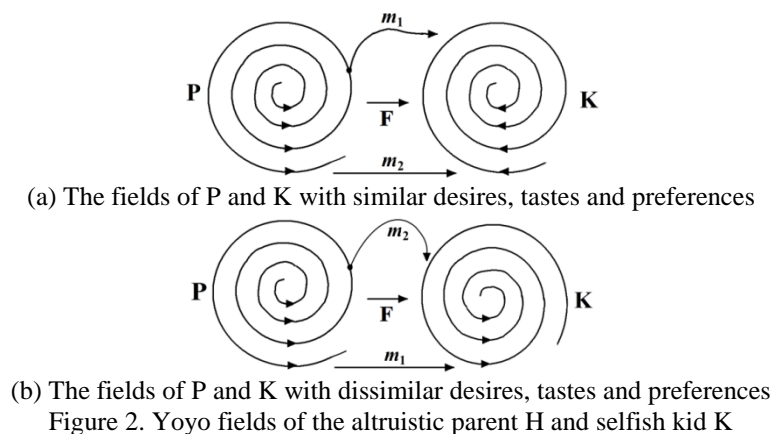
Specifically, on the basis of the blown-up theory (Wu and Lin, 2002), a general theory of development, and the discussion on whether or not the world can be seen from the viewpoint of systems (Lin, 1988; Lin, et al., 1990), the concepts of black holes, big bangs, and converging and diverging eddy motions are coined together in the model shown in Figure 1 for each object and every system imaginable. That is, each system is a multi-dimensional entity that spins about its axis. If we fathom such a spinning entity in our 3-dimensional space, we have such a structure as artistically shown in Figure 1(a). The black hole side pulls in things, such as materials, information, investment, profit, etc. After funneling through the “neck”, things are spit out in the form of a big bang. Some of the materials, spit out from the end of big bang, never return to the other side and some will (Figure 1(b)). Due to its general shape, such a structure is referred to as a yoyo.

What this systemic model says is that each physical or intellectual entity in the universe, be it a tangible or intangible object, a living being, an organization, a market, an economy, etc., can all be seen as a kind of realization of a certain multi-dimensional spinning yoyo with an eddy field around. It stays in a spinning motion as depicted in Figure 1(a). If it does stop its spinning, it will no longer exist as an identifiable system. What Figure 1(c) shows is that due to the interaction between the eddy field, which spins perpendicularly to the axis of spin, of the model, and the meridian field, which rotates parallel to axis of spin, all the materials that are either new to the yoyo body or returning to the black-hole side travel along a spiral trajectory.

To conclude this subsection, let us look at an illustrative example of the systemic yoyo model in action. The Becker's, a Nobel laureate in economics, *Rotten Kid Theorem* (1974; 1991) posits that if the altruistic parent periodically gives monetary gifts to all kids, then the kids, no matter how selfish they are, will help the family to maximize its income. Since the time when this theorem was initially established in 1974, it has found practical applications in many areas of policy making. However, since 1991, various particular scenarios have been constructed to show that such a theoretically important and practically useful result does not hold true in general as expected before. That is, the consequences of all the policy decisions made on the basis of this theorem become practically questionable. Due to its theoretical importance in household economics and practical usefulness in practice, many scholars have tried to establish conditions under which this theorem holds true. However, no fundamental progress was made, for details and relevant references see (Lin and Forrest, 2008). Now, let us see how we can apply the systemic thinking and the yoyo model to investigate this family and develop the long-sought-after breakthrough.

First, as a system the family can be visualized as a spinning yoyo, as shown in Figure 1(a), where its total income is the *inputs* and its consumption the *outputs* and ideas on how to generate income and how to enjoy consumptions make up the eddy and meridian fields in Figure 1(b), respectively.

Second, to better specify the interaction between the parent P and a selfish (or rotten) kid K, let us treat them as two separate systems. When their yoyo fields are seen from above one of the sides – either the input side or the output side, we have Figure 2, where the voluntary transfer of funds from the parent P to the kid K are labelled as either m_1 or m_2 . The label F stands for the fact that the parent P exerts influence of various kinds on the kid K. The altruism of the parent P is represented by the divergence of her yoyo field, as indicated by how the directional arrows point away from the center of the field; the selfishness of the kid K is expressed by the convergence of his yoyo field, as indicated by how the directional arrows point to the center of the field. In other words, the kid K is self-centered, while the parent P is the opposite due to her altruism. Figure 2(a) and (b) show the two extreme situations where the former represents the case when both the parent P and the kid K are mostly alike in terms of their desire for consumptions and related tastes and preferences, while the latter the complete opposite scenario. Of course, in real life there are many scenarios that are located between what are shown in Figure 2(a) and (b).



Third, based on the suggestions given by this systemic intuition, the following result, the long-sought-after breakthrough, is rigorously established (Lin and Forrest, 2008): Becker's rotten kid theorem holds true if and only if the distribution of the altruistic parent's monetary income is not in conflict with the consumption preferences of any selfish kid.

In summary, the importance of systemic thinking and modeling is that they provide not only a visual aid, but also a guide for scholars and managers in their effort to identify and settle boundary conditions – which the traditional science struggles to address. Relating to what we discuss in this paper, each human organization, be it a firm, a market, or an economy, as a whole is made up of its physical body, internal structure, and its interactions with the environment. This whole, according to the systemic yoyo model, is a high dimensional spin field, where the internal structure and interactions with the outside world affect each other and change the characteristics of the physical body. Considering the body being the carrier of all other aspects of the organization, in theory the body is a pool of 'fluid' realized through human sensing organs in the three-dimensional space. The word "fluid" here is an abstract term totalling the flows of information, resources, profits, investments, etc., circulating within the inside of, going into, and giving off from the body. So, each firm, each market and each economy represent an ever-evolving and constantly changing ocean of eddies, which interact with each other persistently. As a matter of fact, this end is also recognized by the contingency theory and supported by empirical evidence: Each organization is above all an adaptive system which evolves by reacting to its environment; and indeed, environment has a determining impact on firms' strategies, structuring and behaviors (Burns and Stalker, 1961; Chandler, 1962; Lawrence and Lorsch, 1967; Woodward, 1970).

The Concept of Innovation of a Manufacturing Firm

The meaning of innovation has been evolving with new particulars added over time. With Industry 4.0 and China's manufacturing 2025 unfolding currently, that are expected to bring forward new meaning to the concept. In order to prevent the definition of the concept used in this paper to be obsolete soon, let us look at the concept of innovation in manufacturing sector as generally as possible below:

Innovation in the manufacturing sector is such a set of activities – which could be just one particular activity or several – that leads to exceptionally added value to the company when compared to other activities that take place in the same sector.

Because of the abstraction and emphasis on the comparatively added value, this definition of innovation implies many facets of the concept. For example, any practical generation of exceptionally added value implies that:

- 1) An extraordinary level and/or quality of creativity has to be involved;
- 2) The creativity has to be both internally conceived and externally adopted;
- 3) Relevant new processes have to be developed in order to develop and push the new or improved products or services onto the market to realize the said value;
- 4) Intended benefits are materialized;
- 5) Other than inventions this definition also emphasizes on the translation of inventions into marketable new or improved products or processes;
- 6) The definition leaves open the possibility of relative newness; and
- 7) Although not particularly mentioned, the definition includes potential roles of relevant processes and outcomes.

What is very important and different from the definitions of innovation in manufacturing sector introduced by various authors (Becheikh, et al., 2006; Camison-Zornoza et al. 2004; Crossman and Apaydin, 2010; Hobday 2005; Lansisalmi et al. 2006; Peres et al. 2010; Pittaway et al. 2004; Schumpeter, 1934) and the Organization for Economic Cooperation and Development (OECD, 1997) is that our definition excludes those activities or innovations that only keep the companies afloat when compared to others in the same industries. For example, in the rivalry between Eastman Kodak and Fuji Films, the former surely identified and invested in resources and capabilities while monitored and took actions against what Fuji Films was doing in order to fence off the competition of the latter. However, its efforts of innovation led Kodak to a wrong direction. That explains why Kodak has since become a company no longer relevant in the market place (McGrath, 2013), and why our condition of exceptionally added value is important in defining what innovation in manufacturing sector truly is.

By understanding the significance of our definition of innovation in manufacturing sector, we can draw a parallelism between the study of disaster predictions and that of innovation. The reason why an event becomes a disaster is because the occurrence of the event is unexpected and causes major losses (Lin and OuYang, 2010). Similarly, an innovation creates exceptional added value because the particular innovation is not expected by the market to be significant (Christensen, et al., 2004). In the rest of this paper, any innovation addressed will be that defined lastly above for manufacturing sector.

Market Cues that Call for Innovations

In this subsection, we outline what has been established in (Forrest, et al., to appear) in order to make new conclusions derived in this paper plausible and complete.

First and foremost important theoretical results are that before a new or improved product or service is introduced, the market actually invites and stimulates innovation and additional competition. Specially, the following results hold true:

Theorem 1. Assume that there are m incumbent firms, $m = 1, 2, \dots$, in the oligopoly market such that

- 1) They provide consumers with mutually substitutable products;

- 2) Each of them has developed its respective share of loyal consumers who purchase the products from their respective firms only as long as the price is not more than their reservation price, which is set to be 1;
- 3) They compete over the switchers in the market with adjustable prices charged to their consumers, where the switchers purchase their products depending on whose price is most competitive;
- 4) The firms' managements are well aware of the pricing strategies of the other firms and have established their best responses by playing the Nash equilibrium through pure self-analyses.

Then in the Nash equilibrium, if the magnitude β of the market segment of switchers is greater than 0, then at least one new firm would profitably enter the market; and the aggregate scale of the entering firms in terms of their operations in this market is proportional to the magnitude of β .

Theorem 2. Assume the same conditions as given in Theorem 1. If the market experiences an increasing number of profitable entrants, then consumer loyalty in the marketplace will diminish overtime.

Jointly these two theorems imply that if a market is either emerging or expanding, then all firms, be they startups or incumbents, have to constantly strive for newer and better products because they cannot depend on the so-called loyal consumers to maintain their business. On the other hand, if the market is quite stable and the incumbent firms do not continuously introduce new products or better versions of their products, then the consumers' evolving desire and taste will lead to a growing market segment of switchers, which in turn will invite new competition from outside the stable market. In other words, as long as the market is not located within a planned economy, then the evolution of market activities will naturally stimulate innovation in manufacturing firms.

NECESSITY OF CLEARLY STATED MISSIONS

In this section, we look at why competitions between employees always exist within any organizational entity. Generally speaking, there are disagreements and competitions among employees on how the organization should be directed and managed, how the detailed operations should be carried out, and how employees' efforts and devotions should be channeled. And each and every stakeholder of the organization tends to have ideas about how things could improve.

The reason why abundant competitive situations exist is because each person looks at the world through his/her distinct world views. Because no two individuals grow up within a perfectly identical environment and because with age individuals' world views evolve according to their respectively changing environments, it explains why different individuals have different underlying world views. For a more in-depth discussion, see (Forrest and Orvis, 2016).

Proposition 1. World-view-based competitions always exist within any organizational system that has at least two employees.

This result is a natural consequence of the fact that no two individuals have an identical set of beliefs so that inconsistencies in opinions regarding the organization always exist. Consequently, any two chosen employees look at many aspects of the organizational system differently. That difference leads to competitive consequences of the two employees, although in most circumstances one of them stays quiet without bringing his/her disagreement to the extreme of a fierce power struggle.

Proof of Proposition 1. By contradiction, consider a fully efficient organization that satisfies given condition, where the organization's mission is not in total agreement with the personal value of employee k . Let Y be a variable measuring one aspect of employee k 's personal value such that

$$U_k = U_k(X_k, Y), \text{ satisfying } \frac{\partial U_k}{\partial X_k} > 0 \text{ and } \frac{\partial U_k}{\partial Y} > 0, \quad (1)$$

where U_k is the utility of k , X_k the total consumption of k , and the production function of the organization is

$$P = P(X_c, U_k, \dots), \text{ satisfying } \frac{\partial P}{\partial X_c} > 0, \frac{\partial P}{\partial U_k} > 0, \dots \quad (2)$$

where X_c represents the expenditure of the organization except that spent on k , and the dots all the utilities of all other employees. The monetary bonus that measures the work efficiency of k is expressed by

$$h_k = h_k(Y), \text{ satisfying } \frac{dh_k}{dY} < 0. \quad (3)$$

In real life, although this variable Y might only exist implicitly and cannot be measured readily, its negative effect on the quality and efficiency generally can be clearly seen. So, we simply assume without loss of generality that Y can be measured in determining the monetary bonus. The organization's resources are distributed to its employees to maximize its production function P in equation (2) subject to the following constraint:

$$X_c + X_k = X_c + (I_k + h_k), \quad (4)$$

where I_k is k 's income from his work at the organization. Maximizing the production function in equation (2) subject to the constraint in equation (4) leads to the contradiction:

$$\partial X_k / \partial Y > 0 \text{ and } \partial X_k / \partial Y = dh_k / dY < 0.$$

That implies that the assumption that the organization that satisfies the conditions of the proposition is fully efficient is incorrect. QED

Proposition 1 implies the necessity for any functional business organization to clearly state its missions; otherwise its daily operations will be torn apart by the inconsistent individuals' beliefs. In particular, for the minimal business desire of survival, each long-lasting business organization needs to have a clearly stated and strictly practiced mission.

If a company desires to be a business leader that successfully rides waves of transient competitive advantages, which generally has to be innovation based, then it has to develop such a mission that clearly establishes a long-term, unwavering public commitment to the ambition of becoming world class, the best of the world. And in practice, such ambition needs to be embraced, endorsed, and sought after by the leadership of the firm through setting the bar high while having a clear sense of strategic direction in every endeavor, and through promoting common key themes.

Speaking systemically, the reason why a clearly stated and strictly followed mission is important is that only by doing so, the leadership will be able to not only bring out and but also amplify the harmonic aspects of all individual employees' beliefs. Although the existing inconsistencies in individuals' beliefs are temporarily depressed both collectively and individually in terms of achieving the overarching company's goals, such as being the business leader, the best of the world, etc., these inconsistencies will naturally emerge when the employees of all ranks of the company are encouraged to take part in innovative activities.

Here, the leadership commitment is essentially the key. As a matter of fact, leadership is one of the most salient aspects of the organizational context. It is the center in the organizational system, a slight change or vibration of which most likely create shock waves throughout the entire system. In other words, each business organization can be seen as a centralized system (Hall and Fagen, 1956) and the following theorem tells why and how the leadership can effectively steer the direction of development of the company.

Theorem 3. (Lin 1988b). Assume ZFC. Suppose that $S = (M, R)$ is a system such that $|M|$, the cardinality of M , $\geq c$, where c is the cardinality of the set of all real numbers, and that each object in S is a system with finite object set. If there exists such an element that belongs to at least c objects in M , there then exists a partial system B of S with an object set of cardinality $\geq c$ and B forms a centralized system.

For all the technical details of this theorem and related proof, see (Lin 1988b). For our discussion here, let us look at one particular interpretation of this result. As long as the business organization of our concern is investigated as a system, where different parts of the organization are connected by various relationships, and some special elements exist within the system such that each of these elements transcends through a great number of the parts of the organization, then in this organization, at least one center will appear. That is, if the leadership of the organization embraces, endorses, and actively seeks after the goal of materializing the established mission through implementing clear strategic direction in every endeavor and through promoting common key themes, then a focused effort will consequently appear. At the same time, along with the practically uneven distribution of resources within the organization, various potential directions of development naturally fight for control of greater proportion of resources and influence. In the process of power struggle, this theorem indicates that many potential directions of development along with their spin fields will be either placed in the backburner or eliminated without damaging the underlying structure of the organization, leading to a uniform motion in the organization's spin field (in the language of the yoyo model).

According to Theorem 3, it follows that the leadership commitment represents the process of social influence in which the leader or a small group of leaders can enlist the aid and support of others in the accomplishment of a common task (Chemers, 2001). Or the leadership commitment is ultimately about creating a way for individuals to work together and to make something extraordinary happen (Kouzes and Posner, 2007). On the other hand, when the organization desires to be the best, its selected leaders will most likely possess the corresponding key traits and demonstrate a pattern of motives (Lin and Forrest, 2011; Kirkpatrick and Locke 1991; McClelland, 1975):

- Drive, which includes a burning desire, energy, tenacity, and initiative to achieve;
- Motivation, which includes the desire to lead without seeking power as an end in itself);
- Honesty and integrity, which help to rally supporters;
- Self-confidence, which is associated with emotional stability;
- Cognitive ability, which provides the necessary vision for the future; and
- Knowledge of the business.

In terms of the systemic yoyo model, the reason why leadership is important is because it stands for the organization's capability to adjust its underlying field structure so that all or most of the individual employees' fields would spin in similar fashions without much difficult readjustment. In particular, if the leadership can utilize its social influence to obtain aids and supports of other stakeholders of the company in accomplishing a common task (Chemers, 2001), it implies that there has appeared a big whirlpool (the ambition). This pool might initially be conceptual only and physically invisible. However it does cover a majority of the larger territory of the organizational pool, within which many smaller fields (individual employees and divisions) are located. Now, an effective leader is such a person who can realign all the individual eddy fields in such a way that the conceptual large field becomes a visible reality. In this systemic modelling, the initially invisible large field is the particular something that is expected to be extraordinary (Lin and Forrest, 2011).

What is important is that no matter what venture the organization is engaged in and no matter which strategy the organization employs need to be grounded in the clearly stated mission. Such consistent conceptual and practical orientation provides an aiming point for all employees to work towards and a comforting point for consumers of the firm.

EFFECTS OF FIRMS' STRATEGIES ON INNOVATION

A large body of literature on technological product and process innovations has looked at what economic forces would lead to innovation in manufacturing sector from either internal or external angles to the companies of concern (Becheikh, et al., 2006). In the following subsections, we holistically analyze the strategic forces identified in the literature from the height of systems science in order to sort out what are the main determinants underneath innovations in the manufacturing sector. The importance of such work is to find which strategic factors actually dominate the occurrence of innovation so that appropriate strategies of management can be reliably and effectively introduced to focus on issues of concern without being distracted from other ignorable variables and issues.

Overall Strategic Orientations: Defined or Not Defined

In this subsection, we analyze the firm's global strategies on innovation from three different angles: a clearly defined strategy, corporate diversification strategy, and market-territory strategy.

Souitaris (2002) empirically shows that a well-defined strategy distinguishes more innovative firms in specialized supplier industries, such as small mechanical and instrumental engineering, from the ones that do not have one. Although there was not any other author who empirically looked at the same issue, we can still derive the following definitive answer in terms of the association between a clearly defined strategic orientation and the innovativeness of the firm:

Proposition 2. In manufacturing firms, a clearly defined strategic orientation is positively correlated to the innovativeness of the firms.

The reason for why this result holds true is similar to that for why a clearly stated mission is important for a business organization to unify the diverse and often conflicting beliefs of individual employees into a set of commonly accepted assumptions and values for the organization. It is because in practice there generally are different approaches available for reaching certain pre-determined outcomes; some of the approaches simply lead to outcomes without much consequent benefits while some others might. So, in practice other than materializing the pre-determined outcomes, it is always good to adopt approaches that also have lasting value in terms of the introduction of future products and processes. So, a clearly defined strategic orientation in theory and practice needs to be well aligned with the company's mission so that other than producing the pre-determined outcomes, adopted approaches will also contribute to the realization of the organization's mission.

As for the corporate diversification strategy, it is about whether the company should concentrate its efforts and specialize its production of products or take the opposite approach of diversifying what it does. If the word 'diversification' is understood as simultaneously reaching into different markets with different lines of products, then the systemic yoyo model indicates that efforts for such diversification would tear the technological integrity, the labor force, and available resources of the company into pieces in order to produce adequate products for each corresponding market. In other words, the original technological strength, labor talent, and plenty supply of resources of the company are suddenly weakened in every direction. This end explains why all empirical results do not support the diversification strategy by showing a significant relationship negatively associated diversification strategies with innovation (Ahuja and Katila, 2001; Hitt, et al., 1997). Speaking in terms of the operations of production, specialization can foster innovation by increasing the number of competing units to search for solutions to specific problems (Robertson and Langlois, 1995); and diversification is often accompanied by formal and financial controls that can discourage technological activity (Ahuja, 2000; Galende and De la Fuente, 2003; Tallman and Li, 1996). And controls, especially financial controls, tend to produce short-term orientations and risk-averse actions, which therefore undermine the innovation process (Francois, et al., 2002). In the contrast, strategic controls focus on long-term performance through promoting increased managerial commitment to innovation (Hitt, et al., 1996).

On the other hand, if the word 'diversification' means the strengthening of the functionalities of the existing products' of the company so that these products would satisfy the needs and likings of consumers from diverse markets, than pushing for such diversification will quite definitely support innovativeness of the company. So, we have established the following result through systems reasoning:

Proposition 3. If a company's diversification strategy implies to reach as many different markets as possible by producing correspondingly adequate products for each potential market, then diversification and innovativeness of the company will be negatively associated. If the company's diversification strategy means to continuously improve the functionalities of its existing products to attract consumers from as many different markets as possible, then diversification and innovativeness of the company will be positively associated.

At this junction, it is importance to note that the second conclusion of this proposition does not contradict the fact of market failure of Eastman Kodak. As a matter of fact, Kodak did not mobilize its resources and capabilities to strengthen its existing products for the purpose of attracting consumers from as many different markets as possible; instead, it did so to continuously fortify its market territory (McGrath, 2013). In this regard, Theorems 1 and 2 explain

the downfall of Kodak, because changing consumer preferences and tastes over time increase the scale of the market segment of switchers, which in turn encourages new competition that erodes Kodak's base of royal consumers.

As for the market-territory strategy, it is concerned with the following two questions (Landry, et al., 2002; Romijn and Albaladejo, 2002):

- 1) Should the company under consideration confine its activities to the local market or go beyond the regional border and the national boundary? And
- 2) Should the company pursue its growth by developing alliances, such as subcontracting, mergers and acquisitions?

With regard to the first question, Galende and De la Fuente (2003), Landry et al (2002), and Romijn and Albaladejo (2002) empirically show that export and internationalization have positive and significant effect on innovation. As a matter of fact, based on the literature of international trade and firm performance we can establish the following theoretical results:

Proposition 4. Assume that all other conditions remain constant. If the market embraces waves of transient competitive advantages, as how the current world economy suggests, then the firms involved in import-export trades is expected to be most innovative, followed by firms that only import, then firms that only export, and finally domestic firms.

As a matter of fact, Vogel and Wagner (2010), López (2006), Gibson and Graciano (2011), Namini, et al. (2011), Wagner (2013), and Forrest et al (to appear a) either empirically confirm or theoretically show that if all other conditions remain constant, then the probability for firms involved in two-way trades to survive is expected to be the highest, followed by firms that only import, then firms that only export, and finally domestic firms. Now, the assumption that the market embraces waves of transient competitive advantages means that innovation in products or processes or both is the only important factor underneath the probability of firms' survival (McGrath, 2013). So, the result in Proposition 4 follows.

Intuitively, to remain competitive on the international market, companies have no other choice than to continuously innovate based on constantly enhanced learning from a much greater pools of competitors and consumers than those the domestic market can provide (Kasahara and Lapham, 2013; Singh 2010; Veugelers and Cassiman, 1999).

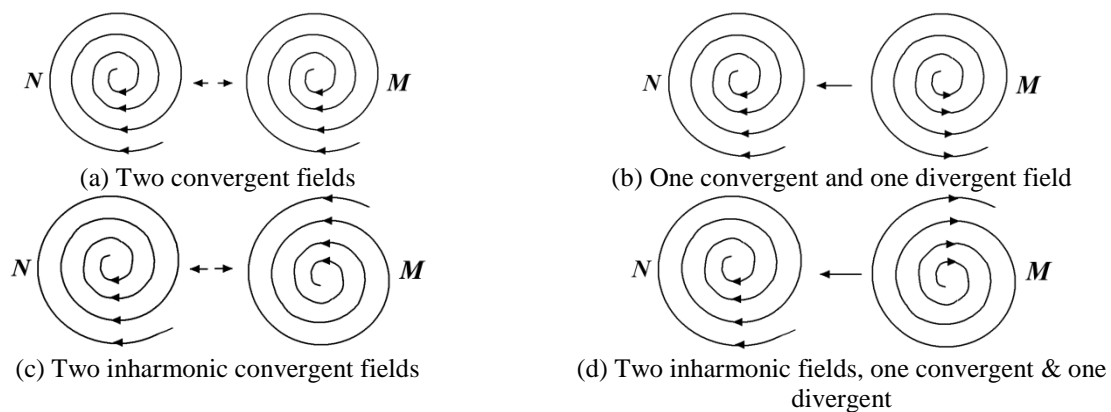


Figure 3. Possible interactions between two different firms

As for the second question listed above, regarding the company's growth by developing alliances with outside firms, a systemic yoyo intuition is presented in Figure 3, where four possible field interaction patterns are depicted with field *N* being the yoyo structure of the firm of our concern and *M* an external firm *N* considers to subcontract to or acquire or merge with. The reason why the firm of our concern is seen as a convergent field *N* is because the firm wants to grow its capability, which means that the firm needs to attract more resources and technology. Evidently out of these four possible scenarios, only Case (a) presents a relatively smooth working relationship. All other three case situations indicate either trouble or major disruption in business operations due to such reasons as the inconsistency in the inward/outward spins of the fields or the harmonicities of the fields. The reason why the working relationship in Case

(a) can only be relatively smooth is depicted in Figure 4, where the two convergent and harmonic fields are in the process of merging into one unified field. In particular, the area enclosed by the rectangle stands for the area of most conflicts. This systemic intuition vividly illustrates why the empirical results are split between a positive and a negative significant association between external growth and innovation. It is because a positive relationship appears when Case (a) in Figure 4 happens to be the situation involved, where new technologies of the external firm provide a boost to the innovativeness of the firm (Belderbos, 2001); and a negative relationship appears when the productivity drops as a consequence of an acquisition, for instance, that disrupts the acquiring firm's established routines and the complexity of post-acquisition management (Ahuja and Katila, 2001; Hitt et al., 1996).

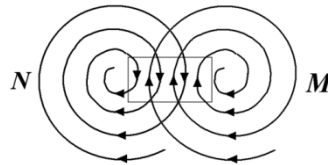


Figure 4. Relatively smooth combination of two convergent/harmonic fields

Growth Strategies

In this section, we analyze the following variables, as identified by the literature: 'differentiation strategy', 'cost reduction strategy', and 'protection mechanism'.

The effectiveness of 'differentiation strategy' on innovation is guaranteed by Theorem 1, because only by being different a manufacturing firm can possibly break the vicious price competition with other incumbent firms and new entrants of the market. And to strive to be different, the firm is motivated to innovate intensively and to accelerate its rate of innovation in order to be well ahead of competitors and achieve a greater competitive advantage. This theoretical result is consistently supported by empirical studies (Beneito, 2003; Debackere et al., 1996; Galende and De la Fuente, 2003; Zahra, 1993).

As for 'cost reduction strategy', Theorem 1 explicitly implies that if a company introduces this strategy into its business operation, then its adopted, more or less standardized technology and operational routines will not be maintained at their optimal conditions. That will adversely affect innovative activities so that the company will have to maintain its market presence through imitating innovations of the market leaders. This end is empirically supported by Zahra (1993) and Porter (1980). As a matter of fact, instead of adopting a cost reduction strategy, the systemic yoyo model suggests that the company should seek to develop more efficient processes of production and routines of business operation in order to increase the productivity while minimize costs. It is because only when the yoyo field of the company spins more viciously, the company attracts more profits and investments among all other kinds of inputs while exerting more influence in the marketplace.

The variable 'protection mechanism', be it through patents, technology complexity, industrial secrecy, keeping key personnel in the firm, maintaining a lead time over competitors or other mechanisms, can be seen as the protection of the integrity of the yoyo field of the company against invasions by the fields of other companies. So, its importance on product and process innovation can be seen clearly: Self-protection forces at least some competitors to enter the race by innovating more. That enhances these firms' appropriation of their innovation benefits (Veugelers and Cassiman, 1999) which in turn feeds back into the firms with necessary wills and resources to innovate more (Malerba et al., 1997).

Summarizing what has been discussed in this subsection, the 'differentiation strategy' is a dominating determinant on innovation, while 'protection mechanism' is merely a part of the effort to maintain the achieved differentiation as long as possible. Considering the recent development and communication technology, protecting what has been invented is becoming more difficult than ever before. So, an emphasis of the firm should be on continuously creating differences instead of spending too much on protection. As for 'cost reduction strategy', the firm should seek to increase the productivity while minimize costs by innovatively developing more efficient processes of production and routines of business operation.

Operational Strategies

In this subsection, we analyze the following variables: 'R&D assets and strategies', 'monitoring of competitors', 'marketing strategies', 'personnel qualification/experience', 'HR strategies', 'advanced equipment/technologies', 'degree of capacity utilization', 'financial autonomy', 'turnover/profit', 'budget/funds availability'.

The purpose for having an in-house research and development (R&D) is to help the company to accomplish one or more of the following:

- Create, exploit and transform new knowledge into new products and/or processes (Keizer et al., 2002);
- Absorb (i.e. acquire, assimilate, transform and exploit) new technologies (Debackere et al., 1996);
- Attract collaborative partners (Hall and Bagchi-Sen, 2002); and
- Create new-technology settings which are very costly and particularly difficult, even impossible, to acquire from competitors (Lee, 1995).

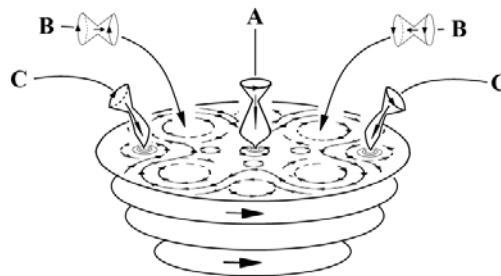


Figure 5. A systemic representation of in-house R&D

In terms of the yoyo model intuition, a systemic representation of the in-house R&D is well depicted in Figure 5. Here, the largest spinning base stands for the yoyo field structure of the company, while the small yoyo bodies A, B, and C are the fields of new knowledge, new technologies, newly located collaborative partners, and the broad attraction of all the small yoyos describes the setting of a new technology which is unique to the company.

This systemic model suggests that when a company grows to a certain scale of strength, meaning that the intensity of spin of the underlying yoyo field of the company reaches a high level, it will naturally possess the R & D capabilities described above. So, officially recognizing and organizing such a division within the company with sufficient financial and administrative supports are only technically determined by the mission and global strategies of the company. In other words, although in-house R & D has been widely accepted as a crucial determinant of innovation in the empirical literature (Hall and Bagchi-Sen, 2002; Parthasarthy and Hammond, 2002), it is merely a specific aspect of the materialization of the company's mission and the implementation of the global strategies. That is, as a determinant of innovation R&D is only secondary.

As a byproduct of this yoyo model of R&D in Figure 5 and as a consequence of Theorem 1, we can see that innovation is really originated from market demands, followed by appropriate ideas on how to meet the demands from various market cues, and then technologies are introduced to materialize the ideas. Here, these three stages are linked together in a circle, Figure 6, so that technologies are also employed to help uncover the market demands. In other words, the yoyo model in Figure 5 and Theorem 1 jointly generalize the 'technology push' theory of innovation, which maintains that new products and services stem from results of basic research and industrial R&D, followed linearly by firms that define, design, produce and market their innovations, and 'demand/market pull' theory, which states that the ideas for solutions also originate in the market (Freeman, 1994; Landry et al., 2002). Our new theory is confirmed positively by empirical studies of different authors, see, for example, (Darroch and McNaughton, 2002; Koschatzky, et al., 2001; Souitaris, 2002).

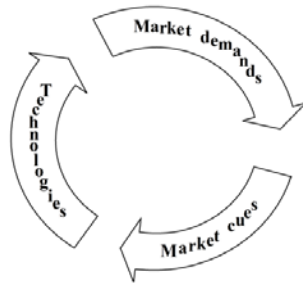


Figure 6. Circular relationship between market demands, cues and technologies

Similar theoretical analyses suggest that although such variables as ‘monitoring of competitors’, ‘marketing strategies’, ‘personnel qualification/experience’, ‘HR strategies’, ‘advanced equipment/technologies’, and ‘degree of capacity utilization’, are all beneficial to innovation, as confirmed by various empirical studies (Francois et al., 2002; Souitaris, 2002; Koeller, 1996; Baldwin and Johnson, 1996; Kam et al., 2003; Smolny, 2003; Freel, 2003; Romijn and Albaladejo, 2002), they are only secondary when compared to the mission and global strategies of the firm.

Regarding the variables ‘financial autonomy’, ‘turnover/profit’ and ‘budget/funds availability’, their importance on innovation can be seen from the coexistence of the local eddy pools in Figure 5. Because these local eddy pools do not spin in the same direction, it means that for innovation to take place in one or more of the local regions, each of the eddies needs to function independently without experiencing adverse effects from others that spin differently. That is, both financial autonomy and budget/funds availability are very important for the local eddies to function innovatively. On the other hand, profitability provides incentives to continuously invest in what have been done earlier, such as doing in-house R&D, innovating internally, etc. All these theoretical conclusions have been well supported empirically, see, for example, (Beneito, 2003; Souitaris, 2002).

Summarizing what is achieved in this subsection, we see that all the operational strategies analyzed exert positive influence of innovation; however, they are secondary when compared to the mission and global strategies of the firm.

MANAGERIAL RECOMMENDATIONS

Although each company has its particular characteristics and specificities beyond what are investigated in the previous sections, the theoretical analysis in this paper provides general guidelines for managers to stimulate and to foster their companies’ innovativeness and scholars to focus their efforts in their research of how strategies affect innovation in the manufacturing sector.

In particular, to encourage innovation, managers and the entire leadership need to develop a clearly stated mission for their company and commit to a long-term, unwavering ambition. These two items, the mission and ambition, represent the most principal guiding forces for the desired innovativeness to appear. They unify otherwise inconsistent or even conflicting beliefs of individual employees, and bring out and amplify the harmonic aspects of these individuals’ beliefs. Accompanying the development of the mission and ambition, the leadership needs to clearly demonstrate its commitment to the established mission and ambition and invest in cultivating an appropriate organizational culture that is conducive to change, supports innovative activities, and pushes for the realization of the unwavering ambition.

The next step in encouraging and promoting innovation starts with a clear and precise definition of the firm’s strategies on how to actualize the mission and how to materialize the ambition. To effectively implement a diversification strategy, managers need to focus on continuously improving the functionalities of its existing products in order to attract consumers from as many different markets as possible and continuously trying to be involved in import-export trades. If that is not practical, the firm needs to be involved in import trades; otherwise, it should try to be involved in at least export activities. When developing alliances with outside firms, managers need to focus on the learning and introduction of new technologies of the external world while avoiding any major disruptions to the established production routines.

The developed growth strategies need to emphasize on building a specialization on the firm’s distinctive strengths with a differentiation business strategy. Highly recommended include the establishment of a special task force to identify what the market competition reveals critically for the firm and what the firm could react accordingly in order

to maximize the emerging opportunities. Because any protection mechanism is merely a part of the effort to maintain the achieved differentiation as long as possible, managers need to mainly focus on developing constantly newer and better differentiations instead of spending too much on protection. For the strategies related to cost control and reduction, managers need to focus on minimizing costs by innovatively developing more efficient processes of production and routines of business operation.

At the operational level, managers should encourage all kinds of secondary strategic steps, such as R&D activities, recruit and maintain qualified and experienced personnel backed with advanced technologies. Continuous improvement and retraining programs need to be planned and run regularly for all employees. A strategy for effective marketing of products and an adequate monitoring system of competitors and the constantly evolving consumer desires need to be in place. Managers need to ensure the financial solvency of their firm by avoiding excessive debts.

Because these recommendations are derived through employing rigorous reasoning instead of methods of data analysis, data mining and anecdotes, they are expected to work reliably in practice. This is surely the major contribution of this work to the empirical literature, where only suggestions can be provided without assurance of any degree of success. In general, conjectures developed empirically suffer from weaknesses that prevent practitioners from making meaningful generalizations. For a more detailed discussion, see (Forrest, et al., to appear).

CONCLUSION

The innovativeness of a manufacturing firm is a very complex phenomenon, influenced by numerous variables, as well shown by the literature. To help better understand this phenomenon, this paper theoretically analyzes strategy-related factors and their effects on innovation. By applying the method of holistic thinking of systems science, this paper brings all the empirical investigations on the strategic determinants of innovation in the manufacturing sector to the height of sound scientific abstraction. The significance of this paper is that from a set of sixteen strategy variables, as being identified in the literature, this work shows which of them are primary and which ones are secondary. In other words, as long as the primary variables are in place, those secondary ones will naturally appear. Practically, this established fact helps streamline the analysis and understanding of the very complex phenomenon of innovation, making any strategic attempt to increasing the innovativeness of a manufacturing firm essentially possible.

More specifically, the literature of relevant empirical studies identifies sixteen strategy-based variables that might explain the innovativeness of a manufacturing firm. However, the established conclusions on the effect of these variables on innovation are not definite, simultaneously showing positive, negative, and/or insignificant confirmations (Becheikh, et al., 2006). That means that most of the empirically established conclusions cannot be practically applied in real life other than providing some very uncertain suggestions. Compared to the theoretical and practical uncertainties extant in the literature, this paper greatly simplifies the strategic complexity of innovation through identifying which strategy variables are primary and which ones are secondary. So, in practical applications managers can simply focus their efforts and attentions on developing and nurturing the primary strategy factors in their attempts to bring their companies' innovativeness to a different level.

To conclude this presentation, we must realize the following two main limits of this study: (1) all conclusions are derived based on our definition of innovation in the manufacturing sector; and (2) an implicit assumption that each firm in the manufacturing sector wants to fill a particular market niche by generating a positive cash flow, either from the profits of the marketplace, or investments, or both. In particular, the concept of innovation considered in this paper does not include incremental improvements, which stands for a major omission of those disruptive breakthroughs that are consequences of incremental progresses (Rostow, 1960; Kuhn, 1962). And the second limitation excludes firms that are established for purposes other than satisfying any market niche.

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IMPACTS OF MANUFACTURING FIRMS' CULTURE, STRUCTURE AND LEADERSHIP ON INNOVATION: A SYSTEMIC APPROACH

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ABSTRACT

This paper employs a method of holistic thinking to see which of the twenty plus internal factors empirically identified in the literature are primary forces underlying the innovativeness of a manufacturing firm and which ones are secondary or appear naturally after the primary forces are created. Based on how organizational culture is formed in general, the effects of firms' culture on innovation are analyzed. By using a general cost-benefit analysis, the effects of firms' general characteristics on innovation are studied. Though modelling a firm systemically, the effects of firms' structure on innovation are seen clearly. With the concept of leaders well explained, the effects of firms' leadership on innovation are shown. At the end, practically useful recommendations for managerial decision making are provided.

INTRODUCTION

Due to the practical importance and theoretical significance, this paper investigates the following question by using the holistic thinking of systems science: How do manufacturing firms' culture, structure and leadership affect the innovativeness of the firms? The importance of innovation in terms of wealth creation has been noted more than two hundred years ago since the time of Adam Smith (1776). The currently increasing intensity of competition of the world economy is also making innovation an unavoidable issue for each company to consider (Stock et al., 2002). That is why it is quite urgent for managers and scholars to answer the question just posted, because for any existing firm, its culture, structure and leadership represent some of the most essential aspects of the organization.

In the past decades, many scholars have empirically checked the effects of various culture, structure and leadership related factors on innovation (Veugelers and Cassiman, 1999; Francois, et al., 2002; Jung, et al., 2003; Koberg, et al., 1996; Darroch and McNaughton, 2002; Parthasarthy and Hammond, 2002; Souitaris, 2002; Papadakis and Bourantas, 1998; Keizer, et al., 2002). However, limited by the methods employed, all the established associations between these factors, as explanatory variables, and innovation, as the dependent variable, experience a large range of varying degrees. So, to overcome this problem in order to produce practically reliable conclusions, we will base our investigation on a different methodology of reasoning and analysis so that the effects of the factors identified in the literature, which are culture, structure and leadership related, on the innovativeness of manufacturing firms can be better understood.

Specifically, this paper will address the question posted earlier by applying the thinking logic and the yoyo model of systems science. After developing a general theory on how philosophical and value systems are formed for individuals and organizations, we discuss how organizational culture is formed, why mission and ambition are two powerful unifying forces of organizational culture, and then why, theoretically, organizational culture represents a significant determinant of the innovativeness of the firm, total quality management is one strategic implementation of the ambition of the organization, any resistance to change is against the firm's ambition and culture, and the perception of support for innovation is positively correlated to the innovativeness of the firm. To study the effects of leadership on innovation, we first construct a systemic model for the concept of leadership, from which we illustrate why leadership commitment is the essence for success in the promotion of innovation. Then we demonstrate why such leadership related variables as 'presence of a project leader', 'CEO's characteristics', 'CEO change', and 'CEO's qualification and experience', are all secondary when compared to having a long-term, unwavering ambition. To investigate factors related to manufacturing firms' general characteristics, we analytically show that such variables as 'firm size' and 'past performance' are indicators of innovativeness of the firm, although they are only secondary when compared to the mission and global strategies of the firm, while 'age of the firm' and 'ownership structure' are not. By modeling manufacturing firms' structures systemically, we show that such firms'-structure related factors as 'formal structure', 'flexible structure', 'centralization of decision making', 'empowerment of employees', and 'interaction between firm's units', are all secondary and practical implementations of the long-term, unwavering ambition.

Beyond the previously listed accomplishments, the most significant contribution this work makes is the introduction of the methodology of systems science into the investigation of innovation. Such an approach helps us derive practically usable managerial recommendations. In other words, all the results established in this paper hold true generally. That is what makes this work fundamentally different from the existing literature, where conjectures and suggestions (instead of recommendations) are developed based on data analysis, data mining, and anecdotes. Because of the logic reasoning and holistic thinking employed in this paper, our established results do not suffer from the methodological weaknesses of the past data- and/or anecdote-based works that prevent decision/policy makers from making generalizations. For more details on this end, see (Lin and OuYang, 2010).

The rest of the paper is organized as follows: The following section views the relevant literature and shows the main contribution of this work. Then presented are the necessary background information needed for the rest of the paper in three parts: a brief introduction to systems logic of thinking, the concept of innovation in the manufacturing sector, and market invitation for innovation. For the effects of firms' culture on innovation, after establishing the facts on how individuals' philosophical and value systems are developed, the concept of organizational culture is constructed, and an explanation on why mission and ambition represent two powerful unifying forces of the organizational culture is provided. With all these preparations in place, the effects of firms' culture on innovation are insightfully shown. In terms of the effects of firms' leadership on innovation, we study first the concept of leadership and second how leadership commitment is the essence for success. In the next three sections, we investigate the effects of firms' general characteristics on innovation, the effects of firms' structure on innovation, and provide the managerial recommendations derived from the theory established in this paper. And the last section concludes this presentation.

LITERATURE REVIEW

Because this paper investigates the effects of manufacturing firms' culture, structure and leadership on their innovativeness, this section reviews the literature in two different but related areas. One area is about the studies on what explanatory variables explicate the dependent variable innovation, and the other on issues related to competitive advantages, where each competitive advantage is innovation based.

For the literature on innovation, Adam Smith (1776), over two hundred years ago, acknowledge the importance of innovation in creating wealth. And the concept and topic of innovation in the manufacturing sector represents a traditional field of study that has been well investigated through the years by many scholars (Aas et al. 2015), due to its close connection with the prosperity of manufacturing firms (Adner and Levinthal 2001) and its being a critical factor for these firms' survival and growth (Damanpour 1991; Visnjic et al. 2016). In the world of business, innovation is characterized by introducing original products and processes (Becheikh et al. 2006) that enable manufacturing firms to competitively enter or create new markets (Smith and Tushman 2005).

Innovation has been treated by many as a factor of long-term performance (Kanter 2001). For example, Daft (1978), Damanpour (1987) and others investigate administrative innovations and organizational processes accompanying technical developments. Utterback and Abernathy (1975) study the innovation of products and processes. Ettl et al (1984) and Nord and Tucker (1987) consider issues related to incremental and radical innovations. Amara and Landry (2005) examine how information sources firms use to develop or improve their products or manufacturing processes affect the novelty of innovation. They find that manufacturing firms prefer to use a large variety of research sources to develop or improve their products or processes.

Becheikh et al. (2006) demonstrate that product and process innovation are closely associated to the manufacturing environment with product innovation receiving more attention.

Alegre and Chiva (2008) study how organizational learning capability affects product innovation performance. Lin et al. (2013) consider the increasing importance of green products and if and how green product innovation can affect firm performance. They find that this market demand is positively correlated to both green product innovation and firm performance, and surprisingly leads manufacturing firms to a better performance. De Massis et al (2015) show that family businesses are different from nonfamily firms in product innovation strategies and in the organization of innovation processes. They find that manufacturing family firms focus on incremental product innovations by using more external sources, while nonfamily firms more on breakthrough and radical innovation through a predominantly closed approach.

With the economic globalization and the advent of internet-based technologies, manufacturing firms experience increasing pressures to become more competitive and innovative than ever before (Caputo et al. 2016; Buffington 2016; Zollo et al. 2016), leading to the emergence of new manufacturing philosophies (Caputo et al. 2016; Holmstrom et al. 2016). These new philosophies have redefined the concept of manufacturing and innovation in the manufacturing field (Roos 2015; Wu et al. 2015). The most famous ones are Industry 4.0 and China's manufacturing 2025 (Lee et al. 2015; Li, 2017).

For the literature on competitive advantage, it is defined by Porter (1985) as a function of either providing comparable buyer value more efficiently than competitors (low cost), or performing activities at comparable cost but in unique ways that create more buyer value than competitors and, therefore, command a premium price (differentiation). In this regard, Saeidi, et al., (2015) consider sustainable competitive advantage, reputation, and customer satisfaction as three probable mediators in the relationship between corporate social responsibility and firm performance. In the context of Chinese-like emerging economies, Li and Liu (2014) define the concept of a firm's dynamic capability as the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely decisions, and to implement strategic decisions and changes efficiently to ensure the right direction. Moustaghfir (2012) explains how knowledge assets provide firms with a competitive advantage and shows how organizational capabilities have the potential to produce long-term superior performance.

Makadok (2010) predicts a negative interaction effect on profits of simultaneously restraining firms' rivalry and increasing competitive advantage. Carpenter, et al., (2014) uses the video-games industry to investigate the consequences of hyper-competition and implications of either maintaining competitive advantage or developing temporary advantages. Peng, et al. (2001) uses the massive Japanese investment in an effort to replicate *keiretsu* (interfirm) networks in Asia since the 1980s to study the sources of competitive advantages. Herrera (2015) built a framework that describes factors leading to successful corporate social innovation, which in turn creates opportunities for co-creation, thereby leading to shared value and enhancing competitive advantage if it is integrated into strategy and operations. Fronmueller (1996) studied the relationship between backward vertical integration and low cost and that between forward vertical integration with differentiation-based competitive advantage.

Peterson (2013) addresses the question of whether deploying compliance and ethics programs would assist U.S. organizations in implementing internal mechanisms necessary to achieve a competitive advantage from the angle of law. (Forrest and Nightingale, 2017) establish a practical procedure for a firm to transit smoothly into the era of fast strategic changes while its once sustainable competitive advantages have become transient. These authors advance the systemic reasons for why a list of time-honored steps would practically help firms successfully surf through waves of transient competitive advantages by combining previously published conclusions derived on anecdotes and data mining.

In comparison, this work contributes to the relevant literature in different ways. First, after developing a general systemic theory of organizational philosophical and value systems and culture, this paper shows the absolute necessity for a manufacturing firm to have clearly stated missions and a long-term, unwavering ambition. Second, by insightfully explaining the concept of leaders, this paper is able to show how the firm's leadership affects its innovation. Third, this paper holistically demonstrates how firm's organizational culture fundamentally affects its innovativeness. Fourth, in its attempt to investigate the effects of firms' general characteristics on innovation, this paper establishes an analytical model that can be more widely employed for other purposes. Fifth, though modelling a firm systemically, the effects of firms' structure on innovation are seen clearly. Sixth, practically very useful recommendations for managerial decision making are provided.

In particular, the most important contribution of this paper is of the following two details. First, instead of employing anecdotes and various methods of data analysis and data mining, as what has been mostly done in the past, this work employs systems science as the methodology and logic of reasoning. That explains why conclusions developed in this paper can be materialistically applied to guide relevant practices in real life. Second, this research convincingly demonstrates that the effects of firm's size on innovation, as respectively claimed by Schumpeter in 1934 and 1942, are not contradictory as many scholars had thought (Damanpour, 1992; Majumdar, 1995; Tsai, 2001; Stock et al., 2002).

PRELIMINARY INFORMATION

In this section, we look at several matters needed for the rest of this paper: the basics of systems science, the general concept of innovation in the manufacturing sector, market characteristics that invite and stimulate innovation in the manufacturing sector, and environmental forces that dominantly affect innovative activities of manufacturing firms.

Systems Logic of Thinking

System exists everywhere, especially in the investigations of issues of economics and business decision making. For example, each person is a complex biological system, made up of many smaller systems. At the same time, she is also a member of many social and economic systems, such as a family, neighborhoods, communities, etc. And each day she interacts with a range of various systems, such as a car, an ATM machine, retail stores, the company she works for, etc. These systems interact with each other constantly. Hence, other than using numbers and variables to investigate problems and issues of business and economics, which is what is mostly done in the literature, there is an urgent need for us to employ the concept of systems and relevant methods to study economic phenomena in order to obtain brand new understandings and conclusions.

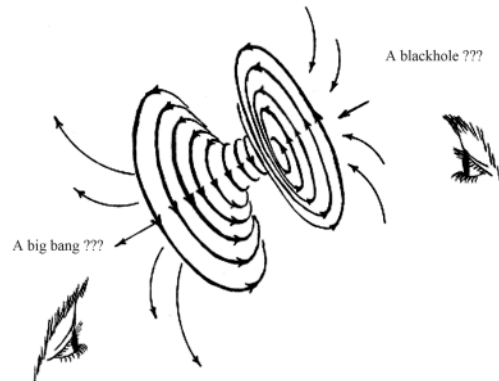
Historically, the concept of systems has been directly or indirectly introduced by scholars in different disciplines. For example, in the area of economics Rostow (1960) wrote that: The classical theory of production is formulated under essentially static assumptions ... to merge classical production theory with Keynesian income analysis ... introduced the dynamic variables: population, technology, entrepreneurship, etc. But ... do so in forms so rigid and general that their models cannot grip the essential phenomena of growth ... We require a dynamic theory ... which isolates not only the distribution of income between consumption, savings, and investment (and the balance of production between consumers and capital goods) but which focuses directly and in some detail on the composition of investment and on developments within particular sectors of the economy. In the area of biology von Bertalanffy (1924) pointed out that because the fundamental character of living things is their organization, the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life. And many others, such as Porter (1985), Klir (1985), Lin (2009), etc., also demonstrated how powerful holistic way of thinking and relevant methodology could be in terms of producing conclusions that are realistically reliable and practically usable regarding organizations, such as business entities, and how these organizations, such as economies or markets, etc., interact with each other. As a matter of fact, since the 1920s, such a holistic view of nature, organizations, and social events has permeated the spectrum of knowledge (Lin, 2009).

Numbers and systems are abstracted out of the physical world from two different and harmonizing angles. When an organization is seen as a collection of unrelated people and properties, numbers come into play, such as n employees, m copy machines, etc. When the organization is seen holistically, then the concept of systems emerges, where such elements as employees, capital, properties, etc., form an organic whole through various relationships, without which the organization does not exist. In other words, all studies in business related disciplines are essentially about systems, be they individuals, see as economic agents, firms, markets, industries, economies, etc. The major differences between numbers and systems include: 1) the former is a small scale local concept, while the latter a large-scale organizational concept (Lin, 1988; 1999); and 2) numbers exist only post existence, while systems emerge at the same time when physical or intellectual existence comes into being (Lin, 2009). That is the reason why systems methodology is a more appropriate tool than all theories developed on numbers and variables for the investigation of economic entities when their internal structures are concerned with and why the Wall Street still cannot successfully make advanced predictions for imminent economic disasters.

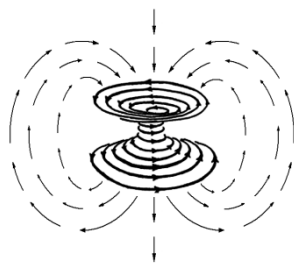
By systems science, it means the totality of all studies of various kinds of systems. In the past 90 some years, the methods of systems science has been widely employed in different disciplines (Klir 2001). Similar to how the Cartesian coordinate system – consisting of the crossing of two or more number lines – plays its role in the development of the traditional science (Kline, 1972), in systems science the role is played by the systemic yoyo model (Lin, 2007) in Figure 1.

Specifically, on the basis of the blown-up theory (Wu and Lin, 2002), a general theory of development, and the discussion on whether or not the world can be seen from the viewpoint of systems (Lin, 1988; Lin, et al., 1990), the concepts of black holes, big bangs, and converging and diverging eddy motions are coined together in the model shown in Figure 1 for each object and every system imaginable. That is, each system is a multi-dimensional entity

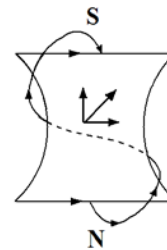
that spins about its axis. If we fathom such a spinning entity in our 3-dimensional space, we have such a structure as artistically shown in Figure 1(a). The black hole side pulls in things, such as materials, information, investment, profit, etc. After funneling through the “neck”, things are spit out in the form of a big bang. Some of the materials, spit out from the end of big bang, never return to the other side and some will (Figure 1(b)). Due to its general shape, such a structure is referred to as a yoyo.



(a) Eddy motion model of the general system



(b) The meridian field of the yoyo model



(c) The typical trajectory of how matters return

Figure 1. The basic structure of the systemic yoyo model

What this systemic model says is that each physical or intellectual entity in the universe, be it a tangible or intangible object, a living being, an organization, a market, an economy, etc., can all be seen as a kind of realization of a certain multi-dimensional spinning yoyo with an eddy field around. It stays in a spinning motion as depicted in Figure 1(a). If it does stop its spinning, it will no longer exist as an identifiable system. What Figure 1(c) shows is that due to the interaction between the eddy field, which spins perpendicularly to the axis of spin, of the model, and the meridian field, which rotates parallel to axis of spin, all the materials that are either new to the yoyo body or returning to the black-hole side travel along a spiral trajectory.

To conclude this subsection, let us see how the systemic yoyo model has been successfully applied to address the question of why firms should somehow make private cost information of their sales associates known to their respective members, and what incentive weights a firm should give to its individual sales associates in order to optimize its profits. The compensation problem of sales force represents an area of research with a great potential of direct applications in real life. And a good number of scholars have contributed to this important research (Forrest and McCarthy, 2017). Assume that the firm of concern consists of two sales associates A_1 and A_2 . Then the competition between these associates can be modelled by the yoyo field in Figure 2, where the overall spinning field stands for the operation of the firm, and when one of the associates, say A_i , grows larger, then the out of proportional growth of A_i will definitely affect the development of A_j . On top of this intuition, the following propositions are shown by Forrest and McCarthy (2017):

- (1) At Cournot equilibrium, the amount of associate A_i 's sales is an increasing function of λ_i and decreasing function of λ_j , where λ_k is the commission of A_k as a percentage of her completed sales, $k = 1, 2$.
- (2) When the associates A_i and A_j are Cournot competitors, making the private cost information of A_i known to associate A_j does expectedly increase the incomes of A_i ($= 1, 2, i \neq j$).

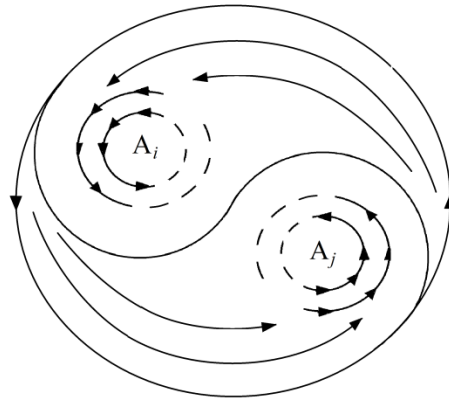


Figure 2. Competition between sales associates within a firm

In this example, the firm is seen systemically as an abstract spinning yoyo with local eddy leaves representing the sales associates respectively. The competitive interactions of the two associates make the yoyo field of the firm spin. For example, associate A_i tries marketing strategy X while A_j tries strategy Y. When the sales of A_i are ahead, A_j will adjust her marketing strategy by adopting some of the successful aspects of A_i 's strategy so that her sales looks better. Consequently, A_i will adjust her strategy by referencing what A_j seems to have done right. In other words, the constantly changing strategies of the sales associates evolve around each other and become better and more efficient. In this systemic yoyo field, the axis of spin is the ultimate revenue generated by the sales associates, the 'black hole' the firm's inputs, such as information, investments, knowledge, revenue, etc., and the "big bang" the firm's outputs, such as goods and services sold. And when the firm is seen from different angles, the meanings of "black hole" and "big bang" are different. But, together these different "black holes" and "big bangs" make the firm alive. Without the totality of the inputs – the "black holes", and the outputs – the "big bangs", the firm cannot be physically standing.

Relating to what we study in this paper, each human organization, be it a firm, a market, or an economy, as a whole is made up of its physical body, internal structure, and its interactions with the environment. According to the systemic yoyo model, this whole is a high dimensional spin field, where the internal structure and interactions with the environment affect each other and change the characteristics of the physical body. Because the body is the carrier of all other aspects of the organization, in theory the body is a pool of 'fluid' realized through human sensing organs in the three-dimensional space. The concept of "fluid" here is an abstract term totalling the flows of information, resources, profits, investments, etc., circulating within the inside of, going into, and giving off from the body. So, each economic entity, such as a firm, a market and an economy, represents spinning yoyo field that is located within an ever-evolving and constantly changing ocean of eddies, interacting with the yoyo fields of other economic and non-economic entities persistently. As a matter of fact, this end is also recognized by the contingency theory and supported by empirical evidence: Each organization is above all an adaptive system which evolves by reacting to its environment; and indeed, environment has a determining impact on firms' strategies, structuring and behaviors (Burns and Stalker, 1961; Chandler, 1962; Lawrence and Lorsch, 1967; Woodward, 1970).

The Concept of Innovation of a Manufacturing Firm

Because of the theoretical and practical importance of innovation in the manufacturing sector, the notion has been conceptualized by many authors (Becheikh, et al., 2006; Camison-Zornoza et al. 2004; Crossman and Apaydin, 2010; Hobday 2005; Lansisalmi et al. 2006; Peres et al. 2010; Pittaway et al. 2004; Schumpeter, 1934) and by the Organization for Economic Cooperation and Development (OECD, 1997). However, with the constant change of the business world, the meaning of innovation has been evolving with new particulars added over time.

Considering the unfolding Industry 4.0 and China's manufacturing 2025, new meanings are expected to be added to the concept. In order to make the value of this work long lasting, let us look at the concept of innovation in the manufacturing sector as generally as possible below:

Innovation in the manufacturing sector is such a set of activities – which could be just one particular activity or several – that leads to exceptionally added value to the company when compared to other activities that take place in the same sector.

Because of the abstraction and emphasis on the comparatively added value, this definition of innovation implies many facets of the concept. For example, any practical generation of exceptionally added value implies that

- 8) An extraordinary level and/or quality of creativity has to be involved;
- 9) The creativity has to be both internally conceived and externally adopted;
- 10) Relevant new processes have to be developed in order to develop and push the new or improved products or services onto the market to realize the said value;
- 11) Intended benefits are materialized;
- 12) Other than inventions this definition also emphasizes on the translation of inventions into marketable new or improved products or processes;
- 13) The definition leaves open the possibility of relative newness; and
- 14) Although not particularly mentioned, the definition includes potential roles of relevant processes and outcomes.

What is very important and different from the earlier definitions of innovation in the manufacturing sector introduced by various authors is that our definition excludes those activities or innovations that only keep the companies afloat when compared to others in the same industries. For example, in the rivalry between Montgomery Ward and Sears, the former surely identified and invested in resources and capabilities while monitored and took actions against what Sears was doing in order to fence off the competition of the latter. However, its efforts of innovation led Montgomery Ward to a wrong direction. That explains why Montgomery Ward has disappeared from the market place (Sobel, 1999), and why our condition of exceptionally added value is important in defining what innovation in the manufacturing sector truly is.

By knowing the significance of our definition of innovation in the manufacturing sector, a parallelism can be drawn between the study of disaster predictions and that of innovation in the manufacturing sector. The reason why a specific event becomes a disaster and causes major losses is because the occurrence of the event is unexpected and the consequent losses are beyond what is imagined (Lin and OuYang, 2010). Similarly, the reason why an innovation creates exceptional added value is because the particular innovation is not expected by the market to be significant (Christensen, et al., 2004).

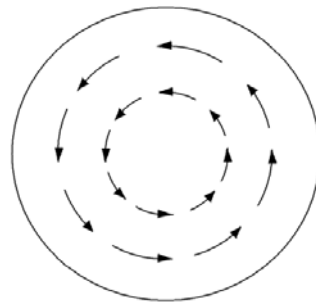


Figure 3. A birds-eye view of our marketplace

Market Invitation for Innovation

First and foremost important theoretical results are that before a new or improved product or service is introduced, the market actually invites and stimulates innovation and additional competition. Intuitively, let us model the marketplace is as an abstract yoyo field, and we look at the multi-dimensional yoyo body at a distance from above either the convergent side or the divergent side, while imagine that everything here takes place in our 3-dimensional space. So, we are looking at a pool of spinning media, Figure 3, that appear and exist in business activities, such as goods, information, money, credit, etc.

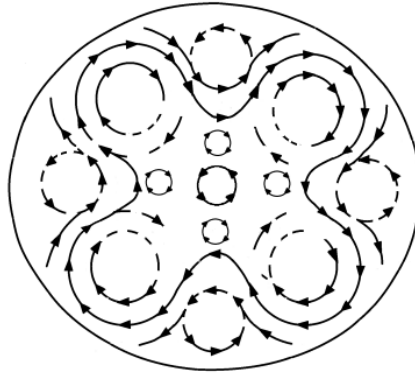


Figure 4. Asymmetric flow observed in Fultz's dishpan experiment

Associated with this end of intuition, the well-known dishpan experiment, which was initially conducted successfully by Raymond Hide (1953) of Cambridge University, England, and then by Dave Fultz and his colleagues of University of Chicago (1959) independently, shows that when the movement of the fluid within the rotational dish is under enough pressure created by either the sufficient speed of rotation or sufficient difference in the temperature between the center and the periphery of the dish, the pattern of uniform movement in Figure 2 will develop into the chaos, as shown in Figure 4. The number of local eddy leaves is determined either by the rotational speed or by the temperature difference or both and increases with the speed and the temperature difference.

This systemic modeling and laboratory experiment suggest that the fluid nowhere within this spinning dish could avoid being disturbed by the flows, either orderly or chaotically, within the dishpan. And being disturbed regionally means that a local flow pattern will appear inevitably.

Based on this intuition, the following results are shown (Forrest, et al., to appear):

Theorem 1. Assume that there are m incumbent firms, $m = 1, 2, \dots$, in the oligopoly market such that

- 5) They provide consumers with mutually substitutable products;
- 6) Each of them has developed its respective share of loyal consumers who purchase the products from their respective firms only as long as the price is not more than their reservation price, which is set to be 1;
- 7) They compete over the switchers in the market with adjustable prices charged to their consumers, where the switchers purchase their products depending on whose price is most competitive;
- 8) The firms' managements are well aware of the pricing strategies of the other firms and have established their best responses by playing the Nash equilibrium through pure self-analyses.

Then in the Nash equilibrium, if the magnitude β of the market segment of switchers is greater than 0, then at least one new firm would profitably enter the market; and the aggregate scale of the entering firms in terms of their operations in this market is proportional to the magnitude of β .

Theorem 2. Assume the same conditions as given in Theorem 1. If the market experiences an increasing number of profitable entrants, then consumer loyalty in the marketplace will diminish overtime.

Jointly these two theorems imply that if a market is either emerging or expanding, then all firms, be they startups or incumbents, have to constantly strive for newer and better products because they cannot depend on the so-called loyal consumers to maintain their business. On the other hand, if the market is quite stable and the incumbent firms do not continuously introduce new products or better versions of their products, then the consumers' evolving desire and taste will lead to a growing market segment of switchers, which in turn will invite new competition from outside the stable market. In other words, as long as the market is not located within a planned economy, then the evolution of market activities will naturally stimulate innovation in manufacturing firms.

Based on these two results and the thinking logic of systems science (for more details, see the following section), (Forrest, et al., to appear) identify 'demand growth', 'proximity', 'networking', and 'government and public sector

policies' from a set of near 20 environmental determinants on innovation of manufacturing firms, as studied in the literature by a good number of different authors, as dominating.

EFFECTS OF FIRMS' CULTURE ON INNOVATION

In this section, we first carefully study how individual and organizational philosophical and value systems are formed, what organizational culture embodies, and why organizational mission and ambition represent two powerful unifying forces that suppress inconsistencies that exist in individuals' philosophical assumptions and values. Based on such a general theory of organizational culture, we analyze the following variables: 'resistance to change', 'total quality management (TQM)/ continuous improvement', and 'culture of support for innovation'.

Formation of Individual Philosophical and Value Systems

First, let us look at how personal values are formed by addressing why different individuals have different underlying assumptions and values of philosophy and why it is extremely difficult for us to find two individuals with the same, identical value system. By underlying assumptions and values of philosophy, we mean the value system of a person that consists of his/her beliefs about how the world functions and his/her moral codes with which he/she is recognized with his/her particular identity and integrity and by which his/her behaviors are judged by his/herself.

The systemic yoyo model of systems implies that each human being lives in a vast ocean of spinning fields or yoyo bodies of various systems. That ocean consists of the yoyo fields of other individuals, physical objects, abstract thoughts, and myriad of other things and matters. As soon as a person is born, he/she starts to interact with the world or the yoyo fields of other systems. It is these interactions with different people, physical objects, abstract thoughts, and the myriad of other things and matter that they shape the person's philosophical assumptions and values, similar to how a civilization formulates its value system (Lin and Forrest, 2011). Because of the differences, be they subtle or not, between the interactions experienced by one person from those by another person, each person has his/her own set of very specific philosophical assumptions and values. These assumptions and values dictate the behaviors and decision making of the person for the rest of his/her life. Although the differences in personal experiences might be 'subtle' when seen from the angle of the magnificent scale of the entire ocean of spin fields, they are generally major to the individuals involved. That is why important differences exist between the relevant personal philosophical and value systems. This end explains why children who grow up in the same household may have quite different personalities, characteristics, and thinking processes.

In the following, let us look at some details along this line of reasoning.

When a system is seen as a living yoyo body, its holistic being systemically looks like the entity shown in Figure 1. No matter how the holistic being is seen from one of the angles listed in Figure 1, nonlinearity is involved due to the everywhere existence of curved or non-straight-line trajectories of movement. To this end, the important Bjerknes' circulation theorem (Wu and Lin 2002; Hess 1959) shows how nonlinearity mathematically stands (mostly) for singularities, and in terms of physics represents eddy motions. Such motions represent structural evolutions, a natural consequence of uneven evolutions of things, information, energy, etc. In particular, a circulation means a closed contour in a fluid or fluid-like flows of visible or invisible things. That can be generally understood either as fluids in the conventional sense or as information, knowledge, money, etc., because the movement of information, knowledge, money, etc., possesses the basic characteristics of fluid. This theorem reveals from another angle the commonly existing and practically significant eddy effects of fluid motions and that uneven eddy motions are the most common form of movements observed in the universe. Because uneven densities create twisting forces, fields of spinning currents (of water, information, knowledge, money, etc.) are naturally created. Such fields do not have uniformity in terms of types of currents. Clockwise and counter clockwise eddies always co-exist, leading to destructions of the initial smooth, if any, fields of currents.

Now, let us look at the questions posed at the beginning of this subsection: Why do different individuals have different underlying assumptions and values of philosophy? And, why is it extremely difficult for us to find two individuals with the same, identical value system?

At the beginning of a new life, due to the existing conditions of disability and limited available resources within the environment, the new born gradually over time forms his/her elementary beliefs, basic values, and fundamental

philosophical assumptions, on which he/she sends out signals, such as crying initially, to acquire what is needed, reasons and explains whatever inexplicable, develops approaches to overcome hardships, and establishes methods to manage personal affairs. With age, the person grows with increasing physical and mental capabilities. So, he/she is becoming able to handle more advanced tools, innovative thoughts, and intelligent methods to deal with personal and interpersonal affairs.

The natural desire for better conditions, more control and recognition (due to the increasing strength of suction and emission power of the yoyo field of the person) paves the way for the person to invent new tools to handle issues with the environment, discover new methods to reason, and introduce more efficient ways to deal with various affairs through interactions with the environment. That is, a circulation of information, knowledge, money, natural resources, etc., starts to form within and around the person.

Along with the rapidly growing awareness of the environment and the world within the person, practical skills also become parts of the circulation. As such circulation starts to appear, Bjerknes' circulation theorem guarantees the appearance of abstract eddy motions within the mind of the person, consisting of the appearance of new acquaintances, expansion of knowledge, improvement of old skills, acquirement of new skills, and accumulation of wealth. That is, with age the person gradually forms his/her underlying assumptions and values of philosophy on how the world functions, what kinds of behaviors are acceptable, how he/she should interact with others and the environment in order to achieve better results.

As the personal yoyo field gradually matures over time, it makes the person more able to fight off different beliefs and value systems that potentially pose the danger of destroying the yoyo structure of his/her own beliefs and values. At the same time, the person enriches his/her philosophical assumptions and values and redefines his/her identities throughout life by slowly and consciously modifying some of the established assumptions and values and by introducing new ones. Here, the person's basic philosophical assumptions and values are a reflection of the fundamental structure and evolution of his yoyo field. Although they change and evolve with time and environment, its basic characteristics will stay the same throughout the lifespan of the yoyo structure of the person.

Proposition 1. Different individuals have different underlying philosophical assumptions and values (or the value systems).

In fact, the reason why this result holds true is because firstly no two individuals grow up within a perfectly identical environment, and secondly with age individuals' philosophical assumptions and values evolve according to their respectively changing environments. For related discussions regarding the four human endowments – self-awareness, imagination, conscience, free will – and related concepts, see (Lin and Forrest, 2011).

Although the literature of economics considers the concept of leisure (Becker, 1991), the concept of personal values and that of value systems are much more general than that of leisure. As a matter of fact, as how it is used in the literature of economics, leisure is only a minor reflection of the underlying personal value system. For example, two individuals with different value systems could all be working hard in their works. However, differences in their personal value systems can naturally lead to drastically different consequences. That is one of the many differences between craftsmen and innovators, where, for example, the former strive to make what they produce finer and better quality while the latter endeavor to make what they create possess additional functionalities.

Formation of Organizational Culture

With the knowledge of how personal value systems develop and mature over time, we can see how organizational value systems are formulated. In particular, for each functional organization in the business world, its value system is generally reflected in its mission statements, which are collectively articulated by various leaders, both official and informal. In other words, the organizational value system is a collection of all the commonly accepted aspects of the individual value systems of the majority of the employees of the company. Its development and evolution also follow that path described above for individuals.

As for the culture of the organization, it involves values and ideals, norms, institutions, modes of thinking, and the higher intellectual, artistic, moral qualities to which successive generations in the organization have attached primary importance (Bozeman 1975; Lin and Forrest, 2011). Therefore, once again, the so-called organizational culture is just

another embodiment of the organizational value system, as it is reflected in the daily operations of the organization's business.

Associating the concept of organizational culture and firms' performance, McGrath (2013) finds that the ten best performing firms in the world invest heavily within their respective organizations in creating a common identity, culture, and alignment in order to create the right cultural foundation that allows for changes to happen. That discovery is well confirmed by Bob Best, CEO of Atmos energy, "Culture is the foundation for all success. This has been a very important process to the long-term health and success of our company," (Senn-Delaney Leadership Consulting Group).

Mission and Ambition – Two Powerful Unifying Forces of Organizational Culture

Generally, there are always competitive disagreements among employees on how the organization should be directed and managed, how the detailed operations should be carried out, and how employees' efforts and devotions should be channeled. And each and every stakeholder of the organization tends to have ideas about how things could improve.

As implied by our earlier discussions, one reason why such competitive scenarios exist is because each person looks at the world through his/her distinct value system. The distinctions between one person's philosophical assumptions and values from another make the same physical world look extremely different. Because no two individuals grow up within a perfectly identical environment and because with age individuals' philosophical assumptions and value systems evolve according to their respectively changing environments, it explains why different individuals have different underlying philosophical assumptions and value systems. For a more in-depth discussion, see (Forrest and Orvis, 2016).

Proposition 2. Philosophy and value-system based competitions always exist within any organizational system that has at least two employees.

This result is a natural consequence of how individuals' philosophical assumptions and value systems are formed initially and revised periodically over time. So, the fact that no two individuals can practically have an identical set of philosophical assumptions and values – Proposition 1 – implies that inconsistencies in opinions regarding the organization always exist. Consequently, any two chosen employees look at many aspects of the organizational system differently. That difference between their philosophical assumptions and values leads to competitive consequences of the two employees, although in most circumstances one of them stays quiet without bringing his/her disagreement to the extreme of a fierce power struggle.

The results in Propositions 1 and 2 imply the necessity for any functional business organization to clearly state its missions; otherwise its daily operations will be torn apart by the inconsistent individuals' philosophical assumptions and value systems. In particular, for the minimal business desire of survival, each long-lasting business organization needs to have a clearly stated and strictly practiced mission. Additionally, if a company desires to be a business leader that successfully rides waves of transient competitive advantages, which generally has to be innovation based, then it has to develop such a mission that clearly establishes a long-term, unwavering public commitment to the ambition of becoming world class, the best of the world. And in practice, such ambition needs to be embraced, endorsed, and sought after by the leadership of the firm through setting the bar high while having a clear sense of strategic direction in every endeavor, and through promoting common key themes.

In terms of the systemic yoyo model, this discussion means that the established long-term, unwavering ambition specifies the direction of the axis of spin for the underlying yoyo structure of the firm (Figure 5). When this direction is determined, supported and promoted by the leadership and throughout the organization, all layers of the eddy pool (or the culture of the organization) that spins around the axis can now focus their efforts on how to interact with the environment. In other words, when the necessary culture is carefully developed and nurtured, employees at different positions can focus on what is important for the organization instead of worrying about potential change in the business direction of the organization. As a matter of fact, the importance of creating and maintaining a common identity and culture for a firm to be health and prosperous is theoretically supported by Proposition 2.

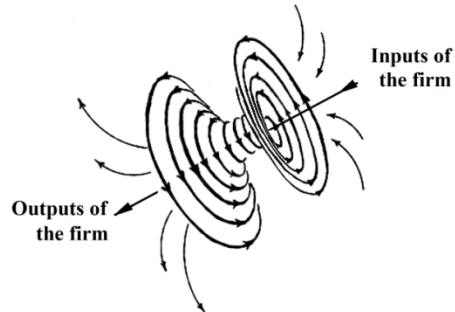


Figure 5. A systemic structure with the axial direction fixed

In summary, what is discussed here leads naturally to the following general conclusions, as empirically confirmed by Baldwin and Johnson (1996), Francois et al (2002), Motwani et al (1999), Veugelers and Cassiman (1999), and Jung et al (2003), respectively:

- (1) Organizational culture represents a significant determinant of the innovativeness of the firm;
- (2) Total quality management, as a mechanism of quality control and realization of the continuous improvement culture within the firm, is one strategic implementation of the long-term, unwavering business ambition of the organization;
- (3) Any resistance to change is against the firm's ambition and culture, and the spirit of innovation; and
- (4) The perception of support for innovation is positively correlated to the innovativeness of the firm.

EFFECTS OF FIRMS' LEADERSHIP ON INNOVATION

This section first looks at the definition of leadership, and second why leadership commitment is the essential key for the innovativeness of the firm and third the effects of the following variables on the innovativeness of the firm: 'presence of a project leader', 'CEO's characteristics', 'CEO change', and 'CEO's qualification and experience'.

The Leadership – Defined and Systemically Modelled

In the organizational context leadership represents one of the most salient aspects and a difficult concept to define. Chemers (2001) defines it as the process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task; Kouzes and Posner (2007) describe it as ultimately creating a way for people to work together and to make something extraordinary happen.

In the research of leadership, many different theories have been developed by various authors. For example, the trait theory attempts to identify talents, skills, and physical characteristics of men that are associated with effective leadership (Carlyle, 1841; House, 1996). Facing criticism, recent studies of this theory identify leadership skills, not simply a set of traits, but as a pattern of motives suggesting that successful leaders tend to have a high need for power, a low need for affiliation, and a high level of self-control (McClelland, 1975).

Spencer (1841) argues that it is the times that produce leaders and not the other way around. This theory maintains that different situations call for different leadership characteristics. According to this group of theories, no single optimal psychographic profile of a leader exists, and what an individual does, while acting as a leader, is in large part dependent upon characteristics of the situation in which he functions (Hemphill, 1949). Van Wormer et al (2007) find three leadership styles: the authoritarian leadership style, the democratic leadership style, and the laissez faire leadership style, each of which has advantages and disadvantages and works only under specified circumstances.

According to the functional theory (Wageman, et al., 2008), the leader is responsible for making sure that his group's needs is taken care of. So, he/she is detrimental for the group's effectiveness and cohesion. According to this theory, when the leader promotes his/her unit's effectiveness, there are five broad functions he/she provides: environmental monitoring, organizing subordinate activities, teaching and coaching subordinates, motivating others, and intervening actively in his group's work.

By a formal organization (Cecil, 1970, p. 884 – 89) it means such a human hierarchy established for achieving defined objectives. The hierarchy is made up of divisions, departments, sections, positions, jobs, and tasks so that all members would behave impersonally towards clients and other members. Employees are ranked based on either merit or seniority so that the higher a member’s position in the hierarchy, the greater his/her presumed expertise and social status. Within such bureaucratic structure heads are appointed and endowed with authority for administrative purposes. Beyond these appointed heads, an informal leader generally emerges within the underlying informal organizational structure that is made up of the personal objectives and goals of individual employees. All the unspoken needs, such as personal security, maintenance, protection, and survival, of the employees are met within the informal organization and its leaders (Knowles and Saxberg, 1971, p. 884 - 89).

Each informal leader without any formal authority provides supports for a group of employees, and is recognized by his/her caring for others, clear communication, and a commitment (Hoyle, 1995). At the same time, although appointed managers have the authority to command and enforce obedience, they still need to possess adequate personal attributes to match their authority. When sufficient personal competence is absent, a manager will have to confront emergent unofficial leader, who challenges the manager and reduces his/her role to that of a figurehead. So, leadership can be defined as one’s ability to get others to willingly follow. Every organization needs leaders at every level to achieve functionality and efficiency.

Systemically, the concept of leadership, be it official or informal, can be modelled and analyzed as follows. Based on the definitions of Chemers (2001) and Kouzes and Posner (2007), leadership is one’s capability to adjust his/her underlying yoyo field structure in such a way that many other neighboring yoyo fields would spin in similar fashions without much difficult readjustment. Specifically, if one person can utilize social influence to obtain aids and supports of others in accomplishing a common task (Chemers, 2001), it implies that there has appeared a big whirlpool spinning around a defined axis – the common task. Although this pool might initially be conceptual and physically weak, it covers a large territory, within which many smaller yoyo fields - individual people, relevant resources – are located. Now, the so-called leader, formal or not, is the person who is able to realign sufficient number of individual eddy fields in such a way that the conceptual large yoyo field becomes a visible and functional reality, Figure 6, where the central pool is able to align the neighboring fields so that jointly a much greater pool of eddy fields is formed.

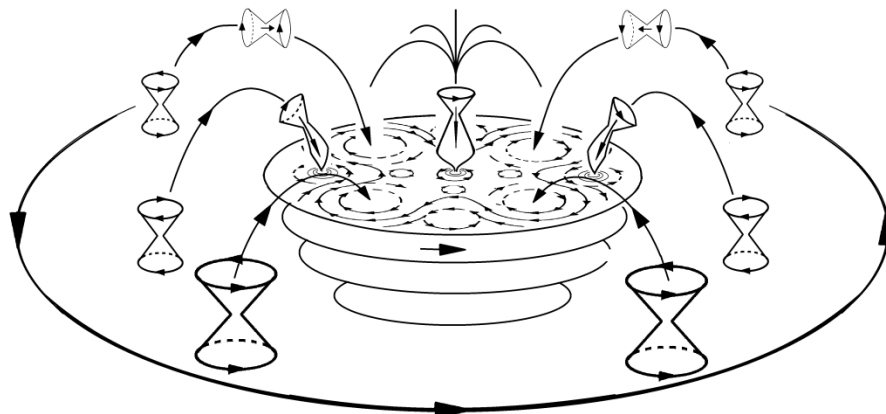


Figure 6. The yoyo field of a leader

This systemic model of leadership unifies all the relevant studies into one organic whole. In particular, to be a leader, the person indeed needs to possess some key elements, such as talents, skills, and physical characteristics, as claimed in the trait theory (House, 1996), and drive, leadership motivation, honesty, integrity, self-confidence, cognitive ability, and knowledge of the business, as argued by Kirkpatrick and Locke (1991). It is the patterns of field movement that are the fundamental reason why a person would become a leader: his overreaching field influence on others makes him seen as having a high need for power, a low need for affiliation, and a strong self-control. This systemic modelling also explain why, as argued by (Spencer, 1841), it is the times that produce the leaders and not the other way around and that different situations call for different leadership characteristics. For all relevant details, see (Lin and Forrest, 2011).

Leadership Commitment - the Essence for Success

Through clearly stating and strictly following the mission, the leadership is able to bring out and amplify the harmonic aspects of individual employees' philosophical assumptions and value systems. Beyond that, the leadership commitment is the essential key. In fact, leadership represents the center of the organizational system, a slight change or vibration of which creates shock waves throughout the entire system. That is, a firm with a true leadership presenting is a centralized system (Hall and Fagen, 1956). In other words, when the leadership embraces, endorses, and actively seeks after the goal of materializing the mission, then a focused effort throughout the organization will appear.

As discussed in the previous subsection, leadership commitment represents a process of social influence where the leader(s) can solicit the support of others to accomplish a common task. And, when the organization wants to materialize its ambition, its selected leaders will most likely possess the corresponding key traits and demonstrate a pattern of motives, as discussed earlier, such as a burning desire, energy, tenacity, and initiative to achieve, an ability to rally supporters, strong self-confidence backed by emotional stability, a necessary vision for the future, and sufficient knowledge of the business.

Systemically, leadership commitment is important because it stands for the organization's capability to adjust its underlying field structure so that all or most of the individual employees' fields would spin in necessary fashions, Figure 6. The coordinated movements of the individual yoyo fields naturally give rise to the appearance of a much greater field that spins around the common task – the big ambition (Lin and Forrest, 2011).

In short, no matter what venture the firm is engaged in and no matter which particular strategy the firm adopts, everything needs to be clearly linked to the mission and the effort of materializing the ambition with visible leadership commitment. Through conducting business with such persistent consistency, the firm clearly establishes an aiming point for all employees to work towards and a comforting point for customers of the firm to look up to.

Leadership and the Innovativeness of the Firm

As discussed earlier, the mission and ambition of the firm have to be embraced, endorsed, and sought after by the leadership. One definite indication of such leadership commitment is the presence of a 'project leader' in the company, as empirically confirmed by Chandy and Tellis (1998) and Souitaris (2002). This person enthusiastically supports and is committed to innovation projects. At the same time, when the firm is committed to its long-term, unwavering ambition, its selected leadership will most likely possess the corresponding key characteristics and abilities to achieve and to motivate with an adequate vision for the future and knowledge of the business, as indicated by levels of education, qualifications and cumulative experience. That explains theoretically why the Chief Executive Officers' (CEO) characteristics have a significant positive influence on the innovativeness of the firm (Jung et al., 2003; Papadakis and Bourantas, 1998). In other words, when the CEO is entrepreneurial, a transformational leader, and has a strong desire to achieve, he/she will most likely set high goals, seek to do his/her work better, and be willing to embark upon innovation projects because only such projects can provide the company opportunities to achieve the established challenging goals.

As for the importance of the CEO's tenure on the firm's innovativeness, CEO's stability reflects how committed the firm is to its established mission and ambition. It is because only an endogenous stability, including those of mission, long-term ambition, and personnel, can help the firm to withstand chaotic impacts of the external world. In other words, only when the firm is sufficiently stable endogenously, it will not internalize chaos from its environment and alter its predetermined path of development (Forrest and Nightingale, 2017). That is, CEO's tenure in the firm is positively correlated with innovation.

In summary, all such variables that are related to the stability and presence of the leadership as 'presence of a project leader', 'CEO's characteristics', 'CEO change', and 'CEO's qualification and experience' are secondary when compared to having a long-term, unwavering ambition.

EFFECTS OF FIRMS' GENERAL CHARACTERISTICS ON INNOVATION

In this subsection, we analyze such variables that describe the general characteristics of a firm as 'size of the firm', 'age of the firm', 'ownership structure', and 'past performance'.

To understand the size of the firm, let us see how the number of employees of the firm is generally determined based on (Lin, 2009). Assume that a manufacturer sells a specific product for $\$p_s$ per unit. The total cost for the product from production to eventual sale is $\$p_p$ per unit. If the number of units produced and sold at the price $\$p_s$ is $n = n(p_s)$, then the profit of this manufacturer from this product is

$$P = \text{profit} = n(p_s)(p_s - p_p). \quad (1)$$

Maximizing this profit subject to the budget constraint, $n(p_s)p_p = I$, where $I > 0$ is the total available funds for the manufacturer to invest in this line of product, leads to the following solution

$$n(p_s) = \frac{n(p_{s0})p_{s0}}{p_s}, \quad (2)$$

where $n(p_{s0})$ is the initial market demand when the product is sold at $\$p_{s0}$ per unit. So, the profit of the manufacturer is

$$P = \frac{n(p_{s0})p_{s0}}{p_s}(p_s - p_p) = n(p_{s0})p_{s0} \left(1 - \frac{p_p}{p_s}\right). \quad (3)$$

Similar to what is seen above, each employee the manufacturer hires generates as much profit as $(p_s^W - p_p^W)$, where the average revenue the employee is expected to make is $\$p_s^W$ while her total expected cost of employment is $\$p_p^W$. So, the total profit of the manufacturer is

$$P_{total} = P^p + P^W = n_p(p_s^p)(p_s^p - p_p^p) + n_W(p_s^W)(p_s^W - p_p^W), \quad (4)$$

where P^p stands for the profit from the product directly, P^W the profit from employees, $n_p(p_s^p)$ the number of units of the product produced and sold at the unit price p_s^p with p_p^p being the unit cost, and $n_W(p_s^W)$ the number of employees hired at the expected average revenue $\$p_s^W$ per employee.

This profit is subject to the following budget constraint, where $I > 0$ is a constant representing the total amount of funds available to the company,

$$n_p(p_s^p)p_p^p + n_W(p_s^W)p_p^W = I. \quad (5)$$

Solving the maximization problem of equation (4) subject to equation (5) leads to the following:

$$n_p(p_s^p) = \frac{n_p(p_{s0}^p)p_{s0}^p}{p_s^p}, \quad (6)$$

$$n_W(p_s^W) = \frac{n_W(p_{s0}^W)p_{s0}^W}{p_s^W}, \quad (7)$$

and

$$P_{total} = n_p(p_{s0}^p)p_{s0}^p \left(1 - \frac{p_p^p}{p_s^p}\right) + n_W(p_{s0}^W)p_{s0}^W \left(1 - \frac{p_p^W}{p_s^W}\right), \quad (8)$$

where all the symbols with a subscript 0 stand for the corresponding initial values.

This analytical analysis of the relationship between the manufacturer's total profit and number of employees hired implies the following:

1. Entrepreneurs and start-ups represent the foremost source of new ideas and technologies, as claimed by Schumpeter (1934), because equation (8) says the importance of being the initiator of a new product. That also explains why first movers tend to have their particular advantages (Lieberman and Montgomery, 1988).
2. The second term in equation (8) indicates that additional profits will be generated by increasing the number of employees if the ratio p_p^W/p_s^W stays constant or decreases. Considering the market competition described in Theorem 1, the market cost p_p^W per employee goes higher over time. So, to keep the ratio p_p^W/p_s^W constant or decrease, the expected average revenue p_s^W per employee has to at least keep up with the increase in p_p^W , which can be practically influenced by many factors (Bertschek and Entorf, 1996; MacPherson, 1994). This fact implies that in general innovation activity increases more than proportionally with firm size, as maintained by Schumpeter (1942). In other words, the effects of size on innovation as claimed by Schumpeter in 1934 and 1942 respectively are not contradictory as many scholars had thought (Damanpour, 1992; Majumdar, 1995; Tsai, 2001; Stock et al., 2002).
3. Market competition is an essential force behind the size of the company and directly stimulates innovation activity of manufacturing firms. It is because the modeling of the previous discussion suggests that generating extra profits is behind the need of hiring additional employees.

As for the effects of firm's age, ownership structure, and past performance on innovation, the systemic yoyo model suggests that these variables are only indicative of some aspects of the company. The company's current state of innovation is really determined by the present vigor of spin of the underlying yoyo field. That explains why the results of relevant empirical studies are mixed, leaning neither positive nor negative. For example, Sørensen and Stuart (2000) demonstrate that through age a firm accumulates the experience and knowledge on innovation. That is, there is a positive relationship between a firm's age and its innovativeness. And in the contrary, Freel (2003) shows how age represents a barrier to innovation because established procedures and routines resist the integration of external advances. From the systemic yoyo modeling such contradictory findings in fact reflect natural existences in nature, because each firm is a form of life so that age should not have such bearing on the innovativeness of the firm.

Similarly, studies on the effect of ownership structure on innovation are also mixed. For example, while Love and Ashcroft (1999) and Michie and Sheehan (2003) confirm the positive correlation between foreign ownership and the innovativeness of the firm, Love and Roper (1999; 2001) and Martinez-Ros (1999) find that this relationship is rather negative.

As for the relationship between the past performance and the innovativeness of the firm, our systemic logic suggests that these two variables should be positively correlated if the past can be extrapolated linearly into the future, assuming that the good past performance was more or less innovation dependent. The past dependence on innovation generally reinforces the belief that the firm's established competitive position, market share, and great profits are results of its innovativeness (Tsai, 2001; Zahra, 1993).

In short, 'firm size' and good 'past performance' are indicators of innovativeness of the firm, while 'age of the firm' and 'ownership structure' are not. However, both 'firm size' and good 'past performance' are only secondary when compared to the mission and global strategies of the firm, because these two variables are merely reflections of how well the firm discovers market cues and how carefully the firm takes the consequent actions.

EFFECTS OF FIRMS' STRUCTURE ON INNOVATION

Continuing the discussion in the previous section, such variables, which are related to the firm's structure, as 'formal structure', 'flexible structure', 'centralization of decision making', 'empowerment of employees', and 'interaction between firm's units', are all secondary and practical implementations of the long-term, unwavering ambition.

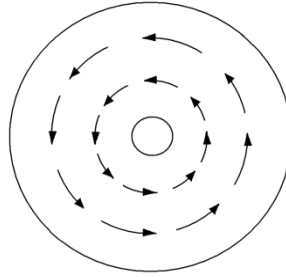
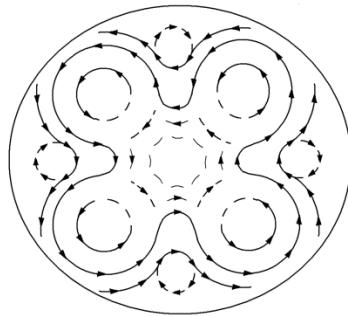
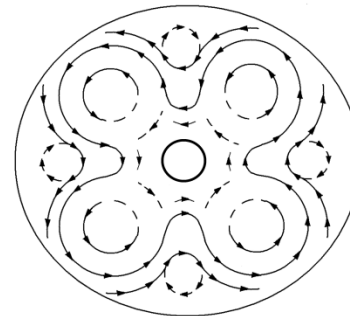


Figure 7. The uniform eddy field of a young firm

In particular, the effects of ‘formal structure’ and ‘centralization of decision making’ on innovativeness of the firm should not be definitively positive or negative depending on the magnitude of the firm. If the firm is young and relatively small without any bureaucratic hierarchy, then its systemic yoyo structure can be adequately modelled by the eddy field in Figure 7, where information, energy, knowledge, and all other components of the organization, are ‘spinning’ in a uniform motion. In this case, both formalism and centralization jointly allow the young firm to concentrate its efforts and limited resources on what is important for the survival and growth of the firm by clarifying roles of individuals and by reducing ambiguity, which helps to improve effectiveness, morale, and innovativeness. For related discussions, see (Walsh and Dewar, 1987; Koberg, et al., 1996).



(a) The eddy field with decentralization



(b) The eddy field with centralization

Figure 8. The yoyo field of a well-established organization

If the firm is a well-established organization, then its systemic yoyo structure can be adequately modelled by the eddy field in Figures 8(a) or 8(b), where each eddy leaf stands for a division within the firm. When decision making is decentralized, as shown in Figure 8(a) where the decentralization is depicted by the absence of a central circle, then each division is able to function as a relatively independent small, young firm so that it can easily concentrate its efforts and limited resources on what is important for the survival and growth of the division. So, the inevitably emerging competition and coordination between the divisions will actually help stimulate and promote the innovativeness of the overall firm to a high level. On the other hand, if decision making is centralized, as shown in Figure 8(b) where the centralization is depicted by the central circle, then other than responding to the changing environment, the outer edge of the dishpan in Figure 8(b), each division, an eddy leaf in Figure 8(b), has to follow the mandates of the central decision-making body. In other words, the wide spectrum of activities the firm is involved in more or less compete for the limited resources, the attention of the leadership, and the support of the administration so that the efforts and commitments of each division cannot be totally focused on what it thinks is important. Additionally, the relatively long chain of command makes the firm react only slowly to market changes. That is how formalism and centralized decision making weakens the innovativeness of the firm.

The same systemic modelling and analysis explain why such variables as ‘flexible structure’, ‘empowerment of employees’, and ‘interaction between firm’s units’ are of significant positive effect on innovation. In particular, if a young firm without any bureaucratic hierarchy can be innovative through formalizing its rules and procedures and through centralizing decision-making, a well-established company has to ensure, if it wants to stay in the same play field with all young firms, that its structure is flexible, that decision making is decentralized, and that interdivisional functional communication and coordination are stimulated.

MANAGERIAL RECOMMENDATIONS

The developed theory in the previous sections naturally provides the following general managerial recommendations for a manufacturing firm to increase its innovativeness and create its success with innovation.

The manager and the entire leadership, including official and informal leaders, need to develop a clearly stated mission for their company and commit to a long-term, unwavering ambition. The mission and ambition represent the most principal guiding forces for the desired innovativeness to appear. They powerfully unify the otherwise inconsistent or even conflicting philosophical and value systems of individual employees. They bring out and amplify the harmonic aspects of these individuals' philosophical assumptions and values. Beyond developing the mission and ambition, the leadership needs to demonstrate its steadfast commitment to materializing the established mission and ambition and invest in cultivating an appropriate organizational culture that is conducive to change and supports innovative activities.

As the ones who push for the realization of the mission and the accomplishment of the long-term ambition, managers of all levels need to be of particular characteristics, such as emotional stability, cognitive abilities to vision the future, knowledge of the business, and burning desires, energies, tenacities, and initiatives to achieve, to lead, and to rally supports. Such quality managers need to be maintained for as long as their goodness and fitness last.

Beyond developing particular strategies to carry out the operational routines (to be addressed in another paper), the next step in encouraging innovation needs to make the administrative structure of the firm flexible; the decision-making process needs to be either centralized or decentralized in such a way that it can efficiently facilitate concentration of efforts and limited resources on what is important for the survival and growth of each division by clarifying roles of individuals and by reducing ambiguity. If the firm is well established and of a large scale, then it is recommended to make its decision-making process decentralized to promote the innovativeness of each business division. All employees need to be empowered and encouraged to interact between various divisions.

In pushing for realizing the long-term ambition, at the operational level, such secondary variables as 'firm size' and good 'performance' need to be maintained. In particular, the firm needs to recruit and maintain qualified and experienced personnel backed with advanced technologies. Continuous improvement and retraining programs need to be planned and run regularly for all employees. An adequate mechanism for personnel decisions needs to be introduced so that when needed, additional manpower can be readily hired or released depending on the changing flow of market demands. The mechanism needs to include specific ways for managers to alter the sizes of their divisions through internal movements of people or through mergers and acquisitions, through disinvestment, downsizing, reengineering, and/or outsourcing. Since good performance is generally good for investors and a good indicator of quality of the firm, it needs to be maintained if all possible.

Considering the fact that our theory is derived holistically through rigorous reasoning instead of data analysis, data mining and anecdotes, it is expected to work reliably in practice. This fact actually represents a major contribution of this work to the empirical literature, where only suggestions are provided without assurance of any degree of success. Generally, conjectures developed empirically suffer from weaknesses that prevent practitioners from making meaningful generalizations. For a more detailed discussion, see (Forrest, et al., to appear; Lin and Ouyang, 2010).

CONCLUSION

Due to its practical importance, the innovativeness of a manufacturing firm has been investigated by many scholars from various angles (Marzi, et al., 2017). However, the more this topic is studied the more complex the phenomenon seems to become. To further the understanding of this phenomenon and help simplify the complexity, this paper focuses on the study of the impacts of manufacturing firms' culture, structure and leadership on their innovativeness. Owing to the power of the holistic thinking of systems science, we are able to card through the sixteen variables (identified in the literature), representing different aspects of manufacturing firms' culture, structure and leadership, and identify which ones are essential for encouraging and promoting innovation in a manufacturing firm, which ones are primary forces underneath the innovativeness of the firm, and which ones are secondary that simply appear when the primary forces are created.

Practically, beyond the creation of many useful insights, the employed thinking logic and method of systems science enable us to theoretically validate many of the empirically discovered conclusions of the literature and explain why some of these earlier conclusions have been mixed with some studies showing positive effect, some negative, while others insignificant (Becheikh, et al., 2006). That is why based on the theoretical results established in this paper we are able to provide managerial recommendations instead of merely suggestions as what has been done in the literature. In short, because of the particular holistic method of reasoning applied in this paper, the established theoretical results are expected to help make each real-life attempt of increasing the innovativeness of a manufacturing firm practically possible.

To locate potential questions for future research, one only needs to realize the main limits this work is subject to. First, all reasoning and results developed in this paper are based on our specific definition of innovation in the manufacturing sector; and second, throughout the entire paper there is an implicit assumption: each firm in the manufacturing sector wants to fill a particular market niche by generating a positive cash flow, either from the profits of the marketplace, or investments, or both. So, it is still unknown about how a firm's culture, structure and leadership would affect the innovativeness of the firm, if the firm exists for some purpose other than attempting to satisfy a market niche. And, the question of how a firm's culture, structure and leadership could affect the firm's efforts on making incremental improvements of the existing products and processes is still open. To this end, it is well known that a good number of major disruptive breakthroughs in the past appeared only as consequences of incremental progresses made over time (Rostow, 1960; Kuhn, 1962).

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WORKPLACE VIOLENCE AND FATALITIES: A MACRO PERSPECTIVE

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ABSTRACT

Shootings in Fort Hood, San Bernardino, and Sandy Hook Elementary in Newtown have all been described as workplace violence in the media or by the government. While many debates the true classification, it is clear that these were acts of violence and aggression which took place in a workplace which meets the National Institute of Occupational Safety and Health's (NIOSH) definition. NIOSH defines workplace violence as "violent acts (including physical assaults and threats of assaults) directed toward persons at work or on duty" (pg. 2).

Criminology and sociology researchers have frequently focused on environmental factors correlated with violence in the community, whereas organizational and psychology scholars focus on individual level factors. However organizations exist in communities. It would appear to be a logical assumption that environment factors associated with violence in the community would also be associated with violence in organizations. However, to our knowledge, this assumption has not been tested.

INTRODUCTION

Research has begun to focus on environmental factors, such as the economy, which influence behaviors within organizations (Shoss & Penney, 2012). Employee bullying and abusive supervision, which both can include violence, have gained attention in recent years. Most of the research focuses on various individual factors, such as personality, that are associated with these behaviors. Environmental factors are often limited to organizational environmental factors, such as cultures. The majority of research is focused on these micro (individual) and meso (organizational) levels to the exclusion of macro level (community). While these macro level variables are often beyond the control of the organization, location of the office is within the company's control. To borrow the language of real estate, it is about "location, location, and location". When looking at new office locations, many companies will consider tax advantages, real estate prices and other costs (ex. utility). Human resources may evaluate availability of employees, skill sets of the local workforce and compensation (ex. local minimum wage and salary surveys). Crime rates may be considered.

From a human resource perspective, the common logic is that the best method for keeping violence out of the organization is to not hire at risk employees. Many employers include assessments in hiring, perform background checks and engage in various other procedures to limit at-risk employees from entering the workforce. Just as office design can influence employee behavior (Zagenczyk, Murrell & Gibney, 2008), the location of the office can be associated with employee behaviors. In this study, macro environmental factors and the association with fatal and non-fatal workplace violence are evaluated.

LITERATURE REVIEW

Context matters in organizational research (Johns, 2006). Just as context matters in research, situational factors are also important influencers in employee behavior. Johns (2006) argues that the information on who, where, when and why are important characteristics of understanding research. The environment in which data is collected may impact the findings. Inherent in this premise is the same factors would influence findings by impacting independent variables. In concert with notion that behavior in organizations does not take place in a vacuum, workplace violence has long been considered a function of external communal and internal organizational factors (Dietz, Robinson, Folger, Baron, & Schulz, 2003). In dealing with workplace violence and other similar constructs, Griffin and Lopez (2005) recommended looking at diverse contexts using archival data with a temporal component. The current research takes these factors into consideration.

Employers hire employees from the community. Thus, it would be important to understand the local labor pool because the level of violence in the community should indicate the level of workplace violence. One major enduring myth has been that the prevalent predictor of workplace violence is the "disgruntled employee" (Barling, Dupré, &

Kelloway, 2009). In addition to being disgruntled, the stereotypical perpetrator is “young, male, white individual with poor self-esteem” (Barling et al., 2009, p. 674). Barling and colleagues suggested that many organizations utilize the criteria when hiring to reduce the amount of violence with the organization.

In their seminal study, Dietz and colleagues (2003) applied the logic that community context, such as divorce rates and community violence, will impact aggression in the workplace. In a study of 250 plants with an average of 680 employees per plant, these researchers found that community level crime rate was positively associated with workplace aggression. Interestingly, that study did not find an association between external stressors, such as divorce rate, unemployment rate and household income, and workplace aggression. These stressors are frequently shown to be correlated with community violence (Dietz et al., 2003). We look to replicate and extend their findings.

A consistent finding in diverse research streams is that males tend to act more aggressively and violently which translates into workplace aggression (Barling et al., 2009). However, this finding is not universal. For example, women are more likely to be workplace bullies (Namie & Namie, 2004, p. 324). While other studies have also shown no correlation with gender and workplace aggression, a meta-analytic review found support for the premise that men are more aggressive (Hershcovis, et al., 2007).

As previously noted, age and ethnicity can also be associated with workplace violence. Often, young Caucasians are stereotyped as perpetrators of workplace violence (Barling et al., 2009). However, these results are equivocal. Interestingly, the ethnicity of the perpetrator and the victim are frequently the same and the existence of interpersonal conflict (Barling et al., 2009; Hershcovis et al., 2007). Most individuals work locally and bring their home to work. The local proximity of work may in part be based upon socio-economic status, which is frequently thought to impact workplace aggression.

Socioeconomic status (ex. poverty, unemployed, etc.) have frequently been associated with violent crime (Short, 1997). This may be a function of lack of opportunity in communities (Peterson, Krivo, & Harris, 2000). From this perspective, communities become disadvantages because organizations are not established in the community. When an employer opens in a disadvantaged community, increased social pressures may be applied to employees to abide by corporate policies and not engage in deviant behavior. The societal hope may be that other organizations may establish offices in the community. This line of reasoning may explain the “minimal support for a link between socioeconomic status and workplace aggression” (Barling et al., 2009, p. 675).

Interestingly, individual factors are far less explanatory than situational factors in explaining workplace violence when holding the employee constant (Barling et al., 2009). Inness, Barling, and Turner (2005) found different correlates between workplace aggression in primary and secondary jobs. A sample of 105 respondents who worked for more than one employer was used to compare situational factors and individual factors in workplace aggression. Of interest to this study, maltreatment at the primary employer was significantly correlated with workplace aggression at the second employer. This suggests that employees bring external stressors to the workplace.

While there are multiple stressors that can be brought to work, one stressor that has been shown to be correlated with workplace aggression is social change (Baron & Neuman, 1996). Social change is often evidenced by voting patterns and political affiliations which can evoke strong emotions from either side of the political ideology divide. In addition, violence can be used to achieve political goals (Lankford, 2013). Charlton Heston’s soaring rhetoric regarding the Second Amendment when he unequivocally stated that he would the only way to take his rifle was “from my cold, dead hands!” (Marietta, 2008). Marietta (2008) argued “that current American political divisions revolve around value conflicts” (p. 768). Values are personal and perceived interpersonal conflict is associated with workplace violence (Barling et al., 2009; Hershcovis et al., 2007).

HYPOTHESES DEVELOPMENT

Research indicates that males, on average, tend to exhibit greater levels of violence (Daly & Wilson, 1994; Wrangham & Peterson, 1996). As violence increases, it is most probable that some of these acts will result in fatalities. In addition, it is equally plausible that as the density of men increase in the population that rates of violence will increase. It is also likely that the patterns which exist in society writ large will also be exhibited within organizations. Overall, we hypothesize:

H1: The population density of males will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

According to FBI statistics, individuals between the ages of 20-29 accounted for approximately 35% of all arrests in 2016, while those persons between the age of 30 and 30 represented approximately 25% of additional arrests (<https://ucr.fbi.gov/crime-in-the-u.s/2016/crime-in-the-u.s.-2016>). In addition, these two groups account for 40% of murders in the same time span. Based upon this data, we hypothesize that:

H2: The population density of individuals age 20-29 will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

H3: The population density of individuals age 30-49 will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

Group heterogeneity and its associated effects on behavior and performance has long been of interest (Amason, 1996; Li & Hambrick, 2005). A consistent finding within the literature is that group heterogeneity is closely associated with increased conflict. This conflict can be dysfunctional affective conflict (Amason, 1996). Dysfunctional affective conflict may be interpreted as personal criticisms (Amason, 1996). Dysfunctional affective conflict negatively impacts emotional and attitudinal outcomes (Medina, Munduate, Dorado, Martínez, & Guerra, 2005). Conflict, negative emotions and attitudes are often a precursor for interpersonal violence (Dobash & Dobash, 1984). We therefore hypothesize that:

H4: The population density of ethnic groups will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

Poverty, income distribution and violent crimes have long been of interest to researchers for a variety of reasons such as public policy derivation (Hsieh & Pugh, 1993). Both individual studies and meta-analyses consistently find positive relationships between poverty, unemployment and violent crime (Hsieh & Pugh, 1993; Pratt & Cullen, 2005). As poverty levels and unemployment decrease so does crime, violent or otherwise. It is quite possible this is due to reductions in the levels of stressors. In this view, poverty and unemployment is a cause of stress, a stressor. Reactions to stress include violent reactions. Thus, reductions in stressors should result in lower incidents of crime. Given this consistent finding in the criminal justice literature, we hypothesize:

H5: Unemployment will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

H6: Poverty will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

According to social categorization and social identity theories, in-group members develop positive perceptions of in-group members (Tajfel & Turner 1979). Social identity theory also suggests that in-group members will develop positive affective attitudes toward other group members. Further, social identity and social custom theories of union membership suggests that having unionized family and friends increase in-group membership perceptions. (Piore & Safford, 2006). Therefore, having family and friends who are members may influence the degree to which non-union members see themselves as being “like” a union member. Positive affectivity and increased in-group membership perceptions should reduce violence in the community as well as violence in the workplace. Prior research supports a negative relationship of union density with workplace violence (Dollard & Yates, 2013).

In addition, statistics indicated that union members experience a 20% compensation premium (Gibney, Masters, Aybat & Amlie, 2017). As previously noted, lower poverty is associated with decreased levels of crime. As union density increases, the union premium impacts a greater number of individuals. Overall, we hypothesize:

H7: Union density will be negatively related to (a) workplace fatalities and (b) nonfatal workplace violence

There is a perception that right-wing, perceived or otherwise, orthodoxy is associated with increased violence (Kaplan, 1995). For example, the Ku Klux Klan (KKK), founded by a future Democrat Senator from Tennessee, has a violent history in the United States. The “violent right” perception has also received continued support in media. While it is certain that organizations associated with a right-wing ideology have perpetrated violence, it is just as certain that left-wing associated organizations have so perpetrated violence. In the 2000s, left-wing violence increased by 80% whereas right wing violence decreased by 40% (<https://bsos.umd.edu/featured-content/proportion-terrorist-attacks>). Generally, political ideology is often associated with violence. The actual left\right ideology associated with the violence appears to ebb and flow, but the relationship between political ideology and violence seems persistent. Overall, we hypothesize:

H8: Political leaning will be positively related to (a) workplace fatalities and (b) nonfatal workplace violence

Pratt and Cullen (2005) found a positive relationship between gun ownership and violence. As laws are passed and gun owners undergo background checks, it becomes more difficult to own a firearm. This may reduce gun ownership levels whereby violence is reduced. Gun regulations also reduce the ability to carry a firearm – either concealed or open. These regulations will reduce the accessibility to firearms when events begin to escalate. Not having access to a firearm should also reduce violence. In addition, those that have passed the scrutiny of a background are more likely to be responsible gun owners. These gun owners may be less likely to place themselves in situations which may escalate. This suggest that gun regulations should have a positive effect on reducing gun violence. Overall, we hypothesize:

H9: Restrictions on gun ownership will be negatively related to (a) workplace fatalities and (b) nonfatal workplace violence

METHODS

Measures

Workplace Fatality and Violence. The data for fatal and non-fatal violence were collected from the Bureau of Labor Statistics (Bureau of Labor Statistics, 2012). The fatal workplace violence data is issued in a yearly report which can be found as News Release in the Bureau of Labor Statistics’ Archives, and the non-fatal data was collected from the Bureau of Labor Statistics. The data for fatal and non-fatal violence were collected from the Bureau of Labor Statistics (Bureau of Labor Statistics, 2012). The fatal workplace violence data is issued in a yearly report which can be found as News Release in the Bureau of Labor Statistics’ Archives, and the non-fatal data was collected from the Bureau of Labor Statistics as well. Workplace violence and fatalities based upon intentionality by other persons were utilized. Therefore, data was selected using (Intentional Injury by other person 111XXX). Data was collected by state. Due to variance indicative to population size, the variables were standardized based upon population using incidents per 500,000 state residents.

State populations were collected from the United States Census Bureau (www.census.gov). State populations were divided by 500,000, then the incident (fatality, workplace violence all sectors or workplace violence private) were divided by the resultant. For example, in 2007, 18 intentional fatalities occurred in Alabama. The Census Bureau reported a 2007 population of 4,672,840 residents. This resulted in 1.93 fatalities per 500,000 residents ($18/(4,672,840/500,000)$). Prior to 2009, nonfatal workplace violence was only provided for private ownership. Beginning in 2009, nonfatal workplace violence statistics were made available for all ownerships.

Demographic related variables. In addition to total population, specific data about diverse groups of interest for this study were also collected from the United States Census Bureau. We collected data for male population, individuals Age 20-29, individuals Age 30-49, Black\African-American, Hispanic, Asian\Island Pacific, and Native American\Alaskan Native by state by year. Each of these population subgroups were divided by the applicable state population for that year.

Employment related variables. The Bureau of Labor Statistics (www.bls.gov) reports the seasonally adjusted unemployment rate on a monthly basis. The Regional and State Employment and Unemployment (Monthly) News Release for December each of year was used. Seasonally adjusted rates for each state are reported in Table 3 (Civilian

labor force and unemployment by state and selected area, seasonally adjusted) of this monthly report. Each state unemployment rate for December 20XX was collected.

Union density data is also available from the Bureau of Labor Statistics. In January of each year, the Bureau of Labor Statistics issues a news release for union membership. The January 2013 press release contains the data for 2012. Table 5 (Union affiliation of employed wage and salary workers by state) contains the state-by-state listing of the ratio of employees represented by unions as percentage of the workforce. This union density of covered employees captures those employed individuals who may have to pay union dues but are not actual members of the union (agency clause) or are covered but do not have to pay dues (right-to-work clause).

The United States Census Bureau data for Poverty was collected for this study (www.census.gov/hhes/www/poverty/data/historical/people.html). Table 21 in the Poverty (Number of Poor and Poverty Rate, by State: 1980 to 2014) contains historical data regarding the percentage of citizens in the state that have earnings below the poverty level. Poverty levels are adjusted annually and are based upon family size.

Public policy related variables. Political leaning of the state is based upon the political party of the Presidential candidate which carried the state in the last national election. If the Republican candidate (ex. Mitt Romney in 2008) won the state, the variable was coded as a 1 for 2009.

The restrictions on gun ownership variable is based upon the Brady Campaign rating of each state by year. The Brady Campaign (<http://www.bradiycampaign.org/>) is named after James Brady who was suffered severe and permanent brain damage during the attempted assassination of President Ronald Reagan. In conjunction with The Law Center to Prevent Gun Violence, the Brady Campaign analyzes each state on 30 categories of gun ownership laws, violence and other topics. Each state is issued a score on a 0-100 range. For the 2007-2012 range, the highest score earned by any state in any year was 85 with the lowest being 0. The higher the score, the more restrictive the gun laws and ownership are in that state in that year.

RESULTS

Analysis

The mean, median, minimum, maximum and total for workplace fatalities, nonfatal violence in all sectors and private sectors are presented in Table 1. Workplace fatalities are best described as a low-base rate phenomenon in any state. In all years from 2007-2012, at least one state did not have any workplace fatalities. The median ranged between 9 and 12 for all years. Nationally, at most, 835 workplace fatalities occurred in any given year of this data.

Nonfatal workplace violence is significantly more common. Data suggests that, on average, nonfatal workplace is trending downward. Every state experiences some nonfatal violence in the private sector. Average all-ownership over the six-year period is more than double private sector only (29,058 and 13,225 respectively). The medians are consistently less than the means for all years. This suggests that the majority of observations are bunched to the left.

See Table 1, below

Hypothesis Testing

Hypotheses were tested using hierarchical linear regression for all three dependent variables. In the first step, the year was entered as a control variable. Population densities were entered in Steps 2 and 3. In the second step, we entered the male and age demographic variables. In the third step, racial densities were entered. Each of the racial densities for Black\African-American, Hispanic, Asian\Island Pacific, and Native American\Alaskan Native¹. The employment related variables of unemployment, union density and poverty were entered. In the fifth and final step, public policy

¹ In our initial analysis, minority density was entered and was significant. This variable was positively correlated with the dependent variables. However, we choose a finer level of granularity which lead to greater insight into the nature of the relationship.

related variables were entered. The public policy related variables were restriction on gun ownership and political leaning. Hypotheses were tested utilizing the results of the fifth step. The process was followed for all three dependent variables.

See Table 2, below

In the first step, 2009 was related to for nonfatal workplace violence in the private sector and all sectors ($\beta = .19, p \leq .05$; $\beta = .16, p \leq .05$ respectively). Also, 2010 was related to for nonfatal workplace violence in the private sector and all sectors ($\beta = .23, p \leq .01$; $\beta = .20, p \leq .01$ respectively). Neither year was related to workplace fatalities.

Hypothesis 1 found mixed support. In support of H1A male density was positively correlated ($\beta = .50, p \leq .001$) with workplace fatalities. While male density was significantly correlated with nonfatal workplace violence in both the private sector and overall, the data indicated a negative relationship ($\beta = -.36, p \leq .05$; $\beta = -.34, p \leq .001$, respectively). Therefore, H1B was not supported.

Hypothesis 2 was not supported, but one relationship was statistically significant. In support of H2B the Age 20-29 density was significantly correlated ($\beta = -.18, p \leq .05$) with nonfatal workplace violence in the private sector. However, the vector of the relationship was inverse to our hypothesized relationship. In addition, this density was not related to nonfatal workplace violence in all sectors ($\beta = -.05, p \geq .05$). H2A regarding workplace fatalities was not supported ($\beta = -.10, p \geq .05$)

Hypothesis 3 was not supported. None of the three relationships attained the .05 level of significance. The population density of age 30-49 was not significantly correlated with workplace fatalities ($\beta = -.09, p \geq .05$), nonfatal workplace violence in all sectors ($\beta = .12, p \geq .05$), nor workplace violence in the private sector ($\beta = .07, p \geq .05$).

Hypothesis 4 found mixed support. In support of H4A, the density of Black\African-American was positively correlated ($\beta = .45, p \leq .001$) with workplace fatalities. While Asian\Pacific-Islander population density reached significance ($\beta = -.18, p \leq .001$), the vector was in the opposite direction. Neither Hispanic ($\beta = .07, p \geq .05$) nor Native American\Alaskan Native ($\beta = .07, p \geq .05$) were significantly correlated with workplace fatalities.

In support of H4B, the density of Native American\Alaskan Natives was significantly correlated with nonfatal workplace violence in all sectors ($\beta = .18, p \leq .05$) and the private sector ($\beta = .25, p \leq .001$). While Black\African-American population density reached significance ($\beta = -.22, p \leq .05$), the results indicated a negative relationship. A positive relationship was hypothesized. The population density Hispanics was not correlated with nonfatal workplace violence in all sectors ($\beta = .03, p \geq .05$) and private sector only ($\beta = -.05, p \geq .05$). The same pattern of results was found for Asian\Pacific-Islander for nonfatal workplace violence in all sectors ($\beta = -.09, p \geq .05$) and private sector ($\beta = -.06, p \geq .05$).

Hypothesis 5 was not supported, but some relationships were statistically significant. H5A did not find support because the unemployment-workplace fatality relationship was not statistically significant ($\beta = -.12, p \geq .05$). However, unemployment was significantly correlated with workplace violence in all sectors ($\beta = -.29, p \leq .01$) and public sector only ($\beta = -.25, p \leq .05$). Based upon one of the existing theories of unemployment, we hypothesized that workplace violence would increase (as opposed to decrease) with increased unemployment, but the data supported a negative relationship.

Hypothesis 6 was not supported. None of the three relationships attained the .05 level of significance. The poverty density was not significantly correlated with workplace fatalities ($\beta = .10, p \geq .05$), nonfatal workplace violence in all sectors ($\beta = .05, p \geq .05$), nor workplace violence in the private sector ($\beta = -.10, p \geq .05$).

Hypothesis 7 was not supported, but some relationships were statistically significant. H7A was not supported because the union density-workplace fatality relationship was not statistically significant ($\beta = .13, p \geq .05$). However, union density was significantly correlated with workplace violence in all sectors ($\beta = .54, p \leq .001$) and public sector only ($\beta = .28, p \leq .01$). Based upon one of the existing theories of labor relations, we hypothesized that workplace violence would decrease (as opposed to increase) with increased union density. However, our results indicated a positive correlation.

Hypothesis 8 was not supported. None of the three relationships attained the .05 level of significance. The political leaning was not significantly correlated with workplace fatalities ($\beta = .07, p \geq .05$), nonfatal workplace violence in all sectors ($\beta = .08, p \geq .05$), nor workplace violence in the private sector ($\beta = .16, p \geq .05$).

Hypothesis 9 was not supported, but some of the relationships were statistically significant. The gun restriction-decreased fatalities was not statistically significant ($\beta = .07, p \geq .05$). Therefore, H9A was not supported. Interestingly, gun restriction-workplace violence was significantly correlated with all sectors ($\beta = .29, p \leq .05$), and private sector only ($\beta = .30, p \leq .01$). Based upon one of the existing theories of gun restrictions, we hypothesized that workplace violence would decrease (as opposed to increase) with increased gun restrictions. The data supported positive relationship. Therefore, while statistically significant, H9B was not supported.

DISCUSSION

Individual occurrences may take place in various years to offer explanations as to why certain years were significant. For example, 2009 saw the Fort Hood shooting which has been listed as an occurrence of workplace violence. Political turmoil and highly charged reactions occurred during 2010 in relation to the passage of the Affordable Care Act (Obama Care).

The percentage of males in the population was significantly related to all three dependent variables. The most interesting part of this result is that the percentage of males in the population was positively correlated with workplace fatalities, but negative correlated to both nonfatal dependent variables. Based upon violent crime and murder statistics, the significant relationship with violence ending in fatality is understandable and expected. However, the negative relationship with nonfatal workplace violence is unexpected.

While the hypothesized relationship was that increased male density would be associated with increased workplace violence, our results indicated less violence (but more fatalities). A recent literature review (Schact et al., 2014) found mixed results between male-biased densities and societal violence. Of the twenty studies included their analysis, nine found a negative relationship and nine found a positive relationship. They hypothesized that the type of violence could be a mitigating factor, which is in line with the results our study.

Another conclusion that could be reached (instead of moderation) is that the relationship is normally distributed. This view would suggest that significant correlations exist in the tails (which are more likely to be published) but majority of studies centered on the mean which indicate no relationship. In this view, the studies in the lower tail would indicate a positive relationship between male density and violence. However, the upper tail would indicate a negative relationship. Whether moderation or publication bias, more research is needed to more completely understand this relationship between male density and workplace and societal violence to gain a clearer understanding of the relationship.

Another unexpected negative relationship was that of age. We hypothesized that both age brackets would be positively related to workplace fatalities and nonfatal violence. Age 20-29 was negatively correlated with nonfatal workplace violence in the private sector only. All other relationships did not reach our cutoff level for significance. Recent research indicates that Millennials are different from other generations on a variety of characteristics that might explain this finding (Borges, Manuel. Elam & Jones, 2006; Borges, Manuel. Elam & Jones. 2010). Millennials have a greater need for affiliation, a lower need for power, lower levels of dominance and tension (Borges, et al 2006; Borges, et al. 2010). Millennials also tend to avoid conflict (Twenge & Campbell, 2012). As such a group that avoids conflict while having a lower need for power and a greater need for affiliation will most likely avoid confrontational situations that could escalate into physical altercations and fatalities. If this is the case, a downward trend on workplace violence should be seen in the future.

Overall, the patterns of results suggest that differential relationships exist. No single variable showed a consistent relationship with the workplace violence and fatalities. Restrictions on gun ownership were not statistically associated with workplace fatalities but were positively significantly correlated with workplace violence. One interpretation would be that gun policies will not stop the current or former employee with lashing out at the employer. Employees would also be more confident that others are not armed and would be more likely to engage in workplace violence because a feeling of safety might be created that others are unarmed and cannot defend themselves.

While union density was not significantly associated with workplace fatalities, it was strongly correlated with non-fatal workplace violence. Our hypothesized relationship was in the opposite direction though. The negative hypothesized relationship was based upon the brotherhood/sisterhood concept of unions. However, dissatisfaction is a driving force for unionization (Gibney et al, 2012). In this view, individuals could respond to the dissatisfaction of the environment through outward aggression based upon the frustration-aggression hypothesis (Dollard et al, 1938). This view suggests that when individual's goal attainment is thwarted, obstructed or frustrated, the individual will act out aggressively toward the perceived source of this frustration.

An alternative explanation of the positive relationship may be associated with the violent history of many of the craft trades such as the Teamsters and Steelworkers (Taft & Ross, 1969). In this culture, it would be socially stigmatized to "run to HR" to settle the dispute. Members might be more willing to take matters into their own hands to right perceived wrongs. This would result in higher levels of workplace violence. Alternatively, union density is higher in some occupations than others. Thus, union density could be acting as a proxy variable for occupation and industry that were not available.

Our hypothesis regarding unemployment and nonfatal violence was supported but was not supported for fatalities. The data supported an inverse relationship between unemployment and workplace violence though. As job opportunities become fewer (as measured by unemployment), employees are more concerned with acting in a manner that would jeopardize the current employment status. Because workplace violence is a terminating offense, employees would be less likely to engage in workplace violence as unemployment increases.

The patterns of ethnicity and density were very interesting as well. Overall, we expected that as diversity increased, there would be increased incidents of workplace violence and fatality. We relied on that heterogeneous workplace are associated with increased conflict and reduced cohesion. A proportion of this type of dysfunctional conflict could result in physical altercations which could then result in a fatality. As such, the percentage of the density of Black/African-American exhibited this positive relationship with workplace fatalities as well as Indian/Alaskan-Native with non-fatal workplace fatalities in all sectors and private sector only. More interestingly, Asian/Pacific-Islander exhibited a negative relationship with workplace fatalities and Black/African-American was negatively correlated with nonfatal workplace violence in the private sector. Alternative explanations may exist for each relationship.

Asian/Pacific-Islander culture provides two reasons why we found a negative relationship with violence (Ho, 1990). First, these cultures frequently support harmonious relationships. Therefore, individuals may be less involved in conflict and not willing to engage in violence. Secondly, even if violence does happen, individuals are less likely to report the violence. While the violence might be at similar levels, the desire to be perceived as harmonious by not reporting incidents would result in a negative relationship between this racial/ethnic category and workplace violence.

Increasing Black/African-American density also indicated decreased nonfatal workplace violence. Interestingly, this could be a "safety in numbers" argument. Research indicates a significant relationship between increased Black/African-American segregation and violence (Masi, Hawkley, Piotrowski & Pickett, 2007). Therefore, one could argue that as there is increased density, less violence will occur. Less dense African-American populations could make them targets of violence and result in less violence when others are around. There is also a possibility that with increased density stereotypes may erode. As stereotypes erode, people identify as individuals and not depersonalized stereotypes. Depersonalization frequently results in increased violence (Moskowitz, 2004).

Limitations

As with all research, there are a few limitations associated with the current research. Due to the nature of the data, additional control items are not available. For example, the industry of the incident. Some industries have been shown to have higher incident rates of violence (Wassell, 2009). For example, law enforcement (as an industry) has a higher rate of violence. This is due to the nature of the occupation in that many criminals and crimes are violent by nature – ex. murder, and armed robbery.

While industries have higher rates of incident, so do occupations within those industries. Continuing with the law enforcement industry, some occupations within those industries could have higher rates of incident than others. For

example, an officer assigned to dispatch unit (directs patrol officers to investigate reported crimes) would be less prone to nonfatal workplace aggression than a patrol officer. Occupation of the victim and perpetrator are not in the data.

Specific incident data is not contained in the data that could be of interest and is an area of future research. The specific nature of the incident is not available in this dataset. While ethnic densities were included, more specific incident information about the victim and perpetrator were not included in the dataset.

Educational attainment (as a proxy for intelligence) would also be a variable of interest. Some serial killers, ex. Ted Bundy, have been shown to be of exceptionally high IQ (Levin & Fox, 2008). This would suggest that higher educational attainment in the population could result in more violence and fatalities. On the other hand, lower IQ individuals may resort to the more basic level of human nature. These individuals might not perceive other avenues for response. Given that threat response in humans have been categorized into the three categories of: fight, flight and freeze (Bracha, 2004), these people might choose to fight.

Another variable would be the employer of record for victim and perpetrator. In some cases, macro level data does not include incident specific information. The victim and perpetrator might be of different employers. This would have differences in practical implications than if both were employees of the organization.

Practical Implications

The main implication for workplace is that employers should expand the analysis when considering and selecting workplace locations. Frequently employers will be very selective in the employment. Often times, employee selection includes a host of selection instruments to include to keep the “bad apple” out of the organization. It is a frequent mantra that the best way to stop workplace incidents is to not hire the individual in the first place. In fact, many organizational behavior and human resource textbooks have sections and chapters devoted to this topic. However, this research indicates that macro level data about possible employee densities should be included in the initial analysis before deciding where the location is to exist or hiring the first employee location.

As part of the decision process to determine where to establish organizations, we recommend further analysis. While this study provides some initial insight, more is needed before targeting organizational interventions.

Future Research

This study focused on a presidential transition year and an environmental shock in the financial markets. As the data becomes available, the current environment should be evaluated. In contrast the time period of this study, the economic times are market by record low unemployment and the longest bull market. However, in contrast, the presidential election of 2016 has been seen as much more contentious than the 2008 transition of power. In both instance, there was a change in the political party of the Executive branch.

Future research should look at the micro-level of this data. Some specific studies have looked at personality characteristics of individuals who are more likely to engage in workplace violence (Douglas & Martinko, 2001; LeBlanc & Kelloway, 2002). This study suggests that this organizational intervention might be too late. However, more research is needed. As previously noted, future research should look at the industries involved in these incidents, the occupations and nature of the employment relationship. For example, the employment relationship of the victim and perpetrator is vital. This would indicate if the victim and perpetrator are both employees. This level of analysis would provide insight into the appropriate corporate response.

Additional research is needed regarding the nature of these relationships. First and foremost, replication is needed. However, additional clarification is needed. For example, all of the variables that were significantly correlated with workplace fatalities were either unrelated to nonfatal or a change in vector occurred. This warrants future research to understand the differences.

In a similar vein, the magnitude of the relationship changed within nonfatal workplace for all sectors and private sectors. Some variables were significantly correlated with nonfatal workplace violence in the private sector, but not all sectors. Others were highly correlated ($p \leq .001$) with the private sector and marginally correlated ($p \leq .05$) with all sectors. This suggests that the nature of the employment relationship influences workplace violence. For example, one could ask what makes public sector jobs so much safer.

Interestingly, stricter gun laws indicated more workplace violence as well as a higher union density. Further research is needed on both of these topics. We hypothesized that stricter gun laws would make the workplace a safer environment regarding both workplace fatalities and nonfatal workplace violence. However, our data did not support this. In fact, it could be argued that stricter gun laws make the workplace less safe based upon our data. Further research is needed.

CONCLUSION

While organizations currently focus on selection to weed out individuals who are more likely to act violently in organizations through various selection techniques, employers should consider different locations based upon various economic, demographic and public policy options. Interestingly, many often consider workplace fatalities to be an extension of workplace violence – an effectiveness viewpoint. In this view, workplace fatalities occur because violent individuals are just more effective and efficient. However, our pattern of relationships indicates differences in correlates. This suggests different theories are needed to explain workplace fatalities and workplace violence.

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TABLE 1
Means, Medians of Fatal and Nonfatal Workplace Violence 2007-2012

	Incidents of Fatal Workplace Violence					Incidents of Non-Fatal Workplace Violence Private Industry Only					Incidents of Non-Fatal Workplace Violence All Ownerships				
	Mean	Min	Max	Median	Total	Mean	Min	Max	Median	Total	Mean	Min	Max	Median	Total
2007	16	0	86	9	835	365	20	2,320	195	15,350	.	.	.	.	.
2008	15	0	84	8	779	359	20	2,710	160	14,720	.	.	.	.	.
2009	15	0	93	12	778	303	30	2,050	200	12,420	763.90	60	8,030	380	31,320
2010	16	0	74	12	800	350	20	2,120	235	14,720	832.86	50	9,740	415	34,980
2011	15	0	85	10	774	260	20	1,610	160	10,650	560.48	40	5,730	290	23,540
2012	15	0	67	11	761	267	30	1,930	140	11,490	613.72	30	7,040	320	26,390

TABLE 2
Hierarchical Regression Results

Independent Variables	Dependent Variable		
	Fatal	Non Fatal – All Sectors	Non Fatal – Private Sector
Year (Step1)			
2007	-.01	-	-.05
2008	-.05	-	-.01
2009	-.03	.19*	.16*
2010	-.05	.23**	.20**
2011	-.01	-.04	-.02
Population Density:			
<u>Demographic (Step 2)</u>			
<u>Male</u>	.50***	-.36*	-.34***
<u>Age</u>			
20-29	-.10	-.05	-.18*
30-49	-.09	.12	.07
<u>Ethnicity (Step 3)</u>			
<i>Black\ African-American</i>	.45***	-.07	-.22*
<i>Hispanic</i>	.07	.03	-.05
<i>Asian\Pacific-Islander</i>	-.18***	-.09	-.06
<i>Native American\Alaskan Native</i>	-.03	.18*	.25***
Employment related (Step 4):			
<i>Unemployment</i>	-.12	-.29**	-.25*
<i>Union Density</i>	.13	.54***	.28**
<i>Poverty</i>	.10	.05	-.10
Public Policy (Step 5):			
<i>Political Leaning</i>	.07	.08	.16
<i>Gun ownership regulation</i>	.14	.29*	.30**
R-squared	.14	.56	.41
F-value	2.79***	12.37***	9.40***

Notes: All tests are two tailed

- * p≤0.05 level
- ** p≤0.01 level
- *** p≤0.001 level

Appendix 1 State Breakdown

	2007		2008		2009		2010		2011		2012	
	Fatality	Non Fatality	Fatality	Non Fatality	Fatality	Non Fatality	Fatality	Non Fatality	Fatality	Non Fatality	Fatality	Non Fatality
Alabama	1.93	17.12	0.85	7.42	1.47	6.31	2.09	6.28	0.62	13.53	2.07	13.53
Alaska	0	36.75	0	14.55	0	35.77	2.82	21.12	5.53	34.59	6.15	34.59
Arizona	0.73	14.59	1.11	15.13	0.47	27.59	1.88	28.16	1.08	22.37	0.84	22.37
Arkansas	1.58	40.37	2.09	22.61	1.73	13.81	1.54	10.29	1.87	5.11	2.2	5.11
California	1.08	32	1.15	37.02	1.07	16.5	0.98	17.85	1.13	12.87	0.88	12.87
Colorado	1.87	0	1.33	0	1.61	0	2.09	0	1.56	0	1.45	0
Conn.	1.28	49.61	0.85	56.41	1.82	56.15	2.38	48.96	1.68	39.1	1.81	39.1
Delaware	1.72	17.21	0	28.28	0	28.04	0	44.55	2.76	22.05	2.18	22.05
District of Columbia	4.35	69.64	0	60.32	5.07	59.1	5.82	91.4	2.43	72.82	3.95	72.82
Florida	1.91	24.77	1.51	12.95	0.94	12.87	1.22	17.82	1.15	0	1.14	0
Georgia	1.34	22.46	1.37	16.31	0.73	16.11	1.19	13.42	0.87	9.68	0.96	9.68
Hawaii	1.52	30.4	0	37.53	0	37.13	1.84	51.46	0	0	1.08	0
Idaho	1.66	0	0	0	0	0	0	0	0	0	0	0
Illinois	1.14	31.9	1.49	28.24	1.41	28.13	1.48	30.4	1.71	26.42	1.24	26.42
Indiana	1.57	11.76	0.93	14.79	1.55	14.71	1	25.45	1.3	16.88	0.99	16.88
Iowa	0.83	50.01	0.99	23.2	0.49	23.08	0.98	19.7	1.8	31.02	0.81	31.02
Kansas	1.44	12.57	1.6	8.9	1.41	22.95	0.7	14.02	1.22	8.71	1.21	8.71
Kentucky	1.17	21.14	2.21	12.82	1.74	23.16	0.35	43.79	1.14	16.02	1.83	16.02
Louisiana	1.49	10.28	1.01	14.65	1.45	25.6	1.32	23.16	1.09	8.74	1.74	8.74
Maine	0	37.68	0	37.58	0	45.13	0	37.64	1.51	26.35	0	26.35
Maryland	1.59	37.15	0.79	60.69	1.48	43.63	1.47	52.83	1.46	31.74	1.19	31.74
Mass.	0.86	59.86	0.62	60.29	0.69	0	0.92	74.07	1.44	59.2	0.53	59.2
Michigan	1.35	15.5	1.11	29.15	1.16	22.72	1.77	27.32	1.67	22.78	2.02	22.78
Minnesota	0.86	52.81	0.29	13.34	0.95	31.24	1.23	32.99	0.47	21.52	1.02	21.52
Mississippi	2.39	0	1.19	0	2.03	0	1.52	0	1.51	0	2.18	0
Missouri	2.29	26.33	2.87	48.95	2.01	24.32	1.09	45.08	1.16	28.28	0.83	28.28
Montana	2.07	20.73	2.56	35.85	6.61	71.14	3.54	35.37	2.5	25.05	0.99	25.05
Nebraska	3.64	11.21	2.23	44.53	1.1	8.28	1.64	16.43	0.54	10.85	0	10.85
Nevada	1.35	23.07	0.75	18.84	0.56	26.07	1.67	25.92	1.65	7.34	2.72	7.34
New Hampshire	1.14	0	0	0	0	0	0	0	0	0	0	0
New Jersey	1.56	35.15	0.8	39.03	1.31	38.26	0.97	44.93	1.36	21.54	1.24	21.54
New Mexico	1.26	70.35	1.24	29.84	1.72	41.73	2.43	24.28	0.96	19.21	0.72	19.21
New York	1.12	50.7	1.25	48.41	1.22	53.09	1.16	54.7	1.23	41.36	1.02	41.36
North Carolina	1.7	47.16	1.83	18.8	1.32	15.87	1.63	18.35	1.5	15.53	1.64	15.53

North Dakota	0	0	0	0	0	0	0	0	3.66	0	2.14	0
Ohio	1	0	1.35	0	1.13	0	1.21	0	0.95	0	0.95	0
Oklahoma	0.83	19.26	0.68	29.98	0.81	28.24	0.93	23.99	0.79	19.78	0.92	19.78
Oregon	1.21	34.92	1.19	18.57	1.31	26.26	1.44	35.24	1.29	29.7	1.41	29.7
Penn.	1.43	0	1.47	0	1.46	0	1.54	0	1.1	19.62	0.86	19.62
Rhode Island	1.42	0	0	0	0	0	1.9	0	0	0	0	0
South Carolina	2.81	21.38	1.55	13.25	1.31	15.25	1.3	14.05	1.28	10.69	1.27	10.69
South Dakota	0	0	0	0	0	0	0	0	3.03	0	1.8	0
Tennessee	1.46	31.58	1.76	22.41	1.43	14.27	1.18	9.45	2.03	14.06	1.86	14.06
Texas	1.8	7.76	1.56	18.1	1.87	12.9	1.47	10.34	1.36	11.49	1.27	11.49
Utah	1.35	19.25	1.31	9.39	0	7.34	1.27	5.43	0.53	12.42	1.23	12.42
Vermont	0	24.06	0	16.02	0	32.01	0	47.94	0	39.91	0.8	39.91
Virginia	1.35	36.12	2.36	10.21	1.96	14.51	1.06	23.12	1.42	6.18	1.1	6.18
Wash.	0.46	13.15	0.99	29.72	1.65	23.25	1.26	36.43	0.44	15.37	0.43	15.37
West Virginia	1.09	43.62	1.36	21.74	0	59.53	0	37.78	0.81	32.34	1.62	32.34
Wisconsin	1.25	17.82	0.53	26.59	1.59	17.64	1.06	26.38	1.14	14.01	2.36	14.01
Wyoming	0	18.7	3.66	0	0	35.72	7.1	17.74	0	17.6	4.34	17.6

THE IMPACT OF TAX REFORM ON HOSPITALS AND HEALTH CARE SYSTEMS

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ABSTRACT

The Tax Cuts and Jobs Act of 2017 (TCJA) made sweeping changes to the US tax code for both for-profit and tax-exempt hospitals and health care systems. The effects of the TCJA will vary for different hospitals and health care systems. Financially strong for-profit systems will likely benefit from the repeal of the corporate alternative minimum tax, and the lowering of the corporate tax rates while highly leveraged systems could suffer from the new limitations on the deductibility of interest. Tax-exempt institutions are anything but exempt from the TCJA. They bear the greater burden of the TCJA by having to deal with significant changes to the unrelated business income tax, new taxes on compensation arrangements, and modifications to certain employee benefit programs. Organizations that are proactive in analyzing these changes will find ways to benefit from the TCJA while others will have to face the consequences of their passive responses. Leaders of these systems will need to assess the efficiency of their organizations and evaluate whether tax-exemption remains viable.

INTRODUCTION

On December 22, 2017, H.R.1-The Tax Cuts and Jobs Act of 2017 (TCJA), a sweeping \$1.5 trillion tax cut package was signed into law. The law constitutes the largest change to the Internal Revenue Code (IRC) since the Tax Reform Act of 1986 and fundamentally changes the tax landscape for both tax-exempt and taxable hospitals and health care systems. While many of the provisions of the new legislation are permanent and take effect on January 1, 2018, others expire after eight years. The new law does not treat tax-exempt and taxable hospitals and health care systems equally. Taxable entities will benefit substantially from the lowering of the corporate tax rates, and the repeal of the corporate alternative minimum tax while tax-exempt entities will have to bear the burden of the law's significantly adverse effects on executive compensation, employee benefits, and unrelated business taxable income.

BACKGROUND

Prior to the 1980s, most hospitals and health care systems were relatively small organizations, typically operating as a single corporation in the form of a tax-exempt community hospital. They provided acute care with an average length of stay of fewer than 30 days. Today, these institutions account for approximately 59 percent of all hospitals. There were also a few tertiary institutions commonly affiliated with a teaching hospital and medical school, a handful of investor-owned institutions, and a few large public institutions such as the hospitals operated by the US Department of Veterans Affairs. All three of these types of institutions emphasized in-patient treatment and many of them were affiliated with religious organizations.

The rapid growth of health insurance and Medicare/Medicaid during the 1980s and 1990s caused billions of dollars to flow into the health care industry. This growth resulted in massive increases in hospital admissions causing revenues to soar. As hospital revenues flourished; however, the relatively unlimited reimbursements caused costs to spiral out of control for the government and health insurers. Legislation was enacted and measures were taken to contain these costs by moving to a managed care environment. To survive in this highly competitive environment, providers had to become much more efficient and market driven. Institutions had to be innovative in finding new methods of delivering services and were forced to make radical changes to their strategic marketing plans. Many reorganized their corporate structures and became integrated systems having multiple corporate entities (see Exhibit 1 in the appendix). Taxable subsidiaries were established and joint ventures were entered into with for-profit physician groups and private industry.

As hospitals and health care systems began to seek out new revenue sources, many of them started competing with proprietary firms by offering health care services and products to the public. For established systems, this was relatively easy to do since they already had the infrastructure in place, were providing many of these services and products to their patients, and had the expertise on hand. When they learned that providing these products and services was not in furtherance of their tax-exempt purposes; however, they began paying taxes on this unrelated income. They also implemented strategies to reduce these taxes by applying expenses and losses against them from other sources. As mentioned above, the net income from an activity that is not in furtherance of an organization's tax-exempt purpose is taxable. The Internal Revenue Service refers to this income as unrelated business taxable income. The rationale

behind this rule is that a tax-exempt organization should not be able to compete unfairly with an organization that provides the same goods or services on a taxable basis. Unrelated business taxable income is defined as gross income derived from any unrelated trade or business that is regularly carried on, less the deductions that are directly connected with the carrying on of the trade or business. Most of the unrelated business income of health care systems is generated from services provided to individuals or goods sold to individuals who are not patients of the health care system. Some common examples include the sale of pharmaceuticals, or the provision of laboratory services to the public. The sale of pharmaceuticals or the provision of laboratory services to a hospital patient; however, would not be unrelated business income since doing so would be in furtherance of the hospital's tax-exempt purpose. The income from taxable subsidiaries and partnerships is normally considered unrelated business taxable income.

TYPES OF HOSPITALS AND HEALTH CARE SYSTEMS

Today's hospitals and health care systems are comprised of approximately 2,849 (59%) non-profit community hospitals, 1,035 (21%) for-profit systems and 956 (20 %) governmental hospitals (see Exhibit 2 in the appendix). Most of the for-profit systems are large public multi-corporate systems and are rapidly growing while many of the non-profit and governmental systems are either closing or being acquired by larger systems. The characteristics of each of these types of systems are discussed below.

Non-Profit/Tax-Exempt

Non-profit/tax-exempt hospitals and health care systems are typically operated as non-profit corporations pursuant to state law. They are exempt from paying income, sales, and property taxes if they are organized and operated exclusively for charitable or other exempt purposes. Contributions to these organizations are tax deductible to the donors if the organizations qualify under Section 501(c) (3) of the Internal Revenue Code. The rationale for their tax-exempt status is that they promote health and/or relieve poverty in their community. They are typically operated and managed by a board of trustees who owe their duty of loyalty to the organization and its tax-exempt purpose. Although these organizations are exempt from taxes, they are subject to taxes to the extent of any unrelated business taxable income.

For-Profit/Proprietary

For-profit proprietary or investor-owned hospitals and health care systems are typically operated as corporations; however, they can be operated in other forms such as partnerships and limited liability companies. For-profit entities are subject to income, sales, property, and excise taxes. Whether private or public, these entities are managed by boards of directors or managing partners who owe their loyalty to the entity and its owners. The purpose of these entities is to generate wealth for their owners by producing income from operations, investments, and capital appreciation. Owners and employees of these entities may receive compensation in the form of salaries, dividends and/or partnership distributions. Creative compensation and incentive arrangements are allowed such as performance bonuses, stock options, and deferred compensation plans.

Governmental/Public

Governmental hospitals and health care systems are typically operated by a public entity such as a governmental division, authority or public university. The gross income from such institutions is excluded from taxation because it is derived from essential government or public services. The loyalty of the operators of these institutions is owed to the government or public institution. Although these organizations are exempt from taxes, they are subject to taxes to the extent of any unrelated business taxable income.

TAX CUTS AND JOBS ACT IMPLICATIONS

Reduction in the Corporate Tax Rate and Repeal of the Corporate Alternative Minimum Tax

Effective January 1, 2018, corporations are subject to a flat tax rate of 21 percent, a substantial reduction from the previous maximum graduated rate of 35 percent. This rate also applies to the unrelated business taxable income of tax-exempt organizations. Although the new flat tax rate is substantially lower than it was before the new legislation was enacted, it could result in a tax increase for those taxpayers who were previously taxed at the lower 15 percent graduated tax rate. This provision represents the largest cut under the TCJA and has an estimated revenue loss of \$1.5 trillion over the next decade.

The corporate alternative minimum tax was repealed for tax years beginning after December 31, 2017. Alternative minimum tax credits from prior years can be applied against regular income taxes in future years and some unused credits may be refundable.

Limitations on Interest Deductions

Proprietary institutions could generally deduct all interest paid or accrued under the prior law. The new legislation places a limit on interest deductions so that businesses can't deduct interest expense in excess of 30 percent of adjusted taxable income. Any disallowed interest can be carried forward indefinitely. Certain small businesses are exempt from the interest deduction limitation. There are no grandfathering provisions for existing debt subject to the previous, more generous deduction rules. As a result of these new limitations, health care systems might want to consider reducing their debt load.

Immediate Expensing of Capital Expenditures

Businesses can immediately expense the cost of any section 179 property and deduct it in the year the property is placed in service. The new law increased the maximum deduction from \$500,000 to \$1 million. It also increased the phase-out threshold from \$2 million to \$2.5 million. The law increases the bonus depreciation percentage from 50 percent to 100 percent for qualified property acquired and placed in service after Sept. 27, 2017. The law applies to depreciable business assets with a recovery period of 20 years or less and certain other property. Machinery, equipment, computers, appliances, and furniture generally qualify.

Tax-deferred like-kind exchanges are now restricted to only the exchanges of real property held for use in a trade, business or for investment. Real property includes land and generally anything built on or attached to it. An exchange of real property held primarily for sale doesn't qualify. Exchanges of personal or intangible property, such as machinery, equipment, vehicles, artwork, collectibles and patents, generally don't qualify. A transition rule applies to some exchanges made before December 31, 2017.

Meals and Entertainment

In the past, health care systems were allowed to deduct 50 percent of business meals and entertainment expenses. They could deduct the entire amount for employee meals as long as the meals were provided on the employer's premises and for the employer's convenience. The meals were not taxable to the employee. Under the new law, entertainment expenses are completely nondeductible, including civic productions, sporting events, dances, etc. Business meals incurred while traveling and employer-provided meals on the employer's premises and for the employer's convenience are subject to the 50 percent deduction limitation.

Net Operating Losses

Under prior law, 100 percent of net operating losses could be carried forward for twenty years and carried back for two years. Under the new law, losses can no longer be carried back but can be carried forward indefinitely. Only 80 percent of net operating losses can be used to offset taxable income when they are carried forward. Multi-corporate health care systems should optimize the use of their net operating losses through proper planning and timing.

Excise Tax on Excessive Compensation

Generally, the new law imposes a tax of 21 percent on the excess compensation over \$1 million of the five highest paid employees of an exempt organization. A former employee of the organization or a predecessor organization can be subject to the tax. There is exclusion from the tax for any amounts paid to a licensed medical professional for the performance of medical services. Compensation includes nonqualified plan deferrals and certain parachute payments.

The new law puts tax-exempt organizations on par with their proprietary counterparts concerning the \$1 million limit on the amount of deductible compensation that a proprietary company can pay to their CEO, CFO, and other three most highly paid executives. Before the new law, performance and commission-based pay were excluded. The new law repealed these exceptions.

Multi-corporate health care systems having both taxable and tax-exempt entities cannot avoid this tax since it includes the compensation from both taxable and tax-exempt controlled entities and is applied on an entity-by-entity basis. As a result, complex multi-corporate health care systems could end up having more than five employees subject to the tax. Such systems will need to carefully evaluate their corporate structures and the timing of compensation payouts in light of the new tax laws.

Modifications to the Unrelated Business Income Tax

Tax reform has created many new rules concerning the unrelated business income tax. As of January 1, 2018, unrelated business taxable income is taxed at the 21 percent corporate tax rate and organizations with more than one unrelated trade or business must calculate unrelated business taxable income separately with respect to each trade or business. Organizations with lower unrelated business taxable incomes will likely experience a tax increase due to the elimination of the 15 percent corporate tax bracket. Losses from one unrelated business will no longer be able to offset income from another unrelated business. Net operating losses will be limited to 80 percent and can be carried forward indefinitely. Loss carrybacks are no longer allowed.

Under prior law, health care systems could provide their employees with transportation fringe benefits, gyms located on the premises, and other athletic facilities without tax consequences to the health care system or the employees. Now, unrelated business taxable income will include employer-provided transportation fringe benefits, gyms located on the premises, and other athletic facilities if the benefits are provided to employees and not included in the employee's income.

Tax-exempt organizations with numerous unrelated business activities should consider establishing a taxable subsidiary to conduct such activities. Doing so would allow for the combination of such activities and would put them on par with their proprietary counterparts.

Repeal of the ACA Individual Mandate

Effective after December 31, 2018, individuals will no longer be subject to a penalty for not purchasing health insurance under the Affordable Care Act. The Congressional Budget Office estimates that this will decrease the number of insured people by four million in 2019 and thirteen million in 2027 and cause health insurance premiums to increase by about 10 percent more per year above their already expected increase. As a result, the uninsured are expected to delay doctor visits, have trouble paying medical bills, and experience poorer health over time. This will cause tax-exempt health care systems to experience a higher level of bad and experience an increased level of uncompensated care.

Repeal of Advance Refunding Bonds

Advance refunding bonds are bond issues used to pay off another outstanding bond issue, typically at a lower rate. Health care systems have historically obtained low-interest financing of capital projects through advance refunding, saving substantial amounts of money. The new law repealed the exclusion from gross income for interest on bonds issued to advance refund another bond. The repeal applies to advance refunding bonds issued after December 31, 2017. A bond is classified as an advance refunding if it is issued more than ninety days before the redemption of the refunded bonds. Tax-free bond financing is still available since it survived the new legislation.

Fringe Benefits

Certain qualified transportation fringe benefits, including van pooling, commuter transportation, and transit passes have either been modified or repealed. These benefits are no longer deductible by the employer but remain tax-free to employees. There is an exception to the nondeductible rule for certain of these benefits if they are necessary for the employee's safety. Moving expenses can no longer be excluded from an employee's compensation, and the employee can no longer take a deduction for moving expenses.

Reductions in Charitable Giving

Tax reform has created many new rules that could adversely affect the level of charitable giving. It nearly doubles the standard deduction causing the number of individuals who are expected to itemize deductions to decrease by approximately 25 percent to only 5 percent. Without itemizing deductions, taxpayers cannot benefit from the charitable contribution deduction. This change alone will remove the incentive for 95 percent of taxpayers to make charitable contributions.

Other rules responsible for the reduction in the level charitable giving include the \$10 thousand limitation on state and local tax deductions, the elimination of the deduction for personal casualty and theft losses, and the elimination of certain miscellaneous itemized deductions. The lowering of the individual tax rates will take away the value of deductions for the 5 percent of taxpayers who can itemize deductions.

The increase in the adjusted gross income threshold for cash contributions from 50 percent to 60 percent might provide an incentive for wealthier individuals to increase their level of charitable giving and could offset the results of the adverse changes mentioned above.

CONCLUSION

As taxable systems flourish from tax savings and repatriated funds, we can expect to see increased investment in methods to improve patient volumes, increase operating efficiencies, and attract talent. The immediate expensing of capital expenditures will encourage taxable systems to expand by investing in capital assets and increasing merger and acquisition activities. Tax-exempt systems will need to find ways to contain costs, increase revenues, and improve operating efficiencies. Compensation and benefits plans, especially those involving highly compensated individuals will need to be revisited, and the organizations corporate restructure will need to be evaluated. Exempt function activities such as charity care, health promotion, and research and medical education will need to be leveraged, and opportunities for collaboration through mergers, acquisitions, joint ventures, and partnerships will need to be considered. Tax-exempt organizations will have to seriously evaluate the viability of continuing to deliver health care services through a tax-exempt, non-profit model.

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EXHIBIT 1
Hospitals and Health Care Systems by Ownership Type

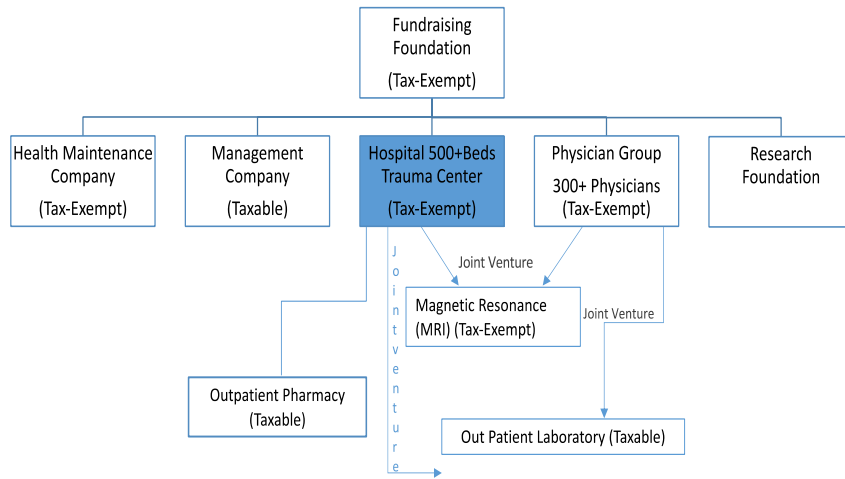
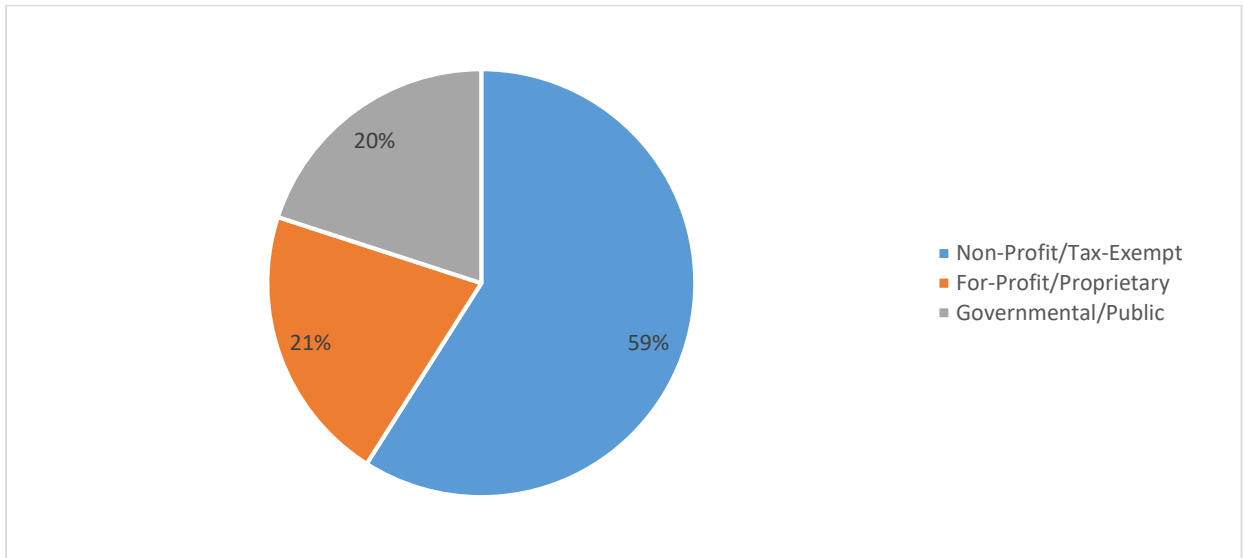


EXHIBIT 2
Hospitals and Health Care Systems by Ownership Type



**DIARY OF A SENIOR MARKETING PROFESSOR:
ADVICE ON HOW TO GET THE MOST FROM STUDENT PROJECTS**

Audrey Guskey, Duquesne University

ABSTRACT

Thirty years of teaching experience imparts valuable knowledge and know-how as to how to be the most effective teacher. Throughout my 30-year tenure teaching the Introduction to Marketing course, I have assigned students a project to “invent” a new product or service and develop a complete strategic marketing plan. This paper gives recommendations to instructors regarding student projects to increase student learning and assist faculty in the execution of a new product development project. This paper outlines some do’s and don’ts which can be generalized to other student marketing projects.

Over the course of 30 years of being a marketing professor, one’s teaching style and methods advance and hopefully become more effective. As a rookie faculty member, I started requiring a new product development project in the Introduction to Marketing course that has evolved over time. As I matured in my teaching practices, the project morphed into a complete, well-structured assignment. Through trial and error, I have learned what to do and what not to do regarding a project where the students must design a new product or service and develop a marketing strategy.

Marketing professors, particularly senior faculty members such as I, recognize that projects are instrumental in efficient and effective teaching. As academics, we know the requirement for students to do challenging projects is essential to the overall learning experience. For students, the benefits of assignments such as this are to advance their skills and provide a real-world experience in the classroom.

EXPERIENTIAL LEARNING

Krajcik&Blumenfeld (2006) posited that project-based learning roots go back to John Dewey (1938) who argued that students would develop a personal investment in the material if they engaged in real, meaningful tasks. More recent research studies have shown that students create a deeper understanding of material with hands-on interactions. In a study by Horan, Lavaroni, &Beldon (1996), students of all levels showed an increase in the ability to critically think and socially participate after doing project-based assignments. Marketing classes that emphasize experiential learning through project-based assignments helped students acquire leadership and communication skills while meeting both needs of future employers and academic accreditation institutions (Stutts& West, 2005).

Young, Caudill, & Murphy (2008) found that students were more effective in applying lecture concepts when they participated in fieldwork, simulations, labs, or consulting projects. According to Graeff (2010), an exercise must provide students with an opportunity to “learn the skills and abilities necessary to achieve their future professional and academic goals” (pp. 266- 267). Bridges (1999), Karns (2005), & Davis, Misra, & Van Auken(2000) found students gravitate toward this type of information transformation and that marketing students prefer activities that incorporate interaction, hands-on experience, and connection to the real world.

Other researchers in marketing education suggest the need to close the loop in experiential learning to cement new knowledge (Kolb, 1985). Bobbitt et al. (2000) used a semester-long exercise integrated across three courses— principles, selling, and sales management. They determined that experiential learning in marketing leads to greater student involvement and improved decision making, problem solving, and planning skills. Munoz &Huser (2008) required students to do a situational analysis in a packaged goods category and found that experiential learning fostered student engagement, realism, and involvement, leading to better critical thinking and communication skills. These experiential learning activities suggest a more effective means of student learning through student engagement and offering realism that then leads to improved critical thinking and communication skills.

PROJECT STRUCTURE

Over the past 30 years, I have assigned a project to students in my Introduction to Marketing class that requires them, in a group, to invent a new product or service and develop a complete strategic marketing plan. They are required to create a product, promote it, plan for its distribution, price it, and determine a target market. The deliverables are a written report and a presentation to the class using PowerPoint or Prezi. The report was to include the four marketing mix

elements (4 Ps), the target market, and the concept of synergy relating how each of the Ps fit together. This project enables students to apply their marketing knowledge and expertise to a managerial situation by designing the marketing strategy of a new product.

Projects are evaluated on their creativity of new product ideas, thoroughness of marketing mix strategy, and use of multi-media. Every student is required to participate in the presentation. The presentations are recorded, and students watch the video with their group members and me, in order to help improve their communication skills. A self-critique of each student's own performance is also required. I also strongly recommend that students produce television commercials, radio commercials, magazine/newspaper ads, social media, and/or prototypes of the packaging. The class is invited to ask questions of the group that is presenting. I also ask questions.

RECOMMENDATIONS FOR A NEW PRODUCT DEVELOPMENT PROJECT

The following are my recommendations from 30 years of incorporating this new product development project in an Introduction to Marketing class.

Do's

-Be clear in the assignment. From an instructor's perspective, a project will be most effective with a well-planned question or problem presented to students that engages them and requires that they generate artifacts and organic problem-resolutions (Blumenfeld et al., 1991). They learned that giving students the same project guidelines and an identical task allows them to be most productive. In order to enhance students' learning through problem solving, professors should present students with problems that are holistic, not divided by narrow disciplinary boundaries, problems that mirror professional practice, problems that are realistic, and problems that are contemporary. The students are provided a detailed assignment sheet that lists everything they need to include in their presentations and their papers. (See Appendix 1 Assignment Sheet for a complete description of the requirements of the assignment.)

-Require students to choose a company or organization. In addition to inventing a product, the students select a company for their product. It can be a company that exists or a company that they originate. If it is a new company, they need to develop a mission statement. After the presentation, I ask the group what their company is planning for their next product launch.

-Have students incorporate the concept of SYNERGY into their presentation and paper. Students are to articulate the *product concept*, which can be defined as the dynamics of a product that highlights in a short powerful statement what the product stands for and what it features. They then use the product concept as the common theme or thread that runs through their strategy, particularly the marketing mix elements, and they demonstrate how the 4 Ps fit together, much like pieces of a puzzle. They also have to show how the product fits in with the company and how the product will appeal to the target market. This is an excellent way to develop critical thinking skills.

-Introduce the project at the mid-point of the semester with the due date at the end of the semester. The ideal time to provide details of the project is at the end of the discussion of the material for the new product development process. Assign the project about five weeks before it is due. The project should be due at the end of the semester, which allows ample time for the coverage of the marketing mix elements. Positioning the project at the end of the semester also presents a good review for a comprehensive final.

-Provide class time for the groups to meet. Time in the classroom should be allocated for work on the projects to supplement traditional lecture-based instructions. Since class time is a common time students have available, allow them the last ten minutes of two or three classes so they can organize and plan their project. It also allows the faculty to be available for questions and issues the groups may be facing.

-Have the project count for a significant portion of the grade. The NPD project in my class counts for 15% of the grade. It amounts to the same weighting as one of the exams. That is a way to guarantee the students will take this assignment seriously and put a significant amount of time into their work on the project.

-Coach the team members. It is crucial that in this type of learning students are coached by their professors and encouraged to start taking responsibility for their learning (Rob & Etnyre, 2009). Conklin (2013) suggests that professors should offer support to students, listen to them, create time for independent work, offer hints, and be responsive to questions and comments. I spend time during class and outside the classroom offering advice and tips on how to improve their projects. The ability of students to work independently of instructors, with limited supervision, creates an efficient working environment (Blumenfeld et al, 1991).

-Encourage students to produce a multi-media presentation. I strongly recommend the groups design a multi-media package of advertising, both print and broadcast, and social media so they can think visually. They may not be aspiring videographers, producers, and web designers, but in crafting videos, social media, and websites, they learn how to structure these various forms of media, determine the objectives of a media plan, and reach the target market. This is one way for the students to utilize their social media skills in a professional setting.

-Require every student to present. The ability to speak in front of groups is a valued skill for business professionals. Having the ability to speak effectively and with confidence can enhance career opportunities. Practice is the key to improving speaking skills, and class projects can provide that opportunity for students to polish their communication skills. Projects assigned in classroom settings create an environment that is very conducive to practicing public speaking skills, which is one of the primary ways this skill can be improved (Shyam & Joy, 2016). I require every student to present. It does not have to be equal time for each student, but every student needs to speak. The presentations are formal, as if the students were presenting to a group of senior managers. The presentation should last no more than 20 minutes. During the presentation, they should use PowerPoint or some other presentation software package. The students are required to dress professionally. If they do not, I deduct points from their presentation.

-Record presentations and watch with your students. Students' ability to improve their public speaking is enhanced when given the ability to critique recordings of themselves for future improvement (Beebe & Beebe, 1997). This technique was used in this project, giving students a better grasp of their strengths and shortcomings in this area. In order to improve students' presentation skills, it is critical that they watch their performance. Having the students view their own presentation within the comfort and with the support of their group members helps them improve their speaking skills. It is suggested the professor view the video with the group and evaluate each student's performance while watching the video.

In large classes, students can get lost and have limited interaction with faculty and other students. By sitting down with each group to watch their video, I have found this is a great way to work around the difficulties of the impersonalization of big classes and emulate a small class setting. The dynamics are intense, and students really benefit from this one-on-one interaction. Faculty can connect and get to know their students on an individual basis. I love it when the students share their positive experience of this project with me as we watch their video. I see that they have bonded and formed friendships. It is a rewarding experience for me as a teacher.

-Self-critiques. After they have viewed the video of their presentation, I require the students to do a one-page self-critique of their communication skills. The faculty member should review the self-critique and share additional feedback with each student to improve the effectiveness of her/his presentation skills. In the self-critique, many students have stated they believed this was a valuable learning experience improving their speaking ability. The experience of the three decades of undergraduate teaching suggests this was effective in improving students' communication skills as evidenced by the comments of students as they viewed the video. Students' comments are very positive. (See Appendix 2 for Selected Student Comments.)

-Peer evaluations. In addition to self-critiques, I have the students evaluate each other using a simple peer evaluation. Each student evaluates their teammates on a scale from 1 to 5. If a student's average score is 4 or over, I give them extra points for the project. If the student's average is 3 or below, I deduct up to 10 points – a full letter grade. Group work is not always fair to the overachievers and the slackers sometimes slide through. But in a project such as this, faculty can reward or punish students and increase or drop a grade.

-Engage the class during the presentations. I allow the students in class to ask the presenting group questions. This helps develop listening skills as well as debate skills. Interestingly, the student questions from the class usually concentrate on the design and functions of the product not the marketing strategy. Encourage the students to ask questions related to the marketing of the product and not just the design and functioning of the product. The

faculty should also question the group focusing on the group's rationale for their marketing strategies. I wait until the class has asked their questions before I ask questions.

-Use a grade sheet with rubrics. I use rubrics to help in the grading process. Using a score sheet, I find the grades I give are fairer and easier for the students to see what they need to do to improve. The written report is worth 50 points and the presentation is worth 50 points. (See Appendix 3 for the Grade Sheet.)

-Offer some healthy competition. In order to encourage students to pay attention to their classmates while they are presenting, I have the non-presenting students "grade" the other groups. The team with the highest grade is awarded an automatic 100%. It is also a good way to motivate the groups to work harder and to guarantee the students will attend class even if their group is not presenting. This also helps develop better listening skills since the students pay closer attention to the presentations if they know they have to evaluate them.

-Use the data from the projects for research. Over a 30-year period, I found it interesting to review the student projects and how they have changed over time. It is a good way for faculty to improve and update the effectiveness of the project's criteria. You can use this longitudinal data to improve your teaching and the teaching skills of other faculty.

Document the projects and review them over time. It is also a great source of data for research papers. I had saved almost all of the students' projects. When I first started assigning this project, digitizing was not available, so I kept a hard copy of the projects. Thanks to a graduate assistant or two, I have now digitized all of the over 400 projects and analyzed the data to determine how student ideas have changed over the years. Have your students send an electronic version of their report and their slides.

-Revisit the criteria of the project often. Over time using the same basic structure of the project, you will want to revise it and tweak it to improve its teaching effectiveness, keep up with new technology, and apply innovative pedagogical theories.

-Require the students to work in teams. Chad (2012) found that working in team-based learning (TBL) situations is positive for the students. His results indicated that the TBL innovation has a positive influence on student engagement and offers opportunities to assist learning. The study concludes that TBL is an effective teaching process enabling educators to offer students enhanced and stimulating learning experiences.

Don'ts

-Don't allow students to choose their own groups. Björk & Magnusson (2009) explored the interrelationship between innovation idea quality and idea providers' network connectivity using social network analysis. The analysis indicated that there is a clear interrelationship between the network connectivity and the quality of the innovation ideas created. The proportion of high-quality innovation ideas increased between the least connected group and the group thereafter. In these settings, where individuals work with others in different groups, the most connected groups perform worst in terms of the proportion of high-quality ideas generated, which points to the necessity to consider a multitude of factors when managing ideation. The findings suggest that to increase the number of high-quality innovation ideas created by individuals, the members of the group should not be highly connected. Students' connectivity during the project was one of teamwork, but not of a very tight knit group since they were put into groups and not permitted to choose their friends as teammates. By forcing students into groups and not allowing them to pick their friends, one can assume that students were not in the most connected type of group, but were still near source groups and cohesive, but not super connected groups. Thus, encouraging students interact with other people outside of their close network should be supported and facilitated.

Groups of four to six students were assigned alphabetically. If you allow the groups to self-select, they will join up with their friends. The actual project will not be as good and learning experience will not be as great due to the emphasis on social factors rather than productivity, creativity, and effectiveness. Over the history of this assignment, I have allowed the students to self-select their groups. Not surprising, the grades were reflective of this with a less than quality performance.

I have found that many of the students develop wonderful friendships as a result of this project. I sometimes have the groups at the beginning of the alphabet present first and sometimes I mix it up and reverse the order so the names starting at the end of the alphabet names go first.

-Don't allow students unlimited time for the presentations. Set a time and then stop the group if they exceed the time limit. That gives students the experience of the real world and its limitations on time and resources. Inform the students as they are working on the project that they will be held to the time limit. Be sure to allow at least five minutes per group for questions. In a 50 to 60 minute class, two groups can present for 20 minutes each, followed by 5 to 10 minutes of questions.

-Don't allow your students to display unprofessional social behavior and unprofessional attire during the presentations. Help your students learn proper business etiquette. Recently, during the presentations, I noticed that most were on their devices. I called out the most blatantly offensive students and requested them to ask a question to the group. You can be sure everyone in the class paid attention to the next group.

Also, be sure to point out unprofessional dress. This especially true for the female students. As business students, they need to know what is appropriate and what is not. You will be doing them a favor. Unfortunately, this has become a more reoccurring problem due to the introduction of "business casual".

ADDITIONAL REFLECTIONS

I came away with many interesting stories from the various products that the students invent. Elizabeth from Alaska had a friend who was in wheelchair. As a young woman, Elizabeth's friend wanted to be fashionable and proper, but that can be difficult when your legs are paralyzed. Elizabeth came up with the idea of Magna Shoes, which are shoes with magnets to keep one's feet together that also were fashionable. She had wanted to market this product, but that never happened. She ended up becoming a marketing professor instead!

And Mark, a freshman in the class, had started his own business selling lip balm, a product similar to Bert's Bees products. For the class project, Mark and his group marketed a product extension of the lip balm – moisturizers for the face and body.

An interesting delivery service product that was developed by the students, Best of Hausz (2013), was an in-home manicure/pedicure service for the elderly, to celebrate the lives of senior citizens. In this group, there was a non-traditional, older student. The student and her sister had planned to start this as an actual business. And one of my favorite products was Duquesne monopoly with a fully designed board including university streets, buildings, and faculty and administrators faces on the Chance cards!

SUMMARY AND CONCLUSION

A project of this design is highly recommended to faculty of higher marketing education. It benefits students, the faculty, and corporate America, by cultivating necessary skills and interests in marketing.

As faculty, we sometimes are myopically focused on the subject matter, and forget that we are shaping our students' professional lives. In addition to learning the key concepts of a subject such as marketing, we can give them opportunities to develop professional and lifetime skills such as speaking, writing, team-building, confidence, discipline, maturity, and self-esteem.

What I found after sitting in small groups of four to six students and watching the video of that group's presentation with them, is that this is really where the training, teaching, and motivation occurs. It is time consuming for the faculty member, but it gives her/him the opportunity to really get to know their students in a small group setting. We laugh and talk about each of their speaking skills. I always tease them that people's biggest fear next to dying is public speaking, and the next biggest fear is watching yourself presenting! The joy of seeing students passionate about their product has been a priceless, rewarding experience for me. This is an opportunity to talk about their future plans and allow them to ask questions about marketing, careers, and how to develop into a professional.

Faculty administering such a project benefit by seeing students grow professionally and personally. Having a first-hand view of this growth is rewarding in an altruistic and career-related way. It also creates an environment in which an instructor can more clearly see ways in which to improve the classroom learning. Furthermore, the instructor can help students divulge interests in a marketing-related future by encouraging the behavior exhibited in the project and presentation.

In the teaching evaluations, student feedback notes this project was the best part of the class, and some have even said it was the best experience of their college career! It is a fun, engaging, and powerful project for students. When I have encountered dozens of my former students over the years, they have told me they remember fondly the project. They remember what their product was and who was in their group. When I tell them I have digitized their project, they want a copy sent to them.

It is suggested that faculty follow the guidelines of the project as recommended in this research, but add new requirements to personalize the experience. For future research, it would be interesting to measure student learning before the project and after the project to see if the project has increased student learning objectives.

By doing the same project over the course of one's career, it allows a professor to constantly improve the assignment and gives the opportunity to tweak and refine the requirements. To those faculty who are starting their career teaching marketing, I hope you find as much reward in teaching as I have!

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APPENDIX 1

Introduction to Marketing – New Product Development Project - Assignment Sheet

Each group is to select a new product that has been conceived by the group. Each group is responsible for presenting one new product idea to the class. **BE CREATIVE! YOU WILL BE GRADED ON YOUR INGENUITY!** The presentation should be formal and thorough, as if it were being presented to a group of senior product managers. The presentation should last no more than 20 minutes.

Be interesting -- use visuals!!! **You are required to use PowerPoint for your presentation.** It is also **strongly recommended that you produce television commercials, radio commercials, magazine/newspaper ads, and/or prototypes of the packaging.** The class will be allowed to ask questions of your group with regard to your product and its marketing strategies. Dr. G. will be asking questions, too☺

Also, a written paper, one per group, should be submitted the day of the oral presentation. This paper should be at least fifteen pages and should be structured along the lines of an executive report. Thus, it should be typed, double spaced, concise, and thorough covering all the key issues which are enumerated below. **PUT ALL OF YOUR MATERIALS TOGETHER IN A BINDER/FOLDER OR GET IT BOUND.**

1. What is the product's (or service's) core benefit?
2. How is this core benefit manifested in the tangible product? What functions does it perform?
3. What are the intangible factors?
4. What is the name of the product? What name strategy was used - family name extension, separate family name for different product lines, or individual brand name? Why?
5. Describe the logo and/or trademark, if there is one.
6. Describe the design of the product.
7. How will the product be packaged? (May not be applicable for some products or services.)
8. How will this product help the organization compete? In other words, how does this product fit into the organization as far as the organization's resources and expertise, the organization's mission, and the environmental opportunities?
9. Describe the product's "promotion mix". Elaborate on the advertising (media type, media vehicle, and the theme of the ad), the sales promotion (typed used), publicity, and personal selling.
10. Highlight your pricing structure. Is this a price skimming or price penetration strategy? What pricing method did you use (cost, demand, competition, customer-oriented)? Why?
11. Discuss the distribution channels. Is this intensive, selective, or exclusive? Will you use wholesalers and/or retailers? Describe the places your product will be sold.
12. Evaluate this product as to whether you feel this product will be successful or not successful. Include information on the target market and why this strategy will reach this group.
13. **Elaborate on the concept of SYNERGY – HOW DO ALL THE PIECES OF THE 4 Ps PUZZLE FIT TOGETHER?**

PART OF THE GRADE FOR THE PROJECT WILL BE A CRITIQUE OF YOUR PRESENTATION SKILLS.

YOUR GROUP WILL VIEW THE VIDEO THE DAY OF THE PRESENTATION WITH DR. G. & DISCUSS WAYS TO IMPROVE YOUR PRESENTATION STYLE. WRITTEN SELF-CRITIQUE WILL BE TURNED IN TO DR. G. ALONG WITH A PEER EVALUATION FORM.

APPENDIX 2 Selected Student Comments

“I’m glad I was given the opportunity to see my weak spots and identify them so I will be careful to avoid the same mistakes in future presentations. I now know what I need to work on and how I actually appear to my audience.” - Michelle Dickson (1994)

“I would like to say that I am glad I had the opportunity to present my project to the groups. I think this presentation was a great idea. Although I have had bad presentations the past, it is always good to have more practice. This presentation definitely helped build my confidence and I plan on building it from this point forward. Also for me personally, I can look back on it and say I can talk to a group for 20 minutes.” -Meghan McMillan (2005)

“Overall there are many things I need to work on and this project helped me realize those things so that I am better prepared in the future.” - Thomas Ferrante (2008)

“Watching the video of our presentation, I was surprised by my overall performance. I have been much more nervous for other things in the past but nonetheless, I was still a little uneasy... I looked more comfortable speaking than I actually felt inside.... I have always struggled with my basic speaking skills. I have never been happy with the clarity of my voice. I specifically focused on this during my presentation because I knew that I would be able to watch it later. It wasn’t terrible, but I still feel that it has room for improvement.” - Thomas Havranek (2007)

“Before I even watched the video, I thought I knew exactly what I did wrong. I was not looking forward to hearing my voice and realizing how bad my posture looked. But I realized there were a lot of little things I completely overlooked. I went into it being a lot more critical about myself than I needed to be. I can’t lie, I looked very professional and to be honest I was having a pretty good hair day. I know I am my toughest critic, but at least I got to see areas that needed improvement and next time I will learn from mistakes I made in this presentation.” - Krista Palmosina (2008)

“After watching the video and talking to Dr. G, I have realized that I would have changed parts of my section of the presentation, but I believe I said everything with confidence.... I have learned how to become a better professional speaker after finding ways to fix my mistakes after this marketing speech. Everyone learns from mistakes, and I am more prepared for the next time I will have to give a presentation in the next class. I really enjoyed this project, and I am happy I learned so much from it for the future.” – Alex Bachorski (2015)

APPENDIX 3

Grade Sheet with Rubric Used for the New Product Development Project

GROUP NUMBER _____

DAY PRESENTED:

PRODUCT NAME _____

ORAL PRESENTATION

- _____ **PRODUCT BENEFITS (5 points)**
- _____ **PRODUCT ELEMENT (name, logo, design, package) (5 points)**
- _____ **PROMOTION MIX (10 points)**
- _____ **PRICING MIX (5 points)**
- _____ **DISTRIBUTION MIX (5 points)**
- _____ **SYNERGY OF PRODUCT AND ORGANIZATION (5 points)**
- _____ **EVALUATION OF PRODUCT'S SUCCESS (5 points)**
- _____ **OVERALL PRESENTATION/SLIDES (5 points)**
- _____ **CRITIQUE OF YOUR OWN PRESENTATION STYLE (5 points)**

- _____ **TOTAL POINTS FOR ORAL PRESENTATION**

WRITTEN PRESENTATION

- _____ **PRODUCT BENEFITS (5 points)**
- _____ **PRODUCT ELEMENT (name, logo, design, package) (5 points)**
- _____ **PROMOTION MIX (10 points)**
- _____ **PRICING MIX (5 points)**
- _____ **DISTRIBUTION MIX (5 points)**
- _____ **SYNERGY OF PRODUCT AND ORGANIZATION (5 points)**
- _____ **EVALUATION OF PRODUCT'S SUCCESS (5 points)**
- _____ **OVERALL PAPER (professional style of writing, spelling & grammar, use of charts) (10 points)**

- _____ **TOTAL POINTS FOR WRITTEN PRESENTATION**

COMMENTS:

SECURITY, DIGITAL CITIZENSHIP, AND COLLEGE STUDENTS. IS THE IOT CHANGING STUDENT'S PERCEPTION OF PERSONAL SECURITY?

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ABSTRACT

The need to increase education in digital security is becoming a prevalent issue as the arms race to secure cloud storage and vulnerabilities of critical data is survival of the fittest. Digital security is a common theme in the news again and again, as many involved in the new age of the IoT (internet of things) have an understanding in the process of storing and retrieving data from their devices, however the security of that data should also come into question. Although it is important for IT (information technology) students engaged in coursework to understand the propensity of their digital actions online, IT students are not the only ones affected, rather, security is a multidisciplinary issue. Students' digital citizenship and education in their personal security will be explored in this review of literature.

INTRODUCTION

As data breaches, identity theft, and multi-scale hacking infiltrate the daily use of technology, cybersecurity is a personal and organizational responsibility in today's digital world. The IoT or the (Internet of things) and social media in collaboration with large-scale databases have changed the way data is collected, used/analyzed, and stored. Students have the potential of leaving digital footprints along their stops on social media and web crawls. As McDermott (2018) discusses, digital footprints can be left by a student unintentionally and without the student's knowledge, stating "People who lack this knowledge may generate digital footprints with negative implications, thus necessitating remediation. But this process needs to be reversed" (p.54). The identification of students' perspectives in digital security is vital to educating them in digital citizenship. Security is a multidisciplinary issue, but how a student is educated can vary by discipline. This literature review will explore students' perspectives of security with the focused disciplines of Management, Accounting and Information Technology.

INFORMATION TECHNOLOGY STUDENTS' PERSPECTIVES

The adage that any tool can be a weapon, is vividly present in today's discussions on cybersecurity. As digital natives of technology, college students are no longer under the security of a personal umbrella of digital privacy. As the students broaden their social media circles, shop for necessities, and handle personal finances online, the threat of identity theft and downloading malicious spyware/adware is frequent. The question of students checking their privacy settings and ensuring that their devices are not broadcasting their location is a small question of security that students should reflect upon often. In an experimental study Wilson (2018), in a mock social engineering baiting experiment where USB drives labeled homework were loaded with fake homework assignments and a file named "readme.pdf" which when opened held the directions to return to the professor with a code word. This experiment found key that most students (67%) of surveyed students would open the USB drive and read the file, thus showing that most students are unable to identify their vulnerabilities as well as the ease at which trust can be easily violated. As this study was performed in an Introduction to Security class the question of the past education in digital security remains.

As students studying information technology and computer science courses may have a course in security the coursework mainly focuses on organizational security. As Moore, Zinkus, Lemay, Peterson, and DeBruhl (2018) found "It may be expected that introductory security courses also cover privacy. However, when we examined daily course schedules for 8 undergraduate security courses from prestigious institutions we find that these courses spend, at most, one day on privacy" (p.159). If privacy as a topic is not focused upon even in IT/CS coursework, college students may be forced to learn digital security through personal trial and error or in the attempt to rectify an attack. The concern for security should not be isolated to IT/CS majors, as digital security effects organizations as a whole, education and practice in personal digital security can then carry over in the students' professional careers.

MANAGEMENT STUDENTS' PERSPECTIVES

As management studies train students to streamline processes and use information in decision-making, the need for securing information from the employee side is a growing concern for management. Findings from a study of 85 undergraduate business students in New England confirmed that 71% understood the importance of information security while 68.2% hadn't taken security training (Kim, 2013). Additionally, it was found that students do not fully understand the importance of changing passwords or encrypting important files and expect the university to take security measures to protect their personal data (Kim, 2013). If students are looking for the University to keep their personal information secure, how will the students effectively protect data when intertwined in the workforce? There are examples of students creating cybercrimes instead of using their knowledge to educate themselves in digital citizenship. Rutgers University students took part in creating a Mirai malware that brought down websites in Western Europe, Northeast, and Californian in September 2016 (Heyboer, 2017; Woods, 2018). NJ.com news reported that the malware was designed to hijack and enslave weak secured Internet of Things (IOT) devices that include video recorders, wireless cameras, routers and was tied to crashing Netflix, Tweeter, Spotify, Reddit, CNN among others (Clark & Mueller, 2017; Heyhoer & Sherman, 2017). The involved students sent out extortion notices and, in some cases, made \$180,000 from leasing computers and redirecting traffic for "click fraud" (Heyhoer & Sherman, 2017); to ensure cybersecurity Rutgers University spent \$3 million for consultation, software, and equipment upgrades to combat cyber-attacks (Clark & Mueller, 2017; Heyhoer & Sherman, 2017). The Rutgers University situation on cybercrime is evidence that digital security is essential and customized training instead of the one size fits all should be made available to all students with follow-up assessments to ensure effectiveness.

Students are digital natives, but how much effort do they put towards their digital security as they use the internet in their academic and social lives? Do they anticipate that they are vulnerable to cybercrime; thus, in need of digital security training to combat the crimes? To test the effectiveness of Java Applet warning messages to user's actions; research by Ayyagari and Figueroa (2017) with 141 undergraduate students who were split in two groups were trained how to handle the Java Applet warning using a video, while the second sample of undergraduates were shown the standard written warning. The objective was to identify if students adhered to policies and took caution to minimize risks; the findings confirmed that the approach of presenting the video of the Java Applet warning had a better understanding on how to handle risk as they understood the reasoning behind protecting their security online (Ayyagari, etl. 2017). The authors argued that "seeing is believing" and confirmed that using a written policy instead of video wasn't effective enough to emphasize the risks associated with internet usage, rather education on why taking the course and being compliant would protect their personal security (Ayyagari & Figueroa, 2017; Caudill & Murphy, 2000; Rezgui & Marks, 2008). Despite the importance of digital security and privacy for students that are currently studying management, the classroom falls short in providing the proper education on security topics.

ACCOUNTING STUDENTS' PERSPECTIVE

Advancements in technology have prompted progress across many industries forcing employees across disciplines to enhance their knowledge of digital security and accounting professionals are not exempt. The accounting industry has been thrust into the new age of IoT (internet of things) where artificial intelligence has taken over the repetitive and mundane accounting tasks changing the role of the accountant from simple bookkeeper to business analyst (Rîndaşu, 2017). "The changes induced by big data, cloud computing, mobile and intelligent devices and not lastly social platforms, just to mention some information technologies "on the wave" are significantly impacting the accounting profession" (Stanciu & Gheorghe, 2017, p. 370). Understanding the security risks these new technologies disseminate into an organization's financial system is crucial for anyone entering the accounting profession. A study conducted by the ACCA (Association of Chartered Certified Accountants) and IMA (Institute of Management Accountants) stated "new roles are emerging in the accounting profession that will focus not only on accounting and finance, but also on information technologies" (Rîndaşu, 2017, p. 582). In order to be successful, it is necessary for future accounting professionals to have the ability to retrieve, control, and analyze digital data (Pearson & Singleton, 2008).

The classroom environment provides a gateway between aspiring accountants and the profession; therefore, researchers emphasize the vital role that colleges and universities play in providing students with fundamental knowledge and skills in digital security (Rîndaşu, 2017). Traditional accounting education consists of learning basic concepts from debits, credits and journal entries to preparation of the financial statements in accordance with current accounting standards. Recently, the reliance on technology has escalated the need for technology street smarts,

especially with an increasing number of financial crimes through the use of digital tools and techniques (Pearson & Singleton, 2008). The boost of mobile technology usage over the past decade has changed societal behavior with a growth rate well exceeding the combined growth rate of desktop and laptop ownership from 2004 to 2015 (Amita et al., 2016). This has changed the auditing process as new IT solutions have resulted in IT audit software and mobile devices utilized by audit team members (Stanciu & Gheorghe, 2017). Implementing digital security knowledge into the accounting curriculum could help prepare these students for the challenges and risks posed by technological advancements within their field of study.

Accounting faculty should strive to teach their students about contemporary and innovative issues they may encounter during their careers (Kaplan, 2011). It is imperative accounting students are exposed to and understand the security risks associated with digital technology. They are the future business leaders who must not only understand their responsibility for cybersecurity and privacy threats, but also know how to design and implement security controls in the pursuit of threat management (PWC, 2016). Since technological advancements have recently accelerated, it is taking the academic platform some time to catch up and develop courses which integrate digital security into the students' knowledge base. Research has supported the theory that currently students have little understanding of digital security, let alone how to initiate it into their personal or professional lives. One study indicated that commercially available security trainings are ineffective for students and they need more formal training to grasp and implement digital security practices (Amita et al., 2016). Academia plays a critical role in educating future professionals about emerging technologies. Rindaşu (2017) stated that "by linking accounting and IT topics, we believe that aspiring accountants will develop a greater level of knowledge" (p. 603).

CONCLUSION

Advancements in technology have brought about many changes to our daily lives, including how we communicate, socialize, shop, etc. In today's world with a heavy reliance on digital data, it is essential for individuals to understand how to secure and protect that data. Students across many disciplines need to develop the knowledge and skills related to not only their field of study, but also the digital security of their personal data as well as the information for the organizations for which they work. Understanding the students' perspectives of digital security across various disciplines is a key component in determining an effective curriculum which educates them on digital citizenship.

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HONESTY IS THE BEST POLICY
Peter Huegler, Lock Haven University of Pennsylvania
Cori Myers, Lock Haven University of Pennsylvania

ABSTRACT

Rhetoric on business ethics indicates that some of the best ways to break the cycle of unethical behavior include espousing business values with ethics as a focal point, establishing a code of conduct, recruiting employees who share those values, training employees about ethical norms, and implementing strict policies with heavy punishment for unethical behaviors alongside attractive rewards for being ethical (Goldfield, 2015; Dubois, 2012; Bazerman & Tenbrunsel, 2011). Part of the solution may reside in dealing with ethics and honesty more during college and high school to address unethical and dishonest behavior during these formative stages. Developing a comprehensive approach to ethics and academic honesty at a given institution requires a study of the issues that exist there. This paper describes the study and results of student perceptions of academic (dis)honest behavior in the business and accounting programs at a small public university as a first step in taking a more proactive approach to developing managers, employees, and people who are better equipped for ethical decision making.

INTRODUCTION

Rhetoric on business ethics indicates that some of the best ways to break the cycle of unethical behavior include espousing business values with ethics as a focal point, establishing a code of conduct, recruiting employees who share those values, training employees about ethical norms, and implementing strict policies with heavy punishment for unethical behaviors alongside attractive rewards for being ethical (Goldfield, 2015; Dubois, 2012; Bazerman & Tenbrunsel, 2011). Publications like *Fortune* and *Harvard Business Review* clamor about how leaders need to be more deliberate about the goals they set and what they communicate to employees about the importance of ethics in decision making. While taking thoughtful steps in the business community to lead in an ethical manner, part of the solution may reside in having learning experiences and curricula deal with ethics in the more formative stages of our business managers' career development. Yes, that means giving our future managers exposure to issues of ethics, honesty, and integrity throughout the educational process leading up to their employment in business and industry. Unfortunately, in many cases, instruction on moral and ethical values has become more limited and less emphasized in the educational system leaving students, who later in life become employees and managers, less equipped to make ethical decisions (Bertram Gallant, 2011). So how do we proactively address ethics and honesty at least in college, if not before? Establishing a culture of ethical behavior and academic integrity will help shape not only student behavior as an undergraduate or graduate student, but also individual action as a member of the business community (Bertram Gallant, 2011; McCabe et al., 2012; McCabe & Pavela, 2000).

BACKGROUND

In high school and college, unethical behavior emerges in various forms: lying to parents, spreading unfounded rumors, stealing lunch money or belongings, and of course, all of the behaviors that constitute academic dishonesty which is the "intentional participation in deceptive practices in one's academic work or the work of others" ("Academic Dishonesty," n.d., para.1). As summarized by Myers and Huegler (2018), academic dishonesty can be classified as plagiarism, falsification of data, bribery, cheating, sabotage, professional misconduct, impersonation, collusion, conspiracy to cheat, and multiple submissions. These behaviors persist for many reasons, including various individual, socio-cultural, and institutional factors.

Individual factors that elicit dishonest behaviors may include pressure on time with the inability to manage it (McCabe, Butterfield, & Treviño, 2012). Students who are socially active, student athletes, and fraternity/sorority members tend to report higher incidences of dishonest behaviors for these reasons (McCabe et al., 2012; Eshet, Grinautski, & Peled, 2012). Individual factors also include being male, younger, and low achievers who need to attain a minimum performance threshold as well as high achievers (as measured by GPA) who face tremendous pressure to succeed and win (Simkin & McLeod, 2010; Bunn et al., 1992; Farisi, 2013).

Some socio-cultural factors that influence dishonest behaviors consist of conditions like less critical attitudes and/or lesser stigma toward cheating (Bertram Gallant, 2011); lack of understanding of what constitutes academic dishonesty or what violates institutional policy (Farisi, 2013; McCabe & Treviño, 1993); less emphasis in the educational system

(Bertram Gallant, 2011); student perceptions of how peers' view behavior, whether peers' engage in behavior, if policies exist, the severity of penalties, and likelihood of getting caught (McCabe, Treviño, & Butterfield, 2002).

While a variety of socio-cultural conditions exist, institutional factors also play a role in the prevalence of academic dishonest behavior. Institutions with honor codes, especially those that enforce the codes or policies, see fewer incidences (McCabe, Treviño, & Butterfield, 2002). Faculty and student engagement in policy development, detection, and enforcement is paramount; however, faculty involvement may relate to the perception of whether strict enforcement will negatively impact the classroom environment and teaching evaluations (Hamlin, Barczyk, Powell, & Frost, 2013; Simkin & McLeod, 2010). In addition, less selective institutions, larger class sizes, types of assessment (e.g., online exams), outdated assessments, and feeble means of preventing or detecting cheating will tend to exacerbate the problem (Bertram Gallant, 2011; Farisi, 2013).

The literature suggests that dealing with academic dishonesty requires a comprehensive approach to establishing a culture of ethics, integrity and academic honesty by identifying the problem exists, studying it, and developing an institution-specific response (Bertram Gallant, 2011; McCabe et al., 2012; McCabe & Pavela, 2000). These efforts will likely include the establishment of clear values and policies, frequent communication of those values and policies, and programmatic efforts to address past behavior and proactively establish ethical norms for the educational community.

THE PROBLEM

Over the past few years, the business and accounting programs (the programs) at a small state university anecdotally identified that a problem existed with regard to academic dishonesty. Although academic honesty and fair and equitable treatment were discussed at orientation, included in the values statement, and addressed in course syllabi, the process for dealing with academic dishonest behavior seemed insufficient. Semester after the semester, the faculty would consult one another and lament as they faced multiple incidences of plagiarism, collusion, cheating, and multiple submissions. Typically, the issues were handled informally with the instructor of each course, usually resulting in a zero for the paper or project in question and in some cases, resulting in the opportunity to redo the assignment for partial credit. Debatably, the punishment was not severe enough in some cases. The faculty conceded that lack of consistent enforcement and informal resolution contributed to the problem. Also, the university did not have a way for faculty to find out if a student was a "repeat offender" with a record of such behavior. In essence the academic honesty policy and process appeared to be lacking, but the faculty felt from the continued encounters with student issues and frustration it caused, that a problem existed. As the literature suggests, they moved from acknowledging that a problem existed to studying it. First, they studied the literature on academic dishonesty: what is it, why does it happen, and what should an institution do about it? Results of the review were published by Myers and Huegler (2018). In this research, the faculty reviewed other institutions' academic integrity surveys and reports on the academic integrity climate and academic dishonest behaviors to develop their own instrument for studying the problem.

DATA COLLECTION AND METHODS

Academic honesty surveys in the literature are primarily based on the McCabe et al. (2012) survey instrument. For examples see "UBMC Academic Integrity Surveys: Spring 2003" (2003), "Arbor Day Academic Integrity Survey Report," 2014, and "Florida State University Academic Integrity Survey Spring 2015," (2015). The program developed an in-house, 56-question survey which asked students about the academic environment (e.g., perceptions of penalties, understanding of policy, support for policies, effectiveness of policies, if informed of policies and from where), specific student behaviors (e.g., did they engage in/observe dishonest behavior and how serious did they perceive such behavior), and demographic data (i.e., class standing, gender, major, and GPA). Changes were made to the instrument to focus on the business and accounting programs and issues within the programs. The appendix includes the survey instrument.

The survey was administered by paper-and pencil in the two sections of the senior capstone seminar for business and accounting students by a university staff member. The in-person administration by a staff member was intended to increase response rates (a documented problem with online surveys) and encourage students to feel more comfortable (in the absence of faculty) about answering potentially sensitive questions about their own (dis)honest behavior. The capstone course is usually taken by students in their senior year. Responses from seniors were expected to be better

informed since the students' longevity would give them more exposure to and a deeper understanding of the norms and behaviors exhibited in the academic environment.

Thirty-four responses were collected from the students who attended class on the date of the survey administration. No students refused to complete the survey but not every student answered every question on the survey, hence the sometimes lower number of responses for a question. Total enrollment of the two sections was 42; eight students missed class on the date of the survey administration. Since survey administration was conducted at the end of the semester, time for follow-up survey administration was not available.

RESULTS AND DISCUSSION

The following figures show the demographic information collected. Figure 1 and Figure 2 show the number of responses by class standing and gender. As noted above, the survey was administered in a capstone class and all of the respondents reported a senior class standing. Figure 3 shows the program affiliation. "BUSA" are business administration majors, "ACCT" are accounting majors. There are five students majoring in both business administration and accounting (the "BUSACC" column). Finally there is one student who has a double major with business administration and another program. Figure 4 shows the number of students in four GPA ranges.

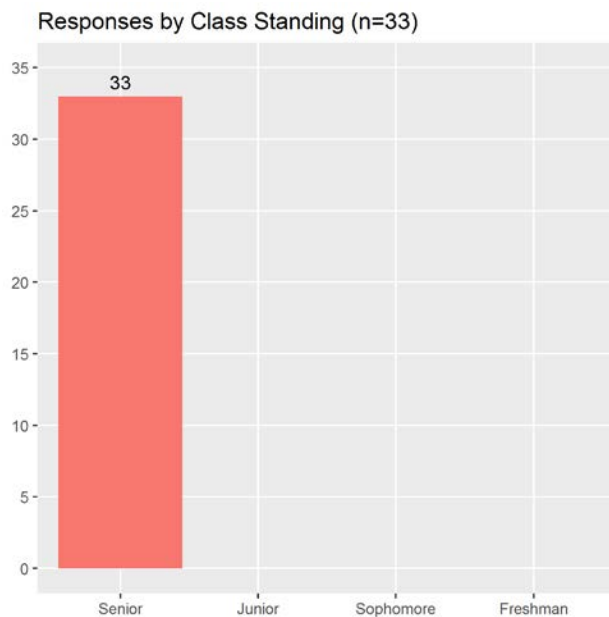


Figure 1: Survey Responses by Class Standing

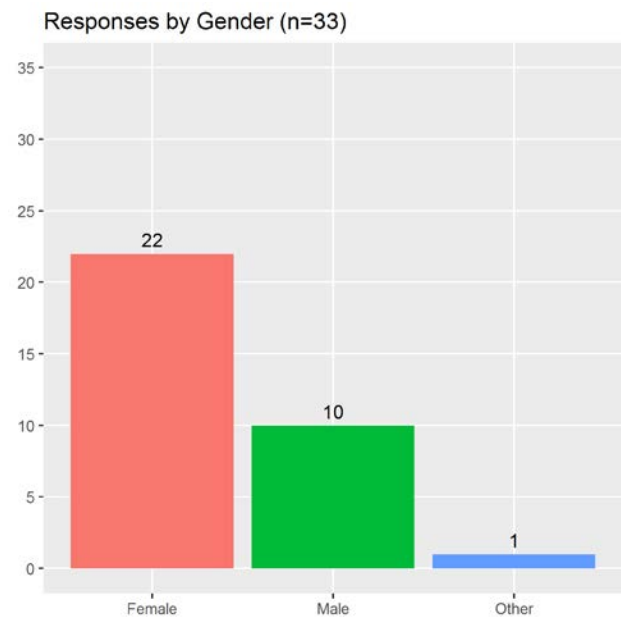


Figure 2: Survey Responses by Gender

Responses by Program (n=33)

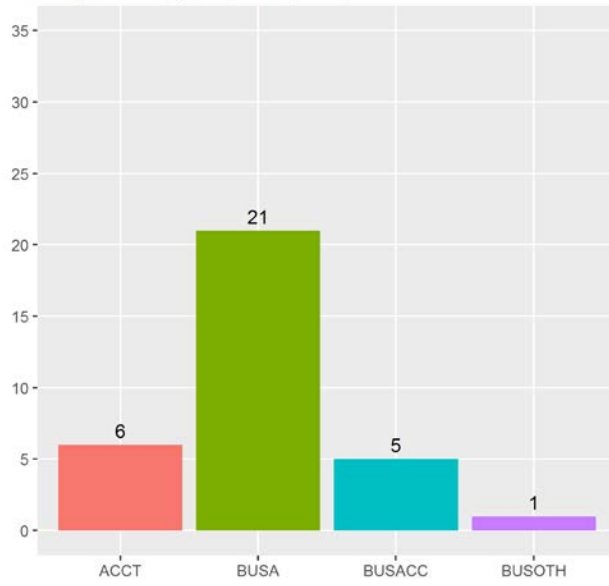


Figure 3: Survey Responses by Program

Responses by GPA (n=33)

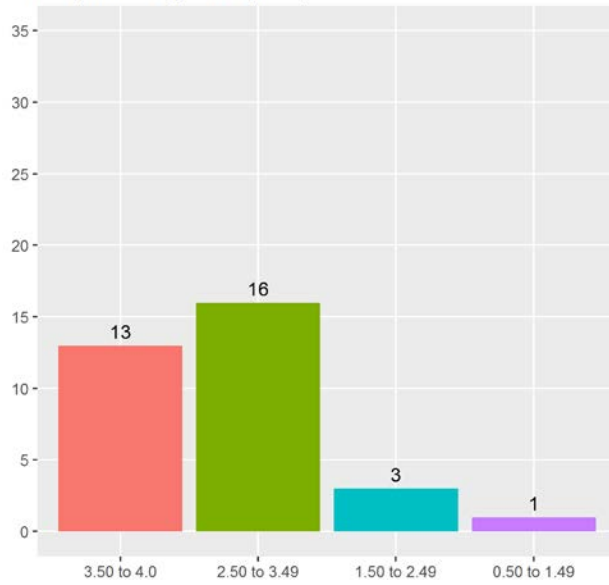


Figure 4: Survey Responses by GPA Range

The first part of the survey queried students about the academic environment within the accounting and business programs. The first set of questions asked about the support for and understanding of academic honesty policies. The results are summarized in Figure 5.

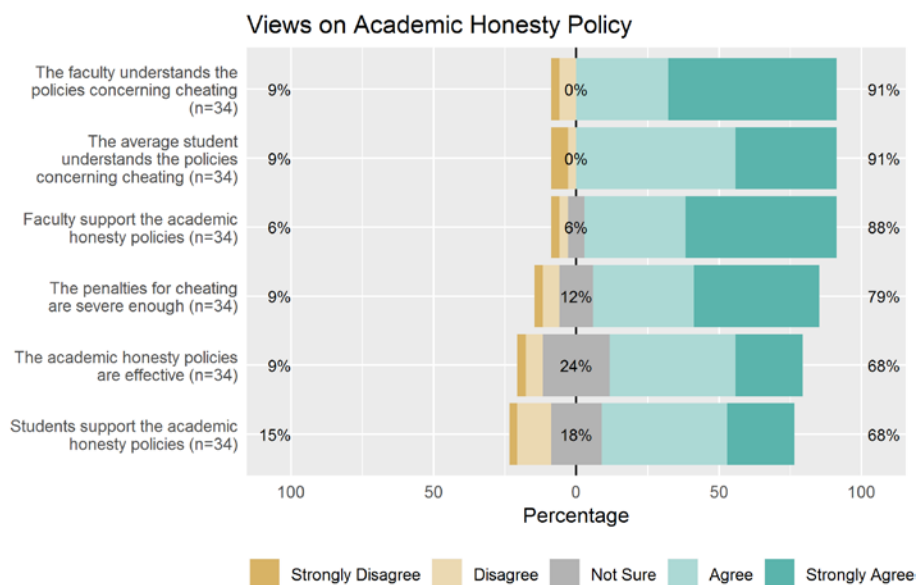


Figure 5: Support and Understanding of Academic Honesty Policies

Figure 5 is read as follows: the question is listed on the left. At the end of the question text is the number of responses for that question. The percentages are for the number of strongly disagree and disagree (left), not sure (center), and agree and strongly agree (right).

When asked about support for and understanding of the academic honesty policies, 91% of respondents indicated that the faculty and the students understood the policies, but their perceptions indicated that 88% of faculty and only 68% of students supported the policy. Moreover, 79% of students felt the penalties were severe enough and 68% felt the policies were effective.

All 34 respondents indicated that they had been informed of academic honesty and cheating policies. Figure 6 and Figure 7 summarize the results on these questions. All students responded that they had been informed of the policies largely from faculty (98% of students heard some or a lot about the policy from faculty), but also from the student handbook and some from other sources as well. The fewest amount of students learned about the policy through orientation and from other students. More specifically, students indicated that in the past year, their instructors talked to them often or very often about various kinds of dishonest behavior and the academic honesty policy, but most often about plagiarism followed by citing from the internet and written sources.

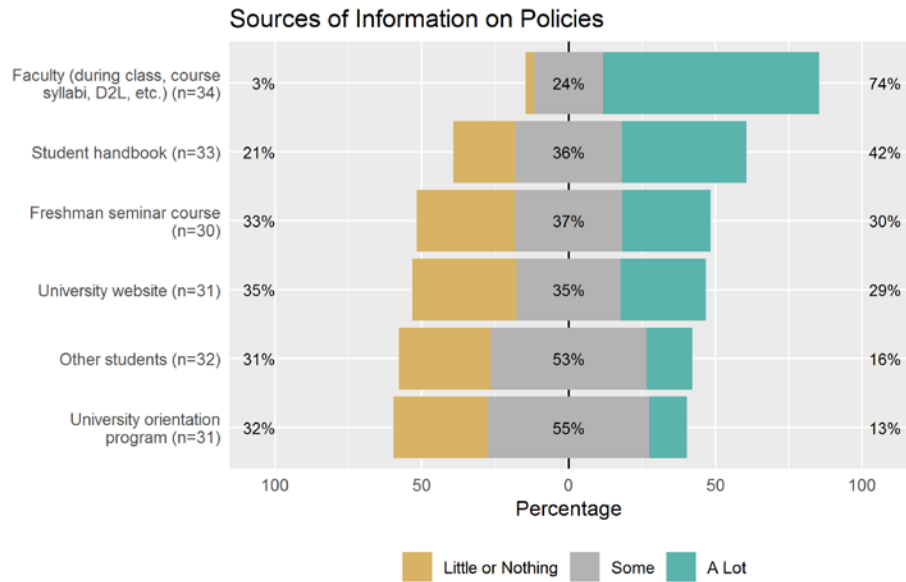


Figure 6: Sources of Policy Information

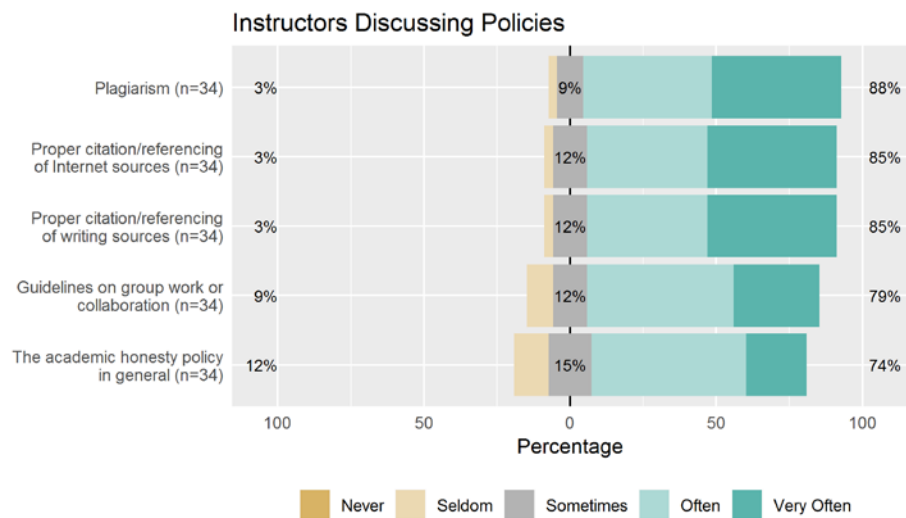


Figure 7: Instructors Discussion of Policies

The following three figures present the results about how frequently academic dishonest behaviors occur, how likely students would be to report it, how serious the problem is, and what level of student and faculty involvement exists.

Students reported that cheating on quizzes, tests, or exams and getting help or using materials not permitted for the assignment happened most frequently with 85% of students indicating that it happens sometimes, often, or very often. However, 50% of students reported that getting help happens often or very often as compared to 41% for cheating and 44% for plagiarism.

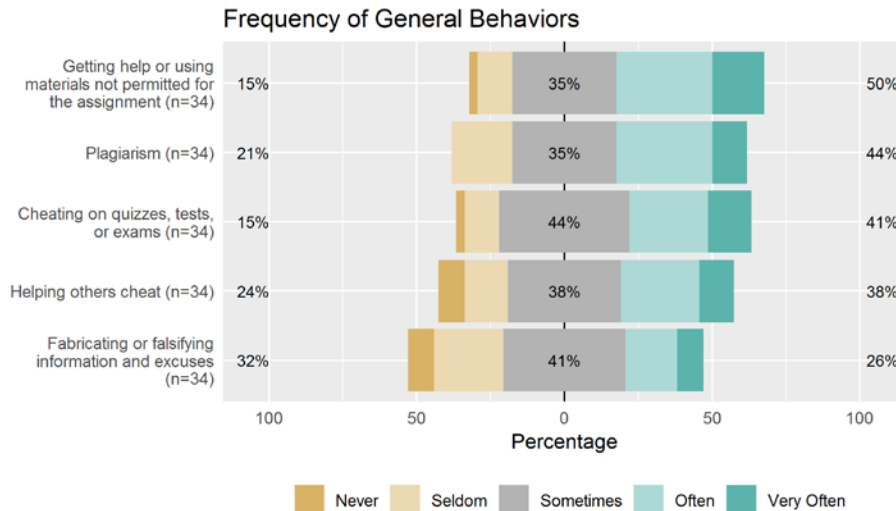


Figure 8: General Views on Academically Dishonest Behaviors

When asked how likely it is that students would report cheating or academic dishonesty, 71% reported that it is unlikely or very unlikely that s/he would report it and 79% unlikely or very unlikely that others (the typical business students) would report it.

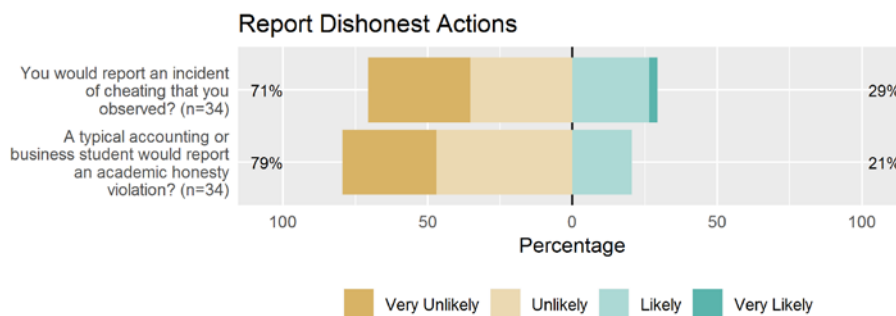


Figure 9: Reporting Dishonest Actions

They also seemed unsure as to whether or not cheating was a problem in the programs. Only 24% agreed or strongly agreed that it was a problem, with 35% who disagreed or strongly disagreed, and 41% unsure. More students (56%) felt that faculty addressed suspected cases, but the majority (62%) did not feel that students should hold responsibilities for monitoring dishonest behavior.

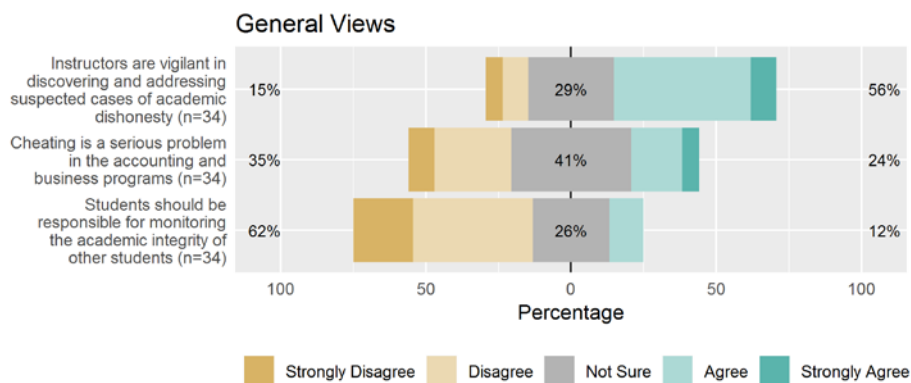


Figure 10: Views on Academic Dishonesty in the Programs

In the second section of the survey, students were asked about specific behaviors regarding cheating, plagiarism, getting unpermitted help, fabricating data, and helping others cheat. There were two parts to each question. First, respondents were asked to identify how often they engaged in or observed the behavior. Second, they were asked to rate the seriousness of the behavior.

Figure 11 shows the results for engaging in/observing the various behaviors. A majority of the students engaged in/observed six behaviors: paraphrasing/copying without referencing, collaborating with others when not permitted, getting questions and answers from someone who has already taken the exam, providing unpermitted help, receiving unpermitted help, and sharing an assignment with other students. Over one third of the students reported engaging in or observing twelve of the 23 behaviors on the survey.

Figure 12 shows the results on how the seriousness of each behavior is rated. The more frequently a behavior occurs in Figure 11, the less serious that behavior is rated. The top six most frequent behaviors are also rated as the least serious.

Engaged In/Observed All Behaviors

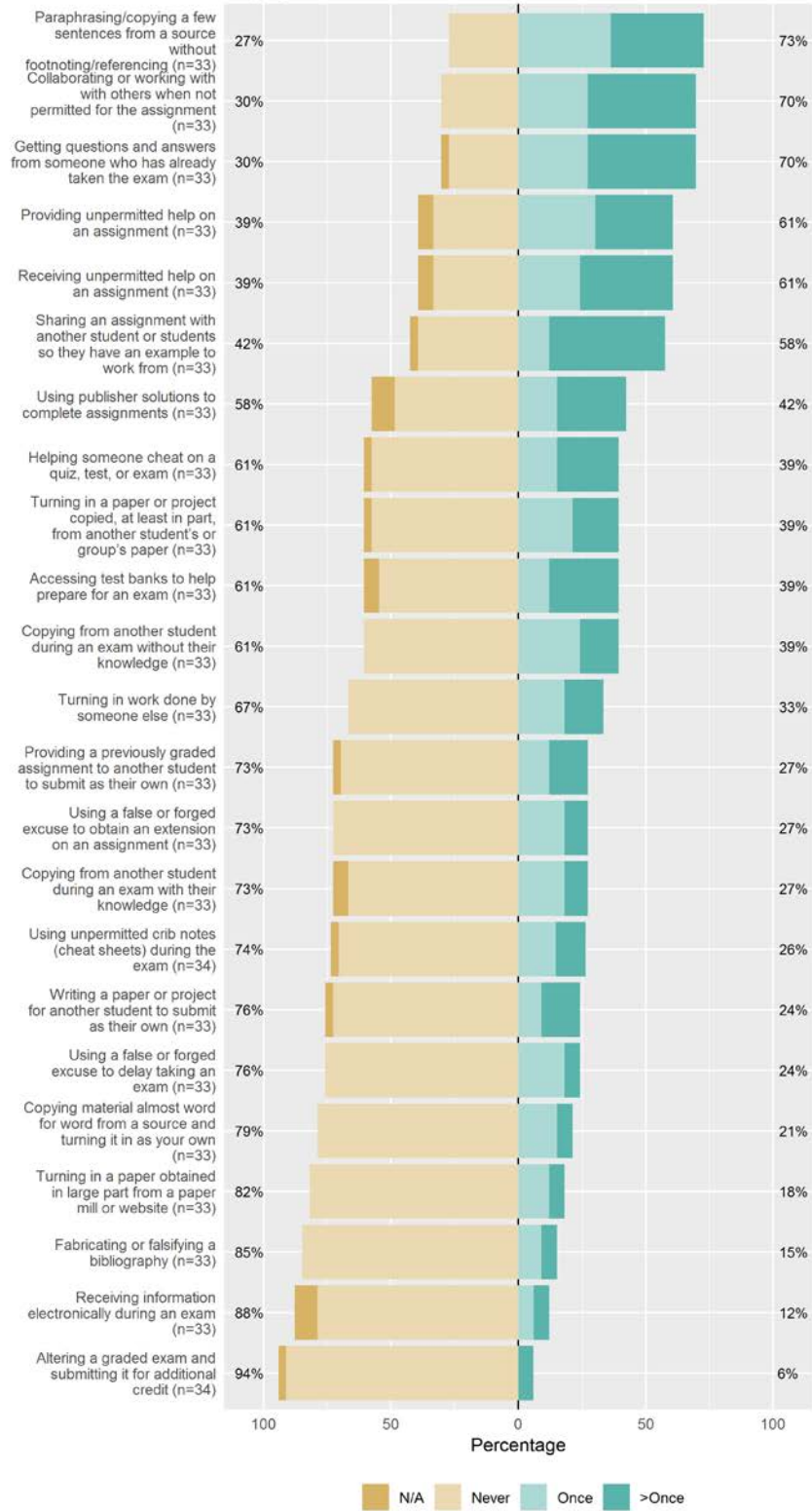


Figure 11: Frequency of Engaging in or Observing Specific Behaviors

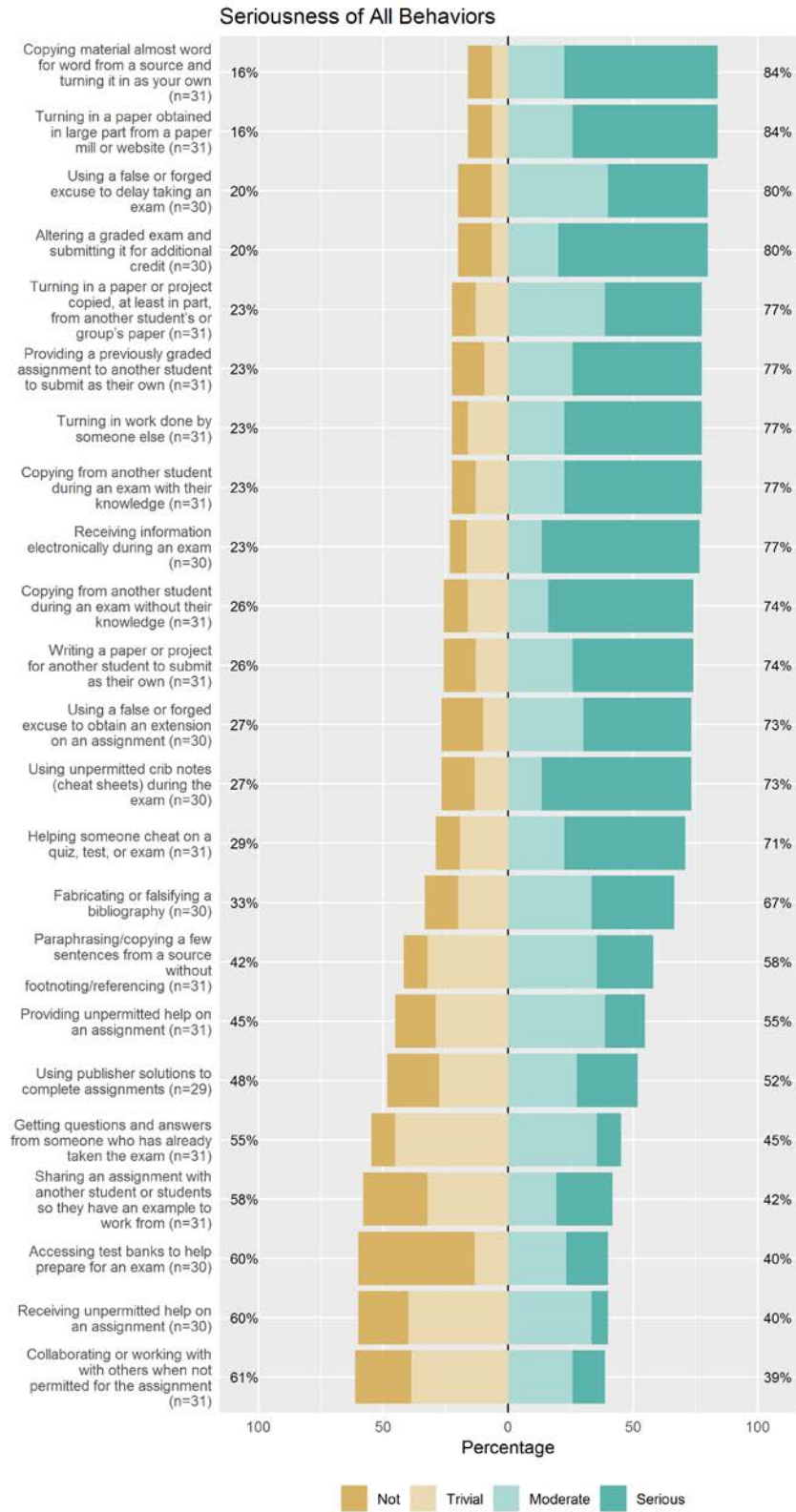


Figure 12: Seriousness of Specific Behaviors

LIMITATIONS

The literature indicates that in order to address academic dishonesty, an institution must study its own circumstances since the response to the problem is not a one size fits all solution (Bertram Gallant, 2011). This study was intended to help inform the programs at a particular institution and is narrow in scope not only by the institution and programs, but also the class standing of students surveyed. Certainly the seniors' longevity will help the programs get a deeper understanding of student perceptions; however, surveying underclassmen may reveal where deficiencies exist in communication and understanding of academic dishonesty/the policy prior to becoming a senior, a year in which academic honesty has been stressed significantly in senior-level courses. Also, a study of a single institution limits generalizability; however, the study may help other institutions benchmark and consider options for developing policy, process, and assessment instruments. This study also shows patterns especially between perceived behavior and seriousness of the behavior that may be interesting for comparison.

Since this study is asking about a sensitive topics, reporting unethical and dishonest behavior, about which some students may not want to admit their guilt even anonymously, the reliability of the information may be limited. The actual behavior may be understated and more severe than reported. This should be considered when drawing conclusions about the seriousness of the problem and need to address ethics and honesty.

CONCLUSION

This study helps point out that, generally, the academic environment seems to be perceived as supporting honest behavior through various communications and by faculty understanding and supporting the academic honesty policy. Although the programs have established and communicated clear values, they may want to develop more programmatic activities that will instill the importance of honesty and help shape ethical decision making (McCabe et al, 2012).

While students believe that the faculty should and do support and enforce the academic honesty policy, they do not agree that students should have responsibility or an active role in monitoring it. McCabe and Pavela (2000) suggest that having students participate in policy development and enforcement can effectively deal with academic dishonesty issues. Educating students about the importance of their role and engaging them more may be one way in which to more proactively address ethics and honesty. The study also shows that students tend to engage much more in the behaviors that they consider less serious which tends to include accessing test banks or giving someone answers from someone who already took the test, paraphrasing without attribution, and getting or giving unpermitted help on assignments. Again, more proactive means of addressing what are dishonest behaviors and what are the consequences not only during college, but as the behaviors carry over into the workforce may help promote a better understanding of the seriousness and significance of the topic.

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APPENDIX

Academic Environment within the Business and Accounting Programs

Consider Lock Haven's Academic Honesty policy as well as those used within the Business and Accounting programs. How strongly do you agree or disagree:					
	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1 The penalties for cheating are severe enough	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 The average student understands the policies concerning cheating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 The faculty understands the policies concerning cheating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 Students support the academic honesty policies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Faculty support the academic honesty policies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 The academic honesty policies are effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Academic Honesty Policies		Yes	No
7 Have you been informed about the academic honesty or cheating policies?		<input type="radio"/>	<input type="radio"/>

If yes, please indicate where and how much you learned.			
	Little or Nothing	Some	A Lot
8 University orientation program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 Freshman seminar course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 University website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11 Student handbook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12 Other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13 Faculty (during class, course syllabi, D2L, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14 Other: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Academic Environment

Page 1

In the past year, how often, on average, did your instructors discuss policies concerning:					
	Never	Seldom	Some-times	Often	Very Often
15 The academic honesty policy in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16 Plagiarism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17 Guidelines on group work or collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18 Proper citation/referencing of writing sources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19 Proper citation/referencing of Internet sources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How frequently do you think the following occurs:					
	Never	Seldom	Some-times	Often	Very Often
20 Cheating on quizzes, tests, or exams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21 Plagiarism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22 Getting help or using materials not permitted for the assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23 Fabricating or falsifying information and excuses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24 Helping others cheat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely is it that:				
	Very Unlikely	Unlikely	Likely	Very Likely
25 You would report an incident of cheating that you observed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26 A typical accounting or business student would report an academic honesty violation?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How strongly do you agree or disagree:					
	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
27 Cheating is a serious problem in the accounting and business programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28 Instructors are vigilant in discovering and addressing suspected cases of academic dishonesty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29 Students should be responsible for monitoring the academic integrity of other students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Academic Environment

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Specific Behaviors

Consider the following behaviors. In the first set of columns (Engaged In/Observed), identify how many times you have experienced the behavior both through your own actions and witnessing others' actions. In the second set of columns (Seriousness of Behavior), give your opinion of the severity of the behavior.

	Engaged in/Observed				Seriousness of Behavior			
	Never	Once	>Once	N/A	Not Cheating	Trivial	Moderate	Serious
Cheating on quizzes, tests, and exams								
1 Getting questions and answers from someone who has already taken the exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 Copying from another student during an exam without their knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 Copying from another student during an exam with their knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 Receiving information electronically during an exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Accessing test banks to help prepare for an exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 Using unpermitted crib notes (cheat sheets) during the exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 Altering a graded exam and submitting it for additional credit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Specific Behaviors

Page 3

	Engaged in/Observed				Seriousness of Behavior			
	Never	Once	>Once	N/A	Not	Trivial	Moderate	Serious
Plagiarism								
8 Turning in work done by someone else	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 Paraphrasing/copying a few sentences from a source without footnoting/referencing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 Turning in a paper obtained in large part from a paper mill or website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11 Copying material almost word for word from a source and turning it in as your own	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12 Turning in a paper or project copied, at least in part, from another student's or group's paper	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Engaged in/Observed				Seriousness of Behavior			
	Never	Once	>Once	N/A	Not	Trivial	Moderate	Serious
Getting Unpermitted Help								
13 Collaborating or working with others when not permitted for the assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14 Receiving unpermitted help on an assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15 Using publisher solutions to complete assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Specific Behaviors

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Fabricating/Falsifying	Engaged in/Observed				Seriousness of Behavior			
	Never	Once	>Once	N/A	Not	Trivial	Moderate	Serious
16 Fabricating or falsifying a bibliography	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17 Using a false or forged excuse to obtain an extension on an assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18 Using a false or forged excuse to delay taking an exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Helping Others Cheat	Engaged in/Observed				Seriousness of Behavior			
	Never	Once	>Once	N/A	Not	Trivial	Moderate	Serious
19 Writing a paper or project for another student to submit as their own	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20 Providing unpermitted help on an assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21 Providing a previously graded assignment to another student to submit as their own	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22 Helping someone cheat on a quiz, test, or exam	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23 Sharing an assignment with another student or students so they have an example to work from	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Specific Behaviors

Page 5

Demographic Information

Standing	Fresh-man	Soph-omore	Junior	Senior
1 Class Standing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sex	Female	Male	Other
2 Sex	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Major – select all that apply	Select
3 Business Administration	<input type="radio"/>
4 Accounting	<input type="radio"/>
5 Other	<input type="radio"/>

Current GPA (approximately)	Select One
6 3.50 to 4.0	<input type="radio"/>
7 2.50 to 3.49	<input type="radio"/>
8 1.50 to 2.49	<input type="radio"/>
9 0.50 to 1.49	<input type="radio"/>
10 0.00 to .49	<input type="radio"/>

Demographics

Page 6

RESTRUCTURING OF GENERAL MOTORS IN GLOBAL MARKET: THE CASE OF GM SOUTH KOREA

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ABSTRACT

The world is nowadays becoming more connected than ever with internet access. With this change also came a shift in the business world, allowing companies to expand into new markets. One example is General Motors' global expansion to places such as South America, India, and South Korea. However, success is not promised in every country. We focused our research on GM South Korea and how it makes decisions to restructure financially and operationally based on its relation to other global subsidiaries and to South Korean economy. We define different types of restructuring in a company and how they would apply to our specific case. Then, we examined the circumstances around General Motors' entrance of Korean market through the purchase of Daewoo Motors. We also analyzed the effects of bankruptcy on the Korean subsidiary in the financial crisis of 2008, rumor circulation in the business world, and the response of the car manufacturer to mass-scale worker strikes and union protests in years to come. By looking at these changes, we can pinpoint when operational restructuring, such as selling subsidiary companies in time of crisis, would be used in addition to financial restructuring, such as offering workers redundancy packages during the shutdown of one of the production plants. Furthermore, we look at General Motors' restructuring plans in specific countries to compare global restructuring to domestic. By exploring the subjects, we can also apply GM's case to other businesses to better understand how global strategy of Multinational companies affect each international subsidiaries. *Note: This study is based on the joint research of Professor Won Yong Kim and Senior Student, Sadie Paulsen; and was funded by the Undergraduate Research and Graduate Opportunity (URGO) Fund of Augsburg University.*

INTRODUCTION

Since the automobile was first invented, businesses have been fighting to enter the automobile market. Many brands exist today such as Toyota and Chevrolet, and with those come much competition. One brand that stands out among the rest and has a presence in many international markets is General Motors (GM). Through international expansion, the company now serves five continents and, by 2016, had sold over ten million vehicles. The company was started on September 16, 1908 with its headquarters residing in Detroit, Michigan. Current plans include opening five new manufacturing plants in China by 2018 (General Motors, 2018). Although General Motors has succeeded in several countries, its success is not universal. In recent years, there has been a decline of productivity and revenue from the General Motors plants in South Korea, which consist of four locations in Boryeong, Changan, Gunsan, and Bupyeong (Choi 2018). The branch employs nearly 16,000 South Korean citizens, and "supports approximately 200,000 direct and indirect Korean jobs" (General Motors, 2018). The company has a large impact on both the Korean economy and economies of other countries that General Motors is tied to.

The premise of our research is to look at how the company initiates and reacts to changes in its own environment, such as changing profit, increasing local competition, and deciding to open more international branches. These actions may be classified as restructuring. To examine these types of company restructuring, we use the case of GM South Korea and analyzed its current performance, which has been affected by restructuring plans throughout the years. Our research questions are the following: How does GM Korea restructure its company due to changes in its surroundings and performance, how do international factors play a role in its restructuring process, and how does this affect us on a grand scheme?

WHAT IS RESTRUCTURING?

To start analyzing how General Motors restructures its Korean division, one must look at how restructuring is defined, why restructuring takes place, and how it benefits the world of business. One professional described restructuring as, "when you change internal operations processes, positioning in the marketplace, restructure debt, modify your operations and work towards becoming a more profitable and cash flow positive business" (Corredor, 2018). To put it more simply, finance professor Ian H. Giddy of New York University defines it as entailing "any fundamental change in a company's business or financial structure, designed to increase the company's value to shareholders or creditor" (Giddy, 2003). He further explains that restructuring can be broken into two separate parts: financial restructuring and operational restructuring. He describes financial restructuring as "improvements in capital structure of the firm" (Giddy, 2003). Some examples of this type of restructuring include lowering the cost of capital through equity-for-debt swaps, which have been popular in the past of

General Motors. Other ideas may be to sell plants, which General Motors did with Opel in 2017 (Youkyung Lee, 2018). This allows for fewer liabilities for a plant that is not producing up to its potential. This is also seen in an announcement of the closure of its Korean plant in Gunsan that has only been running at 50 percent capacity (Choi, 2018). These financial restructuring techniques can also be used in bankruptcy situations, but typically are presented as reorganization plans (Giddy, 2003), as seen after the 2008 crash of the United States' economy (Kim, 2009).

The second form of restructuring discussed by Giddy is operational restructuring. This type includes actions that aim to improve the business model and increase functionality. Some examples are the selling of divisions, abandoning product lines, merging of companies, and other cost-cutting measures. General Motors sold divisions in the past, such as its sale of Opel, as discussed later, and has also suspended two shifts at a plant near Seoul to reduce losses (Szymkowski, 5/10/2018). Additionally, the firm has abandoned product lines as a restructuring tool. One of these actions includes when it sold several brands to Dutch company Spyker, including Saturn, Pontiac, and Saab. Both financial and operational restructuring tactics such as those discussed previously are useful in business settings. They can also be simultaneously utilized to save a business in bankruptcy situations (Giddy, 2018). They also do not always have to be carried out from a top-down approach that is used in many business models- passed from executives to top managers, then middle managers, and downwards. Instead, they are most likely used in crises and emergencies (Giddy, 2018), just how General Motors has maneuvered procedures of this caliber in recent years.

Professionals have even theorized about when restructuring should be used. There are many signs in a company that restructuring may be needed. One theory proposed by Donald Sull suggests that "strategic frames become blinders" (Sull, 1999). This means that what works at one time for a company may not be as successful at another time. Other experts hold the same stance, such as Ricardo Lowe. Lowe commented that a key factor that signifies a need for a business to be restructured is that the firm does not have an up-to-date business model (Lowe, 2017). For instance, wage schemes are often set to change due to how many employees a company has and what year it is. It would not be beneficial for the workers in the twenty-first century to be paid the same wage of what their career would have earned in 1950. A similar situation in General Motors is what prompted a union protest in Korea in recent years. Sull summed up this idea by saying, "When successful companies face big changes in their environment, they often fail to respond effectively" (Sull, 1999). When events like this happen in a company, it may be time to restructure.

THE CASE OF GM SOUTH KOREA

Daewoo Takeover

Now that we have established an explanation of what types of restructuring we are searching for, we are able to look into the history of GM Korea. Although officially started in 2002, the company has deeper roots in the country that reach back to the 1980s. General Motors entered Korea by purchasing a failing Korean car company, Daewoo Motors, in 2002. Daewoo Motors was established in 1982 after buying out another failing car company in Korea. The company had established a strong brand name in Korea, but was also able to branch operations to Europe, the United States, and Canada (Motor Car History, 2013). Daewoo was even successful enough to acquire segments of other auto companies. However, this success was short lived. The company was quickly approaching bankruptcy. It eventually closed its doors after being unable to pay a loan for two consecutive days. "Its failure yesterday was welcomed by foreign investors as a sign that the government is taking a tougher line against insolvent companies that were once considered too big to fail" (Watts, 2000). This was a fair first look into what the fate of the Korean automotive industry would endure.

Two years later, financial problems swelled even further to the point that Daewoo decided it was best to sell all of its assets to stifle its debt. On October 17, 2002 General Motors officially renamed the Korean branch GM Daewoo Auto & Technology (Greimel, 2011). The purchase was not only successful at expanding the market in Korea but also at stimulating the economy (Ledward, 2000). The company decided to use the name Daewoo to preserve the company's roots but also use the name General Motors, associated with Chevrolet, as a name with "more prestige in order to increase sales in the local market" (Motor Car History, 2015). With this name change also came new strategies about branding and marketing. Instead of stopping production of Daewoo automobiles, the company agreed to sell some old Daewoo vehicles under different names. Reusing the car concepts was a way to save money while creating a "new product." The first name they changed was the Daewoo Lacetti to the Chevrolet Optra. This rebranding strategy became so popular in Israel that the company decided to use this strategy in other countries as well (Cars Directory). Despite good intentions with the hybrid name, the bad public image of Daewoo was too influential on General Motors. For this reason, the company decided to change its name in 2011 from GM Daewoo Auto & Technology to GM Korea Co. This is the name that still resides today.

Bankruptcy

Despite being General Motors' fifth largest producer of automobiles, GM Korea still faced similar financial issues as its predecessor. The base of the multinational business was greatly affected by the 2008 stock market crash in the United States. By June 1, 2009, General Motors was bankrupt and its stockholders lost all of their money. Thanks to government assistance received through filing Chapter 11 bankruptcy, the company reemerged into the market on July 10, 2009. Chapter 11 bankruptcy is also known as "reorganization" bankruptcy, and the case of General Motors was one of the largest filings of this type in United States history. The United States treasury invested approximately \$49.5 billion in General Motors and recovered \$39 billion in December 2013 after selling its shares in the company, approximately a \$10 billion loss. At the time of purchase, the government held approximately 61 percent of the stocks (Beech, 2014). With this change also came the sale of several brands to Dutch company Spyker: Saturn, Pontiac, and Saab.

Being that the branches are located in separate countries, there are some cultural differences to be noted as well. For example, in the United States, filing bankruptcy initiates an almost immediate response and is effective rapidly. On the other hand, filing for bankruptcy in South Korea requires a heavy influence of a court. The court has a month to decide whether or not to start a restructuring process, in which an administrator proposes a detailed restructuring plan that must be approved by the company's creditors (Park, 2018). Park Seung-du, a law professor at Cheongju University, released the following statement about the process: "Compared to the U.S. process, South Korea's court rehabilitation process is much more complex and takes longer. Depending on the size of a debtor company, it can take years to see the end of it" (Park, 2018). This could create lulls that result in even more debt for the firm.

In addition, one must realize that filing for bankruptcy in South Korea is largely considered as the death of a company, to which there is no full return to the market. With this serious of a matter being decided, there must be concrete agreements set in place for the Detroit-based company and its operations in South Korea about the filing processes. One official of the Korean Development Bank, which holds 17 percent of the Korean branch's stakes, stated, "GM and KDB also have a side agreement that requires the U.S. automaker to get approval from 85 percent of shareholders for the Korean unit's bankruptcy filing" (Park, 2018). This ensures that all parties are included in decisions of this size. Officials must come to concise agreements, which is a process that also takes a lot of time. However, the stock market crash of 2008 was enough to make that decision for the both locations.

Strikes & Unions

To avoid another large-scale bankruptcy filing, General Motors Korea has taken measures to restructure its company due to increasing pressure from its headquarters. One large issue that the business frequently encounters is labor issues. Many protests and walkouts regarding working conditions and wages have taken place over the span of the last several years. One of the largest and most controversial took place in 2013. Workers demanded, "an increase in basic pay, a bonus that equals three months' salary and a one-time payment of 6 million Korean Won [equivalent to \$5,300 USD]" (Nair, 2013). This created worry for the headquarters about their five-year investment plan in the country. It also started many rumors about the status of the company. Nair commented, "The CEO of GM Korea Sergio Rocha hinted at the possibility of an exit in an email to the company's 17,000 employees in South Korea, writing that further conflict and production losses would have an "irreversible effect on our future" (Nair, 2013). The company negotiated thirteen times with the union before the two groups reached an agreement.

This was not the last time that workers went on strike. According to Zacks Equity Research, this year "sixty nine percent of workers, totaling about 14,016, voted for the strike for the fourth consecutive year." During April of 2018, workers went on strike as the plants in South Korea once again advanced toward bankruptcy. Opposition increased when General Motors announced that "the plant [in Seoul] is only running two shifts two days a week in Korea for next generation global vehicles" (Choi, 2018). This decreased production costs while protecting the employment statuses of the workers and keeping the plant open. However, other plants were not as lucky. Earlier this year headquarters released the news that they will be closing their production plant in Gunsan due to the fact that profits halved from last year. This decrease could be a consequence of recent closures of Opel in India and the discontinued line of cars in Europe (Youkyung Lee, 2018). Experts agree that the plant was only running at fifty percent of capacity while rival companies' sales increased (Choi, 2018). A closure of this magnitude would include cutting the workforce by approximately 5,000 workers, which is about one third of General Motors Korea's workforce (Youkyung Lee, 2018). This news came as a shock to many of the workers and further fueled the strikes.

General Motors has made many efforts to work with the unions and protect the Korean people. Past GM Korea CEO KaherKazem said in a statement "the labor union has demonstrated its commitment and we continue to work with our other key stakeholders to gain their support" (Youkyung Lee, 2018). To compensate for closing the plant, General Motors has offered a redundancy package to workers affected by the closure. Choi mentioned this in his article, "About 2,600 workers at GM Korea, equivalent to about 15 percent of its staff, have applied for a redundancy package that the U.S. automaker has offered as part of restructuring, union officials have said" (Choi, 2018). This package includes three times their annual base salary, money for college tuition, and more than \$9,000 towards a new car. Nevertheless, the buyout package was not enough for some employees and strikes continued.

Plans of Action

The task of revamping the company's Korean arm is not one that could be done alone. Many requests have been made to stockholders and the government asking for assistance for the Detroit-based car company. The group has expressed its interest in \$600 million to pay its subcontractors and the workers who accepted the buyout package this year. Luckily, the Korean Development Bank (KDB) has expressed interest in providing funds to the failing branch. General Motors has also proposed to South Korea to co-invest in a \$2.8 billion plan to boost GM Korea for ten years, and furthermore the South Korean economy. However, this also would result in a loss of almost 5,000 jobs (Szymkowski, 5/29/2018). The group's website also boasts about its plan to be profitable by 2019 (General Motors, 2018). This includes the \$2.8 billion foreign direct investment mentioned above in addition to the release of new models and programs for its customers. Although decisions have not been finalized yet in regards to investment plans, the Korean union has planned to issue preference shares worth \$803.69 million and \$24 million additional stock later summer of 2018 (Joyce Lee, 2018). This will help to alleviate some of the most pressing financial issues.

In spite of these ambitious policies, there is still controversy about General Motors' status in Korea. Figure 1 shows that profit margins of GM South Korea temporarily increased between 2010 and 2013. And yet, it started to decline from 2014 and had negative margins in 2016 and 2017. The leverage of GM South Korea shows a same pattern (Figure 2). The leverage decreased from 2010 and 2013, but it started to increase from 2014.

Sales dropped approximately 24 percent in 2017, which was not favored by headquarters. Chuck Stevens, GM's chief financial officer, commented that South Korea has been a "challenging market". He further stated, "We have a strong presence there, we have a strong brand there, a healthy market share, but the cost structure that's there, not only for us but [the] overall industry in Korea has grown to where it's not sustainable" (Schweinsberg, 2017). Stevens adds that there will be more news to come on GM's position in South Korea, as the automaker is taking action to "build a viable, sustainable business" (Schweinsberg, 2017). Rumors circulate in the business world about the company's standing not only due to falling sales, but also the sales of 'other major global subsidiaries' and the appointment of a restructuring specialist (Premack, 2017). Past General Motors CEO KaherKazem worked for General Motors in India, which is currently in the process of shutting down. This has led some people to believe that Kazem was hired to help close down the General Motors Korea as well (Gauthier, 2017). One article commented that "the situation is so dire that community leaders, fearing job losses of up to 16,000, have formed coalitions like the "Citizens Movement for Purchasing Chevrolet" and have organized guerilla advertising campaigns to encourage folks to buy GM Korea products" (Premack, 2017). Despite these many plans that exist, a decision is yet to be made on a plan of action.

International Restructuring

This is not the only concern that the public has. In recent years, many American automakers are pulling out of international markets and focusing on China and the United States instead (Premack, 2017). General Motors has already announced its plan to stop selling vehicles in South Africa after failure to dominate the market. Similarly, the Detroit-based company will also be withdrawing from India despite having a presence there for over 20 years (Premack, 2017). In 2017, General Motors even looked to cut out approximately 130 jobs in its international headquarters in Singapore to lessen their presence in an unprofitable market (Shirouzu, 2017). These changes work together to mold a different business model for General Motors and can alter the company's success dramatically. In fact, most of the decisions made about changes in the business model are based on a review of operations in GM international markets (Shenouda 2017). One example of how reliant General Motors is to its international branches revolves around its sale of its European subsidiary Opel/Vauxhall to French automaker PSA in 2017. This was problematic as "PSA announced that it would produce GM vehicles in Europe rather than Korea, as GM had done" (Premack, 2017). This would signify a drop in Korean car production and the death of many jobs. Experts theorize that this could be a ploy on General Motors' behalf to slowly undo its ties with Korea.

Others even speculate that GM Korea could combine with its South American region to reduce loss (Gauthier, 2017). Profitability in this region has increased by nearly forty percent, which could guide the hybrid company to financial gain. Another unnamed analyst commented in the *Nikkei Asian Review* in September of 2012 that "GM is highly likely to withdraw from the South Korean market. GM Korea is suffering from big losses for the last few years, losing its market share to imported brands...There is no reason that the company keeps its business here" (Nair, 2013). For these reasons, GM Korea's plan to stay in the country remains unclear.

However, not all predictions about the company's status have been negative. General Motors has been the leading company in the car market in China for the last five years, which shows that there are plans that are functioning to make global expansion successful. If expansion in China is successful, executives can evaluate which tactics could be beneficial to implement in South Korea. Moreover, some experts argue that General Motors might retain the Korean operations all together due to the infrastructure that is already in place. It may be cheaper to continue to use its standing structures than to completely rebuild in another country. Similarly, the company takes up a large portion of the car market in Korea. This has sparked a feeling of loyalty about the brand (Premack, 2017). Hence, these conflicting views on the status of the company makes it hard to agree on a prognosis for the future.

'FIRESTONE' CASE STUDY

Looking at how and why another company uses these types of restructuring is also helpful for examining the strategies of General Motors. One example of another failing company was Firestone Tire & Rubber, which was founded on August 3, 1900. The company was once the leader of its industry with a sense of loyalty from its customers, just as General Motors has with its customers in South Korea. However, this all changed for Firestone when its competitor, Michelin, introduced the radial tire to the market, which was superior to the product that Firestone was selling. The firm tried to financially restructure by investing nearly one billion USD in today's money to build a new plant that produced radial tires just as Michelin did. However, what Firestone lacked to do was change its production processes. The company also did not close their previous factories for a long time, which was a missed opportunity for both operational and financial restructuring as they could have analyzed current trends and demand curves. This action, largely increased debt due to the lack of demand for this old-styled fashion of tires. Executives clung to the idea of a never ending demand for tires, but it was a demand for radial tires instead of the older version. Due to this, they used financial reconstruction to sell all their United States shares to foreign corporations. Eventually, a new CEO came to power and closed five of the fourteen plants, changed the budgeting process from bottom-up capital-budgeting to strict top-down, and changed out the managers at each level (Sull, 1999). This use of restructuring saved the firm from bankruptcy and they realigned their business model.

We are able to relate this to General Motors by looking at the preventative actions and consequences of the companies. Both companies were successful in realizing what power its competition holds. In regards to Firestone, the company was quick to respond to Michelin's new style of radial tires. This allowed for a rapid restructuring of the company's product lines from regular tires to radial tires to better approach its target market. General Motors also has kept a close eye on its competitors in recent years, and has even commented on its actions, "'As the industry continues to change, we are transforming our business, establishing GM as a more focused and disciplined company,' says Mary Barra [GM's first female CEO]" (Shenouda, 2017). One example of this action was when the company took feedback about the failing Daewoo brand and renamed several of its vehicles to increase sales (Motor Car History, 2015).

Despite these quick reactions to competitors, both companies failed to make a complete turnaround during times of trouble. Firestone did not close down its other plants, which rapidly increased debt and drove the company to the ground, as did General Motors when it realized that renaming the same car did not work in every market. However, we can also look at the differences in the approaches each company took into restructuring during troubles. General Motors focused heavily on its international expansion, which lead to both success and failure for the company. Firestone focused more on its domestic production and therefore could have missed out on opportunities to increase earnings or saved itself from losses in countries that they could not penetrate the market.

IMPLICATION AND CONCLUSION

By studying how these two companies compare in their restructuring processes, one is able to draw from the similarities and differences what different business tactics there might be. These could include what to do when there is labor union strikes constantly, such as if you should offer a severance package or choose a buyout option. One can also learn a variety of business skills such as how to deal with international expansion by looking at how other companies expand all the way to if a firm should keep the name of a company they buy out. The way a company restructures is largely based on the resources available and the deciding body present, especially the CEO of a company.

The research followed this type of ideology. By digging into a specific company and reading other scholarly articles on the subject, we were able to assess common themes that flowed through the difference source material and use the specific case of General Motors to present them in a more understandable platform. By doing this, we not only gained new information on the history of this Detroit automotive firm, but also examine how the firm is doing in international markets. It may seem that branches in separate countries are not contingent of each other, but, in fact, are quite the contrary: International branches may be located in separate continents but are so interdependent on each other for the company's success that it only makes sense to study international markets to fully grasp a company's situation, not just the success of that company in its home country. Due to the time limit of this research, we proposed to mainly look at General Motors' activities in South Korea and how its performance relates to operations in separate countries, especially the United States of America. By examining this on both an international and national scope we are able to take the research one step farther than if we were only to look domestically. The themes in this study can be applied to a vast majority of business situations.

Even if a person does not wish to study business. By understanding the basic theories of a business and how companies are ran, it is easier for he or she to predict changes in a business and make better buying decisions. Therefore, by studying how companies restructure helps us learn how to become better members of society. As CFO of Lowe Consulting said, "Businesses don't typically grow straight to the top. Instead, they go through ups and downs over their life cycles" (Lowe, 2017). Companies do not gain success overnight and are bound to hit rough patches due to changes in the market. The success of a company is contingent on the skills of the people running the business.

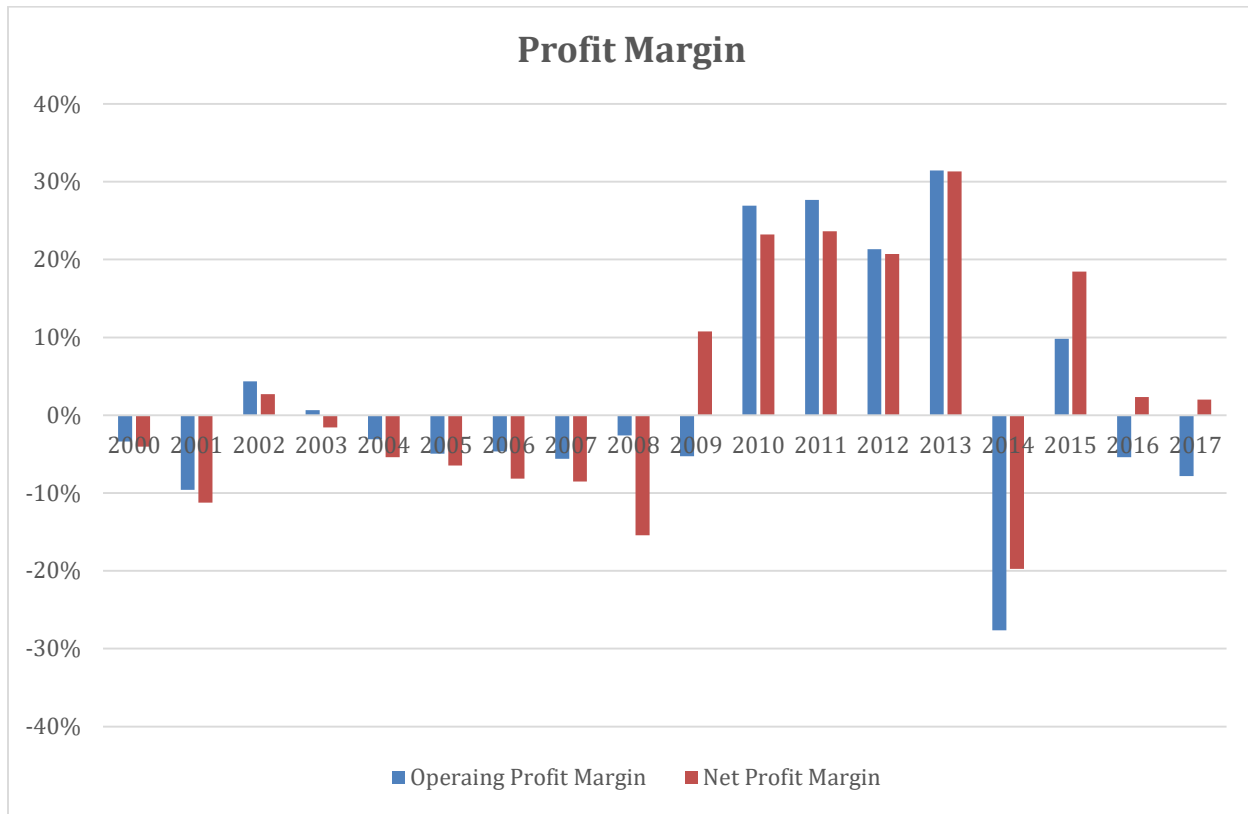
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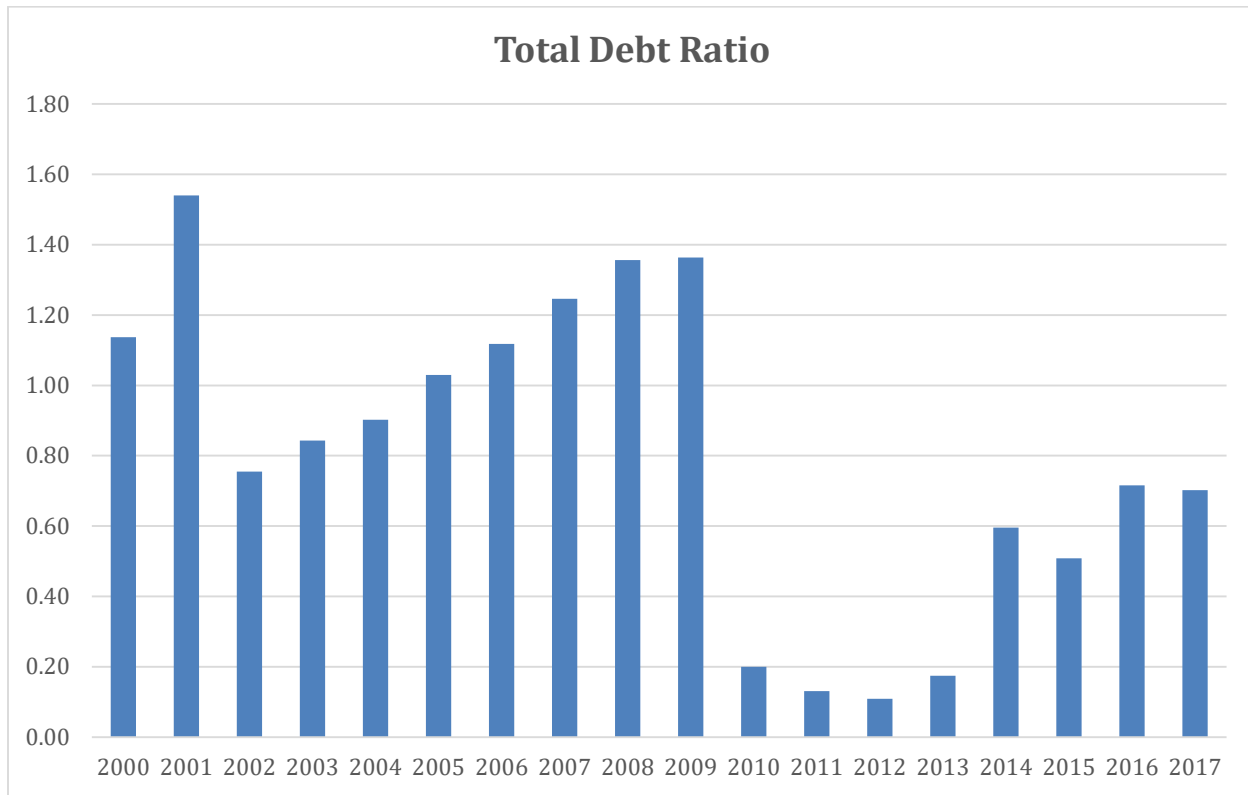
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Figure 1. Profit Margins of GM South Korea



Source: Audit Reports of GM South Korea from 2001 to 2017

Figure 2. Leverage of GM South Korea



Source: Audit Reports of GM South Korea from 2001 to 2017

THE FUTURE OF VALUE: FROM BITCOIN TO CENTRAL BANK DIGITAL CURRENCIES

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ABSTRACT

Bitcoin (BTC), due to its decentralized design, works without any need for a centralized authority and is also censorship resistant. It has caused much speculation over the course of current socioeconomic models in terms of banking, money, privacy, and government. We examine the history of money and how cryptocurrencies may disrupt the current global economy by challenging the U.S. dollar standard. Furthermore, we examine structures and operations of emerging Central Bank Digital Currencies (CBDC) and their mechanics. We differentiate CBDCs from current commercial digital fiats issued by banks and analyze their role as potential tools for monetary policy and examine CBDCs currently in development in Russia, Venezuela, and China. We also look to how CBDCs would affect tax policy, security, monetary controls and speculate about their impact in domestic markets. We argue that Bitcoin will emerge as ‘good money’, gold for the digital age, representing a new currency standard for international commerce.

INTRODUCTION

Classically money has been defined to possess the following three main qualities; ²*Medium of Exchange, Store of Value, Unit of Account*. Kocherlakota predicted that a government’s monopoly on seigniorage (profit from money production) can be jeopardized with cheap and accessible informational storage, with technological advancement as he argued that ‘Money is Memory.’³

Historically, commodities were the earlier form of money represented by gold that acted as ‘good money’: medium of exchange, store of value, and unit of account as well as scarce, fungible, divisible, durable, portable, religious significant, and no one person controlled its supply. Paper Money was introduced by Merchants attempting to secure their gold, trusted goldsmiths to safeguard funds in vaults, which were recorded with a depository paper receipt used to reclaim the funds. Goldsmiths started to loan out against the dormant gold at interest and making a profit with the dormant assets, thus becoming the earliest form of banks.⁴ Goldsmiths and lenders realized that most deposits weren’t being redeemed, as the popular paper-receipts were commonly used as tender in place of gold, and issued more paper than gold available.⁵ This was the start of fractional-reserve-banking, which allowed for unprecedented economic growth as a country’s reserves and money supply is artificially expanded for unseen economic development.⁶

The USD as Global Reserve Currency

After WWII, to restart the global peace and trade initiative and to provide relief and financial stability to Europe and the rest of world a series of meetings between 44 nations, called the Bretton-Woods Agreement took place for establishing a conducive environment for international trade. Here, the US pressed its position as the World Power by having all attending countries establish a fixed peg to the world’s ‘gold-convertible currency’ - the USD at \$35 per ounce.

In early 70’s, despite the ‘Nixon Shock’, abolishment of the Bretton-Woods System and gold standard, the USD still held its position as the global reserve currency. The US was still the world’s strongest and developed economy, and USD was redeemable for US goods and services within its economy despite leaving the gold standard. In a system called Petrodollar Recycling, Saudi Arabia and OPEC countries seeking price stability and to protect their USD assets, tied oil prices to the USD. This helped establish the USD as the world’s dominant currency post Bretton-Woods, as all trade to oil was traded with USD, essentially backing the USD in oil, the industrialized world’s essential commodity⁷. Additionally, there was no

²Hileman, Garrick. (2014). From bitcoin to the brixton pound: history and prospects for alternative currencies. Paper presented at the International Conference on Financial Cryptography and Data Security, Berlin, Heidelberg. Retrieved from www.hillsdale.edu/wp-content/uploads/2016/02/FMF-2014-A-History-of-Alternative-Currencies.pdf 2014

³Kocherlakota, Narayana R. (1998). Money is memory. *Journal of Economic Theory*, 81.2, 232-251. <https://doi.org/10.1006/jeth.1997.2357>

⁴United States. Congress. House. Banking and Currency Committee. (1964). *Money facts: 169 questions and answers on money – a supplement to A Primer on Money, with index, Subcommittee on Domestic Finance ... 1964* (PDF). Washington D.C.

⁵Menger, C., & Frank H. Knight. (1950). *Principles of Economics. 1st, General Part*. Free Press.

⁶Inspection of Gold at Fort Knox.” *United States Mint*, 20 Sept. 1974, www.usmint.gov/learn/history/historical-documents/inspection-of-gold-at-fort-knox.

⁷Tun, Z. T. (2018, October 16). How Petrodollars Affect The U.S. Dollar. Retrieved from <https://www.investopedia.com/articles/forex/072915/how-petrodollars-affect-us-dollar.asp>

alternative for the world economy to question the newfound direction of global finance, as every country's fate was tied in with the US Dollar. The USD, still remains the Global Reserve Currency that international organizations and governments trust as a safe store of value, as of April 2016 the Bank for International Settlements calculated that 88% of global trade uses the USD.⁸

Nobel-Prize Winning Economist, Paul Krugman, argues that 'fiat money is backed by men with guns' that force you to accept it.⁹ Over history the strongest World Power set traditionally the global 'reserve' or 'trade' currency, due to the unquestioned challenge of the issuing tender's military and government strength. Regardless of how wealth is represented with currency, governments can still control the physical goods in the economy. Historically at times, governments just seized the raw resources themselves and took state control over various industries as needed for the regime's sustainability. The US, the world's superpower, spends over 600 Billion annually on Military, which by comparison is equal to the next seven largest countries combined military spending.¹⁰

CRYPTOCURRENCIES- POTENTIAL DISRUPTION

Bitcoin&Blockchain

Bitcoin, pioneered by the mysterious Satoshi Nakamoto in 2009¹¹, was the first cryptocurrency. Bitcoin achieved a distributed consensus via a blockchain, an immutable and shared ledger. Bitcoin, is decentralized, censorship-resistant, borderless, and not contingent on any government backing, hence deriving its value only on its network of those that believe and value it for payment. Many have made the obvious comparison of Bitcoin to Gold, often referring to Bitcoin as 'Digital Gold' and 'good money' thus, sharing all the benefits of a gold based monetary system. While no one knows for certain which cryptocurrency/ies will endure the test of time and reach universal acceptance, this paper will focus on Bitcoin, and treat Bitcoin and cryptocurrency interchangeably in regard to economic impact. Bitcoin has consistently had the largest coin market capitalization with its present capitalization at \$100 Billion, maintaining ~50% dominance over the entire crypto industry¹².

Challenge to USD Global Standard

Some speculate that cryptocurrencies can and may disrupt the current global economy by challenging the global US Dollar standard. The emergence of Bitcoin and other cryptocurrencies question the existing financial model on a large scale by threatening to circumvent banks, clearinghouses, and government-imposed regulation and authority. Since the continuity and existence of Bitcoin and other decentralized coins have minimal direct recourse on the U.S. Dollar and government backing, cryptocurrencies may have the potential to reset the dynamics of foreign relations, diplomacy, international trade, and the effect of economic sanctions in what is referred to the 'de-dollarization' of the global financial system. Additionally, Bitcoin creates a new asset class that unlike gold, can't be seized or controlled, as governments around the world (including the US), throughout history have done. Moreover, for the first time this century, people around the world have access to an alternative to our current Keynesian economic system, with Bitcoins first 'genesis block' (the first recorded bitcoin block) encoding "*The Times 03/Jan/2009 Chancellor on brink of second bailout for banks*", criticizing the instability of modern banking.

Blockchain Security

Bitcoin is evidently very secure as there has not yet been a breach in its core protocol. It uses blockchain as a way of organizing transactions into blocks that are encoded into unique hashed identified codes that are virtually impossible to replicate. Since each added block has the hash of its predecessor, there is never a break in this cryptographic chain of transactions. Despite this theoretically sound security protocol, there exists the possibility of a '51% Attack', in which an adversary can command a majority of the network hashing power and probabilistically generate new blocks at a higher rate than the global network, potentially challenging the decentralization and integrity of the network. However, this

⁸Global FX trading averages \$5.1 trillion a day in April 2016; spot trading falls while FX swaps rise. (2016, September 01). Retrieved from <https://www.bis.org/press/p160901a.htm>

⁹Krugman, Paul. (2018, August 7). Opinion | Transaction Costs and Tethers: Why I'm a Crypto Skeptic. The New York Times. Retrieved from www.nytimes.com/2018/07/31/opinion/transaction-costs-and-tethers-why-im-a-crypto-skeptic.html

¹⁰Peter G. Peterson Foundation (2018, May 07). U.S. Defense Spending Compared to Other Countries. Retrieved from https://www.pgpf.org/chart-archive/0053_defense-comparison

¹¹Nakamoto, Satoshi. (2009). Bitcoin: A peer-to-peer electronic cash system. Retrieved from <https://bitcoin.org/bitcoin.pdf>

¹²<https://coinmarketcap.com/charts/#dominance-percentage> Accessed (2018, August 20)

conceptually possibility has not materialized to this date and seems not be a serious challenge. If it ever happens the Bitcoin community and network would likely identify the attack and ‘fork’ to protect against it. A ‘fork’ is essentially a protocol change where the community universally (or partially) adopts a new standard or the rules, usually as an update or to reverse specific bugs or issues.

Current Technological Setbacks

A large critique of Bitcoin is that its network is slower and more costly than conventional commercial digital alternatives. Currently Bitcoin processes ~7 transactions a second compared to Visa Network’s of 50,000 transactions per second at its peak. Although Bitcoin doesn’t allow for the ledger to have a double spend, there is a potential for an orphaned block which is source of inefficiency in the system. Bitcoin fees have skyrocketed with its oversaturated network, making small day to day purchases or ‘microtransactions’ cost more in transactions than for the good they are buying peaking in January 2018 at an absurd \$37, though it has since stabilized now at about \$0.10¹³. Current technological solutions are being worked on with the introduction of 2nd layer solutions, namely ‘The Lightning Network¹⁴’ which essentially enables parties to have a circulating network of safe and valid Bitcoin transactions much like a valid endorsed check, that only hit the main blockchain when written and ‘cashed’. This enables parties to make account changes by ripping up the old ‘check’ balances and writing new ones, rather than going to the bank to cash and settle every minor transaction. This solution would make Bitcoin transaction secure within seconds and less costly for ‘micro-transactions’ and has the support of the Bitcoin Community.

Critics argue over the enormous cost of electricity to sustain the Bitcoin network regarding its environmental externality, with estimates of roughly the electrical use of Ireland due to the fierce competition to mine caused by ASICs.¹⁵ This is misleading on several accounts. Firstly, when the network hashing power increases, the Bitcoin protocol adjusts its difficulty to equalize the pace of new block creation to 10 minutes, whether by making the puzzle harder or easier to match the network block propagation rate. Furthermore, this doesn’t consider the type of energy used. Many bitcoin mining operations are pushing for cheaper and renewable energy sources in developed regions. Lastly, for a fair comparison we need to compare the cost of maintaining the current financial system of: banks, money security, ATMs, infrastructure, employees, printing presses, bank ledgers, money transit; all which are much costlier in aggregate to estimates of 3x with only the consideration of the hardware.¹⁶ Furthermore, Bitcoin Protocol Improvements such as Segwit and Lighting Network will significantly make bitcoin more efficient and less energy intensive.

Many have also criticized the Bitcoin mining network as being overly centralized. Because mining has become so competitive, it now requires top-grade equipment and access to cheap and abundant energy, making it more of a professional industry in addition to the high concentration of global hashing power dedicated to mining pools¹⁷.

Volatility

Economists are quick to dismiss Bitcoin as a failed money due to its volatile ‘store of value’ This however, may be since Bitcoin has yet to reach critical mass and/or achieved trading pair valuation outside the USD and other major currencies. With more institutions, endowments, and pensions buying cryptocurrencies, this will drastically decrease the volatility by mitigating large volume price action and provide better BTC price stabilization. In addition, once goods & services, and commodity-based resources start creating BTC trade pairs outside of the USD, Bitcoin will stabilize, and it will be a constant and stable monetary weight outside of speculation with lesser impact on its value relative to the USD.¹⁸

¹³<https://bitcoinfees.info/>

¹⁴Poon, Joseph & Thaddeus Dryja. (2016, January 14). The Bitcoin Lightning Network: Scaleable Off-Chain Instant Payments. Retrieved from <https://lightning.network/lightning-network-paper.pdf>

¹⁵de Vries, Alex. "Bitcoin's Growing Energy Problem." *Joule* 2.5 (2018): 801-805. <https://doi.org/10.1016/j.joule.2018.04.016>

¹⁶Domingo, C. (2017, November 30). The Bitcoin vs Visa Electricity Consumption Fallacy. Retrieved from <https://hackernoon.com/the-bitcoin-vs-visa-electricity-consumption-fallacy-8cf194987a50>

¹⁷<https://www.blockchain.com/en/pools>

¹⁸Hampel, Mojmír. (2017, July 20). MojmírHampel: Central Banks, Digital Currencies and Monetary Policy in Times of Elastic Money. Retrieved from www.bis.org/review/r170720b.htm

Deflationary Currency

Bitcoin would create a deflationary currency, meaning the currency is of a finite supply. Its growth will be slower relative to the goods and services it can purchase; Consequently, Bitcoin would appreciate and grow in value by holding it. Deflationary currencies encourage hoarding, pulling funds out of investments and shrinking the money supply in an economy. However, Austrian Economists argue that a stable deflationary currency would provide better price stabilization, as demonstrated during the gold backed dollar years in the US. While this is traditionally problematic as the unit of accounts for currencies such as the USD is finite until the penny, Bitcoin is theoretically infinitely divisible, allowing for Bitcoin to continually be broken down into smaller amounts and causing BTC's price against goods inflate in the opposite direction, meaning less is now worth more. Additionally, if deflation is predictably stable, prices of goods and services would decrease relative to Bitcoin, encouraging people to spend coins as everything gets cheaper. Prices would adjust like they do now with inflation, though in the opposite direction. The psychology of having less gross sum at equal value is a behavioral trap referred to as nominal rigidity or 'sticky wages', where people used to their income at a numerically high value have issues accepting less despite equal purchasing power¹⁹. Unlike gold however, Bitcoin would be a true finite supply, reaching a specific cap of 21 million Bitcoins to be completely mined around year 2140, tapping out its supply growth.

Bitcoin Adoption

A Bitcoin state standard, directly or indirectly (fiat backed by Bitcoin) would be a modern return to a 'gold standard', restricting how much currency a government can allow in circulation. Historically, governments have gone off the gold standard since it was finite and scarce which drastically limits a government's power to manipulate the money supply for economic growth.²⁰ While Bitcoin may not be a viable alternative to state issued fiat for personal use in strong economies, it does possess the qualities that make it extremely attractive for an international currency, free from state influences for international trade. In addition, it also satisfies what John Maynard Keynes theorized as the Bancor, or the International 'gold backed' unit of account as a supranational currency for international use, with the IMF (International Monetary Fund)²¹ recently publishing in support of an international Bancor like currency in 2010 to resolve the Triffin Dilemma²². Bitcoin, unlike Bancor, wouldn't require an International Clearing House or a Global Reserve Bank because of its superior technical efficiency to any gold based or fiat based international global currency. If Bitcoin was to transcend into this status as the Global Reserve Currency, governments would start mining and maintaining the Bitcoin Ledger to ensure and protect the international Bitcoin standard from rouge malicious state/nation actor attacks (as we mentioned above, 51% attack).

THE CASHLESS ECONOMY

Introduction of a Centralized Digital Currency

A Centralized Bank Digital Currency (CBDC) poses an interesting question: What if a government issued its own digital fiat cryptocurrency coin? Venezuela has been the first country to issue its Petro token, based on the NEM blockchain; while countries such as Estonia, Russia, Sweden, Japan, and countless other nations' central banks are researching CBDCs and their theoretical impact in an economy. It is important to distinguish that the CBDC would lack the decentralization that gives current cryptocurrencies viability as a value beyond government control and manipulation. There would be minimal similarities between public cryptocurrencies and a nationally issued CBDC, since a nationally issued CBDC would need to be extremely customized and tailored to fit a government's agenda, controls, and needs.

¹⁹Keynes, J. M. (2018). *The general theory of employment, interest, and money*. Springer.

²⁰Weber, Warren E. (2016). A Bitcoin standard: Lessons from the gold standard. Bank of Canada Staff Working Paper. No 2016-14. Retrieved from <https://www.bankofcanada.ca/wp-content/uploads/2016/03/swp2016-14.pdf>

²¹International Monetary Fund, Strategy, Policy and Review Department. (2010 April 20). *Reserve Accumulation and International Monetary Stability*. Approved by Reza Moghadam. Retrieved from <https://www.imf.org/external/np/pp/eng/2010/041310.pdf>

²²International Monetary Fund. System in Crisis (1959-1971) Part 4 of Money Matters, an IMF Exhibit -- The Importance of Global Cooperation. Retrieved from www.imf.org/external/np/exr/center/mm/eng/mm_sc_03.htm

The Current Digital Cash Economy - Digital Messaging

Currently the public does have access to digital funds, though these digital funds aren't issued by the central bank, rather by commercial banks throughout the country that facilitate digital money transfers in an interconnected banking system. This system revolves around a 'digital messaging' system that alerts banks to update their accounts to reflect on transfers, payments, and balances between parties. While the current digital monetary system works rather well, many have argued over several key issues that a crypto CBDC based solution would improve for the monetary system of an economy.²³ The delayed payment clearing time in our current financial banking system (3-5 business days), frequent credit card/bank fraud and financial disenfranchisement for the 'unbanked' are all notable disadvantages. In terms of financial instruments currently issued by Central Banks, namely physical cash, it is very costly to produce and in cashless economies like Sweden and Denmark, CBDCs help keep government relevant and protect seigniorage revenue. Additionally, it's important to have a money alternative to protect against the risks of the banking sector.²⁴

In many developed countries, cash represents a tiny amount of the money supply also referred to as M1 and M2 (M1 is the actual bills and M2 is M1 + the amount of funds or money supply in checking and saving accounts). Sweden has a record low of 2% of transactions being done in cash as it races towards a cashless economy²⁵. Businesses such as By Chloe, and many other restaurants no longer accept cash, though ironically, it's completely legal for them to refuse US 'legal tender' as per US Federal Law²⁶. The ability to buy goods and services almost anywhere with your credit/ debit card, and now smartphone is an illustration of such forces at play. Through monetary policy, a country's central bank can influence the banking system's Fund Interest Rate, a rate of which banks pay to borrow cash from each other and are used to vicariously expand and contract the money supply in circulation and effect inflation, credit, and loans in an economy. Furthermore, the government imposes serious limitations and laws on the banks to regulate and safeguard its economy. From KYC (Know Your Customer), to cash transfer limitations, to individual balance history for taxes and freezing accounts, the government uses banks to oversee and regulate the economy and its denizens in a way that is functional, and the controls are relatively understood.

Current Issues with Modern Banking and Financial System

While a government issued cryptocurrency would eliminate the need for consumers to have bank accounts to transact online and safely store value; CBDC's wouldn't resolve the intended purpose of banks, to reallocate resources via loans and credit for economic stimulus²⁷. Moreover, current Keynesian economics conditions are more of a credit and spending-based economy, banks would still serve as a body to evaluate and manage risks in loan investments to avoid moral hazards of macro epidemic of 'bad loans'. Though many critics argue that it is the banks themselves that cause the financial panics and issues with systemic risks, the need to allocate dormant funds is what grows the economy. While some do argue for a Public Banking Sector, it is likely decades away with its own challenges, and beyond the scope of this paper.

As economies become increasingly cashless, the government's ability to profit via printing funds of seigniorage can diminish. Seigniorage is a powerful tool that enables a government to create money without raising and collecting taxes. A CBDC would protect this income for governments with the growing trend towards digital cash,²⁸ though there are still many who rely on cash for a safe monetary value outside of the banking system. A CBDC would enable cash to transcend into the digital realm, enabling people to transact without a bank account and protect the people who need a non-bank monetary alternative like a public utility. This would provide a safe monetary umbrella that can help 'bank the unbanked' and combat the likes of credit card fraud that is estimated to cost \$190 Billion annually²⁹. Furthermore, in our growing cashless digital

²³Ludwin, Adam. (2016, June 6). Why Central Banks Will Issue Digital Currency. Retrieved from <https://blog.chain.com/why-central-banks-will-issue-digital-currency-5fd9c1d3d8a2>

²⁴Bjerg, O., & Nielsen, R. H. (2018, February). Who should make kroner? - Copenhagen Business School. Retrieved from [http://openarchive.cbs.dk/bitstream/handle/10398/9592/Who should make kroner-CBS Working Paper 2018.pdf?sequence=1](http://openarchive.cbs.dk/bitstream/handle/10398/9592/Who%20should%20make%20kroner-CBS%20Working%20Paper%202018.pdf?sequence=1)

²⁵ Alderman, L. (2015, December 27). In Sweden, a Cash-Free Future Nears. Retrieved from <http://www.nytimes.com/2015/12/27/business/international/in-sweden-a-cash-free-future-nears.html>

²⁶ FAQs: Currency and Coin. (2011, June 17). Retrieved from https://www.federalreserve.gov/faqs/currency_12772.htm

²⁷Weidman, Jens. (2018, February 26). Jens Weidmann: Opening Remarks - 'Fourth Cash Symposium of the Deutsche Bundesbank. The Bank for International Settlements. Retrieved from www.bis.org/review/r180226a.htm

²⁸HAMPL, Mojmir. (2018, March 8). MojmirHAMPL: A Digital Currency Useful for Central Banks? Retrieved from www.bis.org/review/r180308a.htm

²⁹ Shaughnessy, H. (2012, April 15). Solving the \$190 billion Annual Fraud Problem: More on Jumio. Retrieved from <https://www.forbes.com/sites/haydnshaughnessy/2011/03/24/solving-the-190-billion-annual-fraud-scam-more-on-jumio/#2d43ddb390e0>

economy, commercial digital fiat questions the safety of the financial sector as all funds would have risk from the banking market sector.

Central Bank Tender and CBDCs

Currently, Central Banks have two forms of tender: legal notes also known as cash, and a digital settlement used for banks and large financial institutions. Some see a CBDC as a development of digital settlement used by financial institutions and banks to operate inside of the traditional banking system using Distributed Ledger Technology. Due to blockchains technological efficiency in place of clearing houses, the Bank of England anticipated that “*CBDC issuance of 30% of GDP, against government bonds, could permanently raise GDP by as much as 3%*” due to the “reductions in real interest rates, distortionary taxes, and monetary transaction costs” and “stabilize the Business cycle”³⁰. One can ask why stop at bank-to-bank interactions, countries, and intuitions, and instead just issue a CBDC directly to the public for peer to peer use and settlement redeemable for physical cash tender at a fixed rate of 1:1. It's important to note that a CBDC wouldn't be aimed at replacing cash, rather to supplement it. The Fed or any nation's central bank can transcend its role from a 'bank of banks' to a 'bank of the people' by allowing private individuals to hold its digital tender, though it doesn't have to deploy a system based in cryptocurrency, blockchain, or distributed ledger technology.³¹ Currently around the globe countless central banks and governments are experimenting with the new technology and it shows promise to make current processes and clearing houses more efficient, but nothing conclusive has been determined significantly better than existing infrastructures.³² CBDCs are likely to continue to develop with more testing and research, in addition to financial standardization across the globe as banks develop and link their research and innovations together.

Banks and Commercial Digital Fiat

While the role of the bank may have originally been to safeguard and protect funds and safeguard physical value; banks are now mostly credit agencies that are in the businesses of assessing risk and issuing credit. Banks are essential to the current economic system by re-allocating unused capital back into the economy via investments, loans, credit for businesses, and homes to enhance and develop overall economic growth. A Central Bank Digital Currency (CBDC) can be problematic since it would compete with the commercial bank digital fiat. Depending on the various inflationary and deflationary interest policies a central bank deploys, commercial banks would have to offer a higher saving interest rate compared to CBDCs to compete for consumer funds.

A CBDC can give a Central Bank more tools and impact to secure the economic growth and purchasing power of its national currency especially during booms and busts. Depending on how the CBDC protocol is set up, a CBDC can be interest (or negative interest)³³ bearing and have a modified 'Proof of Stake' approach where users can mine new coins relative to the amount 'put up' or deposited³⁴. Since a CBDC isn't decentralized, this feature can be implemented to be like a basic saving account, giving interest for people who decide to 'lock in' money at set rates for set times. This would directly incentivize the consumer to 'lock money' in an economy, should the economy be predicted to be overheating, to gradually and more effectively contract the money supply. Also, a staking approach enables wealth creation to be given to its holders or citizens directly, giving seigniorage directly back to the customers to better infuse the money into the economy. While this may sound irrational, the FED's Required Reserve Balances and Excess Balances rate is used to do just that for the banks. Essentially paying banks to just sit on funds to prevent inflation from the quantitative easing of monetary supply expansion,

³⁰Barrdear, J. & M. Kumhof. (2016). The Macroeconomics of Central Bank Issued Digital Currencies. Bank of England. Staff Working Paper No. 605. Retrieved from <https://www.bankofengland.co.uk/working-paper/2016/the-macroeconomics-of-central-bank-issued-digital-currencies>

³¹Bech, Morten, & Rodney Garratt. (2017, September). Central Bank Cryptocurrencies. BIS Quarterly Review. Retrieved from www.bis.org/publ/qtrpdf/r_qt1709f.htm

³²Engert, Walter & Ben Fung. (2017). Central bank digital currency: Motivations and implications. Bank of Canada. Retrieved from <https://www.bankofcanada.ca/wp-content/uploads/2017/11/sdp2017-16.pdf>

³³Bordo, M., & Levin, A. (2017, May). Central Bank Digital Currency and the Future of Monetary. Retrieved from https://www.hoover.org/sites/default/files/bordo-levin_bullets_for_hoover_may2017.pdf

³⁴ Meaning, J., Dyson, B., Barker, J., & Clayton, E. (2018, May). Bank of England Staff Working Paper No. 724. Retrieved from <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2018/broadening-narrow-money-monetary-policy-with-a-central-bank-digital-currency.pdf>

which many question ethically.³⁵ A CBDC would extend the impact of monetary policy and provide for tools to regulate the currency directly.

A CBDC can also help Central Banks overcome the lower bound negative interest issue. After the last financial recession of 2008, Banks have approached zero Fed Loan Interest Rates, and central banks have entered a new age in banking with negative interest rates, where people pay to hold funds, incentivizing banks to issue loans and credit, and thus kickstart the staggering economy. When Interest Rates approach zero, monetary policy is potentially nullified with limited potential policy impact to the money supply, due to cash holders who are not directly affected by the interest rates. A successful CBDC would overcome this issue as the interest rate would universally affect the economy and all ‘cash’ holders, enabling all CBDC holders to fall prey to the Fed’s newfound Monetary Policies and negative interest rates since all CBDC holders will be affected.³⁶

A critical concern of CBDC’s is that they lack borders to operate and open the currency beyond its national borders enabling a global run on national currency. This can be a serious problem to ensure economic sanctions along with current KYC laws, to ensure that U.S. businesses and commerce do not fund terrorist or totalitarian regimes. Likely any implementation of a CBDC would not be anonymous for several reasons; it would help ensure better collection of taxes and payment, and it would help restrict the flow of money to illegal businesses and actions, and lastly and less nobly would generate a treasure trove of data that would be easily accessible and tempting for governments and corporations.

Security Risks

A government issued Centralized Bank Digital Currency also poses many risks of foreign government and malicious attacks. If a successful adversary can gain access and overrun a self-contained system, they can block transactions, mine or mint coin, and possibly crash or devalue the network. Therefore, a government issued cryptocurrency is likely to operate in a closed system, only allowing highly authorized and nationally approved institutions to be ‘master nodes’- network validators. In addition to the centralization and ‘closed’ system deployed, a CBDC will employ specific protocol limitations on itself to restrict a system breach. That said, CBDC’s that enlist on established Public blockchains networks are limited to the security proof/work of that network. If governments either buys up a major stake of the coin or rents enough Hash power, the monetary network can be used as a new form of National Warfare or Crypto-War, attacking the consensus validity of the State Issued CBDC coin/token. Methods not even theorized can be used in attack as the race for a viable quantum computer are likely to impose challenges and threaten encrypted networks; at the same time, there are quantum proof algorithms that can implemented in response. Like any warfare, the attack and defense would grow to outpace the other, and the security of any nation’s currency is of top level national security concerns. It is worth noting that current international banking standard (SWIFT) is extremely safe, with its biggest security risk being the login credentials for the Central Banks themselves as demonstrated by the \$81million dollar Bangladesh Central Bank heist conducted by alleged North Korea state hackers the Lazarus Group.³⁷ Any developed system would follow the current banking security protocols and the redundancy checks framework of FINRA (Financial Industry Regulatory Authority) and SWIFT (Society for Worldwide Interbank Financial Telecommunication).

Russia/ China

While the academic material in regard to foreign government blockchain, crypto, and CBDC developments are limited at this time the news-articles are reporting on current developments. Authoritarian governments can use this to mark, freeze, or seize off political oppositions funds, limit what people can buy and who they can transact with; such power should be cautioned, as warned by George Orwell in his novel “*Nineteen Eighty-Four’s*” ‘Big Brother’ omnipresent government surveillance. Countries like Russia and China are most interested in Blockchain Technology each for their own reasons, but they share a desire for it to ensure and maintain political control.

³⁵ Econ, Dr. (2013, March). Why Did the Federal Reserve Start Paying Interest on Reserve Balances Held on Deposit at the Fed? Does the Fed Pay Interest on Required Reserves, Excess Reserves, or Both? What Interest Rate Does the Fed Pay? Retrieved from www.frbsf.org/education/publications/doctor-econ/2013/march/federal-reserve-interest-balances-reserves

³⁶ Gupta, Sahil, et al. (2017, May). Fedcoin: A Blockchain-Backed Central Bank Cryptocurrency. Retrieved from https://law.yale.edu/system/files/area/center/global/document/411_final_paper_-_fedcoin.pdf

³⁷ Hammer, Joshua. (2018, May 3). The Billion-Dollar Bank Job. The New York Times. Retrieved from www.nytimes.com/interactive/2018/05/03/magazine/money-issue-bangladesh-billion-dollar-bank-heist.html

China has been pursuing its economic goals primarily through monetary policy, in addition to their suspected currency devaluation as it attempts to pursue economic growth through number manipulation. *“For instance, if Bitcoin or a stablecoin became a medium for exchange, especially for international trade, it would limit the efficacy of China’s exchange rate policies that have historically supporting its export industry.”*³⁸

Russian had declared its path towards a state issued ‘CryptoRuble’.³⁹ While not too much information is published about it, it will not be mined, and be redeemable 1:1 pegged to the physical Russian Ruble. Additionally, Russia would levy a 13% Tax against any CryptoRuble income that couldn’t be verified.⁴⁰ President Putin’s economic advisor Sergei Glazev was quoted saying: *“This instrument suits us very well for sensitive activity on behalf of the state. We can settle accounts with our counterparties all over the world with no regard for sanctions.”*⁴¹ In another report, Deputy Governor of Russia’s Central Bank, Olga Skorobogatova was quoted *“We will definitely get to a virtual national currency, we’ve already started working on it.”*⁴²

Venezuela

The Petro, the state-run cryptocurrency for Venezuela is on the Public NEM network, which uses the proof-of-importance method (modified proof of stake) to verify the authentication of the transitions. The Petro is the first state issued and asset backed crypto token, backed by the raw oil reserves of Venezuela; though many skeptics look at the Petro as a loophole to get around the US imposed economic sanctions and illicitly raise funds for what critics call a largely corrupt regime that has pushed Venezuela to hyper-inflation and horrible economic conditions. The Petro whitepaper openly acknowledges that the USD and several other basket currencies have acted as the global reserve currencies making global market access and trade dependent on them. *“Due to the imposition of the US dollar as the international backing currency...which has been particularly harmful to emerging economies... decisions made in the major centers of power to stabilize economies has been recognized”*⁴³ President Trump reaffirmed the US sanction on the Petro Token, forbidding any US Citizen or trading partner in investing in the token sale⁴⁴, Additionally, matters aren’t so clear with Russian investors and government helping and aiding the Petro’s development, and the Venezuela National Assembly legislature calling the initiative illegal as oil assets can’t be sold or put up as debt without the approval of the legislature making the Petro not a democratically verified coin. A clear issue for any asset backed currency is how to verify the reserves. It isn’t clear how Venezuela will be able to prove that its Petro fairly represents the assets it claims as reserves. As for the Petro’s ability to evade US sanctions to conduct global trade, it’s too early to have any significant data⁴⁵.

Taxes

A national based CBDC would be able to develop creative ways to tax a domestic economy. While traditional tax returns are done annually, all transactions through a CBDC would be recorded and permanent. However, record aggregation has been proven to be extremely complicated to analyze for cryptocurrencies and likely CBDCs due to need to analyze what transaction a transfer is; getting even more complicated as people trade into other currencies and cryptocurrencies. The easiest way to implement a transaction-based tax- is have a flat tax, which is widely unpopular as most countries impose higher taxes on wealthier inhabitants. Depending on how the CBDC and tax system is set-up, tax could be a form of transaction-fee. This would eliminate any need for most tax reporting, as all transactions would embody the levied tax in a payment fee at the given tax level and could be used to balance the tax on its higher income residents with different fees at

³⁸ Ehrlich, Steven. (2018, September 17). Making sense of China’s grand blockchain strategy. Forbes. Retrieved from www.forbes.com/sites/stevenehrlich/2018/09/17/making-sense-of-chinas-grand-blockchain-strategy/#4af7bf723678

³⁹ Buck, Jon. (2017, October 15). Breaking: Russia Issuing ‘CryptoRuble’. Retrieved from www.cointelegraph.com/news/breaking-russia-issuing-cryptoruble

⁴⁰ The CryptoRuble - A 13% Tax on The Crypto Economy? (2017, December 5). Retrieved from <http://cryptogurus.com/bitcoin/cryptoruble>

⁴¹ Arnold, Martin. (2018, January 2). Putin Considers ‘Cryptoruble’ as Moscow Seeks to Evade Sanctions. Financial Times. Retrieved from www.ft.com/content/54d026d8-e4cc-11e7-97e2-916d4fbac0da?segmentId=9b41d47b-8acb-fadb-7c70-37ee589b60ab

⁴² Capozzalo, Olivia. (2018, October 9). Putin Adviser Says ‘CryptoRuble’ Will Circumvent Sanctions, Government Remains Divided. Retrieved from www.cointelegraph.com/news/putin-adviser-says-cryptoruble-will-circumvent-sanctions-government-remains-divided

⁴³ Bolivarian Republic of Venezuela. (2018, January 30). Petro Whitepaper. Retrieved from www.elpetro.gob.ve/pdf/en/Whitepaper_Petro_en.pdf

⁴⁴ Trump, Donald. (2018, March 19). Executive Order on Taking Additional Steps to Address the Situation in Venezuela. The White House. United States Government Executive Order. No. 13808. Retrieved from www.whitehouse.gov/presidential-actions/executive-order-taking-additional-steps-address-situation-venezuela/

⁴⁵ Chohan, Usman. (2018). Cryptocurrencies as Asset-Backed Instruments: The Venezuelan Petro. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3119606

different transaction volumes. Furthermore, depending on the wallets verification (knowing who the wallets belong too) and identity of the wallet, there can be tiers set up having different tax status identities (nonprofits). Additionally, governments could tax un-accounted for income at a set rate similar to the proposition of the Russian Ruble (at 13%). It's important to recognize that this system wouldn't resolve a tax solution for states and municipalities. This can be tricky due to identifying the location of transactions of purchase, but likely would result to the tax liability of the selling parties registered address of business in conjunction with the Federal Filing/ Receipt of annual taxes.

CONCLUSION

While the current digital fiat system works rather soundly domestically, governments at this time are cautious about issuing a CBDC but will likely start doing so as the economy becomes increasingly cashless. While Central Banks are rightfully hesitant to issue CBDCs to be fashionable, cryptocurrencies' and Bitcoin's success can force governments around the world to respond with their own alternative. Authoritarian governments will likely lead the way, in order to have untold and far reaching influence on the control, privacy, spending, and regulation of its citizens, providing a cash-like substitute for the digital age. The implementation of a CBDC needs to be extremely tailored and highly custom, with a tested and durable function for broad use. CBDC's need to ensure financial safety, and central bank maneuverability for changes in its protocol development which will be done via a closed operation system and not decentralized. If done correctly, CBDC's can provides a more direct method for economic stability than the current vicarious and indirect banking system and could be further developed for future economic and social policies.

While Bitcoin and other Cryptocurrencies do have their current shortfalls in terms of national domestic adoption; citizens, businesses, and international governments now have access to a financial instrument and financial 'hedge' to the USD. While Bitcoin is unlikely to be used as national tender inside national domestic government-controlled markets at this time, it's likely to grow as a monetary weight with the potential to displace gold in international trade and settlement creating a monetary hedge and value outside of USD speculation with better liquidity, storage, and security than gold ever had. Should Bitcoin unseat gold, nations will likely start protecting the network integrity of the Bitcoin and Cryptocurrency ledgers from foreign state level manipulation and maintain and protect its citizens' balances. Bitcoin takes the very idea of money and pushes it to the extreme, accepting money and value, are fundamentally just the ideas we believe.

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EFFECT OF SHAREHOLDER VALUE PERSPECTIVES ON ETHICAL DECISION IN EMERGING MARKET: THE ROLE OF EGOISM AND ETHICS OF AUTONOMY

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ABSTRACT

The shareholder value model of corporate social responsibility has been shown to be the root cause of the widespread unethical business practices in emerging economies, which have drawn increasing attention from both policy makers and business ethicists. The present study aims to extend previous research by investigating how two different ethics, i.e., ethical egoism and ethics of autonomy affect business decision makers' shareholder value perspective as well as ethical decision. Ethical egoism and ethics of autonomy are both originated from market ethic introduced by economic reform in emerging markets. However, these two ethical systems relate to ethical decision making in different ways. Ethical egoism positively relates to shareholder value perspective and negatively relates to ethical decision. In contrast, ethics of autonomy has a negative effect on a shareholder value perspective but a positive effect on ethical decision making. The findings demonstrate a clear distinction between ethical egoism and ethics of autonomy in their impacts on the relationship between a shareholder value perspective and ethical decision making. The theoretical and managerial implications of the results are discussed.

INTRODUCTION

Globalization of the world economy and economic reforms in the developing countries have given rise to the unprecedented economic growth and prosperity in emerging economies. In the meantime, inequities of wealth, environmental degradation, and unethical business practices have become endemic of globalization. Consequently, they have grown into a major concern among economists and business ethicists. For instance, China, the largest emerging economy in the world seems to have a poor record in business ethics and environmental protection. The unethical marketing malpractices in the area of product safety, information disclosure, employee relation and so on have been widely reported in the media. The ethical climate is further exacerbated by highly polluted air and water, slave labor, polarization between wealth and poverty, social inequity, corruption, fraudulent dealings, and money worship (Lu, 2009; Ip, 2009; Tam, 2002). The ethical chaos has been attributed to depravity of morality and the widespread mentality of profit at any cost (Ip, 2009). Unfortunately, what we have observed in China is not some isolated, sporadic or rare incidents. On the contrary, such ethical problems are widely observable in the emerging economies primarily due to the underdeveloped institutional environment, inadequate government and/or professional regulation, weak legal enforcement and lack of public transparency (Tan, 2009; Hashimi et al., 2015). Faced with those challenges presented by the emerging markets, business researchers are obliged to ask: What is/are accountable for the observed unethical business conducts in those markets? What business management or policy makers may do to curb such unethical business behaviors?

The present research is an attempt to search for some answers to those important questions. We agree that the institutional environment, especially effective regulation and legal enforcement are essential to solving the ethical problems we have observed in the emerging markets. Nonetheless, we take a different approach in this study. We wanted to focus on business decision makers, who we believe are responsible for business policies and day-to-day decision-making. Specifically, we attempt to look into the role of business ethics subscribed by decision makers because decision makers' commitment to moral beliefs, values, and principles can exert significant influence on business decisions, especially those that involves moral issues. Our choice is based on a fundamental assumption that the market ethic brought by economic reforms entails a completely new ethical system that would provide an adequate foundation for market economy. The Western experience in the past three centuries shows that market ethic itself may give rise to different kinds of moral values and principles, which may not necessarily be compatible with existing ethical systems, neither do they necessarily promote the market to function effectively and properly. Given the important role of moral values, principles, moral philosophies in moral judgment and decision choice (Chao, Li, & Chen, 2016; Cullen et al., 1993; Forsyth, 1992; Forsyth, O'Boyle, & McDaniel, 2008; Mudrack, 2003), it is imperative to examine how different ethical systems may affect practitioners' moral decision. A moral decision involves moral judgement and moral choice/intention (Rest et al., 1999; Thoma, Rest, & Davison, 1991). Moral judgment refers to evaluation of alternative actions with respect to moral norms and values established in a society (Thoma, Rest, & Davison, 1991). According to Rest's model of moral reasoning, the perceived rightness or wrongness of a course of action directly affects the subject's subsequent choice or behavioral intentions (Rest et al. 1999; Thoma, Rest, & Davison, 1991). Thus, we choose to examine the impact on moral judgment and moral choice of two important ethics: ethical egoism and ethics of autonomy. We have made this choice because the close affinity between market ethic and ethical egoism or ethics of autonomy has caused considerable confusion among decision makers, which in turn negatively affects their moral judgment and decision choice. Furthermore, given the role of the mentality of profit at any cost in

unethical business practices, it is essential to study how the shareholder value model of corporate social responsibility affects managers' moral judgment and decision choice in relation to ethics of autonomy and ethical egoism. We believe, the findings of this study should enhance our understanding of the mechanism under which managers make moral judgement and business decision. Consequently, the present research should shed some light on the determinants of ethical problems and provide certain guidance in fighting against unethical, sometimes illegal business practices in emerging markets.

In sum, our research objectives are threefold: 1) to distinguish ethics of autonomy from ethical egoism and investigate their distinct role in moral judgement and decision choice, 2) to examine the impact of the shareholder value model of corporate social responsibility on moral judgment and decision choice, and 3) to explore the potential intervening role of a shareholder value perspective on the relationship between ethics of autonomy or ethical egoism and moral judgment or choice.

The rest of the paper is organized as follows. The next section examines market ethic, egoism, ethics of autonomy, and their relationship with moral judgement and decision choice. It is followed by a discussion on the impact of a shareholder value perspective on moral judgment and choice, and its role on the effect of ethical egoism and ethics of autonomy. The final section of the paper discusses research limitation and future research directions.

CONCEPTUAL DEVELOPMENT

Economic reform in emerging countries is characterized by the introduction of market economy into the countries. A market economy is an economic system built on market exchange relationships, which take place between two parties who voluntarily enter the mutually beneficial relationships to meet their respective needs. Specifically, an exchange takes place when each party a) has something of value desired by the other party, b) is interested to obtain what the other possesses, c) is willing to give up what s/he owns, and thus d) voluntarily transfers the ownerships and consequently benefits from the exchange. Apparently, market exchanges assume autonomous individuals who have different needs and preferences, who enter an exchange relationship of their own choice, and who participate in the exchange for their own benefits, namely, for promotion of their self-interest. The principle of rational self-interest is at the core of market exchanges. Its important role is well acknowledged in the economic theory of Adam Smith, the founder of modern economics.

When describing the market mechanism, Adam Smith writes, "Man has almost constant occasion for the help of his brethren" (Smith 1776/2003, p. 23). It is through exchange that "we obtain from one another the greater part of those mutual good offices which we stand in need of." When a person (the buyer) wants to obtain something from merchants (the sellers), "it is in vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favor, and shew them that it is for their own advantage to do for him what he requires of them." This is because the rule in market exchange is "Give me that which I want, and you shall have this which you want." In such a relationship, each party to the exchange "intends only his own security," and "only his own gain." (Ibid, p. 572). In doing so, he does not intend to promote the public interest. However, rational self-interest as the driving force has an instrumental value for the society as a whole. Because led by "an invisible hand," each man who pursues his own interest "frequently promotes that of the society more effectually than when he really intends to promote it" (Ibid). Smith further writes, "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest." Therefore, "We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantage" (Ibid, p. 24).

It is clear that self-interest (self-love) is a concept central to Smith's theory of economics. In his view, rational self-interest is what motivates a man to partake in a market exchange and guides his actions in the exchange relationship. It is the driving force of the market system and a necessary condition that unleashes humankind's productive energy and creativity. "The image of the instrumental value of self-love has become, in modern economics, the fundamental assumption that humans are all of the species *homo economicus*, motivated entirely by utility-maximizing self-interest" (Evensky, 2005, p.110). It has been argued that the utility maximizing behavior, combined with the assumptions of market equilibrium, and stable preferences, form the heart of the economic approach (Evensky, 2005). Given the importance of the principles of rational self-interest, Dugay (2005) claims that the early conception of self-interest is a remarkable human achievement that we should learn to appreciate.

If self-interest indeed drives market exchanges, then granting to each individual the right to pursue his or her interest is a prerequisite for a market economy. Moreover, the voluntary participation in an exchange presumes that each party to the exchange enjoys complete freedom of choice. Together with free competition and economic efficiency, private property

right, right to personal preferences, and freedom of choice (Maitland, 1997, 2002) constitute the core of market ethic, a system of beliefs, values and principles that predominates a market economy. Nevertheless, right to pursue self-interest and freedom of choice are necessary, but not sufficient for a market economy to function effectively and properly. As Adam Smith (1776/2003) argues, rational self-interest alone, despite its necessity, would be detrimental to the market as well as society if it is not constrained. Unbridled self-interest would lead to greed and unfair competition, which would turn a perfectly free market system into a Hobbesian abyss – a rent-seeking society. Thus, it is necessary to go beyond the principle of rational self-interest in to provide an adequate ethical foundation for market economy.

To the pioneers of modern economic theories, it is critical to place moral constraints on self-regarding pursuit, that is, to reconcile morality with the market ethic built on rational self-interested pursuit. They devoted considerable efforts to give an account of the rules that business people can identify and must abide by. For example, Hume, a close friend of Smith's, argues that the principle of justice is fundamental to such business rules or virtues (i.e., characters that disposes people to follow these rules). In his opinion, stability of possession, its transference by consent, and performance of promises are at the core of rules of justice (Kline, 2012). These rules are fundamental because market exchanges require voluntary transference of ownership and contractual commitment, which are essential to the function of a market economy. The principle of justice differs from the virtue of beneficence where the utility of individual actions is mostly independent of the actions of the beneficiaries. "The utility of justice depends upon how others are acting." "With justice individual acts have utility because of the cooperation of others. Therefore, respecting property, honoring contracts, and voluntary trade depend for their value on the cooperation of others" (Kline, 2012, p.165).

Similarly, Smith (1759/1966) delineates a business ethics in *The Theory of Moral Sentiments* (hence *TMS*) that labels justice as the pillar of a market economy and the cornerstone of a liberal society. To him, market exchanges are mutually beneficial cooperative arrangement and justice underwrites such market exchanges whether they arise from explicit contractual agreement or not. He writes, "How selfish soever man may be supposed, there are evidently some principles in his nature which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it" (*TMS*, p. 3). Giving emphasis on principles of justice, he further notes in the *Wealth of Nation* (*WN*), "Everyman, as long as he does not violate the laws of justice is left perfectly free to pursue his own interest his own way and to bring both his industry ad capital into competition with those of any other man or order of man" (1776/2003, IV. Lx. 51).

Apparently, to the vanguards of a market economy, the principle of rational interest that drives market exchange, a mutually beneficial cooperative arrangement, is inextricably bound to the principle of justice. Rules of justice place constraints on pursuits of self-interest, thus safeguard the effective and proper function of the market. Only by observing rules of justice, can each party to the exchange enjoy the freedom of choice and maximize the benefits that may accrue from this cooperative arrangement.

In short, to Smith and his contemporaries, the principle of justice and the principle of freedom of choice are at the core of the ethical foundation of a market economy. A market economy would be impossible without free, and self-interested individuals. Similarly, markets would not function effectively, nor properly without the rules of justice and corresponding moral constraints. As a result, freedom of choice and the principle of justice are central to modern morality that evolves from the market economy and modern liberal society. Following Schewede et al. (1997), we refer to modern morality as ethics of autonomy, which regards the moral domain as "prescriptive judgments of justice, rights, and welfare pertaining to how people ought to relate to each other" (Turiel 1983, p. 3). To ethics of autonomy, the self is conceptualized as an independent individual who has the right to pursue his or her preferences and/or happiness, and the right to choose his or her own goals and values based on how he or she feels. Given that autonomous individuals are the locus of moral worth, ethics of autonomy is often called individualizing ethics (Haidt, 2001). Morality is about protecting individuals' autonomy and respecting the rights of other individuals. Thus, rights, justice, and freedom of choice are the core regulatory concepts of ethics of autonomy. The purpose of moral regulation is indeed to protect free choice of each person and promote the exercise of individual will in pursuing personal preferences (Edmundson, 2004; Schweder et al., 1997; Schweder & Miller, 1987).

When comparing modern morality with personal morality based on Aristotelian ethical theory, Punzo and Meara (1993) point out that modern morality as social morality focuses on interpersonal exchange of rights, duties and goods among autonomous individuals. Unlike personal morality, that is concerned with people pursuing a good life and the importance of self-regarding virtues, social morality limits its focus on matters of interpersonal interactions to promote fair and just exchanges, and provide resolution to conflict in exchange of right and duties. Such a unique focus has apparently made

freedom of choice and justice the core values of ethics of autonomy. As such, ethics of autonomy is considered to be a new system of ethics that results from the need of and provides the moral foundation for market economic systems (Maitland, 1997, Shaw, 1997).

Given its emphasis on the moral value of rights, fairness and justice, ethics of autonomy will be more likely to play a positive role in marketing managers' business decision when they are faced with a moral dilemma involving product safety and information disclosure. It is well known that consumers have the right to product safety and right to be informed in market exchanges. Thus, we propose that the higher managers' commitment to ethics of autonomy, the greater the likelihood that they will make judgment and decide on the moral issue in terms of moral values and principles when faced with a moral dilemma in decision making. Thus, we propose,

Proposition 1a. Ethics of autonomy is positively related to moral choices.

Proposition 1b. Ethics of autonomy is positively related to moral judgments.

In contrast to ethics of autonomy, ethical egoism that also evolved from the principle of rational self-interest, takes a drastically different approach to moral issues involved in business practices. Like ethics of autonomy, ethical egoism has been highly influential on business practitioner as well as to academicians (Shaver, 2014). Similar to ethics of autonomy, ethical egoism holds that autonomous individuals are motivated by their interests and desires, thus regarding one's self as the motivation and goal of one's own action. However, ethical egoism differs from ethics of autonomy in that ethical egoism is built on rational egoism and primarily normative rather than descriptive. As commonly understood, "rational self-interest" refers to "thinking and acting in a manner that is expected to lead to an optimal or maximum result for a person on the basis of a consideration of the person's values and risk preferences" (Meglino & Korsgaard, 2004, p. 946). Therefore, "Self-interest and rationality are closely intertwined in that the tendency for a person to react in a rational self-interested way is contingent on the strength of the self-interests at stake" (Ibid). Hence, ethical egoism holds that for an action to be rational, it is necessary and sufficient that the action to be taken maximizes the satisfaction of one's preference. The assumption that individuals will utilize some form of rational outcome or utility maximization in the pursuit of their self-interest so critical to neo-classical economics that people often equate rational egoism to economic egoism (Shaver, 2014). More importantly, ethical egoism regards rational self-interest as the basis for morality rather than something being curbed or constrained. That is, in addition to adopting of the assumption that each person ought to maximize his or her own welfare, ethical egoism goes beyond rational egoism and treat self-interest as the foundation of morality. To ethical egoism, self-interest is the fundamental incentive of any behavior, and maximizing one's self-interest is necessary and sufficient for an action to be morally right (Badswar & Long, 2016). Ethical egoism claims that do what is own good or welfare is an agent's moral obligation. As Ayn Rand puts it, an individual's primary obligation is to achieve his/her own well-being. It is right for a man to live his own life, and selfishness is a proper virtue to pursue. Thus, the agent must always be the beneficiary of his action and that man must act for his own rational self-interest (Shaver, 2014; Badswar & Long, 2016). Such a view "makes the agent's own good primary," and "defining other moral notions in terms of it" (Brink, 2005, p. 407-408). In the strong version of ethical egoism, not only is it rational to pursue one's own interests, it is irrational not to pursue them. Ethical egoism seems to hold that it is always moral to promote one's own good, and it is never moral not to promote it. Avoidance of personal interest is considered as an immoral action (Badswar & Long, 2016).

As a moral theory, ethical egoism subscribes to many of the same duties and virtues that ethics of autonomy endorses, including independence, rationality, integrity, honesty and justice. Unlike ethics of autonomy, however, ethical egoism does not allow for the idea that an agent gives weight to the interest of others for the sake of others¹. To ethical egoism, a person gives weight to the interests of others only because it is in his/her best interest to do so. Each person needs the cooperation of others to obtain goods. If a person breaks his/her promises whenever it is in his/ her direct self-interest, others will not accept his/her promises, and in the end, she/he will be the one who suffers most. Hence, it is for one's life and one's self-interest that an individual ought to adhere to a moral code. An egoist thus would rank as most important duties what can bring her the highest payoff. And s/he may not give any weight to the welfare of others unless it is in her interest to do so. Apparently, egoism regards self-interest as the ultimate motivation for everything we do, including performing our duties and pursuing virtues. Because ethical egoism often regards selfishness to be a proper virtue to pursue and claims that a man must act for his own rational self-interest and must always be the beneficiary of his action, ethical egoism has been labeled as the morality of selfishness (Moseley, 2017). Selfishness differs from self-interest given that a selfish person ignores the welfare of others and often seeks his/her own gain at the expense of others. Taken together, we believe that a business manager who is committed to ethical egoism may tend to make an unethical choice when the moral issues concern the welfare of others. The stronger the commitment, the less likely it is that they would make an ethical decision when faced with a moral dilemma concerning product safety and information disclosure. Therefore, we propose

Proposition 2a. Ethical egoism is negatively related to moral choices.

Proposition 2b. Ethical egoism is negatively related to moral judgments.

Role of a shareholder value perspective

Ip (2009) argues that the unethical practices observed in emerging market primarily result from the profit at any cost mentality of management, which seems rooted in the shareholder value model of corporate responsibility (Wang, Li & Sun, 2018). Given its important impact, we argue that a shareholder value perspective may play an important role in the relationship between moral decision and ethical egoism or ethics of autonomy. In other words, beside their direct impact on a moral choice and moral judgement, ethics of autonomy and ethical egoism may affect moral decision through their effect on shareholder value perspectives. A shareholder value perspective holds that the responsibility of a corporation is to make profit subject to compliance with the rules of business game, namely the legal restraints and government regulations. As Friedman (1970) argues, corporations should strive to maximize profit for shareholders as long as they abide by such rules of game as contractual commitment and free competition. It is obvious that the shareholder value perspective views profit-making as the primary, if not the sole responsibility of business enterprises. Hence, it encourages business to maximize shareholder values with no intention to take ethical or social responsibility beyond legal or regulatory requirements. Business managers with a shareholder value perspective would tend to make decisions to maximize profitability without paying much attention to social and ethical responsibilities other than required by laws or government regulations. It comes with not surprise that a shareholder value perspective will encourage the mentality of making profit at any cost, and thus be accountable for the widespread unethical practices in the emerging markets. Therefore, when faced with moral dilemmas involving product safety and information disclosure, managers who uphold a shareholder value perspective would be more likely to make an unethical decision than those who do not. We propose,

Proposition 3a. A shareholder value perspective is negatively related to moral choice.

Proposition 3b. A shareholder value perspective is negatively related to moral judgement.

It is evident that a shareholder value perspective is closely related to the rational egoism assumption of the neo-classical economics. According to rational egoism, it is only rational that the individuals participating in economic transactions strives to maximize his or her personal gain. Applying the same logic, it is only rational if a business firm strives to maximize the profit of its owners, or its shareholders. In fact, Cullen et al. (1993) explicitly regard egoism as the basis for the ethical climate that focuses on corporate profit and performance efficiency. Moreover, to the strong supporters of the shareholder value perspective, maximizing profit is not just rational but also ethical. As Bevan and Werhane (2015) indicate, people who hold such a perspective indeed regards businesses that pursue any goals other than maximizing profits as being “tantamount to theft” because such pursuits are “unjustified appropriation” of the shareholders’ property (p. 329). Evidently, such a viewpoint heavily relies on the fundamental belief of ethical egoism on the moral nature of rational self-interest. Similarly, Northrop (2013) argues that maximizing profit involves weighing the costs and benefits of any business actions. If a firm puts aside such careful benefit-cost calculation or places it second to other more basic goals, the firm would not be deemed a maximizer of shareholder values. Thus, rational egoism is at the root of profit maximization, which in turn is central to a shareholder value perspective. Given the close relationship between a shareholder value perspective and ethical egoism, we propose,

Proposition 4. Ethical egoism is positively related to a shareholder value perspective.

Unlike ethical egoism, ethics of autonomy sets as its primary goal to curb unbridled self-interest or egoism characterized by selfish behaviors. The founder of modern economics clearly acknowledged the destructive effects of unbridled self-interest. To them, the pursuit of self-interest, unless constrained would lead to greed, rapacity, unfair competition, dishonesty and the like that may undermine the moral foundation of market economy. A fundamental difference between ethics of autonomy and ethical egoism is the weight placed on the well-being of others. As a rights-based ethics, ethics of autonomy regards the interests of others as important, if not more than, as a person’s own self-interest. To another person, one’s self-interest is indeed the interest of others. The principle of doing no harm to others implies that one ought to respect the rights of others to pursue their preferences. This is just a logical extension of the principle of rational self-interest. Therefore, the advocates of ethics of autonomy emphasize the importance of other-regarding virtues and the necessity to place restrictions on pursuing self-interest. For Smith, it is justice, the core value of ethics of autonomy that establishes the boundary conditions of self-serving behavior (Northrop, 2013). For Kant (Paley, 2002), it is reason itself that sets the limit on self-serving pursuit. Kant views autonomy as the power to self-legislate. His categorical imperatives require that one must treat humanity, whether in

one's own or in that of another, always as an end and never as a means. As a result, each should act only in accordance with that maxim which you can will that it become a universal law. Therefore, thinking or caring for oneself does not entail ignoring others and/or obtaining personal gains at the expense of others. On the contrary, true autonomy in Kant's primary sense is the ability to disengage from one's inclination and recognize as one's purpose the happiness and well beings of other people (Paley, 2002). Applying the principles of justice and autonomy, corporations should respect the rights of other stakeholders and take into consideration the welfare of other stakeholders besides shareholders' interest. Given that, we believe managers who are committed to ethics of autonomy will be more likely to reject a shareholder value perspective than those who are not. Therefore, we propose

Proposition 5. Ethics of autonomy is negatively related to a shareholder value perspective.

In view of the difference between ethics of autonomy and ethical egoism, and their opposite position on the self-interested behavior, we suggest that ethics of autonomy might moderate the effect of ethical egoism on moral decision making. To be specific, we argue that ethics of autonomy may attenuate the impact of ethical egoism on both the shareholder value perspective and moral decisions. Therefore, we further propose,

Proposition 6. Ethics of autonomy moderates a) the effect of ethical egoism on business managers' moral choice, b) the effect of ethical egoism on business managers' moral judgment, and c) the effect of ethical egoism on business managers' shareholder value perspective.

According to Rest's model of moral action (1994), moral decision process begins with moral dilemma identification, proceeds to prescriptive judgment and assessment of alternative courses of actions and then arrives at moral choice or behavioral intention. Apparently, one's choice of a certain course of action is a function of the moral judgment. Previous research has shown that the judgment of the rightness or wrongness of a course of action plays a critical role in the choice of courses of action and subsequent ethical behavior (Elm & Weber, 1994; Weber & McGivern, 2010). Therefore, what a business manager may choose to do depends on his or her judgment with regard to ethicality of the course of action in question. The more s/he views a course of action as moral or ethical, the more likely it is that s/he would take that action. Therefore, we propose,

Proposition 7. A manager's moral judgment is positively related to his or her moral choice.

A graphical presentation of our conceptual framework is presented in Figure 1.

CONCLUDING COMMENTS

Adopting market economic system seems to be a double-edged sword to the emerging countries because it brings wonder as well as troubles. Drawing on previous research that regards the narrow view of corporate social responsibility as the primary cause of the widespread mentality of profit at any cost (Mudrack, 2007; Ip, 2009), this study focuses on exploring the ethical systems that may affect business managers' position on a shareholder value perspective as well as their moral judgment and decision. Through examining the relationship among market ethic, egoism, and ethics of autonomy, the present study has made a clear distinction between self-interest and selfishness, and placed ethics of autonomy in sharp contrast to ethical egoism. Unlike ethical egoism, of which selfishness is at the core, ethics of autonomy advocates the rights of all individuals and emphasizes equality as well as justice. Given its core regulatory values, ethics of autonomy is expected to have negative impact on the shareholder value perspective and consequently facilitate moral judgment and ethical decision. In contrast, ethical egoism would strengthen the narrow view of corporate social responsibility and negatively affect moral judgment and ethical decision. In addition, the shareholder value perspective is proposed to negatively affect moral judgment and choice while mediating the effect of ethical systems on moral judgment and decision choice.

Given the nature of market ethic, the ethical rationalism or economic rationalism has been predominant among economists as well as business ethics scholars. Even today, ethical rationalism still has a powerful influence on both business research and business education (Northrop, 2002). Thus, it is of great importance to distinguish self-interest from selfishness, and demonstrate the difference between ethics of autonomy and ethical egoism. The findings of this study should help us better understand what is moral and what is immoral in business actions and consequently delimit the selfish economic rationalism. Considering the shareholder value perspective is widespread among entrepreneurs and business managers, raising the

awareness of the distinction between ethics of autonomy and ethical egoism should help business practitioners develop a clear guide for ethical business practices.

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ABSTRACT

Buy and hold strategies typically outperform active management of portfolios. Few active strategies though outperform passive strategies on a consistent basis. This study is an attempt to back-test some simple active strategies that most investors can replicate with little effort. Criteria for these strategies include size and/or value strategies applied within the S&P 500 index. These strategies consistently outperform the S&P 500 index total return over a long period of time. Size factor generated an excess annualized return of 8.54% over a 15-year period and a combination of size, value and other factors generated excess annualized return of 20.4% over the same period. Combination strategy generated a cumulative return of 2849% relative to 704% for the size factor, 1019% for the value factor and 313% for the index over this 15-year period. This study corroborates the emergence of smart beta strategies and factor-based investing that is gaining traction in financial markets.

INTRODUCTION

Value stocks typically outperform growth stocks over long periods of time (Fama& French, 1998). Value may be defined as those stocks that meet certain criteria such as those that have lower P/E, P/B, P/CF or higher dividend yield than the averages for a group of stocks. Fama and French (1995) and Chen and Zhang (1998) provide evidence that high book-to-market (B/M) firms have persistently lower earnings, higher financial leverage, and higher earnings uncertainty. Lakonishok, Shleifer and Vishny (1994) argue that investor expectations are based on the extrapolation of recent past performance. Therefore, investors with naïvely optimistic expectations about the prospects of glamour stocks; they tend to get overly excited about stocks that have done well in the past and drive the prices of these stocks up, so that these glamour stocks become overpriced. When these overly optimistic expectations are not met, these stocks suffer significant losses. DeBondt and Thaler (1987) document that investors tend to overreact to recent stock market events. When EPS expectations are not met, it adversely affects the market price of growth stocks more than value stocks. They argue that any mispricing is likely to be most pronounced in firms with a high degree of information asymmetry and where rational arbitrage is less likely to be effective. There is evidence that this behavior may be explained by disproportionately large and asymmetric responses to negative earnings surprises for growth stocks (Skinner & Sloan, 1999). Madhogarhia et al. (2009) contend that growth firms have more incentives to “manage their earnings”, and they provide evidence that they do so more aggressively compared to value firms.

Banz (1981) provides evidence that on average, smaller firms have higher risk adjusted returns than larger firms. It is likely that size could be simply a proxy for factors correlated with size or it could be a result of law of large numbers. It is relatively more difficult for larger firms to grow at the same rate as the smaller ones. Smaller firms could be considered to be relatively more risky than larger firms. Bauman et al. (1998) find that value stocks outperform growth stocks in all firm capitalization categories except the smallest size category. If change is a given, it implies smaller companies are expected to displace old leaders. A basket of smaller companies, though riskier in nature, tends to grow much faster than a basket of large companies. In this study only, large cap stocks are considered, and hence, smallest S&P 500 value stocks are expected to outperform the index.

Savor and Cavazos (2011) find that short sellers cover their positions after suffering losses and increase positions after experiencing gains. The momentum effect may make value stocks even more deeply valued as short sellers increase their positions after experiencing gains in these distressed stocks. On the other hand, they may cover their positions after they suffer losses in growth stocks that continue to go higher; these growth stocks may continue to glide higher. Value stocks can become even more valuable on pessimistic expectations, and growth stocks can become overvalued on overly optimistic expectations. Stocks that have a high short interest may perform better than those with low short interest when any good news relating to high short interest stocks creates a short squeeze.

Daniel et al., (1997) find evidence that an average mutual fund does outperform simple mechanical rules based on characteristics such as market capitalization, book to market value of equity and momentum. However, after accounting for fees, the outperformance is approximately equal to management fees, implying that the managers outperform just enough to earn back their fees. Pablo and Pablo (2018) have shown in a working paper that it is relatively easy to beat S&P 500 index by following simple mechanical rules. Jegadeesh and Titman (1993) find evidence that momentum strategies that buy winners with high returns over the previous 3 to 12 months and sell losers with poor returns over the same period generate

significant positive returns of about one percent per month. This momentum effect would make value stocks even more deeply valued over the short term. According to Poterba and Summers (1988), stock returns are positively serially correlated over short time horizons and negatively autocorrelated over longer time horizons (Poterba & Summers, 1988). “If divergence between market values and intrinsic fundamental values exist over short periods of time then beyond some limit speculative forces may eliminate such divergence and hence asset values will exhibit mean reversion” (Madhogarhia & Lam, 2015). Therefore, we should expect value stocks to become more deeply undervalued over short time period and significantly outperform over the longer term. Plyakha (2012) finds evidence that equal-weighted portfolios outperform the value- and price-weighted portfolios on a total mean return basis and Sharpe ratio. They also find that equal weighted portfolio has greater portfolio risk. In an equally-weighted portfolio of large cap stocks, smaller market cap stocks are over-weighted relative to a market cap weighted index such as S&P 500 index in which larger market cap stocks are over-weighted. Higher risk could be attributed to small cap bias as equal-weighted portfolios have inherently higher allocations to smaller cap stocks included in the portfolio. It is becoming increasingly popular that market capitalization weighted indexation is inefficient. Haugen and Baker (1991) show that market cap weighted stock portfolios are inefficient. Equal weighting and fundamental factor-based indexation is becoming more popular. We also know that market cap weighted indices underperform equally weighted indices because of concentration of high market cap stocks in the market cap weighted indices. In contrast, equally weighted indices are concentrated in small cap stocks. Small cap stocks have generated better returns than large cap stocks over a long time in 12 out of 13 major international markets (Fama& French, 1998).

Smart beta strategies can add value by strategically choosing, weighting and rebalancing based on objective factors. Factors can include volatility, momentum, size, value and quality. Systematic rebalancing could be built into the ETF technology itself and smart beta can expand investors’ options based on each investor’s preferences and time horizon. Kahn and Lemmon (2016) contend that smart beta products provide an important component of active management through simple and transparent rules-based strategy in creating portfolios at lower cost. Asset managers need to distinguish between a mix of smart beta, pure alpha in their products and their competitive advantages in delivering these important components. The approach taken in this paper is similar in a lot of respects to smart beta strategies and the factors employed in the strategy discussed in this paper are based primarily on size and value with annual rebalancing.

This study explores simple strategies over different time periods using a combination of the above-mentioned criteria to test whether these strategies can beat a buy-and-hold strategy for the S&P 500 index.

DATA

Bloomberg terminal was used to screen for stocks based on different criteria such as size, P/E, P/B, PEG ratio, short interest ratio etc. Different periods and a combination of different criteria were used to screen and back-test different strategies.

METHODOLOGY

Using Bloomberg, terminal stocks were screened and ranked based on size. The lowest 20 market cap stocks within the S&P 500 index were chosen to form a portfolio, and the portfolio was rebalanced annually as of the last trading day of the year. Once 20 stocks with lowest market cap were identified, they were equally weighted to form the portfolio. This portfolio is designated as bottom 20 portfolio. This process was repeated over different time periods ranging from 5 to 25 years. The study could not go beyond 25 years as Bloomberg did not have data and back-testing available before 12/31/1992. The performance of these different portfolios was back-tested against the S&P 500 index. Results are available in Table 1. As a robustness check, more portfolios were created using 40, 60 and 80 smallest market capitalization stocks within the index, and these were designated as bottom 40, 60 and 80 portfolios.

Again, using the Bloomberg terminal, stocks were screened using a combination of the following criteria:

1. Constituents are part of the S&P 500 index
2. P/E ratio lower than the average P/E ratio for the index
3. P/B ratio lower than the average P/B ratio for the index
4. Short interest ratio lower than the average short interest ratio for the index
5. Market capitalization lower than the average market capitalization for the index
6. Dividend yield higher than the average dividend yield for the index
7. Latest filing return on invested capital greater than the latest filing average return on invested capital for the index.

This portfolio was also rebalanced annually, and equally-weighted portfolios were created over different periods of time. These portfolios are designated as value portfolios. These portfolios were back-tested against the S&P 500 index. Results are summarized in Table 2.

Screening for value and size is based on the above value criteria; however, screening for size is based on bottom 30%, 40% and 50% of the market capitalizations of the constituents of the index. Unlike the size only criteria where bottom 20, 40, 60 or 80 market capitalization stocks were chosen, higher percentages were chosen to ensure that there were reasonable number of stocks in the portfolio, and different percentages were chosen for robustness check. This portfolio was also rebalanced annually, and equally-weighted portfolios were created over different periods of time. These portfolios are designated as value_size portfolios. Again, these portfolios were back-tested against the S&P 500 index. Results are summarized in Table 2.

RESULTS

It is clear that the bottom 20 market capitalization portfolios within the S&P 500 index generate higher returns than the index itself on a cumulative basis over most time periods ranging from 5 to 25 years. Robustness checks were performed using the bottom 40, 60 and 80 market capitalization stocks within the index. Most of the small cap portfolios outperformed the index. The best cumulative returns were generated by the 80 lowest market capitalization stocks for all 5 periods - 5, 10, 15, 20 and 25-year periods. The best annualized returns were generated for the 15-year period from 2003 through 2017 for all four size-based portfolios. The bottom 40 to 80 stock portfolios outperformed the index for all periods analyzed ranging from 10 to 25 years. See Table 1 in the appendix.

Value portfolios outperformed most size based portfolios as well as the index for almost all periods both on a cumulative and annualized return basis. All value and size combination portfolios outperformed the index for all periods ranging from 5 to 25-year periods analyzed except for a single value portfolio which was screened by ranking bottom 50% market cap of the index. See Table 2 in the appendix.

Small cap value portfolios created using a combination of size, value and short interest also outperformed the index by a wide margin over different time periods both on a cumulative and annualized return basis. Interestingly, the combination strategy also outperformed the size strategy by wide margins over different time periods both on a cumulative and annualized return basis. Specifically, the combination strategy with the lowest 30% market cap stocks yielded a cumulative return of 2848.88% over a 15-year period relative to the maximum return of 704.22% for the bottom 80 stock portfolio based on market capitalization for the same period. These results are summarized in Tables 1 and 2.

Bloomberg graphs reveal that the screens outperformed the index in all cases after 2009. Prior to 2009 the results were mixed. This might suggest an important outcome of this study that the results of this study could be economic cycle dependent as 2009 marked the end of the Great Recession. However, the bottom 20 stock stocks in the S&P 500 index closely matched the performance of the index until 2009 and consistently outperformed the index thereafter. See Figures 1 through 4 in the appendix.

Highest returns were generated for bottom 80-stock portfolios for all periods except the 20-year period. Most returns were generated for 15-year periods for all size portfolios. See Table 1 in the appendix. Returns increased substantially when the number of small stocks increased from the bottom 20 to bottom 40. However, annualized returns increased marginally when small stocks increased from the bottom 40 to 60 and 80 stock portfolios. Best returns were generated for value_size portfolios for the bottom 30% size portfolios for all periods except the 5-year period. Highest cumulative return was generated for this portfolio over a 15-year period. Highest annualized return was generated by this portfolio over a 10-year period. Maximum returns were generated over 10 or 15-year periods for all value_size portfolios. See Table 2 in the appendix.

CONCLUSIONS

This study corroborates Fama and French's (1998) size and value factors' contributions to returns when applied to different subsets of S&P 500 index. Small size portfolios carved out of the index typically out-performed the index and small value portfolios out-performed small portfolios for most comparable periods analyzed. Based on size, the bottom 30% value portfolios outperformed the bottom 40% or 50% value portfolios for all periods except the 5-year period. Bottom 60 size portfolio generated an excess annualized return of 8.54% over a 15-year period and the bottom 30% value_size portfolio generated excess annualized return of 20.4% over the same period. Combination strategy generated a cumulative return of 2849% relative to 704% for the size factor and 1019% for the value factor over this 15-year period. The S&P 500 index generated cumulative returns of 313.15% over the same period. Additionally, it appears that some factors become more important post major recessions and value may outperform growth or blend strategies. Over the past several years objective factor-based investing has become popular as smart beta strategy, and this study may partially explain the success of these strategies. Factor based investing models typically outperform an index if factors are chosen appropriately.

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APPENDIX

Table 1: Returns for Size Portfolios and the Index

Period	Years	% Return Portfolio_20 stocks	% Return Portfolio_40 stocks	% Return Portfolio_60 Stocks	% Return Portfolio_80 Stocks	% Return S&P 500 Index
2013-2017	5	60.85 (12.40)	80.82 (14.28)	94.51 (15.73)	113.84 (17.81)	108.06 (15.79)
2008-2017	10	112.41 (14.49)	203.54 (16.97)	230.84 (17.36)	250.71 (17.58)	125.86 (8.49)
2003-2017	15	440.49 (17.58)	623.54 (18.42)	678.57 (18.46)	704.22 (18.34)	313.15 (9.92)
1998-2017	20	808.00 (17.07)	672.48 (14.61)	862.63 (15.42)	952.83 (15.63)	301.08 (7.19)
1993-2017	25	808.00 (13.44)	1385.67 (15.63)	2215.92 (16.40)	2608.82 (16.83)	907.98 (9.68)

*This table shows cumulative returns for portfolios ranked based on size. Returns in parentheses represent annual mean returns.

Table 2: Returns for Value, Combination Portfolios and the Index

Period	Years	% Return Value Portfolio	% Return Value_Size_3 0% Portfolio	% Return Value_Size_4 0% Portfolio	% Return Value_Size_5 0% Portfolio	% Return S&P 500 Index
2013-2017	5	167.75 (23.06)	114.43 (18.74)	133.73 (20.39)	95.89 (15.91)	108.06 (15.79)
2008-2017	10	508.31 (23.31)	1080.66 (34.64)	915.60 (31.27)	526.94 (23.87)	125.86 (8.49)
2003-2017	15	1018.85 (20.20)	2848.88 (30.32)	2163.80 (27.18)	1340.18 (22.48)	313.15 (9.92)
1998-2017	20	1363.38 (17.03)	2066.63 (21.37)	1481.67 (18.81)	1288.79 (17.04)	301.08 (7.19)
1993-2017	25	2435.01 (16.16)	2066.15 (17.29)	1632.65 (15.51)	1972.34 (15.60)	907.98 (9.68)

*This table shows cumulative returns for Value portfolios screened based on 6 criteria mentioned under methodology. The Value_Size portfolios represent the same value criteria, however, screening for size is based on bottom 30%, 40% and 50% of the market capitalization of constituents of the index. Returns in parentheses represent annual mean returns.

Figure 1: Small 20 SP500 20 Years

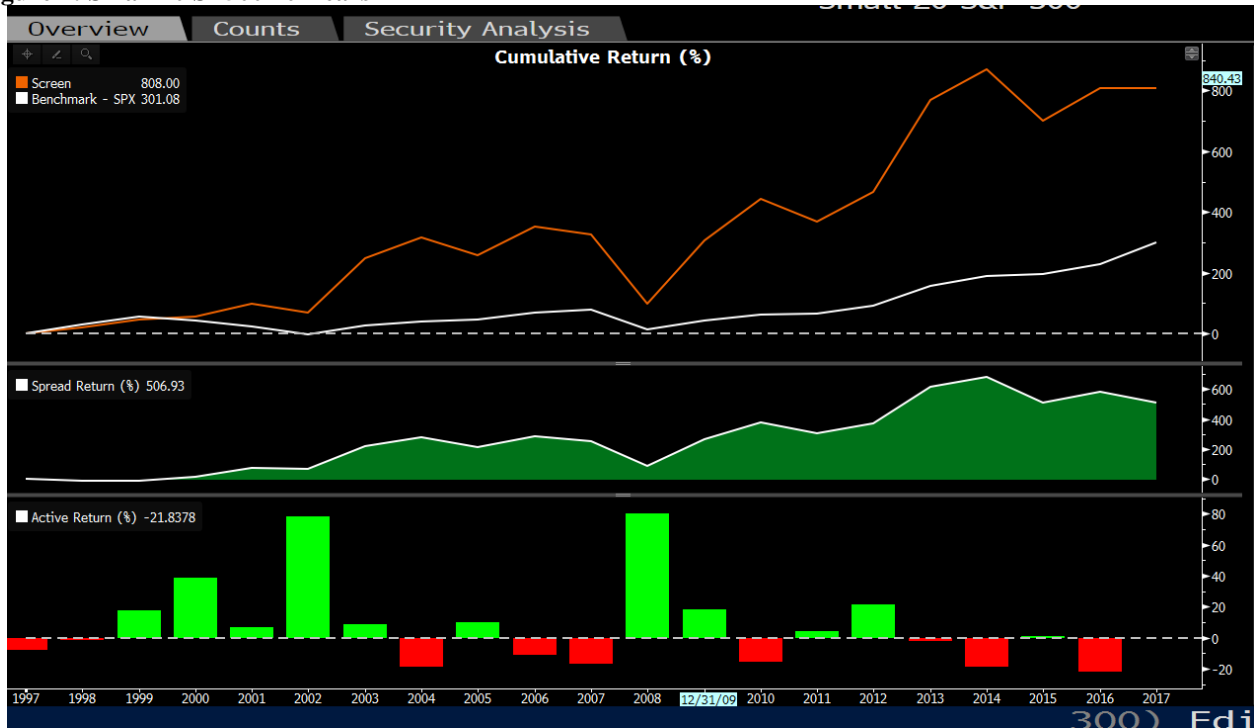


Figure 2: Small 20 SP500 25 Years



Figure 3: Value Size S&P500 20Y

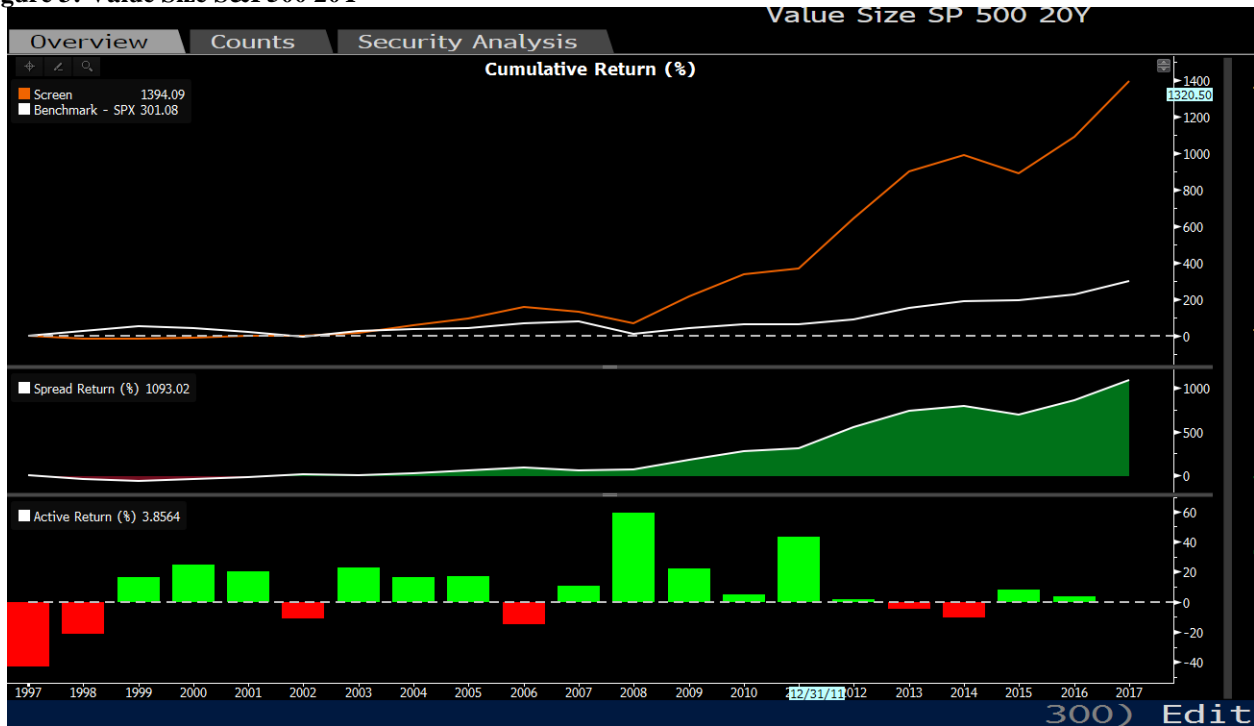
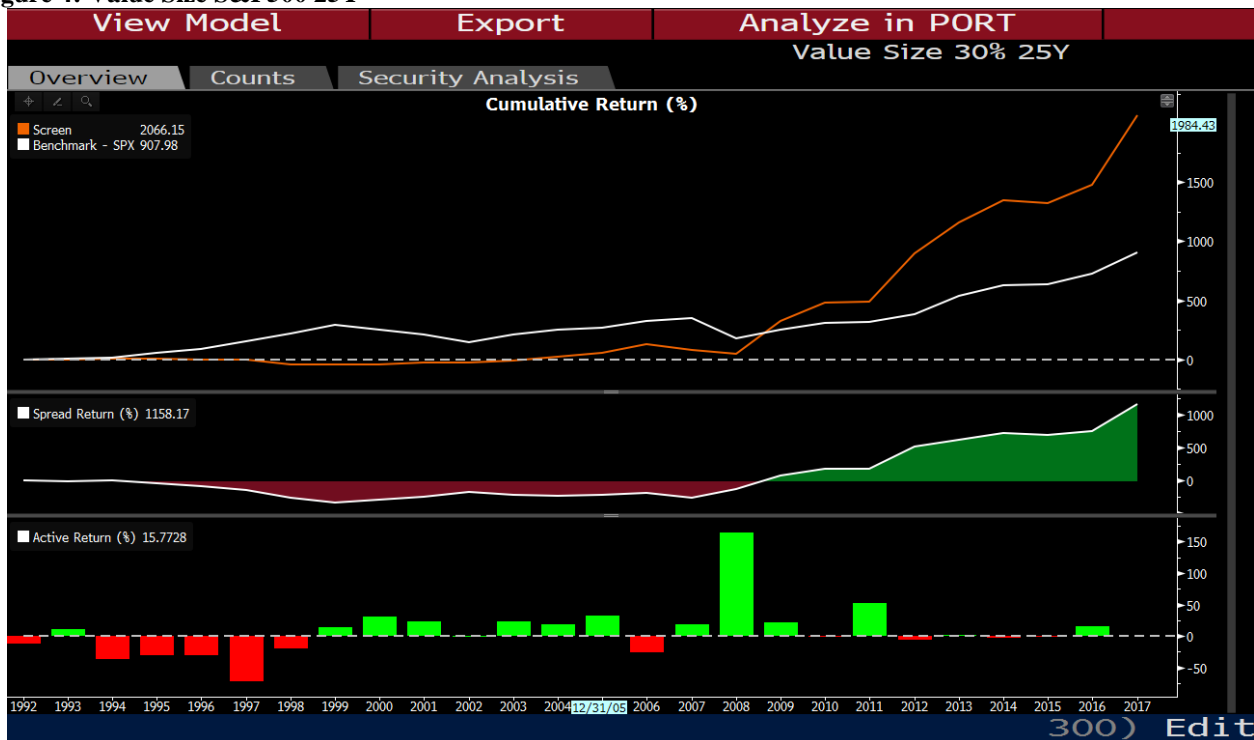


Figure 4: Value Size S&P500 25Y



IMPACT OF A BUSINESS PLAN PROJECT AMONG UNIVERSITY BUSINESS MAJORS

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ABSTRACT

High impact practices are important co-curricular educational experiences in college education, as they promote learning, development, and persistence among students. The objective of this study is to expand the research on high impact practices and explore their connections with the development of the business plan (BP) by college students. Using the National Survey of Student Engagement (NSSE) questionnaire, this study explores whether the participation of students in the development of a business plan has a positive impact on the level of commitment, engagement, and motivation of Lock Haven University Business majors. A control group and an experimental group have been asked to complete the survey. Results suggest that there is some relationship between the students who had been asked to develop a business plan and their High-Value Educational Experience (HVEE) either at the college or in the community.

INTRODUCTION

One of the aims of undergraduate education is to help students develop a set of transversal and professional competences, which are expected to help them reach the highest performance in their future work. In this sense, we are interested in identifying those activities or projects that may have a high impact on their development. This topic of study has been related to the concept called engagement, which is defined as 'the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes and is related to 'the effort institutions devote to using effective educational practices' (Kuh et al, 2008). These two critical features of collegiate quality may be summarized as those situations in which the student is motivated and undertakes to offer the best of himself, reaching the limit of his abilities.

When intrinsically motivated, people are absorbed in the activity they are performing and are not easily distracted. They take the initiative, and this often persists for a long time (Deci & Ryan, 2002). Steele & Fullagar (2009) indicate this often takes the form of "a total state of absorption." Individuals indicate that they are immersed in the activity being carried out and that, for them, the experiences produce such a degree of enjoyment that they are intrinsically motivated by the task itself, rather than by any external reward. Some authors link student involvement in university activities with their higher performance and persistence, critical thinking, methodological competences, and intra- and inter-personal skills. A number of researchers of university student development indicate that the best predictor of their learning and personal development is the time and energy they pour into educational activities (Astin, 1993; Chickering & Reisser, 1993; Pike, Kuh, & Gonyea, 2003; Pascarella & Terenzini, 1991, 2005; Kuh et al., 2005).

Kuh(2008) shows that the main factors of commitment are high academic challenge, enriching extracurricular experiences, high interaction between students and teachers, active and collaborative learning, and campus provisions to motivate and support them. Along with this idea, Chickering & Gamson (1987) proposed seven principles linked to good practices in university education. These High-Value Educational Experiences (HVEE) determining academic performance include: contact with the teaching staff; cooperation between students; active learning; immediate feedback; high expectations; and respect for various forms of learning. Among factors favoring academic performance, student sense of belonging to a group, clear expectations of what must be done, and reasonably high challenge seem to have the greatest impact.

The NSSE - National Survey of Student Engagement- follows the Kuh et al. (2008) definition of engagement as a base for their engagement research. Annually, this institution publishes The College Student Report, which collects information on hundreds of training organizations and universities about the participation of students in programs and activities that institutions provide for their learning and personal development. Therefore, the results provide a set of good practices that universities can adopt to contribute positively to the development and commitment of their students. A high impact activity involves the student having to deal with an open and poorly structured question or complex problem, that involves asking students, at least (1) to analyze in depth an idea, a question, a problem; (2) to analyze critically knowledge or data of various subjects, sources or perspectives; (3) to develop a new track point, hypothesis, interpretation, project; and (4) to critically argue (self-evaluating) its foundations, strengths and weaknesses, scope, and indicators.

In the same line, some items of the NSSE⁴⁶ indicate how often the students have done the following aspects with a certain frequency: (1) to apply facts, theories or methods to practical problems or new situations; (2) to analyze in depth an idea, experience or line of reasoning by examining its parts; (3) to evaluate a point of view, decision or source of information; (4) to develop a new idea or interpretation from different information; (5) to combine content from different subjects to solve problems; (6) to analyze the strengths and weaknesses of their own points of view on a topic or question; and (7) to learn something that has changed their way of understanding a question or a concept. If we analyze these aspects, we can identify that students who carry out a business plan (BP) must face them and therefore we could consider that their realization could become an educational experience of high commitment and value. Thus, the realization of a BP represents a complex challenge that generates a high level of involvement since the perception of relevance and autonomy raises a sense the BP is their “baby.” At the same time, to know something in depth generates a benefit as it responds to a personal intellectual challenge and that can also mean belonging to a learning community.

Likewise, in a business plan, students must carry out inquiry processes as they will have to reflect on their projects resulting in a knowledge increase of business. According to Brew (2003), involving students in inquiry processes - in research - is a way to improve their learning and to motivate them. After all, what drives the majority of academics is to engage in the excitement of research. Teaching is a way to improve the motivation of students. Finally, a highly challenging academic activity obtains, in terms of learning, (1) a more sophisticated understanding of the contents (Blackmore and Cousin, 2003; Smeby, 2002); (2) greater cognitive flexibility and critical thinking; and (3) metacognition, perception of self-efficacy and intellectual empowerment.

Kuh, et al.(2008) surveyed 6,193 freshmen students in the United States looking for the relationship between academic engagement, success, and trend towards premature abandonment. Its results showed that students’ commitment or engagement was positively related to their results and grades. It also pinpointed that their engagement had a direct relationship with their persistence. That is, a higher engagement correlated negatively with their probability of abandonment and positively with their course success. A different research study with 259 students in Europe (Svanum & Bigatti, 2009) tried to find the relationship between engagement, academic success and the average length of university studies completion. Although the magnitudes of the observed relationships were modest, they followed the expected direction. Thus, the students with the highest level of engagement not only obtained better results, but they were 1.5 times more likely to graduate and required an average of one semester less than those with lower levels of engagement.

To conclude this introduction, the findings underline the predictive nature of engagement in relation to academic success. That is why, in this present research, we were interested in determining whether the realization of a business plan (BP) could be considered a High-Value Educational Experience (HVEE) contributing to students’ engagement, and thus, to their success as students.

BUSINESS PLAN AND ENGAGEMENT

The business plan (BP) is a written document, prepared by an entrepreneur that describes all the relevant, external and internal elements involved in starting a new company (Hisrich, 2013). It integrates the functional plans of the different departments involved such as marketing, finance, manufacturing, and human resources. The business plan development requires a high level of planification (Gibson, 2005; Boyd et al, 1998; Matthews, 1995) that integrates marketing, production plan and human resources in a coherent way (Krueger and Carsrud, 2000). It also crystallizes dreams and expectations and contributes to the motivation of students to establish businesses.

⁴⁶<http://nsse.indiana.edu>

METHODOLOGY TO TEACH THE BUSINESS PLAN

According to R. Lang and David (2006) it is important methodologically to use a variety of strategies and instructional methods (Kusumaningrum et al., 2016) to teach subjects in class. The development of business plans (BP) contributes to the development of an inherently experiential methodology that promotes entrepreneurial learning among those who decide to participate (Hegarty, 2006; Roldan et al., 2005; Russell et al., 2008; Sekula et al., 2009). Some authors (Honig et al., 2005) argue that investigating a first entrepreneurial project of business creation is of great importance for nascent entrepreneurs. The transformation of experience as part of a gradual and recursive process of learning by doing allows especially those "who start with inadequate knowledge or experience" develop new competences (Aldrich and Yang, 2014). Participating in a Business Plan Competition (BPC) generates a high level of entrepreneurial motivation, stimulating the creation of new companies and supporting nascent entrepreneurial behavior (Kwong et al., 2012; Randall and Brawley, 2009; Roldan et al., 2005; Russell et al., 2008; Thomas et al., 2014). Roldan et al. (2005, p. 339) affirmed that "as a learning vehicle for entrepreneurship, Business Plan Competitions are difficult to overcome." (Kusumaningrum et al., 2016). However, some authors also mention that, from the business learning point of view, the BPCs at the university level bring limited results (Schwartz et al., 2013).

EDUCATIONAL COMPETENCES DEVELOPED WITH THE BUSINESS PLAN

The development of a business plan contributes to the development of entrepreneurship (Gartner & Vesper, 1994; Gorman, & King, 1997; Hills, 1988; Kuratko, 2005) since it generates the combination of knowledge, skills and attitudes necessary to start and manage the new company efficiently (Aouni & Surlemont, 2009; Politis, 2005). Entrepreneurial learning has also been considered a social and collective process of co-participation (Taylor & Thorpe, 2004), through which the context, networks and external interactions of the entrepreneur support the development of new ways of thinking, skills and attitudes (Cope, 2005; Davidsson & Honig, 2003; Gibb, 1997; Pittaway & Cope, 2007; Pittaway & Thorpe, 2012; Rae, 2006). Therefore, business planning, teamwork, leadership, communication, financial research, pitching, networking, marketing, presentation, sales, project management, self-awareness, self-confidence and the propensity to risk are cited as examples of competencies developed through the practical emphasis of the experience of participation in competition (Hegarty, 2006; Jones & Jones, 2011; McGowan & Cooper, 2008; Randall & Brawley, 2009; Roldan et al., 2005; Russell et al., 2008; Sekula et al., 2009). As a consequence, trying to predict students' engagement using a written BP as a predictive variable needs to take into account the interaction with environment in addition to the hard work emphasized by Kuh, et al. (2008). The NSSE survey incorporates this missing interaction with environment factor.

THE BUSINESS PLAN AND HIGH EDUCATIONAL VALUE

The realization of an activity of HVEE, like a BP, could help students with what Egan (2010) denotes as the danger of superficial knowledge: "Not knowing anything with a significant depth also implies, that the one who has never suffered it, is developing a clear ability to understand." The problem here is not that a well-equipped person with a broad range of superficial knowledge cannot lead a perfectly happy life, but rather that a specifically human pleasure is denied. This pleasure comes from particular wisdom accessible only to those who recognize the nature of their own knowledge. Once someone knows a little in depth, the developed understanding extends over other endeavors in business without any in-depth knowledge: understanding does not extend to just about anything else. At the same time, according to Brew (2017), a business plan also allows future professionals to be prepared. For students, who are future professionals, it develops the ability to investigate problems, makes them take judgments on solid evidence, allows them to make decisions based on rational arguments, and helps them understand what they are doing and why. Research and inquiry are not just for those who pursue an academic career, but it is central to professional life in the 21st century.

ADVANTAGES OF DEVELOPING A BUSINESS PLAN

The nascent entrepreneur, potentially lacking experience and practical understanding of what the entrepreneurial effort could imply in a practical and procedural sense (Karatas-Ozkan and Chell, 2010), can be a "practically blank list" (Aldrich and Yang, 2014). The progression of nascent entrepreneurs and their businesses depends on entrepreneurial learning (Honig et al., 2005; Sullivan, 2000) that can be acquired through the development of a BP. In addition, and according to Rangkuti (2003), the development of a BP contributes to keeping the future entrepreneurship on the right track (Kusumaningrum et al., 2016). By extension, nascent entrepreneurship and its associated activity and effort are based on nascent entrepreneurs developing their ventures from conception to gestation. This progress is gradual and iterative, with business learning crucial for the emergence of a successful company and the operationalization of it (Aldrich and Yang, 2014; Davidsson and Honig,

2003; Deakins and Freel, 2003; Dimov, 2010; Fayolle and Gailly, 2008; Karatas-Ozkan and Chell, 2010). Likewise, entrepreneurial learning serves as a vital response mechanism for the rapid change that characterizes the development of new companies (Fayolle and Gailly, 2008). Entrepreneurial education can "fill the gap" for those who lack experience (Blundel and Lockett, 2011). Consequently, it has been suggested that the nascent entrepreneur participates in entrepreneurial education as a key activity (Davidson and Honig, 2003; Rae, 2004). Therefore, the development of the business plan is a significant activity as a form of business education and positions itself as a key methodology for the development of entrepreneurship (Kusumaningrum et al., 2016).

METHODS

The study herein is a quantitative survey using the same structure as the National Survey of Student Engagement (NSSE) project, which has managed to design a generalized assessment tool called the College Student Report to compare higher education institutions, detect differences and find good practices. NSSE does not evaluate the student's learning directly, but the results of the survey point to areas where universities are working well and those that could be improved. We reasoned that using a trusted and accepted methodology would enhance the integrity of the research. The main difference is the purpose of the application of the methodology. In our case, the survey is applied to check if the students who have used the business plan in the subjects studied in their business curriculum increase the level of engagement in comparison with students who have not done so. By using the NSSE survey, we assume that the High-Value Educational Experiences (HVEE) the survey is looking for, is directly linked to student engagement.

To be able to do this assessment, we proposed to pass and complete the scientifically validated NSSE questionnaire⁴⁷ to experimental and control groups from different universities in order to assess the level of engagement along with the advantages and disadvantages of developing a business plan in similar academic trainings. The methodology used is structured in an experimental study carried out from a pilot test in two universities passing a validated questionnaire to experimental and control groups, as has been done in other previous research or empirical studies to test if the adoption of innovative teaching methods improves the academic performance of students (Garcia & Montagud, 2011). The experimental group from the different universities were represented by students who have studied subjects that include in their work plan the development of a business plan, while the control group will be represented by students who have not studied subjects that include in the work plan the development of a business plan. The questionnaire included 41 questions and was expected to be answered within 30 minutes. Questions focus on the 10 typologies mentioned by Gaspersz, (2005) and Borg and Gall (2003).

RESEARCH CONTEXT AND PARTICIPANTS

The validated questionnaire was given to a control group and to an experimental group of Business faculties from Lock Haven University (LHU) from Dec. 11th, 2017 till Dec 15th, 2017. LHU students were all Junior and Senior year business majors from the Business and Computer Science Department. However, the Experimental group was composed of students enrolled in Entrepreneurship (MANG317) and International Business (MANG425) during the fall 2017 semester, while the Control group included junior and senior business majors who had not yet attended the target courses. The student code in the questionnaire allowed us to distinguish between those belonging to the experimental group and those who belong to the control group.

DATA COLLECTION

As per the time when to pass the questionnaire, the idea was that students complete the questionnaire at the end of their semester. It must be kept in mind that the research project needed approval from the Lock Haven University of Pennsylvania Institutional Review Board (LHUP-IRB) and that all researchers needed to supply their National Institutes of Health (NIH) Office of Extramural Research certificate of successful completion of the NIH Web-based training course, "Protecting Human Research Participants." On the other hand, at LHU students might have completed a BP in International Business (MANG425) or Entrepreneurship (MANG317). Some students may have done both. Also, as freshmen or sophomores, all students have taken Introduction to Marketing (MRKT200), a course that includes a final work that is close to being considered a BP. To do the study, students are divided into two groups: group A (control group) and group B (experimental group). The process of assigning each student to the group has been differentiating those who have done a BP and those who have not done it through the different subjects studied in their specific degree track, suitable for this type of exploratory

⁴⁷ http://nsse.indiana.edu/html/survey_instruments.cfm

analysis. Each group is then given the same questionnaire in English through a link to Google Forms. The process to choose the subjects has been discretionary depending on whether they completed classes that included a BP.

DATA ANALYSIS

Statistical methodology was used to get (1) tables of frequency and of percentages of the qualitative variables obtained and (2) the significant differences in the responses of the two groups (control and experimental) through contingency tables and the Chi-square test. This methodology follows previous research methodologies (Garcia & Montagud, 2011). In particular, the statistical process enables (1) a table of frequency and percentages, for the qualitative variables origin and sex to evaluate the number of students who have taken part; and (2) a check if there are significant differences in the responses of the two groups. To verify if there are significant differences in the responses of the two subgroups, contingency tables and the Chi-square test (p-square) are used to evaluate the relationship between the group variable and the question, with a confidence of 95% (or level of significance p-square of the 0.05). The contrast test hypothesis of the Chi-square checks if:

- H_0 : There are no significant differences in the answers that have been made depending on the group to which the students belong (control or experimental).
- H_1 : There are significant differences in the answers that have been made depending on the group to which the students belong (control or experimental).

If the p-value exceeds 0.05, the H_0 is accepted with 95% confidence. If the p-value is less than 0.05, the H_0 is rejected, so alternative H_1 is accepted.

FINDINGS

Findings are shown in tables, splitting between those of the control group from the experimental group (Table 1). Pearson chi-square is calculated using the SPSS software package (Table 2).

Table 1. Example of a question results (question 6 a)

		6 b. Student prepared two or more drafts of a paper or assignment before turning it in				
		1.0	2.0	3.0	4.0	Total
Control group	Count	17			13	30
	% of the group	56,7%	0,0%	0,0%	43,3%	100,0%
Experimental group	Count	17			13	30
	% of the group	56,7%	0,0%	0,0%	43,3%	100,0%
Total	Count	17			13	30
	% of the group	56,7%	0,0%	0,0%	43,3%	100,0%

Table 2. Question 6a Pearson Chi-square test results

	Value	gl	Asymptotic meaning
Pearson Chi-square	10.083	3	0.018
Reason of verisimilitude	13.554	3	0.004

Frequency tables indicate that all students who have taken part in the study number 58, of which 28 students correspond to the experimental group and 30 to the control group, that is, 48% of students have done a BP and 52% have not completed a BP in their coursework.

TABLES OF FREQUENCY

Using the above-mentioned methodology, the significant differences between the control group and the experimental group are as follows:

Group of questions 6:

Drafts are prepared before delivering a job: $p\text{-value} = 0.018$. For the control group, 30% of the cases do not prepare drafts before delivering a work while for the experimental group in 32% of the cases drafts are prepared very frequently and, most interestingly, none of the students responded that they ever prepared drafts. That is, experimental group students always prepared drafts.

Work is done with other students: $p\text{-value} = 0.009$. 40% of the control group students very frequently work with other students while this is 79% for the experimental group. It is interesting to note that neither the control group students nor the experimental ones mentioned that they ever worked with other students.

A topic is analyzed identifying its strengths and weaknesses: $p\text{-value} = 0.032$. In the control group, in 90% of the cases, students often or very often examined the strengths and weaknesses of the topics while this was done frequently or very frequently only in 57% of the cases within the experimental group. In fact, the control group students said that they have always done this analysis somehow (0% said that they never did the analysis). On the contrary, 10% of the experimental group students said they never performed this analysis.

Group of questions 8:

The teachers clearly explain the objectives: $p\text{-value} = 0.027$. For 87% of the control group students, professors clearly explain the objectives of the course. This compares to 54% for the experimental one.

Professors explain the topics in an organized way: $p\text{-value} = 0.007$. In both cases 43% of students say professor do so. However, 40% of the control group students mentioned that the organization was very good while only 7% of the experimental group said so.

Group of questions 10:

The work required in the subjects is significantly different between the two groups. For the control group, in 73% of the cases, the delivered works did not require writing more than 11 pages while this was true for only 21% for the experimental group ($p\text{-value} = 0.001$). 50% of the deliveries of the control group were up to 5 pages ($p\text{-value} = 0.004$). Thus, the control group required shorter deliveries than the experimental group.

Question 11 a:

Students often talk with people from different races or ethnic groups. Of the control group, 43% talked frequently and 43% very frequently with other races or ethnic groups. On the other hand, is the experimental group, 57% talked very often with other ethnic groups or races ($p\text{-value} = 0.000$) and 0% often. There is a certain polarity of the results between those who talk very often 57% (0% just often) and those low frequently (39%).

Group of questions 13:

Students have decided to participate in study abroad programs: ($p\text{-value} = 0.001$). The control group students have not decided or not surely decided to participate in them in 80% of the cases while the experimental group students have not participated in them in 68% of the cases.

During the university courses, students are asked to carry out community-based projects, not just with their own faculty: ($p\text{-value} = 0.029$). The control group students did not do so in 96% of the cases. On the contrary, the experimental group completed them in 25% of the cases.

Group questions 16:

Students participate simultaneously in curricular activities: ($p\text{-value} = 0.035$). The control group significantly participates in fewer activities such as sports or student associations than the experimental group. 32.5% of the experimental group participated in more than 16 activities in a typical 7-day week, while this is reduced to only 10 activities for the control group (39%).

Students take care of their personal relationships, socialization, with more relaxed, less competitive environments: (p-value = 0.049). 14% of the experimental group students do socialize a lot (26-30 times a week) for 0% of the control group students. However, it seems there is a polarization of behavior within the experimental group (32% take care of their relationships 1-5 times during a typical 7-day week) while 77% of the control group students do so between 6 to 20 times per week.

Question 19: Students class level. 71% of students in the experimental group are Seniors while only 27% of control group students are Seniors: (p-value = 0.000).

Question 28: 77% of students in the control group are men while in the experimental group 70% are women: (p-value = 0.001).

FINDINGS BUSINESS PLAN AND HIGH EDUCATIONAL EXPERIENCE

Taking the survey as a whole, in 13 of the 41 questions there is some significant relationship, that is, in 32% (p-value is less than 0.05). In the others, there is no significant relationship. Another aspect that needs to be reviewed carefully is the sense of the relationship. A positive relationship will directly link writing of a BP and student's High-Value Educational Experience (HVEE), while a negative relationship would mean that writing a BP is not to be considered an HVEE. Starting with question 6m, it did not show positive relationship. It seems that the experimental group is less prone to analyze strengths and weaknesses than the control group. This is somehow unexpected as a BP requires this analysis. In the same line, the answers to question 11a are not positive. It seems the experimental group is not demanding as much to talk to other ethnic groups. Concerning the questions with significant differences that do not have a clear relationship with HVEE, questions 8, related to how clearly professors explain the course and how organized the course is, have been discarded as relating the BP and HVEE. In fact, they would link the professor and the HVEE. In the same line, questions 19 and 20 (Class level and students declared sex) are not to be related to HVEE. Overall, out of 13 questions with significant differences in results between the experimental group and the control one, 2 have a negative relationship and 4 are not relevant (Table 3).

Table 3. Business Plan realisation vs HVEE

	High-Value Educational Experience		
	More	Less	Not relevant
Question 6 b	X		
Question 6 h	X		
Question 6 m		X	
Question 8 a			X
Question 8 b			X
Questions 10	X		
Question 11 a		X	
Question 13 d	X		
Question 13 g	X		
Question 16 b	X		
Question 16 f	X		
Question 19			X
Question 28			X

If we have a look at the significantly different answers between the groups looking for questions directly linked to engagement, we can see that 8 out of 13 of the questions are linked to it. Those who are not either instrumental, such as questions about the class level or their declared sex, or purely course-related ones, such as the perception of

how structured the classes are, how the professor explains, or the number of drafts they need to prepare before delivery (Table 4).

Table 4. HVEE links to engagement

	HVEE vs Engagement?	
	Yes	No
Question 6 b		X
Question 6 h	X	
Question 6 m	X	
Question 8 a		X
Question 8 b		X
Questions 10	X	
Question 11 a	X	
Question 13 d	X	
Question 13 g	X	
Question 16 b	X	
Question 16 f	X	
Question 19		X
Question 28		X

Among the unexpected, non-significant answers, we could put upfront:

- The BP does not seem to help students apply theories and methods to practical problems (group questions 7). The Pearson Chi-square is 0.057, so non-significative.
- A BP plan does not seem to increase the frequency of using numerical information to take decisions (Group questions 9). The Pearson chi-square is 0.051.
- Among the questions 11, though talking with other races or ethnicities has a significant meaning, talking to different religions, social classes, or with people having different points of view, have insignificant answers.
- For the group questions 12 about revising class documentation or student motivation, the answers are not significant.
- Within the group questions 13, which assess the interaction and leadership within the community, it is interesting to note the non-significative answers around the leadership or organizations or having internships.
- This is also found in the group questions 14, assessing student interaction with different people. There are no significant answers.
- Also, the group questions 15 that look for the interest from the institution that students help in different on-campus and off-campus activities, none of the questions showed significant differences between the two groups.
- A BP does not seem to increase the knowledge, skills, personal development, or likelihood of finding a job (group questions 17).
- The literature predicted a link between HVEE and academic success. Question 23 is trying to measure this aspect. However, the correlation between writing a BP and having higher grades is not significant.

DISCUSSION

Looking at these findings, the first aspect to look at is the choice of the definition of engagement. It seems that adding the interaction with the environment is important as some of the significant answers are just related to this interaction: Questions like working with other students (question 6h), talking with people from other races or ethnicities (question 11a), participating in foreign studies (question 13d), participating in community-based projects (question 13g), or taking care of relationships (questions 16f) show that aspect. Comparing the findings to the literature, we can start with the seven principles that linked to good practices in university education proposed by Chickering & Gamson (1987). Results show that 32% of the LHU students having developed a BP in at least a course of the Faculty of Business, increase their motivation to offer the best of themselves by pushing their capabilities to the limit by favoring performance, persistence, critical thinking, methodological competences, and intra and interpersonal skills. Also, it seems that writing a BP means carrying out inquiry processes that can lead to conjectures or tests as described by Brew (2003).

Concerning the negative relationship between HVEE and whether the professor explains the topic clearly and having a well-structured course (questions 8), we shall remember that the NSSE indicates that HVEE means students have to deal with open and poorly structured questions or complex problems. It might be considered normal that students feel unease when confronted with problems without “the right answer” and related to specific market segments where the professor does not

specialize. In that case, faculty is more looking for a logic in the reasoning than a specific figure. This might be different for students in courses where topics are clearly fixed, and results of students' work fall into standardized answers. One aspect that could lead to question 11a not having a positive relationship between writing a BP and HVEE is the fact that students are asked to constitute groups to write their BP. If these groups are not set at random, students might tend to set the group with friends, thus limiting their interaction with other ethnicities. However, there are a significant number of questions that have not validated the link between writing a BP and HVEE and HVEE with engagement. This goes against some authors' assumptions (Egan, 2010). If we accept the finding of Kuh (2008) that extracurricular activities are a predictor of engagement/commitment, the corresponding question to measure that is question group 16. While participating in curricular activities (question 16b) and taking care of personal relations (question 16f) are both significant, the others are not.

LIMITATIONS OF THIS RESEARCH

It is important to note that this research has some limitations. The first one is that the experimental group is composed by a majority of senior students (71%) compared to the control group (only 27%). Therefore, since control group students are most probably younger, a doubt can be raised about them being as integrated or engaged in the community. Also, the control group students are mostly men (77%), while the experimental group is mostly composed by women (70%). Maybe this could have had some influence. However, the impact is not assessable with the available data. Considering that the applied methodology is just Pearson Chi-square, incorporating other types of analysis such as Structural Equation Modeling (SEM) could increase the power of this research. Last but not least, the number of respondents is relatively low. That means that enlarging the number the students, either in the same university or even better, incorporating other universities not only from Pennsylvania or the US, could provide a better understanding and validity to the findings.

CONCLUSION: IMPLICATIONS OF BUSINESS PLANS IN THE BUSINESS STUDENTS ENGAGEMENT

This objective of this article has been to open the discussion linking the writing of a Business Plan (BP) within a university course with improved student engagement. For that the validated NSSE survey has been used. Lock Haven University Business Juniors and Seniors have been asked to take the survey. The survey tried to validate the link of High-value Educational Experiences (HVEE) and engagement, using a definition of engagement that includes the dimension of the interaction with the environment. Half of the students taking the survey have been asked to write a BP and constituted the experimental group. Our findings seem to confirm that the relationship does exist despite the fact that not all questions had a significant link. Also, among the questions with significant response, some relationships were positive (in the same sense) while others had contrary signs. One consequence of this research for the universities is that a BP can be considered a HVEE that helps students understand the complexity of taking a decision without having the whole set of necessary information. This activity seems to be accompanied with increasing interaction with the environment, as this relationship increases the perception of course value. However, students, when writing a BP, tend to be very conservative and limit their interaction with other kinds of people. However, this contradicts the above mentioned finding that a BP is linked to an increase of students' interaction with the environment. So further research needs to be implemented to understand how this interaction needs to be implemented to ensure its high value.

Another consequence is that professors requiring their students to write a BP seemed to be perceived negatively in regard to the course structure and them explaining the course clearly. This could be explained by the fact that the course output is not a standardized project. Instead, each project is different, might touch market segments outside of the professor specialization, and leaves students knowing more about the project and market segment than the professor. However, this explanation might also be influenced by having a weak professor teaching these courses. Thus, it would be wise to reproduce such study in other environment to check if the professor, as the one who sets the course structure and explains it, continues to have a negative impact on student engagement. These mixed findings open the door to new research, especially trying to understand the reasons for the unclear results. There might be some variables that could be explained by others. So, a Structural Equation Modeling (SEM) could help determine the independent and the dependent variables. Using this methodology, we could expect to examine the processes by which the university should structure the courses that include a BP.

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BLOCKCHAIN TECHNOLOGY AND THE FUTURE OF AUDIT PROFESSION

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ABSTRACT

Blockchain, originally used for Bitcoin trading, is one of the most important and innovative technologies developed in recent years (Jun Dai, Miklos A. Vasarhelyi 2017). This technology is considered to be as important as internet and it could fundamentally change the nature of auditing by revolutionizing supply chains, payments and revenue streams through the way it documents and reconciles complex and disparate information from multiple sources. A blockchain is effectively a type of a decentralized database known as a distributed ledger. Unlike traditional databases, blockchains have no sole administrators. As each transaction is recorded it is time-stamped in real time onto the “block”. Each block is linked to the previous block, and each user has a copy of that block in his or her own device. That process creates an audit trail (Hoelscher, Internal Auditor, February, 2018). A technology that increases transparency, improves audit trail and gives real time access to transactions is good news for auditing profession. This paper will focus on both the benefits and the pitfalls related to the blockchain technology by reviewing recent research related to the blockchain. This paper will also address the impact that blockchain technology will have in the future of audit profession.

INTRODUCTION

Blockchain technology was introduced and initiated by mysterious group or person named only by the alias Satoshi, (Nakamoto, 2008). He used a chain of blocks to create a decentralized, publicly available, and cryptographically secure digital currency system. The system, named Bitcoin, enables peer-to-peer digital currency trading. The Bitcoin blockchain can be viewed as a new type of accounting database that records the transactions of the digital currency into blocks. The blocks are arranged in linear chronological order and shared to a network (Fanning and Centers 2016; Peters and Panayi 2016; Swan 2015a; Yermack 2017). The main characteristics of blockchain are: (1) decentralization, (2) strong authentication, and (3) tamper-resistance. The operation and management of the Bitcoin system are designed to be decentralized. This means that all nodes in the system have access to the entire list of transactions. Such access allows nodes to both verify and publish new transaction records onto blocks, which are then periodically added to the end of the main blockchain with a time stamp (Nakamoto, 2008). The system is also able to verify the identity of every payer and payee involved based on a public-key cryptography system (Diffie, 1988). It also examines whether the payer possesses enough money for the transaction to occur. Moreover, the process of creating a block on the chain is designed to require costly computational resources. This is to ensure the integrity and irreversibility of published transactions, and makes it almost impossible for a single or a small group of malicious parties to tamper with any blockchain records (Jun Dai, Miklos A. Vasarhelyi 2017). According to (Kiviat, 2015) blockchain is a “trustless” technology. “Trustless” means –for the first time in history—exchanges for value over a computer network can be verified, monitored, and enforced without the presence of a trusted third party or central institution. Because the blockchain is an authentication and verification technology, it can enable more efficient title transfers and ownership verification. Because it is programmable, it can enable conditional “smart” contracts. Simply, blockchain technology has broad implications for how we transact, and the potential for innovation is hard to overstate.

BACKGROUND

Blockchain technology was introduced and initiated by mysterious group or person named only by the alias Satoshi. Nakamoto (2008). He used a chain of blocks to create a decentralized, publicly available, and cryptographically secure digital currency system. The system, named Bitcoin, enables peer-to-peer digital currency trading. Records would be completely decentralized and this eliminates the need for financial intermediaries while maintaining transaction safety. The Bitcoin blockchain can be viewed as a new type of accounting database that records the transactions of the digital currency into blocks. The blocks are arranged in linear chronological order and shared to a network (Fanning and Centers 2016; Peters and Panayi 2016; Swan 2015a; Yermack, 2017).

The main characteristics of blockchain are: (1) decentralization, (2) strong authentication, and (3) tamper-resistance. The operation and management of the Bitcoin system are designed to be decentralized. This means that all nodes in the system have access to the entire list of transactions. Such access allows nodes to both verify and publish new transaction records onto blocks, which are then periodically added to the end of the main blockchain with a time stamp (Nakamoto, 2008). The system is also able to verify the identity of every payer and payee involved, based on a public-key cryptography system (Diffie, 1988). It also examines whether the payer possesses enough money for the transaction to occur. Moreover, the

process of creating a block on the chain is designed to require costly computational resources. This is to ensure the integrity and irreversibility of published transactions, and makes it almost impossible for a single or a small group of malicious parties to tamper with any blockchain records (Jun Dai, Miklos A. Vasarhelyi, 2017). According to (Kiviat, 2015) blockchain is a “trustless” technology. “Trustless” means –for the first time in history—exchanges for value over a computer network can be verified, monitored, and enforced without the presence of a trusted third party or central institution. Because the blockchain is an authentication and verification technology, it can enable more efficient title transfers and ownership verification. Because it is programmable, it can enable conditional “smart” contracts. Because it is decentralized, it can perform these functions with minimal trust without using centralized institutions. Because it is borderless and frictionless, it can provide a cheaper, faster infrastructure for exchanging units of value. Simply, blockchain technology has broad implications for how we transact, and the potential for innovation is hard to overstate.

IS AUDITING PROFESSION READY FOR BLOCKCHAIN?

There is a lot of excitement and concern when it comes to blockchain and the application of the technology to the auditing profession. During the Annual Technology Roundtable organized by Journal of Accountancy on June 2018 the experts had a lot of input about the future of the audit and accounting profession impacted by this new technology.

The accounting profession is heading into the greatest period of change and disruption it has ever seen. That's the view of Rick Richardson, CPA/CITP, CGMA, founder and CEO of Richardson Media & Technologies. When he was asked about which technologies does he see making the biggest changes to the accounting profession — and maybe a timeline for that?

He answered by saying, “For three to five years out, I would certainly put blockchain right at the top, and it is blockchain-related applications that are going to be even more important as we move down the road. They are going to be vital to any professional accountant, and accountants need to understand how they work and how they might apply to their clients. One of the other interesting parts to blockchain is that in many cases both halves of a transaction are now recorded in a single source. Instead of having a set of books from the buyer and a set of books from the seller, you now have one common set of books. That trust level provides for capabilities we haven't seen before and for pretty exciting new ways to do analytics and forecasting of all sorts of future-looking stuff, which is what our clients are going to be demanding of us in the future. Also in the three- to five-year range are two other issues. One is the expert use of analytics. We need to get closer to real-time reporting. Part of that's going to happen as a result of tools that provide us with predictive analysis, the ability to dig down deeper and not destroy the nature of the data we are working on. Second, we may not just be auditing financial data in the future. We may be auditing people's ability to handle issues. We may be handling total nonfinancial issues relative to a product's performance. So, whatever it might be, the markets are going to start looking for sources that can provide them with secure and trusted information and opinions. And if we do it right, I think the CPA profession can move five to 10 notches ahead of where we are even today. What are we going to need for that? We are going to need to look beyond the numbers. We are going to need to learn how to collaborate, and we need to think and behave more strategically.”

When another panelist Alan Anderson, CPA, President of the Accounting and Assurance advisory firm Accountability Plus was asked about how does he see the transformation of the audit unfold he answered by saying that “Real-time audit and monitoring has been talked about for years, and the reality of it actually happening may finally be here. The issue has always been getting access to the data to analyze it and interpret it. Without question, the data acquisition of transactional information is much easier for auditors to grasp than the required mindset change. This is more of a change management issue than a technology management issue. When I work with firms to prepare them for the future, we start with data acquisition, analysis, and interpretation. If you look at the way an audit comes together today, it hasn't changed in 25 years. Firms have basically added technology and replicated their paper process. The time is now, if not already past, to move down the path to real-time auditing and monitoring. In an instant information society, what company or user is going to be happy with a historical financial statement that finally has the CPA firm's opinion on it 90 days after the client's year end? The old model's going to have to change, and data will be absolutely the catalyst to do this. Firms should focus on the access to data, the analytics, and really understanding what that data means, because there is so much knowledge in the data. Data-driven audits are the foundation for auditing in the future.” If blockchain technology will delivered as promised, it will have a major impact on the organizational structure, personnel needed and the expertise the personnel owns.

Nathalie Bender, Ph.D., CPA and Marion Gauthier, CPA conducted a survey where they interviewed a variety of accounting professionals and the findings were published on the Information Systems Audit and Control Association Journal (ISACA).

Below is the interviewee’s selection they used for their survey.

Figure 1—Categorization of Interviewees

Specialists/Categorization	Percent of Interviewees
Partner	38
Nonpartner (manager and senior manager)	62
IT (audit, security)	25
Financial audit	65
Advisory/risk	9
Accounting standards specialist	1
Big 4 (Deloitte, Ernst and Young, KPMG, PricewaterhouseCoopers)	35
Not Big 4	65

Findings show that 94 percent of the interviewees, regardless of their function (IT or financial) or their level of responsibility, anticipate changes in their jobs and professions.

They reported that Sixty-two percent of interviewees believe that the audit profession will become more IT-oriented. They anticipate that the main objective of a financial audit will no longer be to ensure the regularity and sincerity of a company’s financial statements, but rather to review the information systems and, in particular, to ensure that the blockchain technology is properly set up and deployed. Indeed, as controls can be encoded into the technology and automated, and as the existence, accuracy and completeness of transactions can be guaranteed by the technology itself, some of the interviewees go even further and make the assumption that the auditor’s role will be to perform an in-depth blockchain source code and parameters review. As such, auditors would primarily be “IT engineer auditors, whose function will be to certify the blockchain instead of being financial auditors, whose role is to certify the financial statements of their clients, as it stands today.

Below are some of the Brender and Gauthier findings from their survey. These are the findings that will have the greatest impact based on the answers of the professionals surveyed.

- 94% of the respondents said that there is going to be a change on the audit activities
- 82% said that there is more IT knowledge needed it
- 56% believe it will be an increase in audit efficiency and quality
- 47% believe that will impact companies’ organizational chart.

Growing Need for Technological Skills

Today, in most cases, when the IT environment is not complex, even if financial auditors are not IT experts and are not trained in auditing information systems, they perform IT audit work by following a predetermined audit program, as explained by the interviewees. However, blockchain technology, with its two main technical features asymmetric cryptography and distributed systems is a perfect example of a sophisticated technology. As a result, it is not well understood by most financial auditors and even by many IT auditors, as demonstrated by the answers obtained during the interviews. None of the participants has had any practical experience with blockchain, and none of them knows how to audit such technology. They point out that there is currently no blockchain-specific auditing standard and report a lack of personal experience with this technology, suggesting the need for audit firms to incorporate new skills. It is in this context that 82 percent of audit respondents believe that financial auditors and IT auditors, in practice or in training, need more in-depth technical and technological knowledge. Fifty-three percent of the interviewees anticipate that to fully benefit from the advantages of new technologies and meet the needs of their clients, audit firms will have to hire more IT auditors as well as new profiles, such as analytical specialists, data scientists or even statisticians. This trend, if it is confirmed, will have two major impacts, first on the training of the auditors and then on the configuration and organization of the audit teams. However, if the role of

auditors shifts from auditing financial data to auditing blockchain and certifying that it is correctly implemented, they will have to be able to understand the two main functions of blockchain (asymmetric cryptography and distributed systems). They will have to not only broaden their technical skills to master computer coding, hashing and cryptography, but also keep working on their soft skills such as communication. In addition, the configuration of audit teams will change. In the future, teams will be led by an auditor with solid accounting and financial knowledge.

Productivity and Quality Gains

Thanks to its characteristics, the use of blockchain will make it possible to automate audit tests, or at least facilitate them, thus reducing the duration of audits. For now, auditors confirm the accuracy of their clients' data by reconciling the different sources of these data. The implementation of blockchain will make these reconciliations unnecessary because all transactions will be recorded on this single transactional distributed database. To look at another example, banks' balances, customers' balances and suppliers' balances will no longer need to be confirmed, since the auditor, and possibly even the regulator, will have access to data from auditees and other participants in the blockchain in real time. Traceability and continuous monitoring can, therefore, be guaranteed. As a result, some audit-related tasks that are time consuming and discontinuous and that do not require specific technical expertise will disappear, generating productivity gains.

Real-time auditing has the potential to enable auditors to be more effective, proactive, adaptive and forward-looking, meeting the expectations of investors and other stakeholders who would like the auditors to go beyond the pass/fail evaluation of the traditional financial audit report and make more meaningful recommendations and more sophisticated analyses. To date, auditing is a past-oriented activity that is intended to provide reasonable assurance that "the audited entity's financial statements have been prepared in all material respects in accordance with a set of applicable accounting standards" in order to issue an audit opinion for a specified period of time. Through blockchain and data analysis, auditors will be able to make new types of forward-looking analyses. Audit clients could then expect recommendations and strategic advice from their CPAs, which is not currently authorized by the US-based Public Company Accounting Oversight Board (PCAOB). This situation could represent an ethical challenge for the profession, perhaps involving a complete redefinition of the role and the profession of auditors.

Impact of the Organizational Structure of Audit Firms

As explained previously, some tests and tasks that do not require specific technical skills and that are currently performed by junior auditors will disappear in favor of analyses that require expertise and experience. Audit firms will, therefore, need more experienced professionals instead of juniors. The very pyramidal organizational structure of those entities, where there are fewer and fewer employees climbing up the hierarchy (junior, senior, manager, senior manager, partner), will be strongly impacted. Young accountants and other recent graduates currently start their careers as external auditors to gain exposure to a wide range of clients in terms of business sectors or organization size. They continue their training in the field under the coaching of more experienced auditors and, after a few years, they often leave the audit sector to take on new roles in the industry. However, it seems that this model is likely to diminish or even be reversed if, instead of recruiting juniors, accounting firms recruit more experienced profiles. In the future, recent graduates will first work in the industry to develop some expertise and then join an audit firm. This change in trends will encourage those firms to review their human resources policies marked by a high turnover.

CONCERNS ASSOCIATED WITH BLOCKCHAIN TECHNOLOGY

Blockchain has the potential of being a very useful and transformational technology when it comes to the audit profession. However, there are few concerns that companies that decide to implement the technology should consider. According to the Blockchain Technology Overview, (Yaga, Mell, Roby, Scarfoen), published by National Institute of Standards Technology here are some of those trepidations:

Cybersecurity

The use of blockchain technology does not remove inherent cybersecurity risks that require thoughtful and proactive risk management. Many of these inherent risks involve a human element. Therefore, a robust cybersecurity program remains vital to protecting the network and participating organizations from cyber threats, particularly as hackers develop more knowledge about blockchain networks and their vulnerabilities. In addition to general principles and controls, there are specific cybersecurity standards with relevance to blockchain technology which already exist and are in wide use by many industries. For instance, the NIST Cybersecurity Framework expressly states that it is "not a one-size-fits-all approach to managing cybersecurity risk" because "organizations will continue to have unique risks—different threats, different

vulnerabilities, different risk tolerances—and how they implement the practices in the [Framework] will vary.” With that said, even though the Framework was not designed for blockchain technology specifically, its standards are broad enough to cover blockchain technology and to help institutions develop policies and processes that identify and control risks affecting blockchain technology.

Cyber and Network-based Attacks

Blockchain technologies are touted as being extremely secure due to the tamper evident and tamper resistant design once a transaction is committed to the blockchain, it generally cannot be changed. However, this is only true for transactions which have been included in a published block. Transactions that have not yet been included in a published block within the blockchain are vulnerable to several types of attacks. For blockchain networks which have transactional timestamps, spoofing time or adjusting the clock of a member of an ordering service could have positive or negative effects on a transaction, making time and the communication of time an attack vector. Denial of service attacks can be conducted on the blockchain platform or on the smart contract implemented on the platform. Blockchain networks and their applications are not immune to malicious actors who can conduct network scanning and reconnaissance to discover and exploit vulnerabilities and launch zero-day attacks.

Malicious Users

While a blockchain network can enforce transaction rules and specifications, it cannot enforce a user code of conduct. This is problematic in permissionless blockchain networks, since users are pseudonymous and there is not a one-to-one mapping between blockchain network user identifiers and users of the system. Permissionless blockchain networks often provide a reward (e.g., a cryptocurrency) to motivate users to act fairly; however, some may choose to act maliciously if that provides greater rewards. The largest problem for malicious users is getting enough power (be it a stake in the system, processing power, etc.) to cause damage.

Resource Usage

Blockchain technology has enabled a worldwide network where every transaction is verified and the blockchain is kept in sync amongst a multitude of users. For blockchain networks utilizing proof of work, there are many publishing nodes expending large amounts of processing time and, more importantly, consuming a lot of electricity. A proof of work method is an effective solution for “hard to solve, easy to verify” proofs; however, it generally requires significant resource usage. Because of their different applications, and trust models, many permissioned blockchain technologies do not use a resource intensive proof, but rather they utilize different mechanisms to achieve consensus. The amount of energy used is often not trivial; for example, some estimate that currently the Bitcoin blockchain network uses around the same amount of electricity as the entire country of Ireland. It has also been speculated that the Bitcoin blockchain network will consume as much electricity as the entire country of Denmark by 2020.

CONCLUSION

Based on experts opinions blockchain technology is here to stay. As explained in the paper it will change the way auditing is done. It is in the best interest of audit firms to think about what the audit of tomorrow will look like. The scope of the audit mission will shift from certifying the financial statements to testing the information systems and, more particularly certifying the proper implementation of the blockchain. As Andreas Toggwyler, Partner, EMEIA Financial Services Advisory, Ernst & Young Ltd, pointed out in an interview, “Certifying the blockchain would allow us to stop performing tests that seek to confirm the existence, completeness, and accuracy of the transactions. However, it is important to keep in mind that blockchain would not replace the auditor’s professional judgment.” Depending on how fast and wide the blockchain technology will implement it will impact the accounting education and how academic community prepares students for the new challenges facing accounting profession.

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IMPLEMENTING CASE STUDIES TO ENHANCE STUDENT LEARNING IN CORPORATE TAXATION ACCOUNTING COURSES

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ABSTRACT

This paper analyzes previous research conducted regarding enhanced student learning through the use of case study materials. These materials are then further tested by implementing a case study related corporate taxation that was based off of a real world issue and designed to enhance student learning. The case study was implemented both in and outside the classroom, with various modifications resulting from student input and instructor reflection. Any appropriate changes to the case study were then implemented for further instructor observation. The case study was designed to be used in an upper level accounting taxation course with enough students to work in groups of 3-5.

INTRODUCTION

Corporate Taxation classes are typically only taken by those desiring to attain an accounting degree. However, there are many accounting students who have no interest in tax, and those that do are usually seeking opportunities to experience what work will be like after they graduate. While students can understandably look to various tax forms for the technical knowledge required to succeed at an entry level accounting job, many students do not get any exposure to tax consulting as a result of their university studies. Though many collegiate case-competitions exist that try to give students this type of experience, these offerings have time constraints that cause them to be limited in scope. Case competitions also tend to simulate problem solving from a conceptual perspective alone, rather than taking the conceptual and putting it into practice. This case was designed to address and improve upon those issues. That being said, teaching students the skills necessary for the critical thinking in a consulting environment can be very difficult within the walls of a classroom alone. Because of this, the case was also implemented with the expectation that it would be completed both in and outside of class. This paper will discuss a case study developed to enhance student learning in addition to equipping them with the skills needed to solve problems directly related to issues they would face in a tax consulting environment. Before this analysis, a review of effective case study implementation and learning is appropriate in order to contextualize the value of using case studies in the classroom.

CASE STUDY LEARNING MODEL

Learning would appear to not come not from the effectiveness of the material presented by the instructor, but solely by what the student does or thinks (Ambrose, Bridges, DiPietro, Lovett, and Norman, 2010). Before one can hope to enhance learning, breaking down exactly what learning is must be done first. For the purposes of this paper, a holistic, summarized definition from *How Learning Works* will be used. Learning can broadly be defined as a process of experiences that ultimately lead to change within the student (Ambrose et al, 2010). This definition can make it difficult to achieve student learning based on traditional teaching methods alone. However, using case studies can be an effective supplement to traditional methods in order to drive learning development. While many students often question the applicability of particular subjects or concepts to their life after college, case studies implement active learning that can directly tie solving specific, real world problems through active learning and critical thinking. *How Learning Works* advocates the usefulness of case studies in this way: "Analyzing a real-world event provides students with a context for understanding theories and their applicability to current situations." Having students solve real world problems in order to develop critical thinking skills will enable them to use those skills to address future issues they will face after they graduate.

Bridging the gap between theoretical concepts to practical application of those concepts has always been a barrier for instructors, and tying that practical application to skills needed to vocationally succeed after college can also be challenging. There are three key aspects of case study implementation that allow them to act as this bridge: Foundations, Flow, and Feedback (Anderson and Schiano, 2014). These three factors were used as a conceptual framework by which the case study was implemented.

Foundations, Flow, and Feedback

While the cases used in a given course are vital to the learning of the students, it cannot be understated how important the preparation is before the first day of class. Though each instructor prepares in various ways, one consistent measure of a successful case study implementation is preparation. This importance can be emphasized by the relevancy of the case study

chosen or designed. As important as the implementation of a case study is, the success of a case study is highly dependent on the pedagogy of the instructor throughout the course, not just at the outset (Campoy, 2005). Because of this, the flow of the case study throughout the semester is also critical to student learning outcomes, as each class will bring with it various new issues and personalities. An instructor's ability to address current problems with students and student groups plays a major role in the successful completion of those students in relation to the case. Because no case study is perfect, one must be able to adjust specific aspects of the project throughout the semester. This ties in to the third aspect of case study implementation, feedback. Although getting post-semester feedback can be extremely beneficial, as the students have already received their grade, one must also pursue constant and constructive feedback throughout the process of students completing the case study. Which aspects of the case seem to be more beneficial than others? How does the workload compare to the time constraints given in class? How does the number of team members impact the level of participation in each group? These are a few examples of ways to get open and honest feedback throughout the duration of the case (Anderson and Schiano, 2014).

Influencing Factors

When implementing case studies, there are numerous factors that need to be considered that can alter your case from one semester to the next. As stated before, each class bring with it varying unique features. Some of those feature that have to be accounted for are the following:

- Class Size
- Course: Core vs. Elective
- Part Time vs Full Time
- Gender
- Weekly vs. Modular Courses
- Domestic vs. International Students
- Single vs. Multi-section Classes
- Executive vs. Graduate vs. Undergraduate
- On campus vs. Online Students

While there are many more factors that can change the delivery and ultimate outcome of one's case study, the factors listed above serve as a brief list of considerations that need to be taken into account at all three stages of case study implementation (Anderson and Schiano, 2014).

Collaborative Learning

One of the basic components of case studies is collaboration. It is one of the main differences between lecturing and group work, and it encourages vulnerability among students in order to achieve a common goal. Many research studies have pointed to collaborative learning being an effective tool for instruction (Barkley, Major, and Cross, 2014). An extremely important culmination of research related to collegiate learning, *Seven Principles for Good Practice in Undergraduate Education* outlines various learning principles that were found to be of most use in the college classroom. Of those seven principles, three of them lay the foundation for collaborative learning: encouraging student-faculty contact, encourage cooperation among students, and encourage active learning (Chickering and Gamson, 1987).

CASE STUDY EXAMPLE

One case study was implemented in an upper level corporate taxation accounting course in an attempt to enhance student learning. This case was adapted from research and development tax credit study previously done by a Big Four accounting firm. The case in question required the students to complete the following tasks:

- Research the tax law associated with the R&D tax credit, the client, and industry associated with the case.
- Meet with and formulate list of questions for client (i.e. the instructor), including a list of required documentation.
- Develop positions for and document certain company activities and how they relate to the R&D tax law.
- Formulate a tax credit Excel workbook, summarizing the tax credit.
- Complete appropriate tax form related to the tax credit.
- Write a memo outlining the R&D tax credit, various tasks completed, and their stance regarding each of the company's potential R&D activities.

- Perform these actions in a similar hierarchy as an accounting firm (i.e. some students are associates/seniors, some are seniors/managers, etc.).
- Regularly maintain contact with both the client and the accounting firm's partner (both being played by the instructor).

ANALYSIS OF EXAMPLES

Based on the case study learning model, the case study was analyzed regarding each stage of implementation. Details surrounding the case study can be found in Appendix A.

The Foundations

The students were initially given an outline of the R&D tax credit in the form of a PowerPoint slide deck. The slides were loosely based off of presentations given to potential clients at an accounting firm. The slide deck outlined what the credit was, how it was calculated, what data would be needed, and what documentation was required as a result. In addition to this the students were also given a profile of the client to assist them in their initial research. The students were also given a 'cheat sheet' of the R&D tax credit to assist them when meeting with the client for documentation purposes or data requests. Lastly, the students were given an Excel document from last year's credit calculation to use a template if needed.

The Flow

While the Foundations' resources were given to the students early on in the semester, there were various other documents that were needed in order to complete the tax credit. These documents were either going to be created by the teams themselves (e.g. the final memo), or they would need to ask the client for them (e.g. wages and other costing data). While not every team knew exactly what to ask for initially, the instructor was able to hop in and out of their role as both the client and the accounting firm's partner in order to assist teams that were having trouble.

Because this particular class was made up of students across several ages, different students were able to take on the various roles of employees of an accounting firm. For instance, a senior would act as a tax manager and review the work of a college junior who was acting as the associate. The roles of the students would merge at times as well, giving students opportunities to fulfill various roles of an accountant in public accounting.

The Feedback

The feedback from the case study brought with it mixed results. Students seemed to enjoy the ability to complete a project that had real world implications. They also enjoyed the critical thinking required to find ways to apply the tax law to potentially save their client more money. There were some more constructive takeaways, however. Students found it increasingly difficult to meet as often as needed to complete the assignments. Trying to find the right questions to ask the client also proved to be a source of frustration. Lastly, the unstructured approach taken with the project was a source of anxiety for many students. Not knowing which step to follow, or even what the steps were took a toll on several of the students.

This feedback led to several conclusions. One, most of the constructive feedback was consistent with other classes that implement them. Scheduling conflicts, lack of underlying knowledge, and lack of structured frameworks are consistently found to be complaints of classes that implement these learning strategies. Two, many of these complaints were also consistent with what one experiences at their first entry level job, which can usually lead to a tremendous amount of learning and development of critical thinking. Three, designating more class time to discuss the tax credit itself and how it relates to the course, the project, and the students' career aspirations would be more beneficial than a truly unstructured approach. This would reinforce the value of the project to the students and give them justification for the amount of busy work required to complete the case.

Several changes resulted from implementing this case study. Allowing more class time for inter-group discussion and questions throughout the semester has been a major change. Giving students designated time at the beginning of class has also proven to be a fruitful way to engage the students before getting into new material. Additionally, occasional status checks and allowing time for inter-team questions has also increased student engagement in the classroom as well. The faculty also observed that requiring peer review at the end of the project helped bolster group participation. Additionally,

the faculty saw more student engagement when designating time in class specifically to discuss certain unstructured aspects of the project. This helped bring more clarity and collaboration across teams and teammates.

OBSERVATIONS OF STUDENT LEARNING

Based on the case study learning model, the case study was reflected on regarding each stage of implementation. The level of student learning was determined through instructor observation and student feedback. These observation methods included instructor observation during discussions with different teams, team members, and cross-team activities both in and out of the classroom. Learning was also assessed by analyzing project status at certain periods of time throughout the semester, reviewing work done prior to final submission, and grading final case study submission.

The Foundations

Students were not used to the unstructured nature of the case study. Knowing who their teammates were and that there were files for them to analyze resulted in a great deal of discomfort for the students who were used to being told what to do for most of their academic career. Because the case has multiple files in various formats, the case (as simple as it was) was initially intimidating to accounting students.

The Flow

R&D tax credit studies make up the majority of tax consulting work related to Big Four accounting firms. These studies analyze the R&D activity of a company and make judgements as to whether or not that activity qualifies as a research expense. To the extent that the activity does qualify, it needs to be quantified by a method well documented in the event of an IRS audit. The quantitative aspects of the case did not seem to overwhelm the students as much as the qualitative requirements. Having to apply tax law to the operations of a company forces an accountant to think like a lawyer or an engineer. This took some time to get used to for many of the students, and it accurately reflects the experiences of many first year tax associates in tax consulting.

The Feedback

As state previously above, the feedback from this case was generally positive. The constructive comments were either addressed by the faculty or empathized with by other classes that also implement case studies. The positive feedback was comforting as most of it related to the useful nature of the case. Students were forced to think differently, independently, and in collaboration with their teammates. This was consistent with the feedback both throughout the semester (before getting their grade) and after the semester.

Additional Observations of Collaboration

The case study activities previously listed can also be directly correlated with the three principles outlined for the foundation of collaborative learning:

- Encourage student – faculty contact
 - The unstructured nature of the case study required students to interact with the faculty, as the instructor was playing multiple roles and could answer help each team in multiple ways. This encouraged student contact, as the faculty member was the source of both the problems and the solutions throughout the case.
- Encourage cooperation among students
 - Student cooperation was critical to the success of each team, as the workload would have been too much for just one or two students. Being able to delegate and sacrifice at different times throughout the semester was important to build organizational commitment within each team, and each team grew more cooperative throughout the semester.
- Encourage active learning

- The lack of direction given during the beginning stages of the case study was a key factor in encouraging active learning with the students. Not knowing where to start forced the students to research the initial case for themselves before formulating specific questions about the case, rather than open ended one (e.g. what does this data file entail? vs. what should I be doing?).

Future case studies regarding this topic should include a formal assessment after final submission of the case study in order to assess individual learning. Based on the observations listed above, using case studies for corporate taxation is able to be used as a supplement to increase the development of student learning.

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**APPENDIX A
R&D TAX CREDIT STUDY CASE**

You have been employed to calculate the R&D Tax Credit calculation and form 6765 for MEERChemical. MEERChemical is a newly established chemical manufacturer. Though they have only been in existence for less than 30 years, they have taken a significant market share of their industry. Their two main products, polypropylene and polyethylene are staples in most manufacturing industries, being used for many plastic products and packaging. You are tasked with completing the following:

1. IRS Form - Completed Form 6765 for year 2017
2. Excel Workbook - Completed R&D Tax Credit calculation (use PY as a template)
3. Excel Workbook - Identify any QREs (Qualified research expenditures), including supply, wage, and contractor costs.
4. Word Document - Write a memo documenting and discussing the process by which you have identified these costs, correspondence (e.g. emails or meetings notes) with the client that would be pertinent to the study, and any necessary information supporting the four-part test.
5. PDF Document - A PDF packet that includes all of the above in PDF format.

Any and all necessary information will be coming from the client (i.e. the instructor), though his role may change from time to time (e.g. the VP of Tax, HR Manager, Engineer, etc.).

Each team will be comprised of students from different class designations (i.e juniors, seniors, graduate students, etc.). Therefore, it is expected that the upper level students take a leadership role in this exercise. Most tax teams are comprised of associates, seniors, managers, and a partner. The instructor will play the role of Partner, so he can give you direction when needed. The upper level students should be playing the role of senior and/or manager. This means that regardless of who is doing what, the upper level student should be reviewing all of the work before it gets sent up to the partner.

Grading for this project will be based on both qualitative and quantitative aspects. Completion of the points listed above is required, and any errors noted will result in deducted points. In an attempt to encourage total participation, you will also get a chance for peer review.

ADDITIONAL MATERIALS

- **Client Costing File (Excerpt):**

Year	Department	Item No.	Item Desc.	Vendor #	Project No.	Project Descr.	Cost
2017	R&D	318458811	...	331	1	Polypropylene sustainability manu.	\$ 4,837
2017	Plant	618368	Misc. Material	552	114	PEL Improv.	\$ 5,672
2016	HQ	1736123	N/A	6563	210	N/A	\$ 62

- **Client W-2 Wages File (Excerpt):**

First Name	Last Name	W-2 Wage	Title	Title Descr.	Department
Caleb	EDWARDS	\$ 31,707	Associate	Lab Assistant	R&D
Layla	SANDERS	\$ 22,090	Contractor	Skilled Labor (Dunder Chemical)	Contract Labor
Silas	CARLSON	\$ 120,124	Associate	Accountant	HQ
Sawyer	HUNT	\$ 151,986	Associate	Engineer III	Chem Plant

- **Prior Year Calculation:**

2013		
Supplies	\$	4,211,546
Wages	\$	2,164,547
Contract	\$	-
TOTAL QRE	\$	6,376,093

2014		
Supplies	\$	7,213,645
Wages	\$	5,457,854
Contract	\$	946,524
TOTAL QRE	\$	13,618,023

2015		
Supplies	\$	8,887,465
Wages	\$	6,741,456
Contract	\$	625,478
TOTAL QRE	\$	16,254,399

2016		
Supplies	\$	10,245,978
Wages	\$	8,636,555
Contract	\$	500,006
TOTAL QRE	\$	19,382,539

	CY 2016 TOTAL QRE	\$ 19,382,539
Less	50% of Avg. QRE (Previous 3 Years)	\$ 6,041,419
	Difference	\$ 13,341,120
Gross Benefit	14%	\$ 1,867,757
Reduced Credit under Section 280C		\$ 1,214,042

DESIGNING AN EFFECTIVE DATA VISUALIZATION COURSE A QUALITY ASSURANCE CASE STUDY

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ABSTRACT

Data has become an increasingly important asset to businesses because of the valuable insights that can be gained through analysis. Demand for employees with expertise in business analytics will continue to rise in the foreseeable future. However, traditional business curricula typically do not adequately prepare students to perform data analytics for decision making. Colleges and universities can help students develop their data analytics and visualizations skills by integrating this content into existing courses such as accounting and finance, or by creating stand-alone courses.

This paper discusses how accounting instructors can design an effective introductory data visualization course by utilizing a model that begins with identifying the course learning outcomes and then working backwards to determine the learning activities, resources, and training necessary to achieve the goals. We accomplish this by describing the course design structure and assessment methods used in a graduate-level data visualization accounting course at a large public university in the Northeast region of the United States. The pedagogical methods described in the paper include traditional lecture, active learning techniques, out-of-class reading and writing assignments, summative assessments through multiple choice exams, project-based assignments, and peer learning. This paper also describes the training and teaching resources available for instructors interested in teaching a data visualization course. We conclude by reporting the results of student feedback surveys, pre-test and post-test scores as part of a quality assurance initiative to determine whether or not course learning objectives were met. The results suggest the course design method was effective.

INTRODUCTION

The explosion of big data has created opportunities for accountants to leverage the power of data analytics to help companies gain a competitive advantage. Specifically, accountants in leading firms are using technology to integrate their knowledge of financial and non-financial data to generate new insights, helping to improve decision-making and enhance company performance.

An indispensable component of an effective data analytics campaign is the ability to generate visualizations. Accounting educators can play an important role in helping future accountants, whether in public accounting or industry, develop their data analytics and visualization skills before entering the workplace. The purpose of this paper is to assist accounting educators in designing an effective introductory data visualization course.

LITERATURE REVIEW

“A picture is worth a thousand words” is a commonly used expression that suggests an image can convey complex ideas more efficiently than text. Researchers in the fields of cognitive science and psychology have found that the human brain is capable of processing visual images in as little as 13 milliseconds (Potter, Wyble, Haggmann, & McCourt, 2014). The ability for humans to quickly process information contained in visual representations has implications for decision-making when images are used to communicate complex ideas. One study found that presentations using visual aids are 43% more persuasive than unaided (Vogel, Dickson, & Lehman, 1986).

Various business disciplines are now incorporating data visualization in the college curriculum. Researchers in the field of statistics, the foundation of data analytics, note that the ability to create informative visualizations has become increasingly important in the statistics curriculum (Nolan & Perrett, 2015). Further, Nolan & Perrett (2015) note that a more rigorous treatment of visualization can be taught at the introductory level within a statistics course.

As demand grows for accountants to provide insight from both financial and non-financial data to various stakeholders (CGMA, 2016), accounting education must evolve to include data analytics and visualization. Making sense of large, complex data sets for decision-making is one of the key challenges facing business managers today

(Sharda, Ramesh; Delen, Dursun; Turban, 2014). The remainder of this paper will discuss the course design and then the results obtained after teaching the course.

DESIGNING THE COURSE

We followed a seven-step process to deliver a special topics graduate-level accounting data visualization course at a large public university in the Northeast region of the United States. The course design and curriculum described in this paper could also be adapted for an undergraduate course.

Step 1 - Create Learning Outcomes

Our first step was to create the course learning outcomes and then we worked backwards to determine the assessments and instructional activities. The learning objectives should be specific and measurable.

The course learning outcomes included the following:

- Introduce students to the key design principles and techniques for visualizing data
- Develop and interpret a wide range of charts and graphs in Tableau
- Enhance and customize visualizations as needed for a specific business context
- Visualize and interpret spatial data
- Verbally communicate persuasive, data-driven business insights supported by Tableau visualizations
- Allow for project-based opportunities to identify, understand, analyze, prepare, and present effective visualizations on business topics

Many of the course learning outcomes were adapted from syllabi provided by the instructor resources discussed in step 5 below.

Step 2 – Design Learning Activities and Assessments

A well-designed course should provide students with an opportunity to practice higher order thinking skills such as analysis, critical thinking, evaluation and creation. In addition to traditional lecture, we incorporated active learning techniques, out-of-class reading and writing assignments, project-based assignments, and peer learning, all in an effort to support higher order thinking.

The learning objectives were assessed through various means, including multiple choice exams, homework assignments, and a final project that included a presentation. The final project required each student to create a visualization using a complex dataset. The output was an executive dashboard or story point that enabled the user to explore the data. Students were also required to submit a one-page user manual describing how to use their visualization to explore the data.

Step 3 - Choose the Right Tool

After considering the course learning objectives, choose a data visualization tool that will help you accomplish your goals. According to the editors of PC Magazine(Baker, 2018), the top three software providers are Tableau, Microsoft Power BI, and IBM Watson Analytics. We decided to go with Tableau because of its wide use in industry, intuitive interface, availability of training resources, and the cost is free for students and instructors. It is important to note that the specific tool is not as important as the ability to extract data, build a visualization graphic, gain insight, and communicate to decision makers.

Step 4–Get Trained

It is critical that the instructor receive training using the software prior to teaching the course. Tableau offers a variety of training options, including free training videos available at <https://www.tableau.com/learn/training> and live instruction courses. We completed an introductory training course that covered topics such as connecting with data, creating visualizations and calculations, and building dashboards. The course provided training on a variety of chart types including cross tabs, heat maps, tree maps, scatter plots and others.

Step 5 - Register for Instructor Resources

Tableau maintains an Instructor Resource Page that provides a variety of curriculum materials, including lecture notes, PowerPoint presentations, student handouts, data files, assignments, and exams. Faculty can register at the following site: <https://community.tableau.com/community/teachers>. Once registered, instructors will have access to curriculum that covers basic to advanced data visualization topics. It is important to note that faculty could create their own assignments and cases using existing data sets provided by Tableau.

Step 6 - Teach and Assess the Course

Our typical approach during class was to discuss concepts, demonstrate how to create a visualization, and then have the students create a similar visualization, sometimes using a different data set. We assessed the course using exams, graded homework assignments, written assignments, a pre-test/post-test, and a final project that included a presentation of a data visualization created by the students.

Step 7 - Make Revisions and Teach the Course Again

After completing the course and reviewing the assessment results, determine what was effective in satisfying learning goals. Make any necessary adjustments based on assessment results and course feedback, and teach the course again. We learned that providing students with an opportunity to create visualizations using their own data sets was appreciated by many of the students and contributed to significant learning experiences.

RESULTS

The results from teaching the course from the spring 2018 semester are provided below. Table 1 provides the results of pre-test and post-test scores. Table 2 provides results of an end of class student survey.

Table 1
Pre-test versus Post-test Results on Multiple Choice Exam

	Number of Students	Mean	Median	Min	Max	Std. Dev.
Pre-test	48	47.125	46	31	71	8.877
Post-test	48	87.771	90	66	100	8.077
Difference	0	-40.646	-44	-35	-29	0.8

On the first day of class and before any lectures were given, students completed a pretest to establish a baseline of what students knew about visualization and Tableau prior to the course. The average on the pretest was 47.125%, with 48 students completing the exam. After five weeks of lectures, in-class and out-of-class assignments, and a final project, students retook the exam on the last day of class. The average on the post-test was 87.771%, or 40.646% higher than the pre-test. These results suggest the course design and learning activities adequately prepared students to succeed on the post-test.

Table 2
End of Class Student Survey

Q1. The course introduced key design principles and techniques for visualizing data.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	36	11	1	0	0
Percentage	75%	23%	2%	0%	0%

Q2. The course increased my ability to develop and interpret a wide range of charts and graphs in Tableau.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	35	12	1	0	0
Percentage	73%	25%	2%	0%	0%

Q3. The course increased my ability to enhance and customize visualizations as needed for a specific business context.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	30	17	1	0	0
Percentage	63%	35%	2%	0%	0%

Q4. The course increased my ability to visualize and interpret spatial data.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	23	23	4	0	0
Percentage	48%	48%	8%	0%	0%

Q5. The course increased my ability to verbally communicate persuasive, data-driven business insights supported by Tableau visualizations.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	16	20	8	3	1
Percentage	33%	42%	17%	6%	2%

Q6. The course allowed for a project-based opportunity to identify, understand, analyze, prepare, and present effective visualizations on a business topic.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	27	17	3	1	0
Percentage	56%	35%	6%	2%	0%

Q7. The course provided me with a working knowledge of using Tableau to create visualizations.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	33	12	2	0	1
Percentage	69%	25%	4%	0%	2%

Q8. The course has likely increased my marketability to employers looking for candidates with skills in data analytics and visualization.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	21	18	8	1	0
Percentage	44%	38%	17%	2%	0%

Q9. I will likely continue to use Tableau for academic assignments for other courses in my degree program.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	14	21	7	6	0
Percentage	29%	44%	15%	13%	0%

Q10. I will likely continue to use Tableau in a professional setting upon graduation.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Respondents	21	20	6	1	0
Percentage	44%	42%	13%	2%	0%

The first six survey questions asked students whether they believed the course addressed the course learning outcomes. For learning outcomes 1 through 4 and 6, over 90% of the students agreed or strongly agreed that the course helped them to achieve the learning outcomes. However, on course learning outcome 5, only 75% of the students agreed or strongly agreed that the course increased their ability to verbally communicate persuasive, data-driven business insights supported by Tableau visualizations. This represents an area for improvement the next time the course is taught.

Survey question 7 asked if the course provided students with a working knowledge of using Tableau to create visualizations – 94% agreed or strongly agreed. For survey question 8, 82% of the respondents agree or strongly agree that the course likely increased their marketability to employers looking for candidates with skills in data analytics and visualization. Survey question 9 asked if students would likely continue to use Tableau for academic assignments in other courses – 73% agreed or strongly agreed. Finally, survey question 10 asked if students were likely to use Tableau in a professional setting upon graduation – 86% agreed or strongly agreed.

Overall, the results from the pre-test/post-test and the survey results suggest that the course design was successful, yet there is room for improvement. Since one of the main objectives of introducing data analytics and visualization into the accounting curriculum is to help students gain and communicate insights for decision making, the authors are specifically interested in improving student satisfaction with course learning outcome 5 (the course increased my ability to verbally communicate persuasive, data-driven business insights supported by Tableau visualizations).

CONCLUSION

As the demand for data analytics and visualization skills in the accounting profession continues to grow, accounting educators should seize the opportunity to assist their students in developing these important skills. One data analytics and visualization course will not prepare students with all they need to know, but early and repeated exposure to these topics will help students become more marketable and prepared for jobs that require these skillsets. This paper described how accounting faculty can design and teach an introductory data visualization course. Based on the results of pre-test/post-test scores and end of class student surveys, the course design appears to have satisfied its objectives.

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IMPROVING THE 1040 PROCESS THROUGH THE APPLICATION OF LEAN PRINCIPLES: A CASE STUDY

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ABSTRACT

Individual income tax return preparation (Form 1040) provides a significant revenue stream for many accounting firms. From intake through delivery, managing the processes involved in an effective and timely fashion is critical to firm profits. Although several workflow management systems exist and are used by firms, studying the efficiencies of processes can help improve Form 1040 realization; that is, net client fees as a percent of total fee revenue. This paper documents our study of one accounting firm's existing workflow processes for preparing individual tax returns, with the objective of identifying the predominant wastes as categorized by the principles of Lean Management. We posit that the Lean approach can be readily applied to accounting firms to improve existing workflow processes, thereby improving the profitability of the Form 1040 preparation and processing system. By applying specific Lean tools, our investigation identified several sources of *muda* (waste) within the firm's individual income tax return preparation process. The predominant sources of *muda* were evaluated to better understand the factors contributing to these sources. Recommendations for corrective actions to minimize or eliminate waste contributors are offered. We also recommend a strategy for sustaining improvement. Avenues for further study regarding lean applications within the accounting field are discussed.

INTRODUCTION

Lean Manufacturing, also known simply as Lean, is a systematic method of process improvement which emphasizes the elimination or minimization of waste. The term Lean was developed by John Krafcik (1988) in an article based on his master's thesis at MIT. Krafcik's article "Triumph of the Lean Production System", featured Lean applications at Toyota. His work inspired authors Womack, Jones and Roos to write *The Machine That Changed the World* (1991), which spread the principles of Lean production around the globe. Lean is widely associated with manufacturing firms including not only Toyota, but other top manufacturers such as Nike, Kimberly-Clark Corporation, Caterpillar, Intel, and Ford, among others (<https://www.manufacturingglobal.com/top-10/top-10-lean-manufacturing-companies-world>).

Hallmark to Lean management is the identification of "muda" (Japanese, meaning waste) that burden a process, followed by an evaluation of issues that contribute to or cause the muda. Lean's success in manufacturing has triggered studies of the application of its principles and tools to service industries, in an attempt to reduce muda in non-manufacturing settings. Recent research supports the application of Lean to service industries, leading to increased competitiveness and customer satisfaction (Swank, 2003; Kanakana, 2013; Liker and Ross, 2017). Lean practitioners are beginning to offer consulting services in service industries such as accounting, indicating growing interest in Lean management (<http://www.leanaccountants.com/about.html>).

Accounting firms in the U.S. earn an average of more than fifty percent of their total fees from tax services, including income tax return preparation. Firms with under \$10 million in revenue earn an average of 30 percent of net client fees from individual tax preparation and planning services (National MAP Survey, 2018). In our subject firm, a medium-sized regional office with 45 employees, approximately 56 percent of fees are derived from tax services, of which 44 percent are from individual income tax returns. This means that nearly 25 percent of its client fees come directly from maintaining a 1040 practice within the firm.

PURPOSE AND PROPOSAL

The purpose of this study is to investigate our subject accounting firm's existing workflow processes for preparing individual tax returns with an emphasis on identifying predominant areas of waste. These predominant areas of waste are categorized in terms of the principles of Lean management.

We propose that by applying the Lean approach with regard to the identified waste categories, we can provide recommendations to improve the firm's existing workflow processes, thereby improving the profitability of the Forms

1040 preparation and processing system. The desired result is maximization of the firm's profitability by minimizing identified wastes.

THE WASTES WITHIN

The wastes of Lean are sometimes referred to as the Eight Deadly Wastes (Sunder, 2013). Practitioners originally determined seven categories of waste (Sutherland and Bennett, 2007; (<http://leanmanufacturingtools.org/>), with an added eighth category described as neglected employee creativity (Hicks, 2007). These eight categories include waste due to:

Defect;
Overproduction;
Waiting;
Neglected employee creativity;
Transportation;
Inventory;
Motion; and
Extra-processing,
easily remembered by practitioners through the acronym **DOWNTIME**.

Defect represents any imperfection in a product or service, regardless of its stage of conversion. For example, defect may be found in raw materials used to manufacture a product, during the conversion process itself, or in the finished product. With regard to accounting firms, defect can also be found during any stage. For example, data entry errors, missing data, human error, or flaws in automated reports or systems are sources of defect. In any case, defect may be the result of an internal or external failure.

Overproduction represents excess product or service beyond customer requirements. It has been termed the worst of the deadly wastes because it causes other categories of waste, such as inventory storage and movement of overproduced product. Additionally, it ties up capital that might be used for other needs. Although overproduction is most like associated with goods, services can also experience this waste. For example, accountants may subject their work to more levels of review than are necessary, or manually complete processes that could be automated.

Waiting represents idle time that exists when points in a process are not synchronized to ensure smooth flow. This idle time can be experienced by human resources as well as mechanical resources. This waste is also associated with income tax preparation, for example, when waiting for the client to submit all of the source documents needed to complete their return.

Neglected employee creativity occurs when employees are either not engaged, or their abilities are not fully utilized in the continual improvement of an organization. At times, organizations may encourage employees to provide suggestions for improvement; however, if suggestions are not acted upon, or if employees are not involved in the implementation of changes, the process is less effective.

Transportation is non-value added movement of items from one location to another. It is typically not associated with human movement, which is considered part of motion waste. This *muda* typically results from a poor workplace layout, where value added processes are not located as closely together as possible.

Inventory is any raw material, in-process product, or finished product which has not yet been converted to cash. Work-in-process is the most costly of inventory, as it represents product to which costs have been applied but cannot yet produce revenue. Work-in-process is significant in service industries such as accounting firms, as job order costing is applied and clients are not typically billed until a job is completed.

Motion waste is the waste associated with movement of people that is non-value added. Motion waste is often associated with misplaced items needed in the value-added conversion process, causing workers to search for items, as well as layout where items needed for the transformation process are not readily accessible to employees. In an accounting firm this waste would most likely result from misplaced files, or client information housed in multiple files or offices.

Extra-processing is that waste associated with adding extra process steps that do not add to the value of the product or service. Such steps which might exist include extra reviews, inspections, testing, or tolerances that are too tight. Note that, at times, extra-processing may not be able to be eliminated; for example, quality requirements might dictate a second-person review of documentation.

THE 1040 PROCESS

Lean looks at a process and seeks to reduce or eliminate wastes, regardless of the nature of the process. The 1040 process is a series of tasks organized to convert information from a client to a completed income tax return. The process steps are somewhat consistent among firms, but may vary significantly based on several factors, most notably, the level of technology utilized. This section summarizes the 1040 process at our subject firm.

Generally, the 1040 process begins with the accounting firm providing individual tax clients with a client organizer. The organizer is a pro forma print out that allows firms to gather information from clients in an efficient and systematic manner. A typical organizer contains a list of all information included in the prior year's tax return as well as prior year dollar amounts, helping clients gather all necessary tax data for the current year. Organizers are printed and mailed to clients early in January as a reminder that all information must be provided to prepare the tax return. Clients may choose to mail, drop off, scan or provide documentation electronically.

Once the client information has been received by the accounting firm, the internal preparation process commences. Firms generally begin by scanning taxpayer information or source documents along with the completed organizer to create an electronic file to eliminate paper and to maintain client copies for record retention purposes. A tax preparer in the office begins preparation of the return by entering data from source documents and the client organizer directly into the tax software. If information is missing or questions arise, the client is contacted. Once preparation is complete, the preparer transfers the file either by paper folder or electronically via workflow software to the assigned reviewer. The reviewer verifies data entry and the resulting finished tax return output. If additional information or documentation is necessary the client will be contacted.

If there is a substantial amount of missing information required from the client, or if many errors are discovered by the reviewer, the file is returned to the initial preparer. If the initial preparer is not available, the return waits. Once corrections are made and the file is re-reviewed, the return moves forward to processing.

An administrative assistant processes completed returns, to be signed by the partner and delivered to the client for signatures prior to electronic filing. This includes printing, addressing, and binding the returns along with any additional deliverables such as payment or estimated tax vouchers. The processor passes the final package along to the partner for final review and delivery instructions. If any errors or oversights are discovered by the partner, the entire return may be sent back to start of the process, depending on the nature of the error.

Initial review of our subject firm's 1040 process reveals opportunities for this firm to benefit from the application of Lean principles. Such benefit might be extended to other firms as well.

METHODOLOGY

To begin the study, the firm shared its standard operating procedures for the management of its 1040 process. Some of the managing partners reviewed the current process with the team, and provided some insight into problems that they were aware with respect to their process. They identified areas of improvement based on results of a staff survey administered by the partners at the end of the tax season. This step occurred prior to the on-site visit so that compliance with procedures could be evaluated and then verified by staff who perform the tasks when interviewed. We analyzed the survey data, with particular emphasis on the nature of the issues and the most likely form of waste each issue represented. Those results provided focus for the on-site visit, which took place about one month later.

We met with the firm partners and staff for a period of one working day. Interviews were scheduled with each task group, such as scanners, processors, preparers, reviewers, and distributors. In each case, the interviewed group was asked:

- Please explain the task flow within your process step;

- Please identify to the best of your ability how long it takes to do your task; and
- What are the top factors that impact your ability to complete your task in an efficient manner?

Using the information from the task groups, we constructed a Suppliers who provide Inputs to a Process for Outcomes to a Customer (SIPOC) diagram of the processes, noting areas consistently identified as hindering efficiency. Excel data on 1040 billed hours, work-in-process (WIP), percent realization, overseeing partner, and dates for each process step, including delivery were provided by the client from its work flow software. These data were analyzed to validate the areas of improvement identified by staff surveys, group interviews, and process mapping, as well as to identify bottlenecks or other insights into managing the 1040 process using Lean tools.

RESULTS

In the first round of analyses, 21 separate issues identified from the staff survey data provided were evaluated and categorized with regard to Lean wastes (Table 1).

Table 1: Issues Noted by Staff: 1040 Process Tax Year 2017		
Issue	Frequency	Possible Lean Waste
Cover Letter Inaccuracies	8	Defect
Share File Incomplete	2	Waiting
PDF Extensions	2	Motion
LLC Filings	1	Neglected Employee Creativity
Inaccuracies Found in Final Deliverable	1	Defect
Workflow Assignments	1	Waiting
Quality of Scans	1	Defect
Scheduling	2	Waiting
Working Paper Management	1	Motion
Extension Management	1	Waiting
E-file Acknowledgement Management	1	Motion

A review of Table 1 establishes Defect and Waiting as the most frequently noted Lean wastes. A Pareto Analysis of these wastes follows in Figure 1.

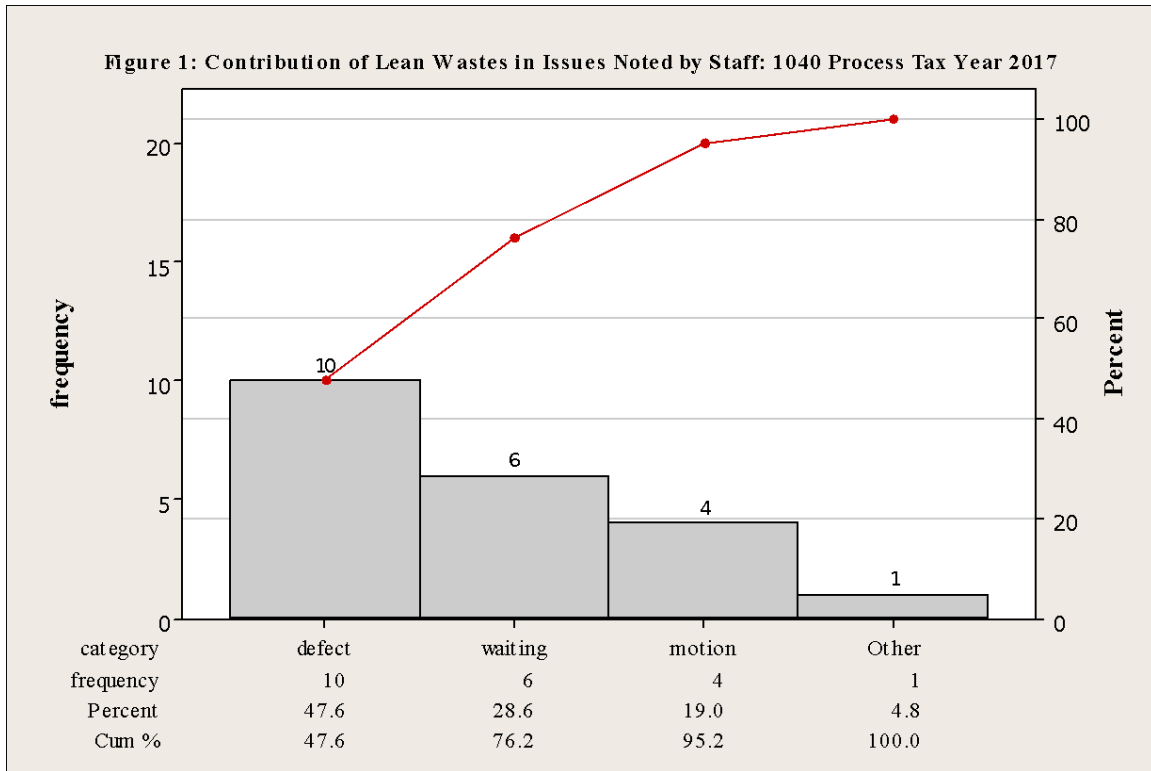
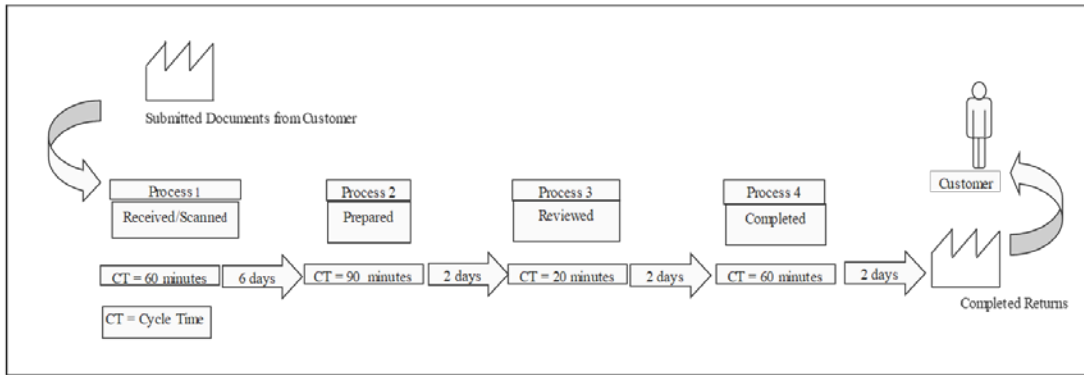


Figure 1 show that 47.6 percent of staff noted issues involving defects. A deep dive into the defect category reveals that the 80 percent of the defects involve inaccuracies in the cover letter written to convey the finished product to the customer. Other sources of defect include issues with the integrity of the scans, as well as small inaccuracies within the final product, requiring corrective actions. It is important to note that defect waste contributes to waiting waste, as staff must wait to start the process again at various points once a defect is corrected.

Waiting waste appears to be connected to workflow scheduling and incomplete documentation necessary for completion of the tax return. For example, when staff members receive information from the client, it is scanned into the system and then moved to the preparer. However, if information is incomplete, it is sent back to the scanner. Another factor contributing to waiting involves assigning specific staff to a particular return, and not acting on that return if staff members are not available. Waiting also occurs when partners choose to review their own clients. If the partners are not available, the file will not be reviewed until that partner is free. Finally, the use of Sharefile® (an online file sharing platform) to deliver returns is a source of waiting (and overproduction), as some clients indicated they would like to receive their returns via Sharefile, but were unaware they requested it. As a result, the firm found itself waiting for clients to retrieve their returns, when in fact the client did not realize the return was available to them.

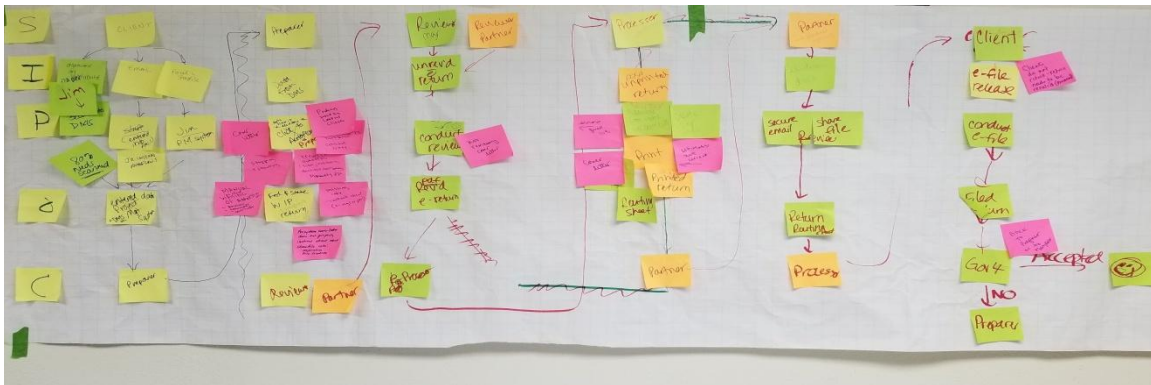
Staff interviews provided data on the average length of time on task, (cycle time), and approximately how long the 1040 return waits before moving to the next step. These times were plotted on an abbreviated value stream map (Figure 2). Lag times between process steps were calculated from Excel data provided by the client from its work flow system. The idle time between the Received/Scanned and Prepared steps (average six days) is identified as the longest wait time, which contributes significantly to inefficiency.

Figure 2: Value Stream Times of Key Processes as Perceived by Staff



The SIPOC created at the on-site visit provides insight into areas that may impact efficiency in the 1040 process (Figure 3). Pink sticky notes were used to designate those areas that staff found particularly troublesome. What was found here validated the value stream finding, indicating problems with waiting for materials or for workflow progression from the Scanning to Preparation steps. For example, if an assigned staff member was not available, the file would simply wait on that individual’s desk until that person was available. In addition, incomplete organizers or missing information from the client required preparers to wait for that information.

Figure 3: SIPOC of 1040 Process from Staff Interviews



Our first round of analyses yielded a preliminary conclusion: the lean waste of waiting is a significant problem in the early stages of the 1040 process.

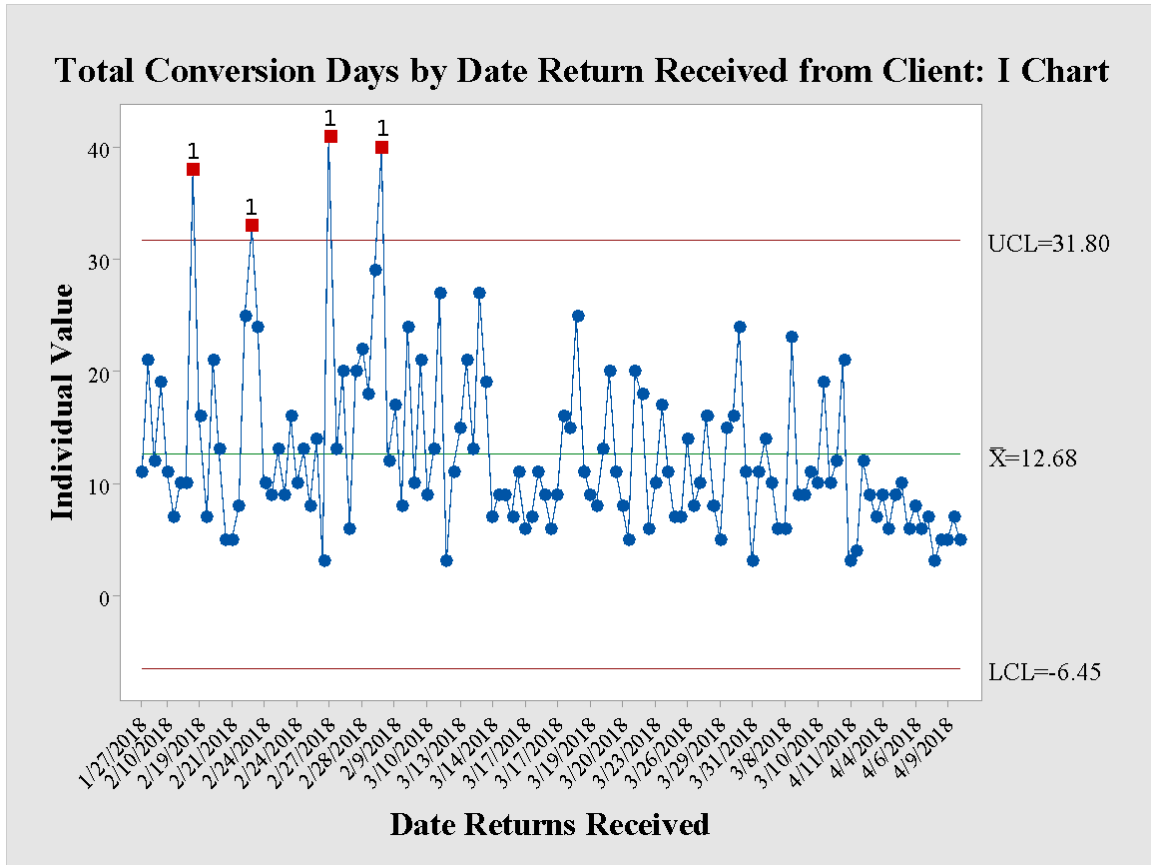
The second round of analyses turned to the Excel data provided with regard to hours billed, WIP expressed in dollars, percent realization, dates for each process step, and the partner in charge of each return. We first sought to understand the relationship between WIP and percent realization, where percent realization is equal to: $(\text{amount billed}/\text{WIP} \times \text{billable rate})$. As expected, these measures were negatively correlated, with a Pearson correlation = -0.185 and a $p = 0.000$ at a 0.05 significance level.

Next, total conversion days were calculated from the data, representing the days elapsed from receipt of materials from the client to the date delivered. That value was correlated to WIP, resulting in a positive correlation, with a Pearson value = 0.349 and a corresponding $p = 0.004$ at a 0.05 significance level. Thus, the more conversion days, the higher the WIP, and thus, the lower the percent realization. This result directly speaks to bottom-line profitability: by reducing conversion days, including idle time, the firm can increase profitability.

Total conversion days over time were evaluated using an individual control chart (I chart) to get a sense of data movement (Figure 4). Instability can be identified in the earlier time frame (late January – early March) as evidenced by the outlying points denoted with the code 1 (which indicates points beyond control limits). However, the important

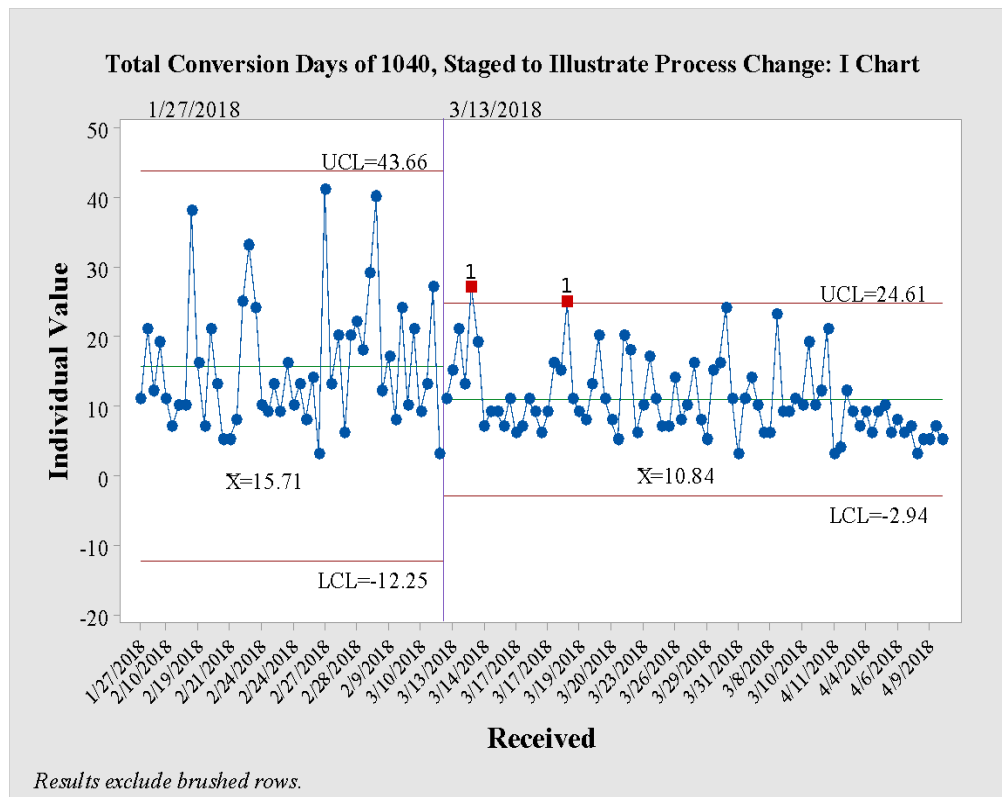
takeaway from Figure 4 is that the process appears to gain stability sometime in mid-March. This time period corresponds to the pass through tax return date (Forms 1065 for partnerships and LLCs, and 1120S for S-corporations), indicating that the pass through process may somehow impact the 1040 management process.

Figure 4: I Chart of Total Conversion Days, 1040 Management



To better illustrate the change, the data were staged (Figure 5). Per Figure 5, it is evident that instability exists in both time frames (before and after March 15), however, the image illustrates that the pass through process appears to have an impact on the 1040 process. Note: the outliers were “brushed” using Minitab, and therefore were not used in any of the derived values, such as the x-bar or control limits provided. An Analysis of Variance (ANOVA) was conducted to ensure that the differences were more than just perceived. The outliers were excluded from the ANOVA as normality is an important consideration for the performance of that analysis.

Figure 5: I Chart of Total Days Staged to Illustrate Process Change



The ANOVA supported that a significant difference existed between the means for total conversion days for 1040 returns before and after the pass through filing date, with the pre-pass through filing date providing a mean of 15.71 days, and the post-pass through date providing a mean of about 10.84 days, with a $p = <0.001$ at a 0.05 significance level.

The notion of process efficiency percentage (PE%) was evaluated, with such efficiency defined as:

$$PE\% = \{Billable\ Hours / (Total\ Conversion\ Days \times 10\ hour\ day)\} \times 100.$$

The PE% of the 1040 management pre-pass through filing date was compared to the post-pass through filing date using a t-test. The pre-pass through PE% of 1.276 percent was significantly lower than that of the post-pass through date PE% of 3.06 percent, with $p = 0.000$ at a 0.05 significance level. Average conversion days for each process step also decline in each critical process step (Figure 6).

Figure 6: Average Conversion Days Within Process Steps, January through April 2018.

Averages	Received→Prepared	Prepared→Reviewed	Conversion Days to Reviewed	Reviewed→Completed	Conversion Days to Complete	Completed→Delivered	Total Days
Total	7.20	2.94	10.07	2.60	12.68	8.26	20.44
January	9.00	6.00	15.00	1.00	16.00	8.50	24.50
February	8.05	3.87	11.74	4.18	15.97	12.74	27.00
March	7.43	2.77	10.20	2.12	12.32	7.13	19.45
April	4.28	1.22	5.50	1.22	6.72	2.83	9.56
Pre 3/15	8.14	3.69	11.73	3.22	14.96	10.26	24.32
Post 3/15	6.17	2.05	8.22	1.73	9.95	5.65	15.60

As a result of the above analysis, it was suspected that the pass through filing process may be more efficient than the 1040 management process prior to the pass through filing date. However, a t-test of the mean total conversion days for pass through filings and 1040 filings indicated that the 1040 filing process was significantly more efficient than the pass through filing process, with $p = 0.001$ at a 0.05 significance level. This finding suggests that inefficiencies may exist in both processes.

The results of this case study suggest that the pass through filing date is a significant date for an accounting firm with regard to gaining efficiency within the 1040 management process. In addition, the processes for both 1040 filings and pass through filings contain areas for waste reduction. The firm should consider actions to address the factors contributing to waste, which as demonstrated has the opportunity to increase profitability.

RECOMMENDATIONS

The final report provided to the subject firm included a detailed list of recommendations and the sources of waste they are designed to reduce or resolve. While these recommendations are not exhaustive, reduction in any of the wastes identified by the study should improve the 1040 process and hopefully the firm's bottom line. Each suggestion is described briefly here.

To reduce defect, and waiting which results from such defect, the firm should dedicate staff members to serve as "tax administrators." These individuals would be responsible for learning the capabilities of the software system at the firm so that human defect in terms of cover letter preparation can be eliminated by automation. Default settings include managing tax organizers, and cover and filing letter preferences. It is necessary to work directly with the tax software company to ensure the comprehensive use of such defaults. Further, once these settings are understood, they should be validated prior to use. In this way, the automation facilitates standard work, thereby minimizing defect and resulting waiting waste. Further, if employees are reluctant to take on the additional responsibilities of tax administrator because their time would not be billable, the firm may consider creating an internal customer code for this work. This way employees could commit the hours necessary to successfully plan for busy season without the negative consequences of losing billable hours needed to reach their annual goal.

Next, the firm should try to manage 1040 issues as they arise and not wait to address them. Short but daily standing or "scrum" meetings would allow the team to know what issues exist or are arising in any of the process points as well as any priorities which may need to be managed (<https://www.playbookhq.co/blog/lean-project-management-and-daily-standup-meetings-part-10>). This activity can work to minimize defect, smooth workflow, and minimize waiting and motion, as well as any other wastes the team sees in real time. Related to this recommendation is the idea that returns should always be moving forward through the process; as such, unless the return is egregious in both the nature and amount of errors, the reviewers or preparers should correct the errors themselves. These errors or issues would then be discussed with staff at the standing meetings with emphasis on the entire process and the elimination of potential repeats moving forward.

A third recommendation is to have staff or first-year interns review incoming client data, comparing it to the prior years' tax organizer to quickly determine if data is missing. Only client data that is determined to be substantially complete (a percentage perhaps to be determined by the firm) would be scanned and entire into the preparation process. If material amounts of information are missing, the client should be contacted immediately. This action will help to eliminate the picking up and putting down of returns that ultimately increases conversion days and WIP throughout the process. Additionally, this activity assigns staff members with work they can certainly do, better utilizing their time.

Fourth, unless the returns are high-profile or require personalized attention, they should be prepared immediately rather than assigned to specific staff. The firm can establish Kanbans (Japanese, meaning signboards) as visual signals to alert staff that a return is ready for the next step (<http://leanmanufacturingtools.org/kanban/>). In this way, files would not wait for specific staff. Kanbans (in a firm, perhaps centrally located bins) could be established for each process step. Files should be pulled from the Kanbans using a first-in-first-out system. In this way, the firm would be managing the returns according to "one-piece flow," a more efficient method to manage workflow consistent with lean practices, which has been proven to reduce WIP (Mullholland, 2018). This recommendation would also require

a “gatekeeper” or individual in charge of monitoring the Kanbans to ensure that no return is waiting for more than 24-48 hours before moving along in the process. Waiting should be minimized or eliminated at all points. Returns that are waiting specifically for K-1s from pass through entities (not available until after March 15) should be partially prepared and returned to the Kanban noting the missing K-1s, or extended, per the next recommendation.

A fifth recommendation, also related to the alleviation of waiting, is the careful assignment of returns or other tasks that can be finished completely in one sitting. It is unavoidable that some staff will be in and out of the office, for various reasons such as audit work during tax season, making it difficult for them to start and complete larger tax returns while they are in. As such, assigning jobs that can be taken from start to finish during in-office time for these individuals will reduce idle time on task. Examples of such tasks might be zero balance due or fixed fee extensions, standalone LLC filing fees, or other tax work that can be completed early in tax season. Identifying these types of returns, and only doing the necessary amount of work on them during tax season will drastically reduce overproduction waste. For example, if certain S Corporations are always extended, only the extension should be prepared during tax season.

To further minimize waiting time, the firm should consider assigning more reviewers to 1040 work, rather than having partners directly review their own clients. Adopting this recommendation would afford reviewers more opportunity to broaden their skills and client knowledge, while allowing partners to engage in higher value added work. This also allows senior managers to champion lean efforts as it embraces the ideas of using human talents (Upton et al., 2014).

Finally, the firm should consider organizing its Sharefile usage policies, so that clients can fully understand how and when to use it. A lead administrator, or at least one email address should exist for Sharefile so that it can be continuously monitored.

LIMITATIONS AND FURTHER STUDY

This study has some limitations; one being the inability to capture exact cycle times for each of the process steps. It would be helpful to track cycle times with the implementation of a Kanban system, to collect data needed to make better decisions going forward. Being able to translate time to dollars allows for a more robust understanding of what financial gains can be experienced as a result of improvements. A second limitation is that the data on staff performance was gathered via interview rather than through direct observation. Direct observation of processes might have helped identify other areas of waste and further opportunities for improvement. In this study, we team did not gather data on the pass through filing process. Given that this process appears to have inefficiencies, this would be a good area for further study to validate if wastes similar to those within the 1040 process exist. Accordingly, this type of study can be applied to each separate revenue stream within a firm to identify inefficiencies and opportunities to improve processes.

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BRINGING THE REAL WORLD OF HEALTH CARE MANAGEMENT INTO THE CLASSROOM

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ABSTRACT

The benefits of inviting guest speakers into the classroom have been well documented in academic literature on innovative classroom learning. Yet some instructors who have employed this technique have experienced mixed results. A good guest speaker seems to make the class time fly-by while engaging students in real world management scenarios, while others fall short of providing a worthwhile experience for the students. This workshop will reveal some of the potential pitfalls of inviting speakers into the classroom, as well as some steps to ensure a worthwhile experience for the students, as well as for the guest. While the focus will be on undergraduate health care management classes, the material may be transferrable to other disciplines.

INTRODUCTION

The benefits of inviting guest speakers into the classroom have been well documented in the academic literature on innovative classroom learning. However, some instructors have experienced mixed results; while many others have failed to embrace such instructional strategies altogether. As a health care management faculty member who uses guest speakers frequently, I have found that although the students always seem to rate the experience positively, some guest speakers have been better than others. Recently, a vice president for a prominent rehab facility visited my class, and he held the students' interest for fifty minutes by engaging them in a real world provider/payer scenario. Unfortunately, others have not done as well. In this article, we will explore some of the pitfalls, as well as the best practices for bringing speakers into the classroom.

PITFALLS TO USING A GUEST SPEAKER

In contrast to the positive experience described above, I once had a CEO of a large non-profit health care corporation that I felt particularly grateful to for having agreed to visit my class. Not only was his presentation very much off topic, but he apparently did not know when to stop talking despite my attempts to politely bring the session to a close. Only through experience and a bit of research have I learned that it is possible to prevent a disastrous guest presentation.

Perhaps the most dreaded pitfalls in inviting guests to the classroom are those that occur quite unpredictably. Sometimes, due to circumstances beyond his control, a guest speaker is a no show, or may have to cancel at the last minute. Other times, the guest may arrive on time, but the audio visual equipment malfunctions. It is important to be prepared for such emergencies by having a "Plan B". In the event of a no-show, be sure to have an alternate lesson plan prepared. To head off technical problems, always have audio visual equipment set up and tested in advance. Unfortunately, even with the best preparation, Murphy's Law can strike. In anticipation of untimely equipment failure, one might offer to make print copies of the speaker's presentation slides to have available as handouts.

Having a guest come into the classroom in order to share her experiences with students requires a certain amount of planning as both the students and the guest speaker need to be adequately prepared. This responsibility rests squarely on the shoulders of the course facilitator.

STUDENT PREPARATION

When a guest speaker is invited to give a presentation, it is important to ensure that there will be good attendance in class for that day. To this end, announce the date of the speaker's appearance one week in advance, as well as over the days leading up to the presentation. In addition, it is a good idea to post a reminder the day before the guest's visit. For this, the announcement feature on Blackboard Learn comes in handy; it can automatically generate an email to the students as well.

To ensure student attentiveness during the guest presentation, I sometimes assign a reflection paper on the speaker's presentation due one week following the guest's appearance. The reflection paper involves a brief summary of the speaker's qualifications, the major points covered during the presentation, a critique of the information provided, as well as a summary of how the presentation might serve the student in his or her future career.

Since it is not unusual for students to remain mute when a guest speaker asks for questions, prepare a list of sample questions and hand them out to the students in advance. As another way to prevent uncomfortable silence, I usually take notes while the speaker is presenting and create a list of my own questions in order to ensure that the important issues are brought forth. This can also serve to fill the allotted time should the presentation fall short. Finally, students should be debriefed during the class session following the guest's presentation including a discussion on what they have learned.

PREPARING THE GUEST SPEAKER

An experienced guest speaker may ask for specific information about the expectations for his presentation. Nevertheless, the instructor should provide a copy of the course syllabus and prepare the speaker by explaining how the presentation is expected to augment the lesson. In addition, the class start and end times, as well as a clear understanding of the amount of time the guest will be allotted should be clearly established (Henderson, 2013). Typically, a couple of minutes will be required to introduce the guest with a summary of his credentials. And, ten minutes should be reserved at the end of the class session for question and answer (Q&A). Of course, if the guest speaker engages the students during the presentation, the Q&A may be unnecessary.

If the guest is expected to share certain information, it should be made clear to her. For example, in my healthcare strategy management course, the guest speaker's agency is used as a real-life case study. Students are assigned a local non-for-profit health care organization and are required to perform a SWOT analysis, identify competitors, and provide strategic recommendations for the agency to consider. For this assignment, the agency CEO or a representative is invited to the classroom to talk about her organization. These guests are asked to consider bringing in brochures or other relevant information, and to be prepared to discuss the governance, service programs, competitors, sources of revenue, as well as to identify the major challenges facing the organization. Always inform the guest speaker whether audio/visual equipment will be available, including whether there is internet access should he wish to use presentation software, or demonstrate her organization's website. It is a good idea to remind the speaker to have the presentation available in two formats, such as on a USB flash drive and cloud storage.

Metrejean and Zarzeski (2001) offer a few additional hints for adequately preparing the guest speaker for a successful presentation experience as follows:

- ask the speaker for a brief biographical summary;
- distribute an agenda to the students and email it to the speaker in advance;
- provide clear directions to the campus, the building and the classroom; and
- make a reminder call, or send an email the day before the scheduled presentation.

I find that the key to ensuring an interesting presentation is to encourage the speaker to use real-life stories. For example, I have a colleague who speaks to my managed care class each semester. As an attorney with years of experience in health care provider/payer contracts, he reviews a sample contract item by item. By sharing many interesting and sometimes amusing anecdotes from personal experience, his presentation is always riveting. The result is that not only do the students feel less intimidated by the task of struggling through a legal document, but their comprehension of the material is enhanced. If a speaker appears to be losing the students' interest, I might interject by asking the guest to provide an example of how his organization has helped someone, or to describe the challenges faced by the agency.

FINDING AND INVITING GUEST SPEAKERS

As a retired health care executive, when I became a full-time faculty member, I felt a bit detached from the real-world contemporary issues previously encountered on a daily basis. With trade journal articles, the information was sometimes outdated and I found it much more satisfying to continue to keep in touch with colleagues who provided a wealth of experience and knowledge. As time has gone by, more and more of them have retired as well. Therefore, I have found it necessary to rely on other networking options in order to recruit new presenters. For instance, my university sponsors an annual health care symposium, which provides an excellent opportunity to cultivate relationships with local health care executives. Obviously, the same can be achieved by attending conferences and maintaining memberships in professional associations. Another good resource for identifying potential guest speakers is through the university experiential learning center where students are matched with internships.

An often untapped pool of guest speakers includes alumni. These individuals are already familiar with your institution and are likely willing to give something back. My most engaging guest speakers have been former students. Not only are they living proof that life after college does exist, but they are able to relate to the students on a very personal level. For instance, a team of two former students once visited my class and began offering advice to the students on how to prepare for job interviews.

One caution is to avoid overusing a guest speaker. I normally keep rotating from a list of speakers that I have compiled over the years. Also, since I may use several guest speakers during a semester, in lieu of an honorarium, I always invite my guest to lunch.

Sometimes when distance or schedule conflicts interfere with a guest speaker's ability to visit in person, a live video chat seems to substitute quite well. In fact, students seem more comfortable communicating via electronic media than in traditional face-to-face interaction. I once had a health care provider speak to my class from the comfort of his office in a live video conference. Rather than obstructing the interaction as one might expect, students seemed far less intimidated and willing to ask questions. If both distance and schedule conflicts impede a potential guest visit, the speaker's presentation can be prerecorded. However, this should be considered a last resort since student interaction must be sacrificed. Laist (2015) also suggests requesting the guest's permission to videotape his live presentation in order to make it available to the class for later reference in continuing the discussion beyond the day of the visit.

Immediately following my guest's meeting with the class, I send an email expressing my appreciation. To this, I would add that it is a good idea to follow up with a formal letter of thanks with a copy to the guest speaker's dean, CEO, or board president (Miller, 2014).

BENEFITS OF BRINGING GUEST SPEAKERS INTO THE CLASSROOM

Given the required preparation and opportunities for a less than desirable outcome, some instructors have written off using guest speakers altogether. However, the benefits are many and can be found on various levels, making it rewarding and well worth the effort.

Primarily, the students normally find the experience enlightening and enjoyable. It seems like any departure from the old-school lecture and ubiquitous death by power point registers a big thumbs up from today's generation students. Demonstrating how course material translates to real-world application is a valuable tool to enhance learning. It is widely accepted that case studies serve to relate the course lessons to practical applications, but guest speakers introduce a perspective that students would not normally find in textbooks. As an added benefit, hearing about the good, the bad, and the ugly of health care from first-hand experience has prompted some of my students to add a minor or specialization to their major in health care management.

For the guest speaker, interacting with a classroom of university students provides a unique opportunity to appreciate the perspectives of an upcoming generation of professionals. Some have developed mentoring relationships with students, created internships, and recruited top talent for their organizations through the guest lecture process.

And finally, for the instructor, using guest speakers adds a degree of legitimacy to the course content while creating and strengthening good community relationships. On occasion, I have represented our Business Department at open house events on campus. On more than one occasion, I have had a parent ask what opportunities her son or daughter will have with a degree in health care management. It is very satisfying to be able to provide an example of our program's networking capabilities and placement successes.

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A READABILITY ANALYSIS OF UNDERGRADUATE TEXTBOOKS IN OPERATIONS MANAGEMENT

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ABSTRACT

Selection of a textbook for use in introductory operations management courses can be challenging. Many criteria may be considered in such decisions, including a textbook's readability. Applying a widely-used readability index, this study analyzes the predicted readability of five popular operations management textbooks. ANOVA testing is performed to determine whether significant differences exist between the texts. The study finds no compelling evidence, regarding readability, to select any one textbook over any other within the study. The findings can be useful to adopters and editors of introductory operations management textbooks.

INTRODUCTION

The selection of a textbook for use in operations management courses is an important decision for faculty. Since introductory operations management is required in the typical business curriculum, all students in the major are affected by their decision. But the text selection process is complicated by the large number of text attributes for faculty to consider. Such attributes may include: a text's pedagogical approach; coverage of material; exhibits, charts, and vignettes; end-of-chapter material; student and instructor supplements; and authors' reputations, as well as instructors' past experiences with the text. Faculty may also wish to consider a text's *readability*.

Readability may be defined as the degree to which a class of people finds certain reading matter compelling and comprehensible (McLaughlin, 1969). Readability should not be confused with legibility, which refers to the ease of being read. Readability, in this context, refers to the qualities of writing which are related to reader comprehension. A variety of techniques have been used to predict readability, including several readability indexes (or formulas) which have been used widely since the 1950s. Examples of readability indexes include SMOG (developed by McLaughlin), Flesch Reading Ease, Flesch-Kincaid Grade Level, Gunning-Fog, and Fry.

Information on readability can be helpful to faculty when making textbook adoption decisions. One of the criteria to which faculty attach the most significance in those decisions is textbook comprehensibility (Smith and DeRidder, 1997), which can be predicted, at least in part, using a readability index. Evidence also suggests that the higher the readability (difficulty) level of textbooks in core business courses, the lower the students' grade averages in those courses (Spinks and Wells, 1993).

LITERATURE REVIEW

A careful survey of literature identifies only one work related to the study of the readability of introductory operations management textbooks. In Render et al (1976), the authors apply the Flesch Reading Ease Index to nine operations management and fifteen operations research textbooks. They showed that although the majority of the books were in the expected range of readability for college undergraduates, most tended toward the lower end of the readability scale—in the “more difficult” to read range (30-35).

Some of the studies of textbook readability for other disciplines include: Raabe, Stevens, and Stevens (1984) in taxation, Razek, and Cone (1981) in business communication, Shuptrine and Licktenstein (1985) in marketing, Villere and Stearns (1976) in organizational behavior, Plucinski, Olsavsky, and Hall (2009), Plucinski (2010), and Plucinski (2011) in accounting, Tinkler and Woods (2013), McConnell (1982), and Plucinski and Seyedian (2014) in economics, and Plucinski and Seyedian (2013) in Finance.

METHODS

Undergraduate students usually take the introductory course(s) in operations management during their junior year. Familiarity with the fundamentals of operations management is critical to a full grasp of the upper level courses in

business curricula. A more readable textbook will certainly help students understand the principles of operations management and subsequent subject matter.

The previous study of the readability of introductory operations management textbooks use the Flesch Reading Ease methodology, which is a function of the number of words per sentence and the number of syllables per word. Our study uses Flesch-Kincaid index, which is based upon and related to the original Flesch index. Since it can be easily generated using word processing software, a large amount of text can thereby be readily analyzed with results that are objective and easily replicated.

Flesch-Kincaid Grade Level

The Flesch-Kincaid Grade Level has its roots in the Flesch Reading Ease formula developed in 1948 by Rudolf Flesch. In 1975, J. Peter Kincaid tested over 500 enlisted United States (U. S.) Navy personnel on a reading-comprehension test and also on passages from Navy training manuals. This enabled him to derive a version of the Flesch Reading Ease formula which yielded reading grade-level scores. The resulting Flesch-Kincaid Grade Level has since been adopted by the U. S. military services as the basis for deciding whether technical manuals from suppliers meet their readability requirements (Pearson, 2002). The Flesch-Kincaid index is now one of the leading readability indexes. It is used extensively by the U. S. government and others, and it is included as a grammar-checking feature in the word processing software, Microsoft Word (MS-Word).

The Flesch-Kincaid Grade Level formula is based upon sentence length and word length. It rates text on a U. S. school grade level. For example, a score of 11.0 means that an eleventh grader can understand the document. The formula is:

$$(0.39 \times \text{ASL}) + (11.8 \times \text{ASW}) - 15.59$$

where: ASL = average sentence length (number of words divided by number of sentences)
ASW = average number of syllables per word (number of syllables divided by number of words)
(Pearson, 2002)

This study uses MS-Word to calculate the Flesch-Kincaid Grade Level of select passages. The formula used by MS-Word is confirmed by agreeing the formula above to that specified in the MS-Word help file. The MS-Word calculation is then validated by manually applying the formula above to a 200-word passage and agreeing the result to that provided by the grammar-checking function in MS-Word.

Selection and Adaptation of Text Passages

An examination of the offerings of the five largest publishers of operations management textbooks in the United States yields about twenty introductory operations management texts currently being published in English. That number does not include the many variations of the main texts by the same author(s). To make this study manageable, a subset is chosen for consideration. However, fairly selecting among the many alternatives is difficult. To make the results useful to the greatest number of instructors while limiting the number of texts, this study examines the most popular (best-selling) introductory operations management textbooks.

To determine the most popular textbooks, an examination of the website, *Amazon.com*, took place, where myriad titles were presented. However, many of the listed books were from the popular press. These popular press books were not included for consideration. Out of the remaining books, those from major publishers were identified, and this list was further refined using the best-seller ranking feature provided by *Amazon.com*, resulting in five textbooks for the study. The five textbooks are listed in Table 1, along with each textbook's particulars.

A review of the list of each text's ancillary materials reveals comparable offerings among the texts. For students, the textbooks have tools similar to study guides; these tools may be found as part of the text itself or as online study aids. For instructors, each text has an instructor/solutions manual, a test bank, PowerPoint presentations, and other support materials. All of the publishers distinguish their product in some way, usually with additional online material. However, it is expected that an instructor will subjectively evaluate the usefulness of any distinctive ancillaries. Therefore, an examination of ancillaries is beyond the scope of this study. This study is limited to the main textbook.

Table 1: Operations Management Textbooks Tested

Authors	Heizner et al	Jacob & Chase	Schroeder & Goldstein	Stevenson	Krajewski et al
Title	Operations Management: Sustainability and Supply Chain Management	Operations and Supply Chain Management	Operations Management in the Supply Chain: Decisions and Cases	Operations Management	Operations Management: Processes and Supply Chains
Edition	12th	14th	7th	13th	11th
Year	2017	2014	2016	2018	2016
Publisher	Pearson	McGraw-Hill Irwin	McGraw-Hill Education	McGraw-Hill Education	Pearson
ISBN-978	0134130422	0078024023	0077835439	1259667473	0133872132
Chapter Numbers tested:					
Project Management	3	4	13	17	7
Forecasting	4	18	10	3	8
Scheduling	15	22	12	16	10
Inventory	12	20	14	13	9
Quality Control*	6	13	9	10	3
Capacity Planning**	7	5	11	5	4

*In some cases, the subject of Statistical Process Control was found as part of a different chapter; however, that content was evaluated as part of Quality Control.

**In some cases, the subject of Waiting Line Theory was found as part of a different chapter; however, that content was evaluated as part of Capacity Planning.

Six chapters are selected for analysis from throughout the texts. The chapters (topics) targeted are those covering *Project Management, Forecasting, Scheduling, Inventory, Quality Control, and Capacity Planning*. The selection of material for analysis is driven by the topics rather than by the chapter. Each of the six topics generally appears in a chapter of its own. When topical content is identified in other chapters where the content is added to the analysis, as is the case of Quality Control and Capacity Planning in Table 1. The selection of these topics provides passages for analysis from throughout the texts, covering those topics that appear to present the most challenging aspects of operations management, based on exam scores of operations management students of one of the authors of this study.

An electronic copy of each text book is obtained. The chapters and content areas under study are imported into MS-Word for analysis. Only the sentences in the body of the chapters are subjected to analysis. Appendices are excluded. Since the Flesch-Kincaid formula analyzes only sentences, all material in figures, exhibits, and headings are omitted from analysis. Since material in graphics and vignettes cannot be readily converted to plain text by word-processing software, it is also omitted. End-of-chapter material (e. g., vocabulary, review, problems) is omitted as well, since it is largely quantitative/ tabular in appearance and does not match the textual nature of the Flesch-Kincaid index.

When a colon appears at the end of a sentence, it is replaced with a period when the sentence is originally followed by a calculation, list, or figure. This action is necessary because, in the Flesch-Kincaid calculation, MS-Word does not recognize a colon as the end of a sentence. Since calculations, lists, and figures are removed from the text, a sentence with a colon preceding a figure, for example, would have been combined with the one following the figure,

thereby inflating the length of the sentence. In that case, replacing the colon with a period ends the sentence before the figure. Colons appearing in sentences that eventually ended in a period are unchanged.

After converting, importing and pruning all files, the spelling and grammar function in MS-Word is applied to all files to correct occasional errors that arise. The Flesch-Kincaid Grade Level is then provided by MS-Word. The Analysis of Variance (ANOVA) is applied to the data using the statistical software package Minitab. The analysis seeks to determine if statistical differences exist among the textbooks themselves, with regard to the Flesch-Kincaid Grade Level.

RESULTS

Comparison of Textbooks by Chapter

Table 2 shows the Flesch-Kincaid Grade Levels for the six target chapters of each textbook. The mean of the six grade levels for each text (MGL) is also shown. Since the grade level indicates the U. S. school grade level required to understand a text passage, the lower the grade level the more readable the chapter.

Table 2: Computed Flesch-Kincaid Grade Levels of Textbook Chapters

	Heizner et al	Jacob & Chase	Schroeder & Goldstein	Stevenson	Krajewski et al
Project Management	9.1	6.6	6.2	8.1	8.1
Forecasting	7.7	8	6.9	8.1	8.8
Scheduling	7	6.9	6.6	6.7	7
Inventory	7.4	7.3	8.3	7.4	7.3
Quality Control	7.6	7.8	7.6	8.1	8.2
Capacity	8.7	8.5	9.2	7.4	9
MGL	7.9	7.5	7.5	7.6	8.1

An examination of Table 2 shows no clear trending in the *overall* readability levels of the texts with the lowest grade level for each chapter highlighted. For example, the Schroeder & Goldstein text is the most readable (has the lowest grade level) for three of the six content areas. It demonstrates a similar score to the Heizner et al text with regard to Quality Control, both of which have the lowest grade level for that content. However, the Schroeder & Goldstein text has the highest grade level for Capacity content.

The Schroeder & Goldstein text appears similar to the Jacob & Chase text grade levels in three of the content areas. However, in the remaining three content areas, the grade levels appear to be higher in one text than in the other. And, they have equal Mean Grade Levels (7.5), representing the lowest among the texts considered.

The Stevenson text and the Krajewski, et. al., text appear very similar with regard to individual chapters; however, the Krajewski et al text demonstrates a grade level of 9 regarding Capacity content, while the Stevenson text demonstrates a grade level of 7.6 for that content.

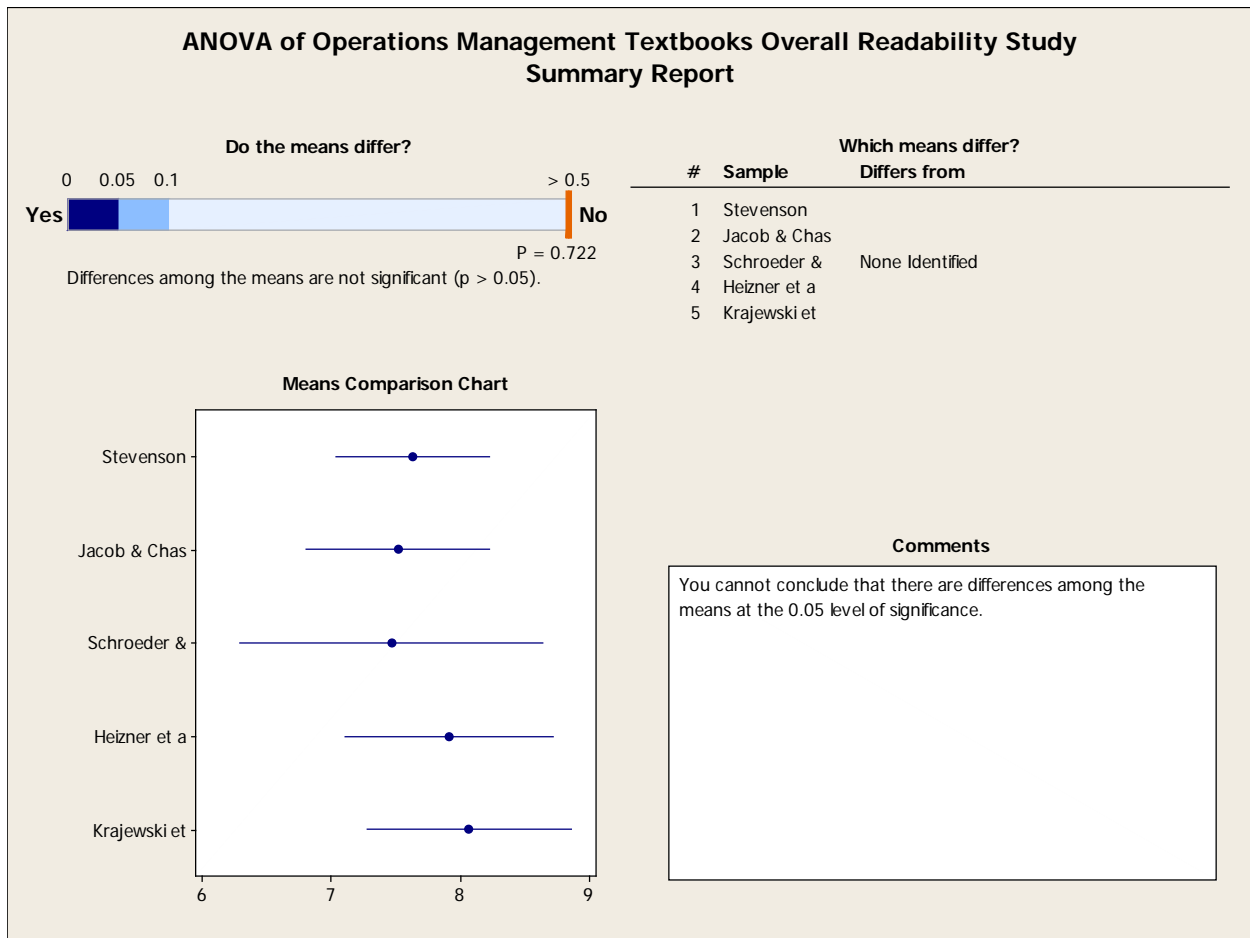
Thus, some differences do exist among individual chapters, when considering individual grade levels. However, many of the grade levels for each chapter are very close to each other.

Overall Comparison of Textbooks

While some texts are more readable than others for select chapters, no one text is more readable (nor less readable) than the other texts for all six content areas. Statistical testing is required to determine if significant differences exist between the texts overall (i.e: mean grade levels).

Although the text of each content area is analyzed, those results really represent sample passages relative to the entire text. Therefore, ANOVA is performed on the sample means to identify the p-value of the differences among the means for the grade levels of each textbook. Table 3 provides the results of the ANOVA, as generated from Minitab.

Table 3: Test of Differences among the Mean Grade Levels of the Textbooks



The ANOVA provides a p-value of 0.722, at the .05 significance level, indicating no conclusion can be drawn that differences exist among the means with regard to grade level. It should be noted that the sample size is small, and such a small sample size may influence the validity of the results. No differences could further be identified when the significance level was 0.1. Therefore, in terms of readability, there appears to be no compelling evidence to prefer one textbook over another.

CONCLUSIONS AND LIMITATIONS

If an instructor places substantial emphasis on readability in selecting an introductory operations management textbook, he/she should rest assured that any of the five most popular ones is as good as any other one. Therefore, the instructor is best advised to consider other features of a textbook. There is more to comprehensibility of a subject than the readability of text matter. The diagrams, charts, demonstrations, calculations, figures, and problem/questionsets included in textbooks are intended to aid in the student's comprehension of the subject matter. Additionally, the textbook ancillaries, such as, study guides, test banks, and online aids are important considerations.

One limitation in this study concerns readability formulas in general. They assume that the lower the readability level the better; but an unrealistically low readability level may lead to lower transferability of the content. In addition, readability formulas *predict* readability; they do not *measure* it. While there have been many critics that questioned the validity and value of readability formulas, there is ample research to suggest that formulas, despite their faults, can predict whether one piece of text will be easier to read than another (Pearson, 2002).

A second limitation involves the amount of data used for the analysis. Because the sample sizes were limited, normality could be an issue. Future studies might consider including at least 15 chapters as part of the comparison to confront this limitation.

Thirdly, the results of this study should not be the sole basis for judging the appropriateness of a particular introductory operations management textbook. Only the main body of each target chapter was analyzed in this study. The calculations, vignettes, charts, exhibits, graphics, figures, and end-of-chapter material are excluded from analysis. Ancillaries such as instructor and student supplements are also not considered. It is likely that an instructor will subjectively evaluate the effectiveness of this material separately from the main body of the textbook.

Finally, as Smith and DeRidder (1997) indicated, when making a textbook selection, faculty attach the most significance to comprehensibility to students, timeliness of text material, compatibility between text material and homework problems, and exposition quality of text, respectively. The first of those criteria, comprehensibility, is addressed (at least in part) by this study. Future studies might address comparisons of texts based upon the remaining criteria.

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UNDERSTANDING THE EFFECTS OF TRAINING AND MENTORSHIP ON ENTREPRENEURIAL SUCCESS IN KENYA

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ABSTRACT

This community study aims to examine factors influencing the gaps between success (40%) and failure (60%) rates of business incubators in Kenya, Africa. Innovative youth are often excluded from becoming successful entrepreneurs. Mentors will be trained to transfer skills and implement evidence-based practices in blossoming businesses. An initial group of 100 participants will be recruited to participate in the needs assessment of the community, with the aim to identify what they lack to attain desired business goals. It is expected that after this study, a customized curriculum will be developed, tailored to the community needs. A collaborative field assessment will be conducted to determine what resources are available, such as, training opportunities in finance administration, mentorship in business planning, farms for agribusiness training, technology availability, production capacity for goods and services and networking of small business enterprises (SMEs). Finally an examination will be made on data collection strategies and ongoing research for success, marketability of the goods and services, and internships for university students to merge theory with practice within their community setting.

INTRODUCTION

In projections for the future of wealth, entrepreneurship is predicted to be among the top ventures that will survive the replacement of human capital by robots (Kaku, 2012). The labor market will be influenced by how well people will position themselves to the demands of time and changing technology, where different contexts will be impacted differently. The sociological theory of entrepreneurship, advanced by John Kunkal in 1965, considers society's values, religious beliefs, customs, taboos and how they influence the behavior of individuals in a society (Powelson, 2015). Individuals are assessed in relation to their past and present social structures and physical conditions to identify what opportunities they can exploit to improve livelihoods. The entrepreneur is the role performer according to the expectations of society. The entrepreneur is likely to get a boost in social ranking. Therefore, the entrepreneurs that strive to build businesses as more industries are replaced with artificial intelligence, need support and access to resources to ensure success through education as one source of intellectual capital (Kaku, 2012).

Early incubator participants acknowledged the financial benefits of shared office space. Next-generation incubators have affordable, shared office space with the additional benefits of mentorship, training, and shared supporting services such as lawyers, accountants, consultants, market specialists, venture capitalists, angel investors, volunteers, and technical support (Meyer & Kot, 2016). Next-generation incubator models benefit Kenya businesses by providing cost-effective resources for new business owners.

Developing countries like Kenya have low incubator success rates, because "innovative youth with entrepreneurial groups are often not aware incubators exist" and "business owners are hesitant to mentor for fear of competition and losing their intellectual property" (Ogutu & Kihonge, 2016). Incubators that do include training and mentorship offer one curriculum for all participants regardless of educational background and capabilities (Robb, Valerio & Parton, 2014). Incubators face problems ranging from "mentor role conflict, gatekeeper control, and affiliation dissonance", and customized training programs are important (Seidel et al., 2016). Anticipating potential conflicts can increase success rates. How do mentorship and training affect the success rates of African incubators?

Case studies and research show that 60% of incubators fail in Africa (Ogutu & Kihonge, 2016). Successful entrepreneurs need to mentor innovative youth. Participants will take ownership right from the start, learn and develop their skills, gain personal success, and transfer those skills to the next generation through training and mentorship. A collaborative field assessment, a survey to current and new entrepreneurs and service providers, determines the available resources, such as farms for agribusiness training, technology use, industrial tailoring, and organized internships for college students to merge theory with practice. This model employs a grassroots approach to create the

incubator, conduct joint field assessments, train in finance administration, and mentorship in business planning. Longitudinal studies are encouraged in order to foster collaboration over competition.

The purpose of this community study is to examine the factors influencing the gap between the success rate of 40% and failure rate of 60% (Ogutu & Kihonge, 2016) of business incubators in Kenya and to test the sociological theory of entrepreneurship. The sociological theory was advanced by John Kunkal in 1965, which considers how “a society’s values, religious beliefs, customs, taboos, influence the behavior of individuals” (Powelson, 2015). The study will use sociological theory of entrepreneurship to test the influence of skills training and mentorship (IV) on success rate for business incubators (DV), controlling for moderating variables, age, gender, level of education, and type of business the community engages in. This study will add to the scholarly literature, paying attention to a previously identified problem of using “a single curriculum for all people regardless of their level of education, expectations and age” (Robb, Valerio & Parton, 2014). The study will also foster relationships with research institutions like Marywood University via its affiliation with the Little Sisters of St. Francis ministries among Kenyan citizens, and encourage the intersection of business and education. Best practices from multiple realms will be shared among current and new business owners to increase the likelihood of business success, reduction of poverty and create a culture of inclusion for young entrepreneurs. The intervention and positive results may improve opportunities for communities to garner additional governmental and community support for business incubators in Kenya.

One challenge noted by entrepreneurs is the availability of funding (Bentley, 2018; Ogutu & Kihonge, 2016). There are several options available to both the incubator and the entrepreneur to attain success once entrepreneurial skills have been realized (White, 2011). Agencies such as Non-Governmental Organizations (NGOs), Intergovernmental Organizations (IGOs) such as the United Nations, the church, the government, or the private sector (White, 2011). The Papal Foundation awards grants ranging from new hymnals to new schools. The Ewing Marion Kauffman Foundation’s mission is to assist individuals as they attain economic independence via education. The Kenyan government highlights at least seven grants directly related to entrepreneurship targeting youth, women, the disabled, and those interested in agricultural ventures (Malit, 2016). Funding may also come from bank loans or websites such as Kiva, which is similar to a GoFundMe page and includes video clips in which entrepreneurs share their mission and funding needs (Kiva, 2018). Investors can loan as little as \$25 which will be repaid by the entrepreneur.

Outside sources of funding are helpful, but it’s also important to create a sustainable funding source (Stefanovic et al., 2010; White, 2011) via the incubator itself using revenue from new business owners. There are four basic models for incubator revenue (White, 2011). The first is the rent model which charges rent and instills a commercial discipline in the client. The second is the equity model which gives the incubator a minority stake in the business (usually 2-6%) in return for free or low-rent periods. The third is the royalty model which is used when the client has a legitimate royalty payment for the product. The fourth is the deferred debt model where services are valued and charged as an incubator fee. Clients have up to ten years to repay, and the debt is frozen when the client leaves the incubator (White, 2011).

LITERATURE REVIEW

A meta-analysis of 445 business incubator studies was conducted to establish trends; the most prevalent studies were found in the United States, China, England, and the Netherlands (Albort-Morant & Ribeiro-Soriano, 2016). Mentorship in incubators have been explored in the United States, United Kingdom, and China. One study found that culture and country-specific needs must be considered, when mentorship strategies were implemented in China, they struggled to find sufficient volunteers because volunteering is not part of the Chinese culture (Ting et al., 2017). Mentorship is not widely understood and can be country-specific. The most important factors are the mentor’s intention: “active care, personal demonstration, responsibility” (Ting et al., 2017). Spiritual (awards of honorary certificates) and material (allowances or bonus rewards) were successful motivational tools used to improve participation and efficiency.

An analysis of Georgia Tech’s Advanced Technology Development Center (ATDC) strived to connect people and offer mentors, a networked community, resources, and funding to entrepreneurs (Bentley, 2018). They are particularly concerned with quality over quantity (or the right quantity of bigger companies versus more companies). As international best practices for Kenya are considered, the quantity versus quality ratio must be determined early.

Although women entrepreneurs play a significant role in the development of Sub-Saharan societies, incubators inadequately support their businesses. Current incubators offer training and access to resources but do not sufficiently assess the needs of the entrepreneurs. Future incubators must better assess the actual needs of entrepreneurs and provide those resources accordingly; in particular, “Customised training programs for skills development are the most important service for the start-up and business development” (Kapinga et al., 2018).

As Kapinga et al. (2018) note the importance of customized training programs, Seidel et al. (2016) also acknowledge that resources and autonomy are equally important, i.e., “Help Me Do It On My Own”. These incubators faced problems ranging from “mentor role conflict, gatekeeper control, and affiliation dissonance”. Anticipating potential conflicts can increase preparation, but entrepreneurs should not be constrained by the structures.

Incubators have existed in the Netherlands for decades compared to the new introduction of incubators in South Africa. Incubator managers in both regions agreed that the most important success factors are more training, networking, infrastructure, risk-taking, and financial services. For women entrepreneurs especially, the patriarchy, discrimination, and culture prohibit access to collateral and deter women from successfully starting businesses. The suggestions of this literature can be implemented with entrepreneurs in Kenya. However, no incubator is ever the same, and managers are encouraged to learn from one another’s successes and mistakes. Governments are encouraged to allocate funding to strengthen success (Meyer & Kot, 2016).

In Brazil, incubator entrepreneurs indicated that an informal mentoring model was related to a developing a successful career (Pontes Regis et al., 2007). Successful business owners serve as mentors to provide both career support and psychosocial support. Career support ranges from sponsorship, exposure and visibility, coaching, protection, and providing challenging tasks. Psychosocial support provides a role model, acceptance and confirmation, counseling, and friendship.

A non-profit organization called TechnoServe exists and operates in 29 countries, of which one is Kenya. Their mission states their intention to “[harness] the power of the private sector to help people lift themselves out of poverty. By linking people to information, capital and markets, we have helped millions to create lasting prosperity for their families and communities” (TechnoServe, 2018).

The research occurring in other countries, including elsewhere in Africa, can be used as a springboard to specifically consider Kenya, women entrepreneurs in Kenya, and entrepreneurs interested in fruit, vegetable, and dairy industries in Kenya.

METHODS

This is a longitudinal study which aims to bridge the gaps in success (40%) and failure (60%) rates identified in Kenya, Africa, and hopes to answer the research question: How do mentorship and training (IVs) affect the success rates of African incubators (DV)? This community study will be mixed methods.

Successful business owners will be identified to serve as mentors, trained to transfer skills and implement evidence-based practices, and matched with hopeful entrepreneurs. An initial group of 100 promising entrepreneurs will be recruited based on submitted proposals and business plans, specifying what they lack to attain their desired goals. This number of participants is a starting point to maintain an adequate number to sustain the mentor-entrepreneur partnerships in the future; it is natural that some mentors and entrepreneurs may cease participation for a variety of reasons, and this number strives to maintain a substantial core. A collaborative field assessment will be conducted to existing businesses and outside resources determine available resources, such as training in finance administration, mentorship in business planning, farms for agribusiness training, natural springs for clean water supply, technology availability, industrial tailoring, nutritional services for mothers and children, data collection and ongoing research for success, marketability of the goods and services, and internships for university students to merge theory with practice. The incubator will assist with obtaining funding, assisting with writing a successful business plan, providing skilled instructors and mentors to teach sound business practices, and include specific training in financial management, and accurate record keeping.

The common needs of entrepreneurs have been determined in previous studies, but the websites of existing services like TechnoServe note recent successes: “Kenya’s economy, the largest in East Africa, has witnessed a period of recent

stability, with increased credit access to the private sector, investment in infrastructure, and growth in key sectors such as tourism, renewable energy, and information and communication technology (ICT)” (TechnoServe, 2018). Despite this, they are still facing high unemployment, food insecurity, and poverty rates; more resources and awareness are needed.

As of 2016, the Business Incubators Association of Kenya identified 12 business incubators in Kenya, including incubators linked to universities or corporations, private incubators, and government owned or supported incubators (Ogutu & Kihonge, 2016). Ongoing needs assessments can be administered to verify the ongoing needs and the needs that may suddenly arise for continuous improvement of the program. The curriculum must continue to match the current needs of the participants and can influence the higher education curriculums to train future entrepreneurs.

Field assessments will be conducted following the work of Mahmood et al. (2015) who examined business incubators in Pakistan. They conducted a comprehensive survey to “analyze the current functional status of business incubators, along with the services provided by those incubators, with their success and shortcoming links with incubation systems in Pakistan” (Mahmood et al., 2015). This survey included a combined physical inspection of facilities and structured interviews with incubator managers and entrepreneurs involved with the incubators. Questions include topics such as numbers of incubators, government requirements of incubators, success of entrepreneurial activity and technological innovation, and policy issues.

After identifying the participating entrepreneurs and conducting the field assessments to establish available resources, participants will receive a customized curriculum tailored to their needs. This curriculum serves as the intervention, and the intervention interval is one year. The success rates of the participants’ businesses as well as their learning will be assessed before, during, and after the intervention via interviews and surveys and measured against other case studies.

The records of this study will be kept private. Information used in any written or presented report will not make it possible to identify participants. Only the investigator will have access to the research records. Records will be kept in a locked file. Records will be kept for a minimum of five years. Then they will be destroyed; all computer records will be deleted.

The risk in this study is no greater than the risks experienced in daily life or activities. The benefit in this study may be an increased understanding of training and mentorship related to entrepreneurship and greater awareness of resources available to business entrepreneurs. Any aforementioned funds that are secured to fund this initiative will be identified here for full disclosure.

RESULTS

The pilot study will forecast the success of entrepreneurs in Kenya, women entrepreneurs in Kenya, and entrepreneurs interested in fruit, vegetable, and dairy industries in Kenya.

The ultimate goal is to create global entrepreneurship with new training and mentorship strategies. The transfer of skills and best practices in the pursuit of excellence will provide competencies sensitive to the needs of Africa and the world. Research-based practice should be mindful of cultures but can be replicated in any part of the world.

ETHICAL CONSIDERATIONS

The mission of this study is to maintain respect for, and autonomy of, the communities and the participants. The community and the individual entrepreneur must receive the primary benefits of this study and service. Benefits include resources like mentorship, training, networking, and shared services. Distributive justice will ensure access to resources after the study concludes, and individuals with the greatest needs will receive the greatest resources. Participation is voluntary with informed consent forms outlining the benefits and burdens. Needs in one country or area do not necessarily translate to the needs of others in a different setting. The study will be reviewed by the IRB for approval to conduct research with human subjects. It is expected that the Exempt Review Committee will approve the study because it does not cause more than the minimum risks of everyday life experiences to participants.

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USING ANALYTICS TO PREDICT STUDENT CLASSROOM ACHIEVEMENT

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ABSTRACT

Increasingly, publishers create and professors use online learning resources to help students master their coursework. Cengage Publishing's online learning system, MindTap, provides such resources and additionally collects data on student engagement with the online material for each course. This research applies data mining techniques, frequently dubbed 'analytics' in nowadays usage, to that data with the goal of predicting student achievement on exams given in the course. After contrasting traditional statistical methods with modern analytics practices, it specifically employs linear regression, neural networks, and regression trees to analyze the data with the intent of predicting student exam scores. Following the recommended method of an analytics approach, the paper employs a multi-model strategy, a so-called ensemble, for prediction purposes.

INTRODUCTION

Increasingly, publishers create and professors use online learning resources to help students master their coursework. Cengage Publishing's entry into this market, MindTap, provides e-resources for professors to assign to their classes. It additionally provides summary data of student performance on and engagement with these online materials.

This research seeks to analyze the summary data of Mindtap so as to predict student performance on semester exams. Instead of traditional statistical techniques, it employs data mining, or analytics, techniques. It does so through a multi-model approach, typically called an ensemble.

After this introduction, the paper next explains the data available on Mindtap. It then contrasts traditional statistical methods with an analytics approach. Section IV presents empirical results while the last section summarizes results.

THE DATA

In the spring semester of 2018, I used N. Gregory Mankiw's *Principles of Macroeconomics* and *Principles of Microeconomics* for Economics I, Foundations of Macroeconomic, and EC102, Foundations of Microeconomics respectively. Cengage Learning published both texts. In addition to a traditional textbook, Cengage provided an e-book with a variety of online tools and assessments to help students master the material. Course assessment included several types of online assignments, which, while designed to help students master the material for exams, counted toward the final grade. Assignments related to each exam were due midnight before the exam was given in class. MindTap recorded summary statistics, dubbed analytics, of student performance; Figure 1 gives a screen shot of some of those statistics. See Figure 1, below:

Figure 1- Screen Shot of Partial MindTap Output

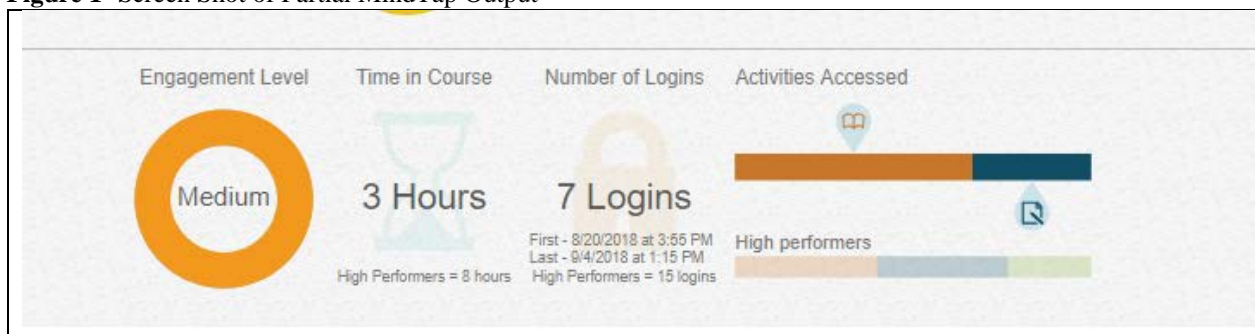


Table 1 provides more detailed explanation of the variables. Each section took 3 semester exams, resulting in 124 observations.

Table 1. Variables	
Variable	Explanation
Score	MindTap calculated percentage correct

% of activities	Percentage of activities completed
Engagement	MindTap classification; values include low, medium, and high. Dummies created, with low the excluded variable.
Time	Minutes spent on the MindTap platform
Logins	Number of logins
Minutes per login	Time/logins; average minutes per login
Section	= 1 if EC101; = 0 if EC102
Exam	Exam number 1, 2, or 3. Dummies created, with 3 is the excluded category
Text	=1 if student additionally purchased a hard-copy text; = 0 if not
Gender	=1 if female; = 0 if male
% grade	Grade on exam in percent
Letter grade	Letter grade for exam; A, B, etc. Dummies created, with F the excluded category

ANALYTICS VERSUS TRADITIONAL STATISTICS

Tradition statistics arose before the invention of the digital computer in an era of sparse data. It emphasized statistical inference. The population being studied was too large and too costly to be investigated in its entirety, so samples were taken. From these samples, researchers developed inferential techniques – t-tests, F-test, etc. – to draw conclusions on population parameters through hypothesis testing.

In contrast, modern techniques developed in an era of the digital computer and massive data. The name for these collection of techniques has changed over the years. Originally, they tended to be called data mining. For a while, knowledge discovery in databases (KDD) and business intelligence were fashionable. Currently, the labels seem to have settled on analytics and data science, with a distinction between what each addresses. While analytics typically deals with structured data, generally numeric values likely pulled from a database, to investigate fairly well-defined problems, data science more typically deals with unstructured data, including text, to investigate nebulous issues. The issue raised and the approach used in this paper would best be called analytics.

Within analytics, researchers generally, though not universally, apply the term ‘classification’ to label an investigation of a categorical outcome variable and ‘prediction’ to label an investigation of a continuous outcome variable. Both approaches emphasize prediction, leading to the common usage of the term ‘predictive analytics.’ Hence, predictive analytics includes classification and prediction, but both seek to predict an outcome variable. The data available for this paper allow for classification techniques, using letter grade as the outcome variable, and prediction techniques, using percentage grade as the outcome variable.

Just as in done in traditional statistics, predictive analytics uses samples, just in a different manner. A traditional statistical approach typically posits a model, drawn from theory and logic, takes one sample, and makes an inference to the population based on the sample. This approach quantifies an existing theory. In contrast, predictive analytics takes a sample and randomly partitions it into subsamples. One partition, dubbed the training set, creates the model. This model is then assessed with the holdout or validation set. Depending on the algorithm employed, a further partition, the test set, is sometimes needed. Analytics, thus, relies on large amounts of data and computing power for implementation.

Traditional statistics and predictive analytics, however, should not be thought of as mutually exclusive. The tradition statistical approach, while likely emphasizing theory, can and does use data to help build the model. Likewise, predictive analytics, while using the data to build the model, can and does rely on domain knowledge for modeling. Each approach borrows from the other; the distinction rests on the emphasis of the approach.

EMPIRICAL RESULTS

Given the available data, this paper could employ either prediction, predicting the continuous variable exam score, or classification, predicting the letter grade. The following sections present preliminary results for each method. Further, as suggested by West and Dellana (2007), each section employs a multi-agent (that is, multi model) strategies for

analysis. Such an ensemble approach can improve predictive accuracy and is generally used in predictive analytics. (Shmueli, et. al., 2018)

Classification

The research first applied the classification tree technique to the data. The method splits the sample by independent variables, one at a time, calculates information gain, and chooses the variables that provide the greatest information gain. The procedure is then applied to the remaining subsample. Independent variables that do not contribute significantly to the information gain for the model are eliminated, or pruned (Olson and Shi, 2007).

Attention next focused on neural networks. As the name implies, the neural network model tries to mimic, albeit in a simplified form, the way the human brain processes information. Indeed, neural nets epitomize data discovery; modeling is used minimally. Instead, the technique is typically applied to large amounts of complex data for which relationships are not well understood (Stanton and Myers, 2010).

The final approach used logistic regression. Logit is an example of a traditional technique modified to a data mining approach. In fact, a researcher using a traditional statistical approach would likely employ this technique. This is a standard approach taught in econometrics classes (see Studenmund, 2011).

Prediction

The three methods used to predict exam score instead of letter grade parallel three classification techniques used. Regression trees are analogous to classification trees, splitting the sample by independent variable and selecting those splits that results in the fewest misclassifications (Shmueli, et. al. 2016).

Neural networks can be applied to continuous outcome variables as well as categorical ones. Again, while, given sufficient data, this technique frequently predicts well, it does not lend much insight into the underlying relationships and hence is characterized as a ‘black box.’ (Shmueli, et. al., 2016).

Finally, with a continuous dependent variable, analysis can use multiple linear regression to explain the variation in the outcome variable attributable to a group of predictor variables. This again is a traditional statistical technique, probably the most widely used technique in business research. A data mining approach modifies this technique by the resampling process of building the model with the training data and assessing the model with the validation data.

Results

Given the limited amount of data, none of the techniques performed well as a predictor of exam grades. Predictive accuracy was generally in the 20 to 30% range. As such, these results should be viewed as a preliminary investigation into the issue raised; more accurate predictive results would need more data than were available here.

CONCLUSION

This paper attempted to provide some insight into the grade achievement of students in the economics classroom, undoubtedly an important and interesting question for professors. It employed an analytics approach, making use of techniques frequently now used in a host of business problems. These data mining techniques, however, are dependent on large amounts of data; indeed, they were typically conceived of in an environment of large data and powerful computing capabilities. Given the small sample size for this preliminary investigation, results were weak, as was expected.

Continued research along these lines does seem warranted. Before it can continue, however, more data must be collected. The author is currently collecting such data.

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A n-GRAM BASED FEATURE SELECTION TECHNIQUE FOR EMOTION CLASSIFICATION

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ABSTRACT

In this study, we have explored the potentiality of k-NN classifier for recognizing four basic emotions (anger, happy, sadness and surprise) using a heterogeneous emotion-annotated dataset which combines sentences from news headlines, fairy tales and blogs. For classification purpose, we have chosen the feature set to include the class-specific n-grams that were generated using a scoring function and an n-gram model. Our study reveals that the use of both the resampling filter and the class specific n-grams contributed towards boosting the prediction accuracies of the k-nearest neighbor (k-NN) classifier.

INTRODUCTION

Understanding the emotion state of a person has a variety of applications. Human beings have often expressed their emotions either by speech or through written texts. Recently, the advent of social media and microblogging sites has paved the path for individuals and communities to express their opinions, feelings, and thoughts on a variety of topics in the form of short and limited size text. Short or long, texts often hold a wealth of information on how an individual communicates their thoughts, emotions (happiness, anxiety, and depression) and feelings within their social network. Not only the emotions of individuals, but also the emotions of a larger groups (such as a certain country, state etc.) can be identified by analyzing the corpus of texts. More commonly expressed state of emotions and feelings include anger, disgust, fear, joy, love, sadness, surprise, tensed etc. For example, the text (tweet) “I felt quite happy and lighthearted; I put on the shoes and danced and jumped about in them” expresses a happy mood and the tweet “I left it but throughout the whole day I was really awful” expresses sadness. Sometimes more than one emotion can be expressed within a text. Since text’s lack structure and size, the determination of emotions of an individual or for larger group i.e. emotion classification, is a very challenging task.

Even though, sentiment analysis has made a significant breakthrough in the field of Data Mining and Machine Learning and there has been a lot of research in this area, it does not address the wide range of emotions associated with human behavior and at times, it is important to know the exact emotion behind a topic rather than a generic sentiment. Since more than one emotion can be expressed in a text (sentence), it becomes necessary to analyze each sentence in a document to determine an overall emotion associated with it. Also, with the popularity of the social media, short messages are replacing the traditional electronic document and article style of expressing the views of an individual. However, there are several challenges for emotion classification.

Unlike the conventional texts, short messages for example tweets, are peculiar in terms of their structure and size. Primarily, they are restricted to a length (140 characters) and secondly, due to this limitation the language used by people in tweets to express their emotions is very different when compared to the other digitized documents like blogs, articles and news (Ling & Baron, 2007). Another major challenge is posed by the availability of a very large number of features in the texts. Each text when presented as a vector of features exponentially increases the size of the available features as the corpus would contain millions of features for a given topic (Hasan, M., Rundensteiner, E., & Agu, E., 2014). Also, there is a major challenge associated with manually classifying the texts to different emotion classes. Researchers have previously tried to manually classify texts however manually annotating the texts may be ambiguous and does not guarantee 100% accuracy (Hasan, M., Rundensteiner, E., & Agu, E., 2014). Finally, the inherent nature of the different types of emotions makes it very difficult to differentiate between them. According to the Circumplex model (Russell, J.A., 1980), there are 28 affect words or emotions. In the two-dimensional circular space, the 28 different emotion types differ from each other by a small angle. Few emotions are clustered so close to each other that it becomes very hard to differentiate between them. When humans try to label texts, there is a high probability of mislabeling the emotions that differ by a small angle. This in-turn inhibits the classifier from learning the critical features that can enable it to identify emotions hidden in the texts.

Previous studies on emotion classification have focused on exploring the potentiality of different classification techniques using the *bag-of-words* (BOW) and/or the n-grams as features (Chaffar, S., Inkpen, D., 2011, Ghazi, D., Inkpen, D., Szpakowicz, S., 2010, Hasan, M., Rundensteiner, E., & Agu, E., 2014, Aman, S., Szpakowicz, S., 2007,

Badshah, A.M., Ahmad, J., Lee, M.Y. & Baik, S.W., 2016). All these studies aim at accurately classifying the instances to different emotion classes but have failed to explain which textual features indeed contributed to the accuracy. We hypothesize that class specific n-grams have the potentiality in discriminating between different emotion classes during classification. In this study we present a scoring function that can help in identifying discriminative n-grams that are highly specific to any given emotional class.

The rest of the paper is organized as follows: Section 2 details the materials and methods employed in this study. In Section 3, we present the results from this study and discuss the findings. In Section 4, we report the survey of the literature. Finally, Section 5 concludes the paper and outlines the future direction of our research.

MATERIALS AND METHODS

In this section, we provide the details of the dataset (training dataset), feature selection techniques (filters), scoring function for determining the class specific n-grams and the classifier employed in this study. Here we also provide the details of all the experiments performed in this study.

Training Dataset

A dataset consisting of 1,229 emotion-rich sentences was collected from blogs by Aman et al., (Aman, S., Szpakowicz, S., 2007, Chaffar, S., Inkpen, D., 2011) also well known as Aman’s dataset. We obtained this dataset by contacting the authors. All the sentences in this dataset were annotated with one of the six different emotion classes namely Happy, Anger, Disgust, Surprise, Sadness, and Fear. All the sentences in this dataset were assigned an emotion label by four different annotators. By employing few basic cleaning steps implemented in PERL, the dataset was re-structured in a way that it can be used for training the classifiers. The table 1 lists the class-wise distribution of the number of sentences in this dataset.

Table 1. Class-wise distribution of the number of sentences in Dataset (Aman dataset)

Class	Anger	Happy	Sadness	Surprise	Disgust	Fear
# of sentences	173	495	170	113	164	114

In this study, we have investigated a four-class emotion classification problem. The classes included in this study are Happy, Anger, Sadness and Surprise. Hereafter, we will refer to sentences in the dataset as instances and the dataset as a training dataset. Next, we provide a brief discussion about the data pre-processing, the feature selection filters, the n-gram model and the scoring function employed in this study.

Data Pre-processing

In the machine learning process, the first step is to train the supervised classifiers using the training datasets. Before training the classifiers, the training datasets must be pre-processed using two different filters as discussed below:

Resampling - Resampling is performed to create a stratified subsample of the given dataset (Bouckaert, R. R., Frank, E., Hall, M., Kirkby, R., Reutemann, P., Seewald, A., Scuse, D., 2013). On a heterogeneous population, the precision achieved can be increased and the risk of bias can be greatly reduced by dividing the population into sections (stratum) each of which is relatively homogenous. From each of these sections or stratum the sampling can be done independently which is otherwise known as stratified sampling (“Theory of Sampling”, (n.d.)). The training datasets used in this study are highly unbalanced and as a result the resampling, a supervised filtering technique, is employed to introduce a bias towards uniform class distribution within the samples.

String to Word vector conversion – An unsupervised attribute filter which converts each of the string attribute into word vectors, i.e. creating one attribute for each word which either encodes the presence or the word count, within the string (Bouckaert, R. R., et al., 2013). Using this unsupervised attribute filter relevant feature sets in the form of Bag-Of-Words (BOW) are obtained. In the BOW representation, each sentence in the dataset is converted into a feature vector that comprises of Boolean attributes for each word that occurs in a sentence. If a word occurs in a given sentence, then its corresponding attribute is set to 1 (one), otherwise it is set to 0 (zero). In BOW representation format,

each word is considered as an independent entity and it does not take in to consideration any semantic information from the text. Generally, the BOW representation is well suited for text classification (*Chaffar, S., Inkpen, D., 2011*).

Later we will introduce the concept of n-gram model which is similar to the BOW representations.

In addition to the above-mentioned filters, we have explored the potentiality of six different feature selection filters namely:

Attribute selection (CfsSubsetEval) – A feature selection process by which the best subset of the attributes in the dataset is searched, identified and retained for training the classifiers. The key benefits of performing attribute selection are reducing overfitting, improving accuracy and reducing the training time. This process can be separated in to two parts namely Attribute Evaluator and Search method. In the attribute evaluator phase a subset of the attributes are assessed by building a model and evaluating the accuracy of the model. The subset that correlates highly with the class and low with each other is considered as a best subset. In the search phase, the search space of possible attribute subsets is navigated based on the subset evaluation. In order to navigate through the search space graph-based search algorithms are preferred. An example of the graph-based search algorithm is the Best First Search (Browniee, J., 2014).

Chi Squared Attribute Evaluation (ChiSquaredAttributeEval) - The chi-squared attribute evaluation employs the chi-squared test statistic to compare the worth of the features with respect to the target variable (class). For each data instance, the chi-squared value is determined based on the squared difference between the expected and the actual value divided by the expected value to produce the percentage error. A summation of the same for all the data instances gives the final chi-squared test statistic. The worth of the variable is determined using the null-hypothesis theory of statistical analysis. The greater the Chi-squared value, the more significant the feature is to the model. The features with greater Chi-squared value are used for building the model ([Jantawan, B., Tsai, C., 2014](#))

Info Gain Attribute Evaluation (InfoGainAttributeEval) - The Information Gain measure is primarily used to select the test attributes which are applied to every non-leaf node in a Decision Tree. Without the application of the Information Gain measure, the resultant accuracy of the Decision Tree would not be consistent, and the Tree size would increase with the increase in the number of features. It can be considered as a pruning measure. The Information Gain is generally calculated by comparing each feature against the target variable (class). This measure reduces the uncertainty about the feature for a target class. The uncertainty of a feature is calculated using its entropy. The Information Gain measure ranges from 0 and 1. The features with the highest Information Gain value are selected to minimize the level of uncertainty in the model. ([Naseriparsa, M., Bidgoli, A. M., Varae, T., 2013](#)).

Gain Ratio Attribute Evaluation (GainRatioAttributeEval) - In the Decision Tree modelling approach all the non-terminal nodes signify some test that is applied on the data instances and the terminal nodes signify the decision outcomes of those tests. Information gain is an added degree that helps in selecting the test attribute at each non-terminal node. By default, the Information gain measure favors only those features, which are present in large number of instances. The Gain ratio method negates this prejudice by taking the number and size of branches into account. The C4.5 algorithm, which is an ameliorated version of the ID3 algorithm, accomplishes to incorporate the Gain ration measure by taking the ratio of gain and normalized information gain ([Karegowda, A. G., Manjunath, A. S., Jayaram, M. A., 2010](#)).

Principal Components (PrincipalComponents) - PCA is a supervised algorithm used to identify the similarities and differences in the data. It is a useful tool to identify patterns when graphical representation of higher dimensional data is not possible. This process involves calculating the mean across each dimension of the data and then subtracting it from each data dimension. Following that, a covariance matrix is computed for the resultant dimensions. Based on this covariance matrix, the eigenvectors and the eigenvalues are determined. The eigenvalues are always absolute i.e., they are independent of the positivity/negativity polarity and the eigenvector values always range between -1 and 1. The features whose eigenvectors have the highest eigen values are retained as the principal components for model building ([Deegalla, S., Bostrom, H., 2007](#)).

SVM Attribute Evaluation (SVMAttributeEval) - Support Vector Machine is a supervised learning algorithm that is used for classification of data. It plots the training data in an infinite dimensional space. A hyperplane is then constructed in this space, which classifies the data into the respective categories. This hyperplane is said to be optimal

when it is at a farthest distance from the nearest data point to achieve minimum error probability. The features that have weights close to zero with respect to the optimum hyperplane are eliminated to maintain normal distribution of the data samples. Here we define normal distribution as the average number of instances for every feature in the resultant feature set. Hence, the features that remain after this selection/elimination step are the desired features that can be used for model building ([Weston, J., Mukherjee, S., Chapelle, O., Pontil, M., Poggio, T., Vapnik, V., 2001](#)).

The n-gram model

An n -gram is any subsequence (word) of a sentence. Given a dataset of sentences D , let d_i be the complete sentence where $d_i = (s_1 s_2 \dots s_k)$, where $s_i \in \Sigma^*$ where Σ^* represent a word of varying length formed from the set of twenty-six letters in the English alphabet. For example, a 1-gram is a single word, a 2-gram is two words with a space between them and so on. Also it is important to note that if a sentence is of length k , then the total number of n -grams is given by $(k - n + 1)$

Scoring function

The scoring function obtains a set of common and unique n -grams based on the n -gram model discussed above. The scoring function is parameterized with the length of the n -gram and the target dataset to begin with. The scoring function reads in the sentences (each belonging to an emotion class) from the dataset and generates all possible n -grams without any repeats. Once all the n -grams are generated, the scoring function compares all the n -grams from an emotional class against those from all the other emotional classes in the dataset. After successful comparison the scoring function determines a profile of all the common and unique n -grams for an emotional class in the dataset. All the unique n -grams are assigned a weight of unity, *i.e.* 1, indicating that this n -gram is only present in one emotion class and not in others, and the common n -grams are assigned weights using a dampening factor that accounts for how popular the n -gram is with respect to the other emotional classes in the dataset.

For any n -gram x , the dampening factor is given by the expression $\frac{\log_e |c|}{\log_e |c: x \in c|}$, where $|c|$ denotes the total number of emotional classes in the dataset and $|c: x \in c|$ denotes the total number of emotional classes in which the n -gram x is present. The damping factor adjusts the weights of the n -grams in such a way that popular n -grams receive a low weightage and vice-versa. If the n -gram is present only in a single emotional class then its weight is unity, *i.e.* 1, and if it is present in all the emotional classes then its weight is zero, *i.e.* 0. Once the weights of the n -grams are determined a discriminative ratio (DR) is calculated for each n -gram to identify the class that contains this n -gram at least ∂ ($\partial > 0$) times higher than the average of the second and third highest class. Here, ∂ represents a selection threshold at which DR is considered significant to be class-specific (Srinivasan et. al., 2013).

The focus of this study is to explore the potentiality of k -NN classifier for emotional classification. Secondly, we also want to determine the potentiality of our n -gram model and the scoring function in boosting the performance of the k -NN classifier.

To summarize, this study conducts various experiments following the steps mentioned below:

1. All the instances in the training dataset is initially cleaned. Based on the objective of the different experiments we either resample the training dataset or not.
2. The instances from the resulting training dataset are transformed into a feature vector using the unsupervised attribute filter namely the String to Word vector conversion.
3. The k -NN classifier is then trained on the training dataset after applying different feature selection techniques. The performance *i.e.* the prediction accuracy of the K -NN classifier is evaluated using the 10-fold cross validation technique. Accuracy *i.e.* the ratio of the sum of true positive and true negative to the total population can be used as a performance measure to compare the performance. Here, we refer to accuracy as the 10-fold cross validation accuracy.
4. A different set of experiments were performed by skipping the step 2. By applying the n -gram model and the scoring function we obtained the n -grams from the training dataset and used it to train the classifier. Again the 10-fold cross-validation accuracy was used to determine the performance of the k -NN classifier.

The survey of the literature reveals the fact that the supervised classifiers are the most commonly used classifiers for emotion classification. (Peng, B., Lee, L., Vaithyanathan, S., 2002, Pak, A., Paroubek, P., 2010, Barbosa, L., Feng, J., 2010, Go, A., Bhayani, R., Huang, L., 2009, Thelwall, M., Buckley, K., Platoglou, G., Kappas, A., 2010, Brynielsson, J., Johansson, F., Jonsson, C., Westling, A., 2014, Danisman, T., Alpkocak, A. 2008, Hasan, M., Rundensteiner, E., & Agu, E., 2014, Choudhury, M.D., Gamon, M., Counts, S., Horvitz, E., 2013, Purver, M., Battersby, S., 2012, Roberts, K., Roach, M. A., Johnson, J., Guthrie, J., Harabagiu, S. M., 2012, Chaffar, S., Inkpen, D., 2011, Aman, S., Szpakowicz, S., 2007, Ghazi, D., Inkpen, D., Szpakowicz, S., 2010, Badshah, A.M., Ahmad, J., Lee, M.Y., Baik, S.W., 2016, LLiou, T., Anagnostopoulos, C.N., 2009). In this study we have explored the k-NN classifier. The k-NN classifier learns by comparing a given test tuple against several training tuples which are similar to it. The training tuples are described by n numbers of attributes. Each tuple represents a point in an n -dimensional space. In this way, all the training tuples can be stored in an n -dimensional pattern space. When an unknown tuple is provided to a K-NN classifier, the classifier searches the pattern space to identify the k training tuples that are closest to the unknown tuple. These k training tuples are the k -nearest neighbors of the unknown tuple. The distance metric, "closeness" is computed as a Euclidean distance (Maleki, R. E., Rezaei, A., Bidgoli, B. M., 2009).

In the next section, we provide the results and discussions from this study.

RESULTS AND DISCUSSION

Several different experiments were devised using the Weka version 3.6.13 to evaluate the performance of the k-NN classifier. Table 2 summarizes the parameter settings for the Resample, String-to-word vector, and the six-different attribute (feature) Selection filters.

Table 2 Parameter settings for the Resample, String to Word vector, and Attribute Selection filters

Filter	Configurations	
Resample	Resample-B0.0-S1-Z100.0	
String to Word Vector	StringToWordVector-R1-W6000-prune-rate-1.0-C-T-I-N1-L-S-stemmerweka.core.stemmers.NullStemmer-M2-tokenizerweka.core.tokenizers.WordTokenizer -delimiters "\r\n\t,.;:\\""?!"	
Attribute Selection	CfsSubsetEval	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.CfsSubsetEval-Sweka.attributeSelection.BestFirst -D 1 -N 5
	ChiSquaredAttributeEval	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.ChiSquaredAttributeEval-Sweka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1
	GainRatioAttributeEval	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.GainRatioAttributeEval-Sweka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1
	InfoGainAttributeEval	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.InfoGainAttributeEval-Sweka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1
	PrincipalComponents	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.PrincipalComponents -R 0.95 -A 5-

		Sweka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1
	SVMAttributeEval	weka.filters.supervised.attribute.AttributeSelection-Eweka.attributeSelection.SVMAttributeEval -X 1 -Y 0 -Z 0 -P 1.0E-25 -T 1.0E-10 -C 1.0 -N 0-Sweka.attributeSelection.Ranker -T -1.7976931348623157E308 -N -1

We performed 12 different experiments on the training dataset to obtain the baseline performance of the k-NN(k=1, 3, 5, 7) classifier. A pair of 6 experiments were performed by varying the different feature selection techniques. The first 6 experiments did not include the application of the resampling filter to the training dataset. The other 6 experiments were performed on the resampled version of the training dataset. Table 3 records the 10-fold cross-validation accuracy for a four-class emotion classification problem using the k-NN classifier.

Table 3 10-fold cross validation accuracy of the k-NN (k=1, 3, 5, 7) classifier across six different frequency selection technique with and without resampling

<i>k</i> -NN	Feature selection technique	10-fold cross validation accuracy	
		With resampling	Without resampling
1	CfsSubsetEval	83.1	67.6
	ChiSquaredAttributeEval	84.96	64.4
	GainRatioAttributeEval	84.96	64.4
	InfoGainAttributeEval	84.96	64.4
	PrincipalComponents	85.7	63.8
	SVMAttributeEval	84.96	64.4
3	CfsSubsetEval	74.76	65.6
	ChiSquaredAttributeEval	60.36	56.4
	GainRatioAttributeEval	60.36	56.4
	InfoGainAttributeEval	60.36	56.4
	PrincipalComponents	61.93	56.1
	SVMAttributeEval	60.4	56.4
5	CfsSubsetEval	67.5	62.3
	ChiSquaredAttributeEval	55.7	53.3
	GainRatioAttributeEval	55.7	53.3
	InfoGainAttributeEval	55.7	53.3
	PrincipalComponents	56.5	53.2
	SVMAttributeEval	55.7	53.3
7	CfsSubsetEval	62.9	61
	ChiSquaredAttributeEval	54.9	52.1
	GainRatioAttributeEval	54.9	52.1
	InfoGainAttributeEval	54.9	52.1
	PrincipalComponents	55.1	52.3
	SVMAttributeEval	54.9	52.1

Next using the n-gram model described in the previous section we obtained all the $n=1, 2$ and 3 grams. Figure 1 shows that there is an exponential growth in the number of n-grams as we increase the value of n from 1 to 3. For $n=1$, we

obtained 3,273 n -grams and for $n = 3$ we obtained a total of 11,677 n -grams. In this study, we obtained only n -grams of size 1 ($n = 1$).

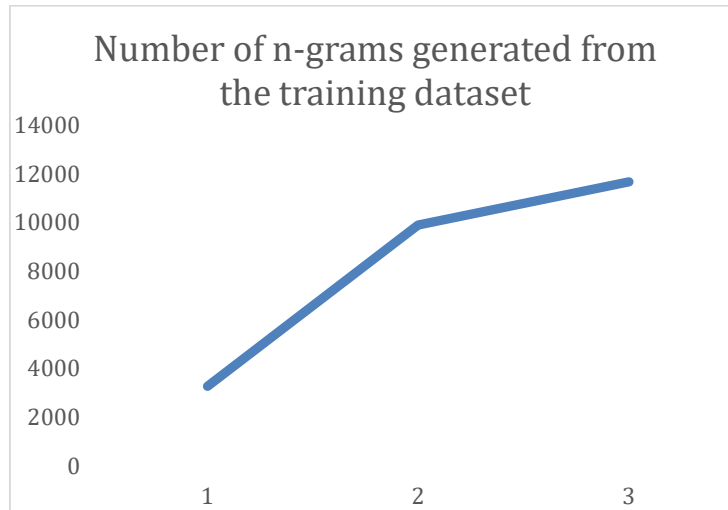


Figure 1. Number of n -grams generated from the training dataset varying the value of n from 1 to 3

Upon varying the threshold (τ) from 3 to 9 we obtained all the discriminative n -grams for any given threshold. From table 4 it is evident that the number of discriminative n -grams significantly dropped from 91 (for $\tau = 3$) to 15 (for $\tau = 9$).

Table 4 Number of discriminative n -grams generated by varying the threshold

Threshold (τ)	3	4	5	6	7	8	9
# of discriminative n -grams	91	58	42	30	23	20	15

The discriminative n -grams obtained by varying the threshold from $\tau = 3$ to 6 was provided as features to the k -NN classifiers, where $k = 1, 3, 5,$ and 7 . The 10-fold cross validation accuracy of the k -NN ($k = 1, 3, 5, 7$) classifier is provided in table 5. A total of 32 experiments were performed on the training dataset. From table 5, it is evident that at $\tau = 3$ the 1-NN classifier recorded the maximum 10-fold cross-validation accuracy of 69.23 on the training dataset. However, on the resampled training dataset the 1-NN classifier recorded the highest 10-fold cross validation of 85.4% at $\tau = 4$. This clearly demonstrates the potential of the resampling filter in boosting the performance of the k -NN classifier. Also, using fewer n -grams or features we were able to boost the performance of the k -NN classifier (see table 4 and table 5). From table 5, it is also evident that for the higher order of the k -NN classifiers ($k = 3, 5, 7$) the 10-fold cross validation accuracy drops consistently on both the original and the resampled version of the training dataset. From table 3 and Table 5 we can compare the performance of the classifier k -NN ($k = 1$). For both the “PrincipalComponents” as the feature selection filter and the discriminative n -grams obtained with $\tau = 4$ we see that k -NN ($k = 1$) classifier resulted in about the same performance i.e. 85%. This suggest that the n -gram model and the resampling filter combined together significantly provides a boosting to the k -NN classifier.

In the next section we present the literature survey.

Table 510-fold cross validation accuracy of the k-NN classifier using the discriminative n -grams as features

	Without resampling the training dataset				With resampling the training dataset			
	$\tau = 3$	$\tau = 4$	$\tau = 5$	$\tau = 6$	$\tau = 3$	$\tau = 4$	$\tau = 5$	$\tau = 6$
$K = 1$	69.23	68.21	67.4	66.2	79.6	85.4	81.6	80.28
$K = 3$	67.86	66.3	65.2	64.16	77.8	83.4	80.9	79.1
$K = 5$	66.56	65.81	63.78	62.23	75.42	81.72	79.8	77.24
$K = 7$	64.4	63.66	61.22	59.56	74.99	81.3	76.12	75.2

LITERATURE REVIEW

Sentiment analysis and Emotion classification has attracted much research during the last decade. This popularity can be attributed to the growing amount of opinion-rich text corpus being available due to the development of social media, giving researchers and company's access to the opinions of the people. Also, the recent advances within the fields of natural language processing and machine learning has attributed towards the popularity of sentiment analysis and emotion classification. Peng, et. al., has shown that an accuracy of 80% is achievable on a well-balanced dataset for the problem of classifying movie reviews as positive or negative (Peng, B., Lee, L., Vaithyanathan, S., 2002). Several other studies including the work by Pak, et. al., and Barbosa, et. al., has utilized the machine learning techniques on twitter datasets to distinguish between positive and negative classes with accuracies ranging between 60% and 80% (Pak, A., Paroubek, P., 2010, Barbosa, L., Feng, J., 2010). Using the Western-style emoticons Go, et. al., have labeled and classified twitter messages as positive and negative sentiment. Using different classification techniques including Naive Bayes, Maximum Entropy, and SVM they have reported an accuracy of 80% on their dataset collected from twitter (Go, A., Bhayani, R., Huang, L., 2009). Thelwall, et. al., have developed an application *SentiStrength* that utilizes machine-learning approaches to extract the strength of the sentiments hidden in short informal text. They have reported that their applications can classify the positive sentiment with an accuracy of 60% and the negative sentiment with an accuracy of 72% (Thelwall, M., Buckley, K., Platoglou, G., Kappas, A., 2010).

In contrast to the sentiment analysis studies, Brynielsson et al. have looked in to another class of problems well known as emotion classification. They have collected tweets related to the Sandy Hurricane and have tried to classify them based on four classes of emotions namely positive, fear, anger and other(s). Out of the two classifiers that they have employed in their study - SVM and the NB (Naïve Bayes), the SVM classifier yielded the best classification accuracy close to 60% (Brynielsson, J., Johansson, F., Jonsson, C., Westling, A., 2014). Danisman and Alpkocak have proposed a Vector Space Model (VSM) based approach titled Feeler using which they were able to automatically classify the ISEAR (International Survey on Emotion Antecedents and Reactions) dataset into 5 emotion classes namely anger, disgust, fear, joy and sad. They have reported an overall accuracy of 67.4% using NB and an accuracy of 66.9% using SVM. Their reported classification accuracies are based on the 10-fold cross validation technique on the stammered ISEAR dataset. Their observations also suggest that the VSM classifiers are as good as the NB and the SVM classifiers (Danisman, T., Alpkocak, A. 2008). Hasan, Rundensteiner and Agu have proposed *EMOTEX* that employs different supervised classifiers to detect emotions in text messages. Using the supervised classifiers namely the NB, SVM, Decision trees, and the KNN, they were able to demonstrate approximately 90% precision for a four-class model on the collected tweet dataset. In their studies, they have incorporated all types of features namely the unigram, unigram emoticon, unigram punctuation, and the unigram negation. They have also reported a 90% classification accuracy on a larger tweet dataset using the supervised classifiers namely the KNN and the SVM (Hasan, M., Rundensteiner, E., & Agu, E., 2014). Choudhury et. al., have tried to classify the tweets that were posted by individuals with an onset of depression. Upon performing a 10-fold cross validation analysis on this dataset Choudhury et. al., have reported a classification accuracy of 70% using the supervised classifier; SVM with the RBF kernel (Choudhury, M.D., Gamon, M., Counts, S., Horvitz, E., 2013). Purver and Battersby have tried to detect six types of emotions namely happiness, sadness, anger, fear, surprise and disgust on a dataset that contains short messages from twitter. They have constructed two training datasets, one that contains the tweets classified using emoticon and the other containing the tweets classified using hashtags. On their two datasets they have reported an overall 10-fold cross-validation accuracy of less than 70% using the SVM (Purver, M., Battersby, S., 2012).

Roberts et. al., have proposed *Empa Tweet*, an approach that can be used for annotating and detecting emotions on twitter posts. In their research, they have developed a synthetic corpus containing tweets for seven different emotion types namely Anger, Disgust, Fear, Joy, Love, Sadness and Surprise. Using 7 different binary SVM classifiers they have tried to classify each tweet to determine if a particular emotion is present in the tweet or not. It is also worth to

note that their corpus contained tweets with multiple emotion labels (Roberts, K., Roach, M. A., Johnson, J., Guthrie, J., Harabagiu, S. M., 2012). Chaffar and Inkpen have tried to compare the performance of several different supervised classifiers including the NB, Decision tree (J48), and SMO (an implementation of the SVM). A 10-fold cross validation analysis performed using the different classifiers revealed the fact that the SMO algorithm has the highest accuracy rate across all the datasets used in their study. Across all the datasets their feature set was represented using the BOW (Bag of Words) (Chaffar, S., Inkpen, D., 2011). Aman and Szpakowicz have tried to compare the performance of the supervised classifiers namely the NB and the SVM on their constructed dataset. A stratified 10-fold cross validation analysis on their dataset containing six classes namely Happiness, Sadness, Disgust, Anger, Fear, and Surprise; resulted in an overall accuracy of 72.08% and 73.89% respectively suggesting the fact that SVM classifier is slightly better than the NB classifier. Their feature set includes a combination of the GI and the Word Net Affect (Aman, S., Szpakowicz, S., 2007). Ghazi et. al., have tried to classify the emotion classes in both the Aman's and Alm's dataset using the SVM classifier. Using the BOW as the feature set and SVM as the classifier they have performed a 10-fold cross validation analysis and have reported an overall accuracy of 61.67% on the Aman's dataset and 57.41% on the Alm's dataset (Ghazi, D., Inkpen, D., Szpakowicz, S., 2010). Badshah et. al., have proposed a divide-and-conquer approach to identify six emotions namely Happy, Surprise, Fear, Disgust, Angry and Sadness on a dataset in three different stages. Using the classifiers namely the Decision Tree, the SVM, and the Random Forest on a Surrey Audio-Visual Expressed Emotion (SAVEE) dataset they have reported a maximum overall accuracy of 82.21%. According to them, the Random Forest was the best classifier in all the three stages. On the SAVEE dataset the features were derived using the Mel Frequency Cepstral Coefficients (MFCCs) technique (Badshah, A.M., Ahmad, J., Lee, M.Y., Baik, S.W., 2016). Lliou and Anagnostopoulos have compared the classification performance of Artificial Neural Networks (ANN) and Random Forest on the emotional Berlin Database. In an effort to classify seven different classes namely the Anger, Happiness, Anxiety/Fear, Sadness, Boredom, Disgust and Neutral they have reported an overall accuracy of 83.17% and 77.19% using the ANN and the RF respectively. They have also reported a mean classification accuracy of 55% and 48% on the speaker independent framework thus suggesting the fact that the performance of the ANN classifier is superior to the Random Forest classifier (LLiou, T., Anagnostopoulos, C.N., 2009).

CONCLUSIONS

In this study, we have addressed the four-class emotion classification problem on a heterogeneous emotion-annotated dataset. The first order of the k -NN classifier *i.e.* ($k = 1$) demonstrated a striking performance of 85.4% 10-fold cross validation accuracy on the resampled training dataset using the discriminative n -grams ($n = 1$) generated using the threshold ($\tau = 4$). Also, when the training dataset was resampled there was a significant boost in the performance of the k -NN classifier for $k = 1, 3, 5$ and 7 . Overall, the supervised classifiers along with the resampling filter and the discriminative n -gram model seems to be promising for emotion classification on the heterogeneous datasets.

In future, we plan to investigate the potentiality of other supervised and deep learning techniques for the four-class emotion classification problem. Also, in future we plan to further investigate each of the discriminative n -grams obtained at different threshold, as they could possibly be a significant signal for classifying the instances to an emotion class.

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ADVANCED PREDICTIVE ANALYTIC TECHNIQUE FOR DECISION MAKING

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ABSTRACT

Predictive analytics embraces an extensive range of techniques including but are not limited to statistical modeling, machine learning, Artificial Intelligence and data mining. It has profound usefulness in different application areas such as data-driven decision making, business intelligence, public health, disaster management and response, as well as many other fields. In this study, we design and implement a predictive analytics system that can be used to forecast the likelihood that a diabetic patient will be readmitted to the hospital. Upon extensively cleaning the Diabetes 130-US hospitals dataset containing patient records spanning for over 9 years *i.e.* from 1999 till 2008, we modelled the relationship between the predictors and the response variable using the XGBoost classifier. Upon performing hyperparameter optimization for the XGBoost, we obtained a maximum AUC of 0.671. Our study reveals that attributes such as lab procedures, number of medication, time in hospital, discharge disposition and number of inpatient visits are strong predictors for the response variable (*i.e.* re-admission of patients). Findings from this study can help hospitals design suitable protocols to ensure that patients with a higher probability of re-admission are recovering well and possibly reducing the risk of future re-admission. In the long run, not only will our study improve the life quality of diabetic patients, it will also help in reducing the medical expenses associated with re-admission.

INTRODUCTION

Diabetes is a disease frequently characterized by abnormal levels of sugar in the body. Commonly known as Diabetes Mellitus, it is a chronic disease that can have severe physiological consequences if caution is not exercised. Diabetes can strike anyone from children to adults and it is unfortunate that its numbers are drastically increasing each year. The Centers for Disease Control estimated that 30.3 million people or 9.4% of the U.S population had diabetes in 2015 and another 84.1 million adults, an estimated 33.9% of the adult population, were diagnosed with pre-diabetes conditions (CDC, 2017). The onset of the disease can be triggered by the long-term inability of the pancreas to secrete sufficient insulin, a type of hormone that helps in transporting the glucose from the food we consume into the blood tissues before it is being converted to body energy. The chronicity associated with diabetes, however, can exert many physical implications including damages to body organ, fatigue, heart diseases, blurred vision, weight loss, stroke, or even death (American Diabetes Association, 2010; NIDDK, *n.d.*; WHO, 2013). The medical conditions of the diabetic patients can be controlled using both oral medications and by insulin injections (Medline Plus, 2014). Diabetes related hospital admission, nevertheless, are not uncommon among patients with complications. Every year, millions of people are admitted to the hospital for diabetes related treatment, and many of these patients often get re-admitted (Gambino, 2017). While diabetes has been known to be caused by or associated with a constellation of factors related to lifestyles (e.g., obesity) and family history (e.g., genes), the disease tends to be more prevalent among certain ethnic-racial groups (e.g., African Americans, Mexican American), some age groups (*i.e.*, 45 years old or older), or during pregnancy and under certain medical condition (e.g., high blood pressure) (Kirman et al., 2012; NIDDK, *n.d.*; Spanakis & Golden, 2014; WebMD, 2017). Given that there is no cure for this disease, patients with diabetes must efficiently manage their conditions to stay healthy (WebMD, *n.d.*). While there are several factors that can cause someone to be re-admitted (e.g., time in hospital, number of lab test performed, number of medication consumed, history of prior hospitalization), a good predictive analytic-based research study is necessary to explore what such factors are. Our decision-making problem centers around the research questions – How can we predict hospital re-admission of diabetic patients who were previously admitted? What are the factors that are associated with re-admission of diabetic patients? Given that patients facing high risk for re-admission need to be identified at the time of being discharged from the hospital, this study will help in facilitating improved treatment that could result in reducing their chances of re-admission and expenses spent on diabetes care (Bhuvanet. *al.*, 2016). In this study, we are interested in addressing the re-admission challenge in a more systematic way to facilitate future healthcare implementation that significantly improve the in-patient diabetic care. The purpose of this study is to design a predictive analytics system that will be used to forecast the likelihood that a diabetic patient will be re-admitted upon release from the hospital. Therefore, we asked the following research question: What were the factors that were associated with diabetic patients' re-admission upon release?

The rest of the paper is organized as follows: Section 2 details the materials and methods employed in this study. Section 3 present the results from this study and discuss our findings while Section 4 report the survey of the literature. Finally, Section 5 concludes the paper and outlines the future direction of our research.

MATERIALS AND METHODS

To design our predictive analytics system, we rely on the dataset “Impact of HbA1c Measurement on Hospital Readmission Rates: Analysis of 70,000 Clinical Database Patient Records”/Diabetes 130-US hospitals for years 1999-2008, a dataset compiled by the Center for Clinical and Translational Research housed in the Virginia Commonwealth University. This dataset, collected across a 10-year-period, is well-suited for our study because it offers detailed measurement of the participants’ re-admission, hospitalization, diagnosis, lab records, medical histories, and socio-demographic variables. Collected from 130 hospitals over a 9-year-period this dataset examines diabetic related encounters in the hospitals where the length of stay for each patient was at least 1 day and at most 14 days (Strack, DeShazo, &Gennings, 2014). This dataset holds information about the number of times the patients were re-admitted to the hospital for diabetic treatment after an initial admission. Each record in this dataset contains 50 potential risk factors for a patient and a label indicating whether the patient was re-admitted within 30 days, after 30 days, or was never re-admitted. In this dataset, the distribution of our target variable is as follows - 11% of the patients were re-admitted within 30 days, 35% after 30 days, and 54% of the patients were never re-admitted (Bhuvanet. *al.*, 2016). Overall, there are over 100,000 instances, 54 multivariate predictor variables, and a single response variable. Each record in this dataset is uniquely identified using an inpatientencounter identification number. The response variable is a categorical variable consisting of three different categories. However, in this study, we have transformed the three response categories to two categories, (namely re-admission and no re-admission) and have approached this problem as a binary classification problem.

Next, we discuss about the predictive modelling technique adopted in this study.

Predictive Modeling Technique

Here, we have explored the potentiality of theXGBoost (XGB) classifier. The XGB, is an ensemble learning method and is based on the Gradient Boosting principle. It is also well known as extreme gradient boosting. Gradient boosting works on the principleof boosting weak learners iteratively by shifting focus towards problematic observations that were difficult to predict in previous iterations and performing an ensemble of weaklearners, typically decision trees. It builds the model in a stage-wise fashion like otherboosting methods do, but it generalizes them by allowing optimization of an arbitrarydifferentiable loss function (Chen &Guestrin, 2016).Table 1 discusses about the working principle of the gradient boosting learning method. There are three elements involved in gradient boosting

- Loss function depends on the type of problem being solved. In this case of classification problems, logarithmic loss will be used. In boosting, at each stage, unexplained loss from prior iterations would be optimized rather than starting from scratch.
- Decision trees are used as a weak learner in gradient boosting.
- Trees are added one at a time and existing trees in the model are not changed. The gradient descent procedure is used to minimize the loss when adding trees.

Table 1. Working principle of the gradient boosting classifier

Initially, a model is fit on observations producing a certain accuracy ($F(x)$) and the remaining unexplained variance is captured in the *error* term as shown below:

$$Y = F(x) + error$$

Then another model is fit on the error term to pull the extra explanatory component and add it to the original model (see the equation below), which should improve the overall accuracy:

$$Y = F(x) + G(x) + error2 \text{ where } error = G(x) + error2$$

We can further continue this method *i.e.* fit a model on the **error2** component to extract a further explanatory component as shown below:

$$error2 = H(x) + error3$$

Now, model accuracy is further improved, and the final model equation looks as:

$$Y = F(x) + G(x) + H(x) + error3$$

Here, if we use weighted average (higher importance given to better models that predict results with greater accuracy than others) rather than simple addition, it will improve the results further. Therefore, the final model equation looks like

$$Y = \alpha * F(x) + \beta * G(x) + \gamma * H(x) + error3$$

The steps involved in Gradient boosting are

1. Initialize $f_0(x) = \operatorname{argmin}_{\gamma} \sum_{i=1}^N L(y_i, \gamma)$

2. For $m = 1$ to M do the following

$$\text{For } i = 1, 2, 3, \dots, N r_{im} = - \left[\frac{\partial L(y_i, f(x_i))}{\partial f(x_i)} \right]_{f=f_{m-1}}$$

Fit a regression tree to the targets r_{im} giving terminal regions R_{jm} , where $j = 1, 2, 3, \dots, j_m$

For $j = 1, 2, 3, \dots, j_m$ compute $y_{jm} = \operatorname{argmin}_{\gamma} \sum_{x_j \in R_{jm}} L(y_i, f_{m-1}(x_i) + \gamma)$

$$\text{Update } f_m(x) = f_{m-1}(x) + \sum_{j=1}^{j_m} \gamma_{jm} I(x \in R_{jm})$$

3. Output $f'(x) = f_M(x)$

We have employed a grid-based Hyperparameter tuning for the XGB model to identify an optimal model for the dataset used in this study. The optimal model identified using XGB is reported in the results and discussion section.

Performance Measures

In this study, we have tried to address a binary classification problem. Here, we report the values for *Recall*, *Precision*, *F1 score* and *AUC*. *Precision* is the fraction of relevant instances among the retrieved instances and *Recall* is the fraction of the relevant instances that have been retrieved over the total number of relevant instances. *F1 score* is the harmonic mean of the precision and recall. We provide the receiver operating characteristic curve (ROC) that is commonly used to **visualize the performance of a binary classifier and compute the Area Under the Curve (AUC)**. **The ROC curve** is a graph showing the performance of a classification model at all classification thresholds. This curve plots two parameters, namely the True Positive Rate (TPR) and False Positive Rate (FPR). AUC ranges in value from 0 to 1. For binary classification problems, the AUC is desirable for the following two reasons: It is **scale-invariant** (*i.e.* it measures how well predictions are ranked, rather than their absolute values; and AUC is **classification-threshold-invariant** (*i.e.* it measures the quality of the model's predictions irrespective of what classification threshold is chosen. Generally, the classifier with high AUC or high recall is highly desirable for any binary classification problem.

Pre-Processing of the Dataset

In this study, we have performed data pre-processing which includes tasks such as excluding variables and instances, as well as cleaning the dataset to remove outliers, missing values, variables lacking variation in the response categories and variables highly skewed.

The *weight* variable had a total of 98,569 observations missing. This constituted a large proportion of missing data in the dataset. Additionally, given the response categories are in range format, rather than the participants' explicit

weight, this variable did not offer a clear depiction of the participants' weight. Thus the 'weight' attribute was removed from the dataset. The *race* variable had a total of 2,273 missing observations. Here, we deleted the observations with the missing data instead of removing the variable (*race*) itself. The *Payer code* attribute had a total of 40,256 observations missing. In addition to removing instances, several variables were also removed from this study including the *payment methods*, *the Medical specialty*, *Examide*, and *Citoglipton*. These variables were excluded from this study because they were either not relevant for predicting the response variable, or they all had a high percentage of missing values, or such variables lacked variations for predicting the response category outcomes. To reduce redundancy, we have also deleted the unique identifier *patient_nbr* and have used the identifier *encounter_id* as an identifier for our data instances. Our response variable has three response categories (" <30 " if the patient was re-admitted in fewer than 30 days, " >30 " if the patient was re-admitted in more than 30 days, and "No" for no record of re-admission). In this study, we have transformed the response variable into a dichotomous variable where the categories are 1 or class 1 if the response categories are " <30 " or " >30 " and 0 or class 0 if the response category is "No re-admission". In addition, we have transformed the nominal variables, namely *age*, *admission_type_id*, *discharge_disposition_id*, and *admission_source_id* as vectors rather than keeping them as numeric. By employing the Shapiro-Wilks tests for normality, we identified several attributes that were skewed to the right. We performed necessary data transformation to normalize those variables using the Box-Cox Transformation. Using Boxplots, we have also identified several attributes with outliers including the *num_lab_procedures*, *num_medications*, *number_outpatient*, *number_emergency* and *number_inpatient*. Specifically, we assumed that data points with positions beyond 1.5 times the interquartile range to be outliers. For example, any values exceeding 96 was considered an outlier for the variable *Num_lab_procedures*. A total of 400 instances that were identified as outliers for this attribute were removed. We also observed many outliers for the variable *Num_medications*. For the variable *Num_procedures*, we applied suitable data transformations removing all the outliers within that variable. The following variables *time_in_hospital*, *Number_outpatient* valuable, *Number_emergency*, *Number_diagnosis*, and *Number_inpatient* was transformed and the outliers were removed. Finally, outliers for the attribute *number_diagnosis* were removed leaving a total of 97,095 instances in the dataset. The original distributions of the eight numeric variables were examined and Box-Cox transformation were performed. These numeric variables, namely *time_in_hospital* (-0.1373503), *num_lab_procedures* (1.136644), *num_procedures* (0.1626556), *num_medications* (0.05438773), *number_outpatient* (0.03836429), *number_emergency* (0.02824686), *number_inpatient* (0.08456597), and *number_diagnoses* (1.961915), were all suspected to have skewness with majority of them being right-skewed. Large kurtosis value for these attributes indicated sharper peaks but flatter tails. We observed both positive and negative kurtosis within these variables. Log transformations were performed on four of the variables, namely the variables *number_emergency*, *number_outpatient*, *number_inpatient*, and *num_medications* as suggested by the lambda value of the Box-Cox transformation. A Pearson correlation coefficient indicating the strength of the relationship between the above mentioned 8 quantitative variables, is shown in **Figure 1**, below:

Correlation diabetic_data_no_outliers.csv using Pearson

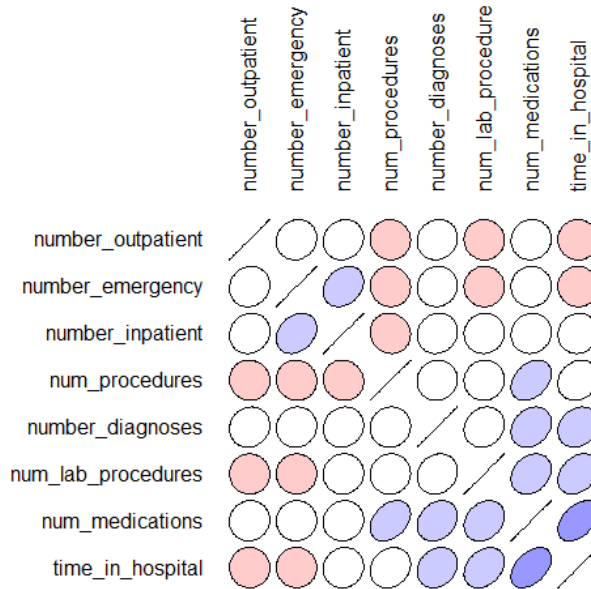


Figure 1. Correlation matrix and the Pearson correlation coefficients between 8 numeric variables

RESULTS AND DISCUSSION

We employed the XGB classifier to model the diabetics’ dataset. For modelling, 54 predictor variables were taken from the dataset. Upon splitting the dataset into 80:20 (80% for training and 20% for testing), we performed a 10-fold cross-validation on the training dataset. Hyperparameter tuning was performed to regulate the values for the parameters namely *cp* (complexity parameter), *maxdepth* (maximum depth of any node of the final tree) and *maxiteration* (number of iterations the boosting is run). The values for each of the parameters ranged as follows: *cp* from 0.01 to 0.0001, *maxiteration* from 500 to 1000, and *maxdepth* from 5 to 15. The XGB model resulted in an output error that ranged from 0.395 to 0.473.

Importance and Frequency

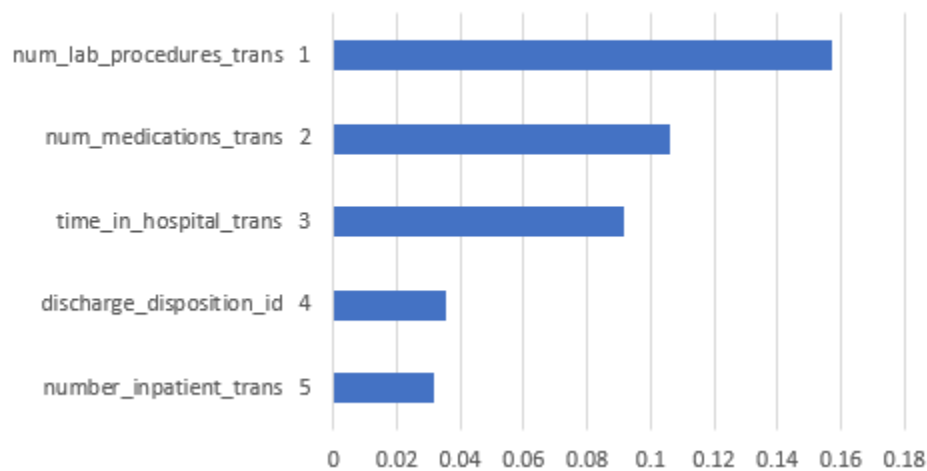


Figure 2. Top 5 ranked variables identified by the XGB model

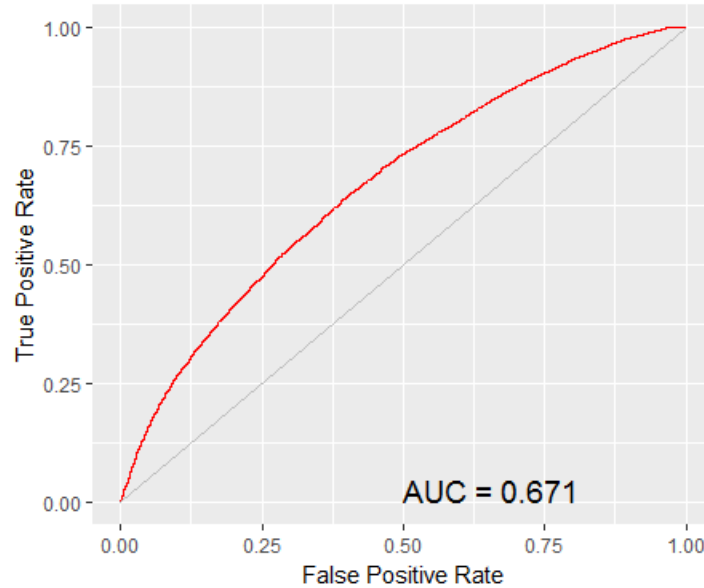


Figure 4. ROC curve for the XGB2 classifier on the test dataset

Figure 2 lists the top 5 important variables determined by the XGB model that can be used to predict the response variable. From Figure 2, it is evident that the predictor variable *number_lab_procedure_trans* is the most important variable for predicting the categories of the *re-admission* (response variable). Using these top 5 important predictors we developed another XGB model (XGB2). For $cp = 0.0001$, $maxinteraction=1000$, and $maxdepth=15$, we observed a recall of 0.60 and 0.71 and a F1-score of 0.58 and 0.68 for class 1 and class 0 respectively for XGB2. For XGB2, we observed an AUC of 0.67 (see Figure 3) using only the top 5 ranked variables listed in Figure 2.

Bhuvanet *al.* have reported the AUC as the performance measure for different predictive analytics technique. They have achieved a maximum AUC of 65.0% using the Random Forest. In contrast, our XGB classifier with hyperparameter tuning resulted an AUC of 67.1%. As indicated by Bhuvanet *al.*, the dataset used here is highly skewed and consequently, the performance of identifying re-admissions categories is modest (Bhuvanet. *al.*, 2016). Therefore, we believe that an increase of 2.1% in AUC is a significant contribution. In addition to focusing on the use of the predictive analytics technique, we have also highlighted a significant effort invested on data cleaning and preparation.

On the same dataset, Hephzibah and Goutam have proposed using the High-Performance Support Vector Machine with a misclassification rate of 36.3%, 49.7% sensitivity and with specificity of 75.1% in their validation dataset. They have indicated that the key factors that drove re-admission are the number of times a patient was formerly admitted both as an inpatient and outpatient, primary diagnosis, mode of admission, and conditions like heart failure or hypertensive chronic kidney disease (Hephzibah & Goutam, 2015). Our optimized XGB classifier has identified the number of lab procedures, number of medication, time in hospital, discharge disposition and number of inpatient visit as the top five key factors that can help in determining whether the patient was re-admitted within 30 days, after 30 days or was never readmitted.

LITERATURE REVIEW

Diabetes (also known as diabetes mellitus), which affects millions of people worldwide, is characterized by a chronic disease involving high blood sugar (blood glucose). The onset of the disease can be triggered by the long-term inability of our pancreas to secrete sufficient insulin (a type of hormone) that helps transport glucose from food we consume into blood tissues before it is being converted to body energy later. The chronicity and long-term complications associated with diabetes, however, can exert many physical implications including damages to body organ, fatigue, heart diseases, blurred vision, weight loss, stroke, renal failure, or even death (American Diabetes Association, 2010;

NIDDK, n.d., WHO, 2013). Along with oral medications, insulin injections have been utilized to control the medical conditions of diabetic patients (Medline Plus, 2014). Diabetics related hospital admission, however, are not uncommon among patients with complications. In fact, the American Diabetes Association estimated that over 1 million of the U.S. population is plagued by type 1 diabetes, with many remaining undiagnosed. Worse yet, approximately 1.5 million of Americans are diagnosed with this deadly disease annually, making it the 7th leading cause of death in the country (American Diabetes Association, 2018a; CDC, 2017). Economic costs incurred from the diagnoses and health care costs of this disease can be substantial. Specifically, in 2017, the total cost resulting from the diagnoses, medical cost, and loss of productivity is estimated to be \$327 billion (American Diabetes Association, 2018b). There is no doubt that this enormous expenditure can exert a major toll on the health care financing system in years to come if the current trend continues.

Certain socio-ecological determinants, health behaviors, and psychosocial factors have been found to be linked to the disproportionate advancement of this disease (e.g., Hill, Nielsen, & Fox, 2013; Mansyur, Rustveld, Nash, & Jibaja-Weiss, 2015). In particular, while this disease has been known to be caused by or associated with a constellation of factors related to lifestyles (e.g., obesity) and family history (e.g., genes), it tends to be more prevalent among certain ethnic-racial groups (e.g., African Americans, Mexican American), some age groups (i.e., 45 years old or older), or during pregnancy and under certain medical condition (e.g., high blood pressure) (NIDDK, n.d.; Echouffo-Tcheugui, Caleyachetty, Muennig, Narayan, & Golden, 2016; WebMD, 2017). Given that there is no cure for this disease, patients with diabetes must efficiently manage their conditions in order to stay healthy (WebMD, n.d., WHO, 2013).

Previous studies on the similar topic have focused on analyzing the risk factors that predict the re-admission rates of diabetic patients (Briefing, T. D., 2014, Dungan, K. M., 2012, Eby, et. al., 2014, Hasan, M., 2001, Herman, B. B. H., 2014, Howell, et. al., 2009, Jiang et. al., 2003, Kim et. al., 2010, Silverstein, et. al., 2008, Strack, et. al., 2014). According to Briefing, the acute and chronic glycemic control influence re-admission risk in a dataset of more than 29,000 patients over the age of 65 (Silverstein *et. al.*, 2008, Bhuvan, et. al., 2016). Briefing has analyzed the re-admission risk for a dataset with more than 52,000 patients in the Humedica network (Briefing, T. D., 2014, Bhuvan, et. al., 2016). Strack, et. al., has studied the impact of HbA1c on the re-admissions rate (Strack, et. al., 2014, Bhuvan, et. al., 2016). The dataset considered in this study captures different types of information including demographic, clinical procedure-related and diagnostic-related features along with drug information for patients above 65 years of age to predict the re-admission within and above 30 days.

Bhuvan, et al. (2016) have employed different predictive analytics technique including Adaboost, Bayes Network, Naïve Bayes, Neural Networks and RandomForest to identify high-risk patients who are readmitted in the future and to determine if the patient will be admitted before or after 30 days, or no re-admissions. Hephzibah and Goutam (2015) have tried to predict the probability of a diabetic patient being readmitted using the identical dataset.

Except for the work by Bhuvan, et. al. (2016) and Hephzibah & Goutam (2015), we have not come across any other work that has focused on applying predictive analytics technique to address queries regarding re-admission of diabetic patients who have been previously admitted to a hospital.

CONCLUSIONS

In this study, we have presented a design and an implementation of a predictive analytics system to identify high-risk patients. We have also evaluated different factors that are associated with diabetic patients' re-admission upon their release. We have considered both short-term and long-term re-admissions and focused on a specific disease like diabetes. We found that the XGB with hyperparameter tuning was optimal for this task when compared to the other work from the literature. The dataset of re-admissions is often skewed and consequently, the performance of identifying high-risk patients is modest. However, our efforts on data preprocessing and hyperparameter tuning paid off to account for the skewness in the dataset. Compared to the previous studies, we were able to slightly boost the performance of our classifier. Using the optimized XGB (XGB2) classifier, we were able to achieve an AUC of 67.1%. Medical transcripts of the readmitted patients are likely to be helpful for boosting the performance of the classifier.

In this study, we were also able to uncover important features that are critical in identifying high risk of re-admission. In summary, factors such as number of lab procedures, number of medication, time in hospital, discharge disposition and number of inpatient visit are critical factors in determining whether the patient was re-admitted within 30 days,

after 30 days or was never readmitted. Based on the AUC (67.1%) and the survey of the published results we believe that the results from this study can be incorporated in healthcare institutions to witness its effectiveness.

We believe further data collection including the date of admission (to find the season of the year), number of patients with same disease at the instance of admission (to co-relate to epidemics), family history (to find hereditary information) and the conversation between doctor and patient can help to extract essential features corresponding to patients thus boosting the performance of the classifier. Since identifying the features that can precisely differentiate between the classes (re-admission vs. no re-admission) is of importance, we look forward to investigating the potentiality of deep learning classifiers.

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**EXPLORING THE RELATIONSHIPS OF HUMAN RESOURCE PROFESSIONAL DEMOGRAPHICS
AND NEED FOR APPROVAL TO FREQUENCY OF SELF-REPORTED OBSERVATIONS OF
FEMALE-FEMALE WORKPLACE BULLYING**

Kathleen Voss, Temple University

ABSTRACT

Workplace bullying is a pervasive problem in many organizations. While opposite gender bullying such as a male bully and female target (male-female) can be presented as sexual harassment, there is no Title VII protection for female-female workplace bullying in the United States (U.S.). In addition, workplace bullying is often measured by self-report, i.e., the target. Prior research has not investigated human resource professional (HRP) observations of female-female workplace bullying behaviors. Using an online survey sample of 97 complete-data U.S. HRPs, this study tested two research questions: (1) are there relationships between HRP gender, age, career tenure to frequency of self-reported observations of female-female workplace bullying; and (2) is there a relationship between HRP need for approval to frequency of self-reported observations of female-female workplace bullying? Results did not show any relationships of HRP gender, age or career tenure to self-reported observed female-female workplace bullying, but did find a significant negative relationship of HRP need for approval to self-reported observed bullying. Implications for HRPs as well as study limitations are discussed.

INTRODUCTION

Workplace bullying is a form of negative interaction that can express itself in many ways, ranging from verbal aggression and excessive criticism or monitoring of work to social isolation or silent treatment (Einarsen, Hoel&Notelaers, 2009). Recent research about the prevalence of workplace bullying has confirmed that between 27% and 35% of U.S. employees, or approximately 54 million people, have been bullied at work (Hartford Business Journal, 2013). Instances of female-to-female (female-female) workplace bullying, and the negative impact it creates across targets and organizations, has been detailed in prior studies (D’Cruz& Noronha, 2010; Hintz Klein, 2012) as well as in news sources such as The New York Times and Wall Street Journal (Meece, 2009; Tuna, 2008). Successful, high-performing females have been targeted more frequently by female bullies at work (Cortina, Magley, Williams, &Langhout, 2001), and female-female bullying targets often feel forced to leave when they are bullied, in part due to their perception that Human Resource Professionals (HRPs) are ineffective at or unwilling to intervene to stop the bullying (D’Cruz& Noronha, 2010; Hintz Klein, 2012). There is a need for improved mitigation of the bullying of females by other females at work, and since HRPs are generally accountable for mitigating these events (Woska, 2013), there is a need to understand factors that may affect HRP-observed workplace bullying. This observation will precede the capability for HR professionals to reduce or even stop bullying (Gholipour, Sanjari, Bod &Kozekanan, 2011). Therefore, this study will explore the relationships of HRP demographics, i.e., gender, age and career tenure, and need for approval to HRP frequency of self-reported observations of female-female workplace bullying.

Female-female Workplace Bullying and the Role of HRPs: A Review of the Literature

Workplace bullying has been defined with varying, although similar, language. The definition provided by Salin (2003) that “repeated and persistent negative acts towards one or more individual(s), which involve a perceived power imbalance and create a hostile work environment” (p. 1213) appears in multiple studies, including analyses of legal outcomes (Einarsen et al, 2009; Hintz Klein, 2012; Salin, 2003). Workplace bullying differs from harassment and other forms of uncivil behavior at work because bullying behavior is persistent, and, when females bully other females, the bullying behavior is primarily psychological versus physical, and the target’s behavior or personality may trigger the bullying (Cortina, 2008;Gholipour et al, 2011).

HRPs are in a unique position to observe female-female bullying at work and have access to related data that can substantiate unreported cases of female-female bullying (Levine Albright &Fiester, 2010). However, satisfaction of bullied targets with the effectiveness of HR involvement was rated less than 2% in a survey of 372 target employees (Namie, 2012). If HRPs fail to observe bullying between females effectively, the bullying behavior is likely to become more persistent and chronic (Levine et al, 2010; Salin, 2003). Although little, if any, existing research has focused on data from HRP observers, evidence does show that the frequency of workplace bullying reported by targets inside HR departments is consistent with workplace bullying rates outside of HR (Daniel, 2011), substantiating that HRPs cannot or do not observe/intervene effectively.

When any employee experiences bullying, HRPs are accountable as a primary resource to investigate or resolve the situation (Woska, 2013). Title VII of the Civil Rights Act of 1964 offers some protections if the bully and target represent different genders when it can be presented as sexual harassment (Bible, 2012), which creates a mandate for employers to apply diligence to identify and resolve bullying that occurs between genders. However, Title VII does not offer protections, and therefore no explicit mandate for employers to apply diligence, when both bully and target are female (Trotter & Zacur, 2012). Workplace bullying litigation involving female bullies and targets has resulted in ambiguous findings that do not validate that the bullying occurred or that the alleged bully was punished (Bible, 2012). These findings suggest that, once HRPs identify female-female workplace bullying, there may be variability in outcomes or effective responses. However, there are no existing research findings that define variables that distinguish where, how and why HRPs do (and do not) observe and report female-female workplace bullying using data collected from (versus about) HRPs. This research is essential as a prerequisite to then understanding effective responses.

Relationships of HRP Gender, Age and Career Tenure to Female-female Workplace Bullying

There has been little research focused on investigating the ability of HRPs to observe female-female bullying through analyses of data from HRPs (Ballien, Neyens, De Witte & De Cuyper, 2009). Typically, prior research has focused on self-reports of bullying (Einarsen et al., 2009). Prior self-reports of bullying have tested if there are relationships between gender and age of target and/or bully to perceived bullying; Using a sample of Turkish employees, Karatuna and Gok (2014) found that while gender and tenure were not significant, employees younger than 51 perceived higher bullying over a six-month period. Cortina et al. (2001) tested for the impact of gender and age on perceived workplace incivility and found that gender (females higher), but not age, was related to perceived workplace incivility over a five-year period. Pichler, Simpson, and Stroh (2008) surveyed 902 HRPs regarding observations of unfair treatment of females in promotion processes and found that HRPs were able to observe more uncivil behaviors towards females, such as excluding females with equal qualifications to male counterparts, from being promoted. These general framework studies collectively suggest that demographics, such as gender, age and career tenure of HRP are important to investigate as correlates of perceived female-female workplace bullying.

Relationship of HRP Need for Approval to Female-female Workplace Bullying

Prior research conducted with undergraduate business students found that gender does produce differences in the impact of impression management preferences upon identifying uncivil behavior (Dalton & Ortegren 2011). Females had higher impression management scores than males. More research is needed to understand whether there are variables that explain differences in the HRP's ability and/or willingness to observe and acknowledge bullying. While demographic characteristics of HRPs are important to investigate, one additional unexplored personality variable is the need for approval, i.e., feeling accepted/liked by others, which is part of impression management (Paulhus, 1984). This may reflect a self-enhancement motive (Crommelinck & Anseel, 2013) by the HRP that directly impacts his/her willingness to observe female-female workplace bullying and to intervene appropriately).

Given the lack of prior research, there are two exploratory research questions investigated in the current study:

RQ1 - are there relationships between HRP gender, age, career tenure to HRP frequency of self-reported observations of female-female workplace bullying?

RQ2 - is there a relationship between HRP need for approval to HRP frequency of self-reported observations of female-female workplace bullying?

METHODS

Sample and Procedure

Survey methodology is widely used across workplace bullying research, although studies typically leveraged self-reported data from targets. Data for this study were collected through administration of an online survey measuring the dependent variable of HRP-perceived frequency of female-female workplace bullying. The independent variables

were HRP gender, age, career tenure, and need for approval. In addition, HRPs were asked to report the number of female employees in their organization. This variable was used as a control variable. During a 21-day period in August, 2016 responses to an anonymous, confidential survey were sought from U.S. HRPs. 164 responses were collected, with complete responses from 100, or approximately 61%. In order to obtain an adequate sample size and to ensure respondent confidentiality and anonymity, data were collected through SurveyMonkey Professional Panel Services (SurveyMonkey, 2014).

Measures

HRP demographics. HRP gender, age and career tenure were collected using separate one-item measure categories. The following response scale categories (and percentages found) were used. *HRP gender*, 1 = (29%) male, 2 = female (71%); *HRP age*: 1 = under 18 (0%), 2 = 18-29 (7%), 3 = 30-44 (16%), 4 = 45-59 (44%), 5 = 60 and over (33%). *HRP career experience*, categories, 1 = up to one year (5%), 2 = 1 to 5 years (14%), 3 = 6 to 15 years (20%), 4 = 16 to 25 years (28%), 5 = more than 25 years (33%).

Number of female employees. Prior work by Einarsen and Skogstad (1996) showed that organizations with more employees have higher perceived bullying rates. The response scale used here was: 1 = less than 50 (27%), 2 = 51 to 200 (21%), 3 = 201 to 1,000 (22%), 4 = 1,001 to 5,000 (13%), 5 = over 5,000 (17%).

Female-female workplace bullying. Female-female work bullying was measured using the Einarsen et al. (2009) 22-item Negative Acts Questionnaire (NAQ-R). The (NAQ-R is the most widely used survey instrument across academic research focused on frequency of workplace bullying (Lutgen-Sandvik, Tracy & Alberts, 2007). Permission from Einarsen et al. (2009) was given to use the NAQ-R, with the modified reference point of HRPs. Previous research has successfully worked with a modified reference point, i.e., adapting an existing work incivility measure (Cortina et al., 2001) from an “experienced” to “instigated” work incivility perspective (Blau & Andersson, 2005). The 22 items or behaviors included: “having your opinions ignored” (work-related bullying), “persistent criticism of your errors or mistakes” (person-related bullying) and “being shouted at or being the target of spontaneous anger” (physically intimidating bullying). The same 5-point response scale as Einarsen et al. (2009) was used: 1 = never, 2 = now and then, 3 = monthly, 4 = weekly, 5 = daily. The respondents in the current study were asked to report observations during the most recent 12-month period rather than the 6-month period used in the self-report NAQ-R instrument. Given the HRP (versus self-report) perspective, a longer timeframe was used to capture female-female bullying. Prior research has supported using a one-year retrospective timeframe (Blau & Andersson, 2005; Johns, 1994).

Need for approval. This scale was measured using 5 items, based partially on adapted items from the longer Impression Management scale from Paulhus (1984; 1991). Prior work successfully adapted a shorter measure (Blau et al., 2010). Need for approval items included: “I am always willing to admit when I make a mistake at work” and “I never hesitate to go out of my way to help someone at work.” Responses were made on a 5-point Likert scale, from 1 = strongly disagree to 5 = strongly agree.

Data Analyses

The initial complete data sample was 100. SPSS-PC version 24 used (SPSS, 2013) was used to analyze the data. A comparison of missing to complete data showed one significant difference on the study variables. Missing data respondents had less HRP career tenure than complete data respondents, $t = -3.13$, $df=162$, $p < .01$. For the initial hierarchical regression analysis, there were 3 outliers, i.e., respondents with had standard deviations above 3. These outliers were deleted, leaving an $N = 97$ for all data analyses reported below (SPSS, 2013). Removing these outliers had very little impact on the reported results. An independent t-test was done for gender, and correlational analyses were initially used to test the relationships of the other independent variables to female-female bullying behavior. For the final regression model presented, statistical tests indicated that the assumptions of no multicollinearity, linearity, and homoscedasticity were satisfactorily met (Stevens, 1996). Consistent with prior general bullying research (Karatuna & Gok, 2014), demographic and control variables were first tested for their impact on observed bullying behavior, followed need for approval in the regression model.

RESULTS

An independent samples t-test on HRP gender for a difference in means (M) on female-female workplace bullying was not significant $t = .96$ ($df=98$), $p > .05$; male $M = 38.31$ versus female $M = 38.14$. This indicated there was no difference in between bullying by HRP gender. Table 1 presents the results for the means, standard deviations, reliabilities and correlations for continuous variables. Inspection of study means indicated a generally older HRM sample with more experience. Organizations sampled did not typically employ a larger number of females. The scale reliability for the need for approval measure ($\alpha = .63$) was lower than the desired $.70$ (Nunnally, 1978). However, the alpha for the workplace bullying measure of $.96$ compared very favorably to prior studies (Einarsen et al., 2009; Lutgen-Sandvik et al., 2007). Looking at correlations, as would be expected there was a significant positive correlation between HRP age and experience ($r = .56$). Also, older and more tenured HRPs tended to work in organizations with more female employees. Neither HRP age nor career tenure were significantly related to observed workplace bullying. However, there was a significant negative relationship of HRP need for approval to workplace bullying ($r = -.34$).

Table 1

Means, Standard Deviations, Reliabilities and Correlations for Continuous Variables

Measure	M	SD	1	2	3	4	5
1. HRP Age ^a	4.04	.89	(NA) ^f				
2. HRP Career Experience ^b		3.69	1.21	.56**	(NA)		
3. Number of Female Employees ^c		2.73	1.44	.20*	.24*	(NA)	
4. Need for Approval ^d		19.01	3.16	.15	-.04	-.17	(.63)
5. F2FWB ^e		36.28	12.74	-.05	.04	.09	-.34** (.96)

N = 97. * $p < .05$; ** $p < .01$ (two-tailed)

^a HRP age: 1 = under 18 (0%), 2 = 18-29 (7%), 3 = 30-44 (16%), 4 = 45-59 (44%), 5 = 60 and over (33%)

^b HRP career experience, categories, 1 = up to one year (5%), 2 = 1 to 5 years (14%), 3 = 6 to 15 years (20%), 4 = 16 to 25 years (28%), 5 = more than 25 years (33%)

^c Number of female employees, 1 = less than 50 (27%), 2 = 51 to 200 (21%), 3 = 201 to 1,000 (22%), 4 = 1,001 to 5,000 (13%), 5 = over 5,000 (17%)

^d Need for Approval, 5 items aggregated, using response scale of 1 = strongly disagree to 5 = strongly agree

^e F2FWB = Frequency of Self-Reported Observations of Female-female workplace bullying, 22 behaviors aggregated, using response scale of 1 = never to 5 = daily

^f Cronbach's alpha (in parenthesis), NA = not applicable

Looking at Table 2, the hierarchical regression model showed that collectively the background variables of HRP gender, age, career tenure and number of female employees accounted for only 3% of workplace bullying, which was not significant. In addition, none of these individual variables was significant. After first controlling for these background variables in Step 1, need for approval was entered in Step 2. The results showed that need for approval accounted for a significant additional amount of workplace bullying variance (10%), beyond the background variables. Overall, 13% of the variance in workplace bullying was accounted for. Thus there was no support for the first research question (RQ1) but the second research question (RQ2) was supported.

Table 2

Full Hierarchical Regression Model for Explaining Frequency of Self-Reported Observations of Female-to-Female Workplace Bullying (F2FWB)

F2FWB = Dependent Variable

	<i>b</i>	SE	R ² Chg	R ²
Antecedent				
<i>Step 1: Background Variables</i>				
HRP Gender ^a	-3.93	2.95		
HRP Age	-.87	1.77		
HRP Career Experience	.04	1.29		
Number of Female Employees	.26	.91		
			.03	
<i>Step 2: Need for Approval</i>	-1.33*	.41		
			.13*	.10**

Note. N = 97; *b* = unstandardized regression weight, SE = standard error; both rounded to nearest hundredths; * $p < .05$; ** $p < .01$

^a1 = male, 2 = female

DISCUSSION

The goal of this study was to investigate the relationships of HRP demographics, i.e., gender, age and career tenure, and need for approval, as well as number of female employees in the organization, to frequency of HRP-observed female-female workplace bullying. The findings of this study revealed that, while there were no relationships between age, gender and/or career tenure of the HRP and frequency of HRP-observed female-female workplace bullying, HRP need for approval was negatively correlated with HRP frequency of observance of female-female workplace bullying. In a sense it is perhaps reassuring that neither gender, age nor career tenure of an HRP was related to observed female-female workplace bullying. This suggests that male HRPs as well as younger or less experienced HRPs were as equally sensitive to observing female-female workplace bullying as their counterparts, i.e., female, older and more experienced HRPs. In addition, the study results showed the NAQ-R (Einarsen et al., 2009), using a one-year retrospective time frame, could be successfully measured from the HRP perspective. To our knowledge, this is the first application of the NAQ-R using HRPs.

HRP need for approval explained a significant amount of the variance in HRP frequency of observed female-female workplace bullying. Pichler et al. (2008) surveyed 902 HRPs and found that HRPs were able to observe more uncivil behaviors directed towards females. However, HRPs have been perceived by targets as unable or unwilling to take action when female-female bullying dynamics and tactics occur (Hintz Klein, 2012). Similarly, a study performed with 102 HRPs found that HRPs recognized and observed workplace bullying when they were targets yet reported frequency of bullying that suggested HRPs do not intervene or mitigate bullying with any more effectiveness inside their own departments (Daniel, 2011). In this study, higher need for approval of HRPs was found to correlate negatively with frequency of HRP-observed female-female workplace bullying, which may be an important step in understanding the ineffectiveness of HRPs in these instances.

Existing research has shown that organizational support levels, communication quality and leadership climate created significant differences in the effectiveness of mitigation and intervention in workplace bullying (Salin, 2003). In a

review of 87 case plans, Ballien et al (2009) found that destructive team and organizational cultures or habits was one of three key factors that correlated with higher frequencies of target-reported workplace bullying. If an HRP observed female-female bullying, the HRP might wonder, “If I intervene, will I be supported by top management”? Ferris (2004) reviewed existing literature and found that, when workplace bullying is reported by targets, responses from organizational representatives (including HRPs) vary, from 1) it is acceptable to 2) it is attributed to both parties as a personality conflict to 3) it is inappropriate. Before the HRP responds to female-female workplace bullying, it must be first be reported to the HRP by the target or another employee, or via direct HRP observation. The current study found that variable HRP responses in observing such bullying may be due to higher HRP need for approval. However, it is important for future research to explore the organizational context within which the HRP is responding to further understand where and why HRPs recognize female-female workplace bullying with varied self-report frequency.

Implications for HRPs

It is critical for an organization to provide a safe environment for all of its employees (Baillien et al., 2009; Chechak&Csiernik, 2014), which includes transparent rules and procedures to ideally prevent workplace bullying, but if necessary to then punish documented bullying employees. Given the prior-noted lack of protective government legislation in the US to prevent female-female workplace bullying (Trotter &Zacur, 2012), organizations need to clearly provide such preventive and consequential rules and procedures. HRPs are generally responsible for ensuring employee compliance with organizational rules and procedures (Woska, 2013). It is important for HRPs to satisfy multiple stakeholders (e.g., employees, managers, customers) in order to effectively perform their jobs (Schuler & Jackson, 2005). As such, HRPs must be given the latitude and support to fairly enforce organizational policies that support ethical conduct and behavior (Schuler & Jackson, 2005). If HRPs feel that they must appease the demands of one stakeholder first, e.g., a manager, over an employee, this can violate such fair enforcement. This study raised the issue of HRP need for approval negatively influencing observed female-female workplace bullying.

The question becomes, where does this need for approval come from, i.e., it is a personality characteristic an HRP brings to their job? Or it is somehow “imposed” by the culture of the organization? If it is mainly a personality characteristic, then it is possible to screen for this during employment selection process (Gomez-Mejia, Balkin&Cardy, 2004). However, if need for approval is more “imposed” on HRPs by another stakeholder, e.g., management, this may be more difficult to change (D’Cruz& Noronha, 2010). Prior research has shown that female-female bullying targets often feel forced to leave when they are bullied, in part due to their perception that HRPs are ineffective at or unwilling to intervene to stop the bullying (D’Cruz& Noronha, 2010; Hintz Klein, 2012). Namie (2012) found that the satisfaction of female bullying targets with the effectiveness of Human Resource Department involvement was less than 2%. Dysfunctional organizational cultures certainly exist (De Vries & Miller, 1986), and organizational surveys may be a useful tool to detect inequities in the fair enforcement of organizational policies, including female-female workplace bullying (Bartlett & Bartlett, 2011). Estes and Wang (2008) suggested that exit interviews could be used for assessing work incivility. Organizational investment in training to reinforce fair treatment policies and reduce bullying is important. However, whatever policies and supportive procedures (e.g., surveys, training, exit interviews) are in place, it is clear that HRPs must have the support from management to fairly enforce these policies (Schuler & Jackson, 2005).

Limitations

One study limitation was the cross-sectional self-report study design, which did not allow for inferring causality. However, it would be harder to argue for HRP-observed female-female workplace bullying significantly influencing HRP need for approval than vice-a-versa. The research design contained a limited number of independent variables for understanding self-reported observations of female-female workplace bullying behavior. There was a gender imbalance with 70% of the HRPs being female. In addition, the age, career tenure, and number of female employee variables used were measured using limited general response categories, which may have attenuated their relationships to observed female-female bullying behaviors. Including job characteristic variables (e.g., role conflict, job insecurity) as well as organizational context variables (e.g., social support, leadership style) would have helped in accounting for more female-female workplace bullying behavior variance (Ballien et al., 2009). Missing data reduced the sample size and it was found that missing data respondents had less HRP career experience than complete data respondents.

Since all data were self-report, common method variance must also be acknowledged. A one-factor test (Podsakoff, Mackenzie, Lee & Podsakoff, 2003) found that 36% of “common method variance” was explained by the first factor,

and that there were seven factors with eigenvalues of at least one. This indicates that while there is method variance, it is not an over-riding limitation. Ideally, future research can gather observed frequency of female-female workplace bullying information from multiple perspectives, e.g., target and HRP, to test their convergent validity. Research testing the impact of HRP-perceived female-female workplace bullying on employee measured outcomes, such as motivation, morale and intent to leave is also needed (Lochan Dhar, 2012). Although need for approval was a useful correlate for understanding observed female-female workplace bullying, the scale reliability was marginal. The scale represented a shortened version of Paulhus's (1991) 20-item impression management scale. In future research, if survey length is not a study constraint, the longer scale can be used. Finally, this study used a U.S.-based sample of HRPs, so testing the generalizability to other non-U.S. samples is needed.

CONCLUSION

To our knowledge, this study is the first empirical research to test the relationships of HRP gender, age, career tenure to HRP observed female-female workplace bullying behaviors. Within this research design, the NAQ-R scale (Einarsen et al., 2009) was successfully measured from the HRP perspective. As such, this study's results should best be regarded as exploratory with additional research testing needed. Especially given the fact that government legislation in the US, i.e., Title VII of the Civil Rights Act of 1964, does not cover female-female workplace bullying, increased employer diligence is needed. Unchecked female-female bullying behavior can only hurt an organization's culture. We hope this exploratory paper stimulates follow-up study.

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BUILDING STATISTICAL UNDERSTANDING THROUGH PROGRESSIVE COURSEWORK AND PROJECT-BASED LEARNING

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ABSTRACT

Individuals who make organizational decisions are often college-graduates who have had statistical courses ranging from introductory coursework to advanced work where statistics are used to solve problems with fixed and known outcomes. This work explores using project-based learning in a course designed to provide data-driven recommendations for a live organization by using the Six Sigma problem-solving cycle. The students use data to define the organizational problem; measure the current state; analyze root and contributing causes; and offer improvement actions. Students use both Excel and Minitab, determining the most appropriate tools to employ in each stage to best interpret the data voice and arrive at sound conclusions. Credible, sound solutions are derived for the organization's challenges, thereby providing the students with a much more realistic model of what they may face when met with a management problem in their career and building their confidence in solving organizational problems with data.

INTRODUCTION

Data analysis and interpretation has become a discipline with applications in essentially every aspect of human life. Indeed, from scientific endeavors to sports performance to business management and everywhere in between, the ability to collect, analyze, and interpret the voice of the data is essential to decision-making. The rise of data has provided expansion to data-driven careers, from statisticians who apply statistics to real life problems to data engineers, who ensure the flow of data, to data scientists, who extract meaning and insights from data (Rizvi and Dar, 2017). Gomez and Peter (2017) describe skills associated with data as essential to employability, with employability representing those characteristics that allow an individual to not only get a job, but also keep the job, and find success within it. This notion is consistent with the fact that quantitative skills are routinely used as business tools in the modern economy (Smith, 2014). Smith (2014) further indicates that quantitative skills are rapidly declining in the West.

This work seeks to describe the statistical and data analysis curriculum challenges experienced by students pursuing a Bachelor of Science degree in Management at a small school of business existing within a liberal arts college. Part of this curriculum involves project-based learning, requiring the use of two software platforms, Excel and Minitab. As a result of these challenges, students are queried to determine if they have a better understanding of how to apply statistics and data analysis to actual business decision-making.

BACKGROUND

Smith (2014) provides the notion that students struggle with quantitative research. In his work, he explores factors that may affect the student's proficiency in quantitative research. These are as follows:

1. Student Motivation (Breen & Lindsay, 1999)
2. Competence with Statistical Software (Proctor, 2002)
3. Quantitative Aptitude (Schuhmann et al., 2005)
4. Aptitude for Data Analysis (Onwuegbuzie, 2000)
5. Understanding Statistics (Corner, 2002; Murtonen, 2005)
6. Teacher's Influence (Knox, 1988).

The results of the Smith (2014) study indicated that student motivation, teacher's influence, understanding statistics and an aptitude data analysis were highly correlated with proficiency in quantitative research; however, competence with statistical software and quantitative aptitude were not key drivers. How then can these key factors be grown or strengthened within the classroom setting? Dewey (1938) believed that a balance between traditional and progressive education is needed. He felt that traditional education was too rigid but that progressive education could be too impulsive or unconstrained. He recommended that, to provide such a balance, education must provide some degree

of educationally valuable experience. To Dewey, a quality educational experience allows for continuity, that is, the leaning outcomes of the experience can be carried forward by the learner and can shape future experiences of the learner.

Kolb (1984) provided a four-stage experiential learning cycle that embraces Dewey's experience imperative. The four components of Kolb's cycle are concrete experience, reflective observation, abstract conceptualization, and active experimentation. Kolb identified the need for experience within the first and fourth stages, which suggests the continuity of the experience, as identified by Dewey. Specifically, after a quality experience in the first stage, one processes and learns from the experience during the second and third stages; this is followed by a carrying forward of the learning in the fourth stage.

The work of Dewey and Kolb provide that experiential learning can assist with the key factors noted by Smith (2014), at least in terms of the classroom context: statistical understanding and data analysis aptitude. While these are complex factors, experiential learning has been found to engage students with the curriculum and to enhance their understanding of complex ideas (Papamarcos, 2002). The curriculum followed by the management students at a mid-size liberal arts college embraces elements of the Kolb cycle as students advance from a basic statistics course to an advanced problem-based learning course.

THE COURSE WORK

Students studying the management curriculum at the college where this research took place progress through three required levels of courses involving statistical analysis. Each course is progressively more reliant on realistic experimentation.

The first course is a 200-level course taken mostly by sophomores. Approximately 105 students take this course per semester, and it is taught in three sections. No pre-requisites exist for this course. It is an introductory study of statistical methods as applied to business and economic problems, covering topics such as frequency distributions, measures of central tendency, measures of dispersion, probability, probability distributions, sampling distributions, estimation, statistical inference, and simple linear regression. Further, it has an emphasis on the use and abuse of statistics. The course emphasizes manual calculations without the assistance of software platforms. Here, the instructor provides theoretical foundation, and then gives problem challenges to students, which are to be done either as classroom practice or as homework. In this way, students are able to experiment with the concepts in the classroom setting, while reflecting on weaknesses and strengths in completing the problems. These weaknesses and strengths are then able to be addressed through the homework assignments. The intent of this course is for the students to fully understand the mechanics behind the problem solutions in an effort to enhance their statistical understanding.

The second course is a 300-level course taken primarily by juniors. Approximately 70 students take this course each semester, and it is taught in two sections. Its pre-requisites include the 200-level statistics course described above. This course provides a study of the techniques and tools used in analyzing business and economic data with equal emphasis on estimation techniques and interpretation of results. Simple and multiple regression methods, simple time series analysis, non-parametric techniques, analysis of variance, and surveying are reviewed. The course emphasizes the use of computer software for statistical analysis. Here, the instructor provides theoretical foundation, and then offer the students various data sets throughout the semester that are to be analyzed using the software package. As a result, students are able to experiment with the data sets, which have known solutions, and then correct their analyses when the assignment is evaluated. The intent of this course is for the students to become comfortable with data analysis using software packages.

The third course is a 400-level course taken predominantly by seniors. It is not a statistics course per se, but rather an advanced operations management (OM) course where statistics and statistical and data analysis software are routinely used. Approximately 20 students take this course each semester, and it is taught in one section. Its pre-requisites include both the 200-level and 300-level statistics courses discussed, as well as the first level of operations management, a 300-level course. It applies the concepts learned in the first OM course with an emphasis on the nature of the production, operations, and material functions and their interrelationship with quality. A live project is used to serve as a project-based learning tool designed to provide data-driven recommendations for a course client through the use of the Lean Six Sigma (LSS) problem-solving cycle, that is, Define-Measure-Analyze-Improve-Control (DMAIC) (Brussee, 2004). This framework entails students to work within teams and to apply statistics and analysis

at each DMAIC phase, with no known “correct” answer. It requires flexibility in applying various statistical methods using software tools, such as Minitab and Excel, and to engage with the data to provide the recommendations.

LSS employs DMAIC to systematically effect an improvement in a process wherever such an improvement is needed (Furterer, 2013). These improvements may be in terms of efficiency as well as effectiveness, where efficiency is gained by the elimination or minimization of waste, and effectiveness is gained by achieving consistency in meeting identified targets with virtually zero defects.

Each of the five phases of LSS has a specific goal, and each phase has different tools associated with it, some of which overlap phases. The Define phase has the aim to identify the project’s scope, goal, and objectives as well as to understand the high-level process and that process’s stakeholders, inputs, outputs, and functionality. The goal of the Measure Phase is to understand the process at a more detailed level, identify metrics to characterize the process, and measure it at a base level to serve as a basis for improvement. The Analyze Phase must aim to identify the influencers of the process’s performance. The goal of the Improve Phase is to identify new process operating conditions and improvement recommendations. The Control Phase concerns establishing a plan to ensure that the gains in improvement are sustained.

As a result of using this framework, the intent of this 400-level course is to truly engage in all four phases of the Kolb cycle, with students attempting to take what they have previously learned in the abstract and apply it in live experimentation, with the hope that students become comfortable with the value and ambiguity of data analysis. Such project-based learning is fluid, in that students may look at the data differently, and using the technology available, be able to manipulate the data, analyzing and visualizing it in response to various considerations. In this way, the answers derived are not known outcomes, but instead are credible, sound solutions which may offer excellent solutions for the organization’s challenges, thereby providing the students with a much more realistic model of what they may face when met with a management problem in their career and building their confidence in using statistical software.

PURPOSE

The purpose of this study is to determine if the current statistical and data analysis curriculum progression at a small liberal arts school enhances the understanding of how to apply statistics and data analysis to actual business decision-making of those students pursuing the Bachelor of Science Degree in Management. It is hypothesized that students will perceive that they will be able to apply statistics and data-analysis skills to business challenges they will experience after graduation.

METHODOLOGY

To respond to the purpose of this study, attribute data were gathered using an on-line survey instrument to protect for respondent confidentiality and anonymity. A link to the survey was provided to the current 16 students enrolled in the 400-level course. All respondents were over 18 years of age. The population consisted of 12 men and 4 women. The survey was administered for one week.

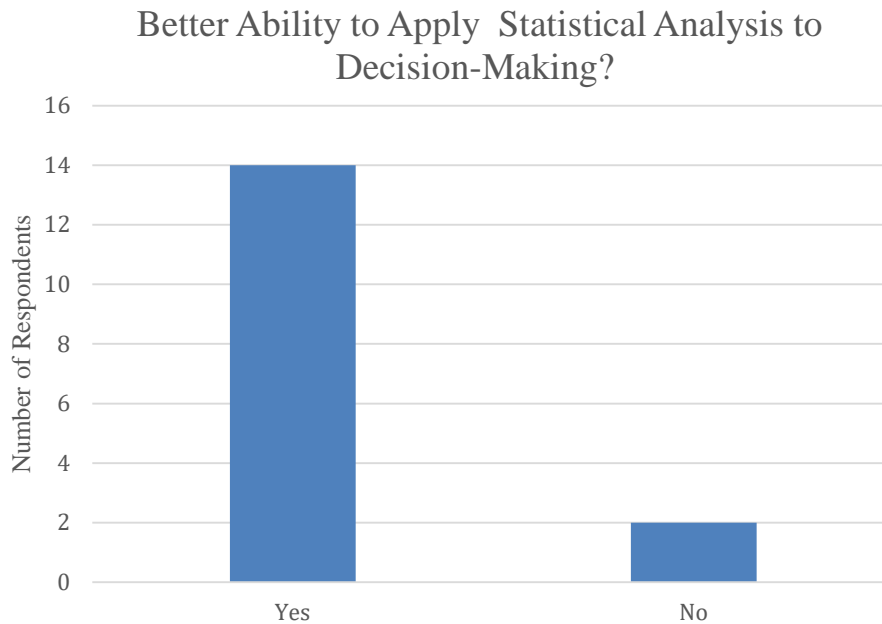
The survey consisted of one question: Thinking about your project, do you have a better understanding of how to apply statistics and data analysis to actual business decision-making?

The answer choices were: Yes; No; I don’t know. The ability to comment was also included. A preponderance of affirmative responses would infer a failure to reject the hypothesis.

RESULTS

After one week, the survey was closed. The results were exported and graphically represented. This graphical representation is noted as Figure 1: Better Ability to Apply Statistical Analysis to Decision-Making?

Figure 1: Better Ability to Apply Statistical Analysis to Decision-Making?



All students appear to have participated in the survey. Fourteen students agreed with the inquiry, while two did not. No comments were offered, nor did any student indicate “I don’t know.” From these results, it appears that progressive statistical studies coupled with problem-based learning facilitates a student’s understanding of how statistical and data analysis is applied to business decision-making.

DISCUSSION

Understanding how to apply statistics and data analysis to actual business decision-making can be considered quantitative research, particularly when considering the DMAIC problem-solving cycle’s reliance on quantitative analysis. As a consequence, these results are consistent with the findings of Smith (2014) whose findings indicated that proficiency in conducting quantitative research was related to data analysis aptitude as well as an understanding of statistics. Indeed, although the use of statistical software was not correlated with a student’s proficiency in conducting quantitative research (Smith, 21014), the project-based learning activity used in the 400-level course required the extensive use of Minitab and Excel to evaluate the data with regard to statistical techniques to evaluate decisions for the course client. Thus, although the software applications were not the drivers of the business-decisions determined for the course client, the applications facilitated the students’ ability to readily coax the data to reveal insights that would might otherwise go unexplored, due to the laborious nature of executing statistics without the aid of software such as Excel and Minitab.

This study’s results are also consistent with Kolb (1984) and Dewey (1938), who each provide insight into applied learning. With regard to Dewey (1938), this project based learning activity at the 400-level provided for a continuity of learning, threaded from the earlier 200-level and 300-level statistics courses. That is, the leaning outcomes of the earlier academic experiences were able to be carried forward by the students to be applied at the 400-level course. Thus, after the concrete experiences and reflective observations found in the 200-level and 300-level course, students were able to conceptualize the application of the quantitative methods and experiment with these methods in the 400-

level course, consistent with Kolb (1984). The students' responses to this study's query suggest the students' confidence in carrying the learning forward in their careers.

LIMITATIONS AND FURTHER STUDY

This study has several limitations. One significant limitation is the inability to know if the students' data analysis aptitude and statistical knowledge were gained in the lower level courses. If the student had extracurricular skill in these areas prior to the 400-level course, then the lower level courses cannot be implicated as key drivers to proficiency in the data-driven business decision-making challenge in the 400-level course.

A second limitation is similar to the first noted limitation in that it is unknown if the student's skill with Minitab and/or Excel was gained from curricular work or some other source. As a result, some students may have been much more proficient in applying the various statistical analyses than other students. Additionally, it was not known if other courses taken by the students used statistical software platforms in other courses, such as accounting or economics.

To control for these limitations, a longitudinal study could be undertaken which selects students into the study who have varying levels of experience with statistics and data analysis as well as experience with software platforms. An assessment of their statistical understanding as it relates to business level decision making could be undertaken at each course level: 200, 300, and 400. In this way, a better understanding of the role of the statistical platforms plays in enhancing statistical proficiency can be made.

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CARVANA: THE DEATH OF A SALESMAN & THE NEW WAY OF CAR BUYING

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ABSTRACT

The use of a 22 billion dollar technology in a trillion-dollar industry sets Carvana apart from other companies in the automobile industry. As the only used car vending machine company in the U.S., the organization is transforming the used car buying experience by giving consumers the option to select from over 36 different car makers, great value and quality, transparent pricing, and a simple no-pressure transaction. The focus of this article is to portray a clear image of a purchasing experience through technology and a custom business model that will forever change the future of car buying. Technology is diminishing the role of car dealerships in the United States and poses numerous threats to new and used car dealerships. However, multiple online, U.S. car dealerships are now chipping away at the advantages held by used car dealerships and the traditional marketplace style of online sales platforms. The Internet has made it easy for customers to complete much of the used car selection process. This article addressed the advantages that Carvana has over its competitors and dealerships in the United States. Although there is limited information available for this organization due to its recent establishment, the objective of this paper is to not only explore the organization's technological infrastructure and growth strategies, but to also contribute to the existing literature about the vehicle shopping experience.

Vending machines are nothing less than genies in today's technological world today. They have added convenience to our purchase habit for simple items ranging from cigarettes, to candies, and drinks, and now to a more complex item such as a used car. A brief history of the vending machine begins with the first of its kind introduced in Egyptian temples in Alexandria and dispenses water in return of coins (Oliveri, 2013). Shortly after WWII, vending machines began to dominate the marketplace. According to Refermat (2018), vending machines are a \$22 billion industry with an optimistic outlook for the coming year.

Carvana has studied the vending machine concept and followed its historical concepts from Egypt to Japan, and now the U.S. The world's first ever, fully automated, coin-operated car vending machine in the U.S. was built in Nashville, Tennessee. This robotic vending machine for cars is state of the art. It is a multi-story structure that delivers customers' cars by merely inserting a custom coin (Williams, 2015). According to Carvana's CEO Ernest Garcia III, "Carvana's mission is to create a better way to buy a car, and this new Vending Machine will be a one-of-a-kind experience that mirrors just how simple and easy we've made it to buy a car online," (Williams, 2015, p. 1).

BACKGROUND

The U.S. used car marketplace is highly fragmented and faces competition from franchised dealers, who sell both new and used vehicles; independent used car dealers; online and mobile sales platforms; and private parties. According to (Singh, Ratchford, & Prasad, 2014), the automobile industry has great economic significance, a large portion of which comes from used car sales. Technological changes and new business models are at the leading causes of disruption in the current business model of most used cars companies. Borrell Associates 2017 Outlook estimated 43,000 used car dealerships in the United States (SEC Filings, 2017). These independent dealerships or used cars dealerships are competitors that primarily sell late-model, used cars. To increase their competitive advantage, the majority of these independent dealerships are incorporating web-based marketing and other web-based tools for both consumers and their respective dealerships. The U.S. automotive industry generated approximately \$1.2 trillion in sales in 2017, which, according to the U.S. Census Bureau, comprised roughly 21% of the U.S. retail economy, making it the largest consumer retail market in the United States (Garcia, et al., 2017). In 2016, Edmunds.com estimated the U.S. used cars sales market at over \$739 billion, representing approximately 38.5 million used vehicle transactions at an average sales price of \$19,189 (Garcia, et al., 2017). Also, in 2016, the average selling price of used vehicles was \$19,866, as compared to the average selling price of new vehicles, which was \$34,449 (National Automobile Dealers Association, 2016). This extreme price difference is one of the main reasons used cars are known as a "free-for-all," affordable for an average household income.

Used car purchasing often presents unknown variables such as unobserved driving and maintenance habits of previous owners and failed screening processes for unsatisfactory units. These unsatisfactory units that sometimes slips onto the purchasing lines might be one reason that used car buying is discouraged. As a result, new used cars dealerships

are focusing their attention to the ‘voice of the customer’ to evaluate and implement new business strategy to meet the customer’s needs. According to the 2016 DealerSocket Independent Dealership Action Report, 81% of American consumers lacks excitement in the car buying process (DealerSocket, 2016). The used car marketplace is a highly regulated industry that requires licenses and permits to conduct business in every operational state, under state and federal regulations. These regulations govern advertising, sales, financing and employment practices, and privacy laws.

Industry Issues

Everybody loves driving home in a new car but hates the traditional process of buying one. The uncomfortable buying experience is multiplied when buying a used car. If you are lucky, you get about 20 minutes, and 15 miles to test drive the vehicle and figure out whether any of the infinite noises you hear are unexpected for that model. You also can evaluate whether the seat will continue to fit you after a lengthy trip, or whether you even like the way it drives. All of these problems have fostered the development of new websites to create easier accessibility for used car buying by offering a fixed price to avoid negotiating, and three months warranty coverage. Additional challenges such as dents, stains, smells, leaks, and a problematic engine that are often prevalent in used cars, make them harder to sell online. In 2016, according to the Independent Dealership Action Report, 29% of American customers do not trust sales people, 32% of the customers agree that the used car buying process was time consuming, and 75% of customers believe that they do not get a fair value on trade-ins at the dealership (DealerSocket, 2016). For these reasons, startup organizations such as Shift, Vroom, and Beepi are growing far more quickly than new car dealerships because they have been able to find solutions to some of these problems. Shift was established in 2014 as an online marketplace for buying and selling used cars. Shift does not keep inventory, offers no warranty, ships cars to three states, and charges fees for each transaction. Vroom, founded in 2013, offers a seven day/250-mile money back guarantee, a three month or 6,000 miles warranty, and no test drive.

Overall, the used car market is frightening, time-consuming, and entails dealing with stereotypical salepeople, only to end up with the result that is less than satisfying. Beepi, an online used car company, recognizes that customers were having an issue with their used car buying experience and decided to find a solution. The company wanted to revolutionize the used car market for the benefit of consumers by bypassing the middleman, the car dealership, and removing unnecessary costs. Such an action could mean higher profits for Beepi, lower prices for buyers, or both. However, Beepi’s flaws were not accounting for picking up and delivering the same vehicle more than once, storing and reselling the vehicle that gets returned, and competing for 100% of online sales space that had already been introduced by other companies like eBay and AutoFi. Additionally, Beepi failed to understand the customer’s needs, and this is where Carvana leads its competitors (Baker, 2017). Founded in 2012, Carvana is one of a few small numbers of companies trying to change how cars are traditionally bought in the dealership. Carvana has also challenged CarMax, the largest used-car retailer in the United States (Baker, 2017). CarMax represent 1.7% of the used cars market, has stores located in 91 television markets, and covers approximately 73% of the U.S. population (CarMax, 2018).

ORGANIZATION HISTORY

A local vehicle distributor or dealership is a physical location that sells new or used cars at the retail level with assistance from the company representative. These sites help account for the limitation of direct sales by automakers and encourages a face to face interaction. With the improvement in technology, an organization like Carvana has introduced a new way of purchasing used vehicles, which enables customers to complete their entire transaction online without going to a dealership. The organization was founded in 2012 with the mission of changing the way people buy cars by replacing the traditional dealership with technology (SEC Filings, 2017). Carvana revenues grew from \$4.6 million in 2013 to \$365.1 million in 2016, accounting for the 180% growth rate (Garcia, et al., 2017). The first quarter of 2017 generated 118% in revenue, which was a record high for the organization (Engage & Carver, 2017), until the organization released its first quarter report for 2018. Carvana’s first quarter report for FY18 displayed a \$360 million in revenue, an increase of 122% as compared to the first quarter of the previous year (Carver & Levin, 2018). Second quarter results exceeded its prior goal with a revenue of \$475 million, an increase of 5% over the first quarter of FY18 (Carver & Levin, 2018). These FY18 early results are impressive for this young organization while opening nine new markets and four new car vending machines. According to Ernie Garcia, “we had a strong first half of the year and are on track for our fifth consecutive year of triple-digit revenue growth in 2018, and our network has allowed us to cover half of the U.S. population” (Carver & Levin, 2018, p. 1).

Over the last 20 years, we have witnessed the auto industry undergo massive changes. A typical customer will choose a dealership, then pick the car followed by an extensive process that would consume most of the customer's time. Carvana's proprietary technology provides a different strategy for customers to shop for cars and schedule delivery online in as little as 10 minutes. Carvana is a Phoenix-based, eCommerce for used cars that makes online auto shopping more compelling by providing more inventory to choose from. This online, Phoenix-based organization provides an inventory of over 1,500 vehicles that have gone through the 150-point inspection process and are ready for delivery within 24 hours (Garcia, et al., 2017). The organization allows buyers to use modern tools that are simple and more efficient, and enables online shopping and trade-in through a vending machine mechanism. Although the organization discourages a face-to-face interaction to cut shopping time, it does provide the option to the customer should they choose to use the service or prefer next-day delivery to residents in nearly two dozen markets. Carvana believes that cutting out the dealership allows the customer the ability to shop 24 hours a day from the comfort of their couch. Carvana supplies a lower cost for the client on every vehicle they sell, a 7-day money back warranty, and a 100 day/4,189 miles worry-free guarantee (Garcia, et al., 2017).

Best Practices

Carvana's business model is very similar to that of Beepi, but to avoid collapsing, Carvana included a differentiator factor. The differentiator factor was the inclusion of a \$22 billion-dollar technological value (vending machine) and an up to \$200 airfare reimbursement option to help address customer's needs. The vending machine technology has been successful in many different market segments to include Coin-Operated Vending Machines (COVM), Coin-Operated Restaurants (COR), and now Smart Vending Machines (SVM). The COVM made its debut in London with kiosks at post offices, and train stations offering envelopes, notepaper, and postcards to customers. In 1902, the COVM machine was enhanced as a COR and started selling more than candy and postcards to customers (PYMNTS.com, 2018). The Vending Machines have since evolved to selling more high-ticket items such as cars, and shapes the customer experience by providing the convenience of a pick-up option and making the car acquisition process memorable.

Similar to retail, organizations will either go the low cost, low-price route or choose the "differentiation path." The beauty of the differentiation strategy is that it is flexible in use; it can be utilized as a merchandise quality or as an organization form of market strategy. Carvana's reputation is dependent upon its differentiation module (vending machine, airfare reimbursement, and 100-day warranty). Carvana's failure will likely be due to costs related to repairs, inspections, and reconditioning, as well as a lack of vending machines and repair centers.

In 2016, the company's used vehicle department grossed a profit of \$1.6 billion as compared to \$1.8 billion in the new cars unit (National Automobile Dealers Association, 2016). This amount for servicing and repair costs could be considered a lost revenue for Carvana. Although the company has a significant increase in revenue and growth, year after year, it is expected that its growth rate could soon decline (SEC Filings, 2017). With more fully automated, coin-operated car vending machines around the country, Carvana will succeed, and that is its best practice.

DISCUSSION, LESSONS LEARNED, AND RECOMMENDATION

Discussion

Unlike Beepi, Carvana has not only understood the frustration customers have with traditional used cars dealerships like CarMax, Drivetime, or used cars auto auctions, it has provided a solution to the frustration. Imagine not leaving your house to purchase a car, having the power to set your price, and longer days to properly test drive your newly purchased, used vehicle without any pressure to return it within a short time limit. Offering options such as these provides the customer with convenience, reducing frustrations normally experienced in person. In 2016, Bigcommerce conducted a study surveying over 1,000 U.S. consumers to assess their online shopping and buying habits. The company said the "results show that 96 percent of Americans are shopping online, spending an average of five hours per week making online purchases and allocating an average of 36 percent of their shopping budgets to e-commerce" (Zackiewicz, 2016, p. 1). Hillary separated the study into groups and realized that 67% of the Millennial demographic and 56% of Generation X prefer e-commerce sites rather than in-store. On the contrary, 41% of Baby Boomers and 28% of senior citizens prefer online shopping to offline (Hillary, 2016). Asaron Zackfia of William Blair & Company

projected Carvana's total revenue to climb to \$7.3 billion by 2020 versus \$365 million last year. He also believed Carvana will inflate into profitability by the fourth quarter of 2018 and generate free cash flow in 2019 (Blair, 2017). If this projection holds, Carvana will become the fastest growing publicly traded company in customer raising revenue. All of these revenues are expected to derive from online customers because this is the platform Carvana is based around.

Lessons Learned

The most Promising Companies' list by Forbes in 2015, included Carvana, just two years after it started. After its public offering in early 2017, investors were not willing to finance the growing losses the organization experienced because of the focused placed on risks versus opportunities. However, the CEO, Ernie Garcia III, was not worried, as he believes that

“if you drew a line from four years ago when we were just an idea to today, I think that's a line with a very steep trajectory. We're going to continue to build the business that got us that trajectory, and we're not going to worry too much about what the stock does in between because we feel strongly that as long as we continue to execute everything is going to be fine” (Korosec, 2017).

Shortly after its public offering, Carvana barely had enough cash to sustain itself for at least one year. As time went on, things began changing for the company. The price of shares fell from \$15 to \$10.70, and closed at \$11.10 (Korosec, 2017). The S-1 IPO filing displayed concerns with future losses before filing for an IPO according to its CEO, which is why the expected loss was a lesson learned from previous experience. Carvana's management team understands that competition is always a match against services and identify that one day it will face its real competitor, the self-driving car. Carvana has learned from CarMax and Beepi how to attract customers and implement service differentiation to match customer needs by making customers lives better.

Recommendation

My recommendation to Carvana is to avoid writing checks to founding members and focus on the expansion of its operation in multiple cities. With its revenue projection of \$7.3 billion by 2020, Carvana should consider partnering up with Tesla to start selling new cars directly to its high-end customers in addition to its used cars inventory. Finally, since the organization relied entirely on external financing for a capital-intensive expansion strategy, the combination of high leverage and elevated cash burn will slow growth efforts.

CONCLUSION

Carvana is trying to change the way individual purchase used vehicle by delivering a better experience, value, and selection with a simple, intuitive website. It is offering customers the ability to buy and finance used cars anytime and anywhere with a 10 minute or less transaction completion time span. Its six-story car vending machines have been shown to accelerate Caravan's customer awareness and market penetration meaningfully. However, every organization faces significant problem during and after their developmental stages and Carvana has overcome its IPO challenge. The organization differentiation strategy and targeted customer groups are credited for determining whether it will outperform and produce more revenues for investors. With a future projection of profitability for 2018, Carvana is issuing a death sentence to salesman and introducing the new way of car buying.

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ONWARD AND UPWARD: A SWEDISH CORPORATE FINANCE COURSE

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ABSTRACT

Business education in Sweden has been characterized as the meeting of Mercury, the god of merchants, with Minerva, the patron of science. The understanding of corporate financing typifies that association, i.e., commerce is depicted in accepted, systematic formulations. The course that is described herein is a master's level finance course at Umeå University in Sweden – Advanced Corporate Finance. The primary purpose of this course is to provide an integrated overview of the most important concepts in Corporate Finance in theory, practice and in some instances method. The course is designed to develop students' ability to do the following:

- assess the impact of information asymmetry on corporate financial policy decisions;
- explain the theoretical basis and applicable strategies applied in corporate control;
- compare and contrast leverage strategies in ideal versus real capital markets and ably explain the impact of alternative taxation systems on the use of debt;
- argue for optimal levels of corporate debt and be able to value an offering under different financing strategies; and
- formulate and logically defend a position in regard to current issues, which confront corporations today.

Highlighted and discussed are measures such as how business valuation can affect various stakeholders, and potential implications are related to ethics and sustainability. A group exercise and case study analysis, used in the course, are covered in the paper. The paper should be of interest to educators and administrators because of Michael Porter's reflection that one of the competitive advantages of Sweden is the universally high educational level of its population.

INTRODUCTION

The virtual meeting between Mercury and Minerva has been used as a metaphor in describing the development of Swedish business schools (Engwall, 2009). That is, Mercury, the god of merchants, has joined Minerva, the patron of science, in business education⁴⁸. Some may even be tempted to say “wed with”; Engwall (2009, p.xiii) is content to characterize this development as a “sparkling meeting”. The premise is that from its very onset, the approach in Sweden has not been to build up from practice, but instead to associate practice with science as it existed at the time. For instance, the association of technological innovation with mass production introduced the need for professional managers who were not the main owners of the corporation that they managed (Engwall, 2009, p.1). History of business education in Sweden can be traced to the seventeenth century and Uppsala where a chair was established (Engwall, 2009, p. 28); developments at Umeå, on the other hand, came rather late, the first chair there was established in 1965 (Engwall, 2009, p. 45).

The understanding of corporate financing typifies the association of commerce being depicted in accepted, systematic formulations. The course that is described herein is a masters' level finance course at Umeå University in Sweden – Advanced Corporate Finance. The primary purpose of this course is to provide an integrated overview of the most important concepts in Corporate Finance in theory, practice and in some cases, method (See Appendix 1). The course is designed to develop students' ability to:

- assess the impact of information asymmetry on corporate financial policy decisions;
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- compare and contrast leverage strategies in ideal versus real capital markets and ably explain the impact of alternative taxation systems on the use of debt;
- argue for optimal levels of corporate debt and be able to value an offering under different financing strategies; and

⁴⁸One consequence of this association is that a caduceus and winged hat are used to symbolize commercial activity and thus business schools (*cf.* Stockholm School of Economics, Umeå School of Business). This icon is frequently confused with the symbol associated with medicine, which was adopted at a later date.

- formulate and logically defend a position in regard to current issues, which confront corporations today.

Highlighted and discussed are measures such as how business valuation can affect various stakeholders, and potential implications are related to ethics and sustainability. A group exercise and case study analysis, used in the course, are covered in the paper.

The paper should be of interest to educators and administrators because of the international interest in finance. They might be specifically interested in Swedish treatment because of Michael Porter's (1990) reflection that one of the competitive advantages of Sweden is the universally high educational level of its population (p. 343). Further, Sweden has taken a leadership role in both sustainability (*cf.* Lindbergh et al., 2016) and sustainability financial reporting (*cf.* Långström et al., 2017). That is, Sweden has been ranked first in Robecosam's country sustainability ranking (Robecosam, 2013, pp. 6-7). Based on the Robecosam framework, Sweden earned high scores across almost all criteria. Perhaps as a consequence, sustainability has been a topic of funded, academic interest within that country. Additionally, since 2014, companies owned by the state have had to make a report based on the Global Reporting Initiative (Swedish Department of Finance, 2013). In 2017 a new EU-directive makes it compulsory for listed companies with 500 employees or more to report sustainability items in their management commentary (Dienes et al., 2016). This has been translated into Swedish law, which makes it compulsory for big companies to have a sustainability report in some form to fulfil some criteria of sustainability factors (KPMG, 2017).

GENERAL BACKGROUND

Business Administration has been taught at Umeå University for the past 50 years, and the Department of Business Administration has been an integral part of the Umeå School of Business and Economics since the School's inception. The Department of Business Administration is the largest unit within Umeå School of Business and Economics (USBE). Currently, close to 80 staff members work with teaching, research and administration related to five traditional areas: Accounting, Entrepreneurship, Finance, Management and Marketing. The Department offers five master's programs, four professional degree programs, a doctoral program and single subject courses, and is organized into four sections: accounting and finance, entrepreneurship, management and marketing. In each of these areas, there is a Master's program and business administration is the main subject in the school's four four-year degree programs (e.g., Civilekonomprogram). There are also courses provided for several other educational programs at the University. In total, the equivalent of about 1,100 full-time equivalent students are enrolled in business administration programs and courses each year.

USBE's programs are a part of the Swedish higher education system, a highly regulated educational environment that includes the stipulation of degree goals and program syllabi. The Swedish government determines the national degree goals, and these are also stipulated in the Higher Education Ordinance, together with standards for program syllabus content required for the specific degree. There are a variety of degrees offered in the USBE program, but the common ones are a Bachelor of Science with majors in business administration, economics, or statistics (180 credits) and a Master of Science with a major in accounting, entrepreneurship, finance, management, or marketing (60 credits beyond the BS). There is also a professional degree of Master of Science in International Business and Economics, which requires 240 credits. Courses normally carry 7.5 credits each, so if a student takes eight courses per year, the equivalent of a BS may be obtained in three years and an MS in four.

Course definitions are formally addressed in a department's Permission to Offer document (POD), which contains the course syllabus. An important part of this document is the expectations of learning section. That is, each POD contains a section that specifies for each course an "after completion, students should be able to ..." specification. The expected learning outcomes are clearly aligned with the degree goals to ensure that courses within the program are designed to support the students in reaching the degree goals. These documents also contain the texts that will be used and pedagogy that will be utilized in course conduct. Generally, these documents are reviewed each spring to see if they remain relevant and are changed when appropriate. Learning within courses tends to be supported by lectures and tutorials, exercises, cases with seminars and labs associated with business activity monitoring. One of the unique features of the Swedish system is that students are voluntarily organized in unions and one of the responsibilities of elected representatives is to see that the terms of these PODs are followed. Other representatives, for instance, sit on the School of Business Board.

In passing, it might be noted that there also tends to be a self-directed learning emphasis within the Department (*cf.* Hiemstra, 1994; Robinson et al., 2016; Lindberg et al., 2017). Consequently, following Sarasin (1999), a teacher's role thus changes to a facilitator of learning in line with an inquiry-based pedagogy. The approach also tends to follow a Swedish study (Graff, 2008) that indicated high-performance individuals tended to learn from a combination of academic and experiential exposure. In this regard, students are expected to independently select, collect, process and analyze both practical and theoretical information as well as function within work groups.

The 10-month academic year is divided into two terms of four, five-week time units. Under normal circumstances, students take a single course per unit, and within their course, teachers prepare their own schedules⁴⁹. For incoming students, their years of matriculation (and consequent course level) are A (1st year), B (2nd year), C (3rd year) and D (4th year). The nature of course conduct varies, but mutual understanding dictates that 40 hours will be spent meeting students. Typically, this takes four to four-and-a-half weeks with a comprehensive examination in the fifth week. It is not uncommon for courses to be shared among instructors on the basis of specific expertise and/or experience. Course grades (pass w. distinction (VG), pass (G), fail (F)) are established on the basis of the written examination, collectively implemented seminars comprising oral preparation, active student participation and frequently a laboratory in business. In order to pass a course, individuals generally are required to pass each part of the course. For those that fail, a make-up exam is offered five weeks after the end of the course. Administrative support for every course is provided through a *studentexpedition* group and exams are proctored by a group dedicated to that specific function. By general practice and regulation, every course is supported by a current home page for the course.

THE COURSE: ADVANCED CORPORATE FINANCE

The course is usually conducted during the second segment of the fall term, October, i.e., weeks 39 through 43. Monday of week 44 is devoted to the four-hour final in the course; the review of that exam is conducted on Friday of week 46. Necessarily, all exams (in the most recent course conduct, 121 exams) are corrected and available to the students before the review. The re-exam is scheduled within the five week allowance, i.e., Monday of week 49 (the schedule for course conduct is attached as Appendix 2). Both the course text and language are English.

Although attempts are made to integrate components of the course, students are graded on three course inputs 1.) 24 chapters of the course text, 2.) a group project that produces a research proposal in corporate finance and 3.) a case analysis, group project. The 24 chapters of the course text are covered in three weeks with four hours review of previous coverage. (The review is necessitated because some students, e.g., industrial engineering grads, come without the proper level of prerequisites.) Both group projects must be passed in order to pass the course. The numerical course score, however, is set by the final exam score and thus determines the pass with distinction (VG) – pass (G) – Fail (F) assessments.

The text for the course is Brealey, R. A., Myers, S. C. and Allen F. (2014). *Principles of Corporate Finance*, 11th Global Edition, Berkshire, England: McGraw-Hill Education. The opening paragraph of the introduction sets the theme of the text, "This book is about how corporations make financial decisions. We start by explaining these decisions and what they are seeking to accomplish". Amazon.com customers gave it a 3.5/5 rating with 49% giving it a 5.0 rating. Highest raters assert its quality; lower ratings tend to be associated with writing clarity and applicability. Additionally, a reading list on relevant concepts is provided for the course (See Appendix 2); these papers are referenced, cited and discussed during the appropriate lectures. They also provide added background for use by students in the two assignments in the course.

Group work, term papers and presentations are standard fare in many Umeå courses. Two assignments were provided in this course 1.) a research proposal (see Appendix 3) and 2.) a case analysis (see Appendix 4). Both these assignments were conducted in four person groups and came due in the last full week of the course. Detailed instructions were given for both project conduct and reporting. These instructions were helpful both to the instructor for grading purposes and also to the students as experiential exercises in project conduct and reporting.

⁴⁹In fact, the homepage for students states, "It is not possible to apply for two full-time courses given the same period of time, as that would mean double (200%) workload for that period and constant schedule collisions." Further, "Full-time courses are given in sequence (one at a time) and not parallel during the whole semester. It is therefore very important to notice the time period in which each course you wish to apply for is offered."

Some topics selected for discussion in the first assignment are shown in Appendix 3. These were selected by individual groups and reflected their interests at the time – some driven by ongoing activities in the business environment, others by interests spurred by reading or in-course discussions. The object was to fulfil the “formulate and logically defend a position in regard to current issues” issue in the syllabus; it also was partial preparation for the course project needed to complete the degree.

Elkington (1999) advocated that a company should be responsible for more than its profit and earnings growth and has developed the Triple Bottom Line (TBL) that focuses on social, environmental and economic sustainability. Discussions in this area were developed by coverage of the Yes Bank case (Purkayastha et al., 2016)⁵⁰. Yes Bank’s is India’s fourth largest bank and its sustainable finance model produced not only short-term profitability, but also assisted in nurturing sustainable business lines that delivered triple bottom-line outcomes in the longer term. Reflections on the questions in Appendix 4 produced the understanding of this concept in a real-world situation. That is, what is sustainable finance and how does it act as a change action among stakeholders?

The final examination for the course is in English and is digested in Appendix 5. It was a four hour examination and consisted of i.) calculation and short answer questions, ii.) multiple choice questions and iii.) essay questions. The essay questions were 52 % of the examination and their content (strategy, control and structure) reflect the learning goals of the course (see Appendix 1). The calculations, short-answer and multiple choice questions were taken from the test bank and were also keyed to the course goals. Two additional pages accompanied the exam. They were i.) a definition of terms that defined “describe”, “explain”, “exemplify”, “analyze”, “discuss” and “reflect”; this need can be appreciated insofar as English was a second language for most students, and ii.) a page of financial formulas sans dependent variables.

EVALUATION AND FUTURE DEVELOPMENT

Student evaluations are mandatory for each course although individual students do not have to make an evaluation. Although evaluation was encouraged, only 23 of the 128 students participated. The overall conclusion from the response, or lack thereof, was that students were pretty satisfied; at least they saw no reason to complain. Most students came to most meetings, and 95% participated in the written exercises. Consensus was that the course required a lot of work, but the course objectives were met by a mix of the learning approaches. The major change for the future will be to incorporate the concept of sustainable finance more deeply into the course; this time it appeared only in the case and deserves more emphasis. The amount of initial review will be reduced and replaced with more coverage of actual course concepts. The readings list will be updated and there is also thought of writing our own case for the course.

⁵⁰ This case was a runner-up in the 2016 aikos Global Case Writing Competition, sustainable finance track, organized by aikos.

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APPENDIX 1: SYLLABUS FOR ADVANCED CORPORATE FINANCE, 7.5 CREDITS

The primary purpose of this course is to provide an integrated overview of the most important concepts in Corporate Finance, both in theory and in practice and in some cases even methodologically. The subject extends the student's knowledge about the context in which corporations operate. Topics to be covered in this course include capital market imperfections and methods developed in finance to control risk and reduce uncertainty in the financial management of corporations. Issues in corporate policy and strategy, based on theoretical developments in finance are presented. Students will learn the processes involved in the valuation of debt and equity and the methods that have been used to manipulate external perceptions of business outcomes.

Expected learning outcomes:

After completing this module, the student should be able to:

- assess the impact of information asymmetry on corporate financial policy decisions from the selection of particular modes of financing to dealing with the problems associated with financial distress
- explain the theoretical basis and applicable strategies applied in regard to issues of corporate control
- compare and contrast leverage strategies in ideal versus real capital markets and be able to explain the expected impact of alternative taxation systems on the use of debt in a firm's capital structure
- argue for optimal levels of corporate debt and/or equity and be able to value an offering of either, under different financing strategies
- formulate and logically defend a position in regard to current issues, such as corporate control and governance, which confront corporations today

Focus of instruction:

- Learning is supported by lectures, as well as in smaller group workshops and seminars.

Examination modes:

- Examination is based upon a written comprehensive individual exam and group assignments.
- A passing grade is required for each part of the module.

APPENDIX 2: COURSE SCHEDULE: ADVANCED CORPORATE FINANCE

Day	Date	Time	Topic	Room	Lect.	Comment
Week 39						
Thu	Sept. 28	10-12	Introduction, Goals and Governance of the Firm	s205h	LL	BM, Review part 1 & 2
Fri	Sept. 29	08-10	cont. review. & present assignments	s205h	LL	BM, Review part 1 & 2
Week 40						
Mon	Oct. 02	10-12	Capital Budgeting	s205h	LL	BM, part 3, ch. 10-12
Tue	Oct. 03	10-12	cont. & Financing Decisions and Market Efficiency	s205h	LL	BM, part 4, ch. 13-15
Wedn	Oct. 04	10-12	cont. & Payout Policy and Capital Structure	s205h	LL	cont. & BM, part 5, ch. 16-19
Thu	Oct. 05	10-12	cont. and Options, incl. Real Options	s205h	LL	cont. & BM, part 6, ch. 20-22
Week 41						
Mon	Oct. 09	10-12	Debt Financing	s205h	LL	BM, part 7, ch. 23-25
Tue	Oct. 10	10-12	cont. & Risk Management	s205h	LL	cont. & BM, part 8, ch. 26-27
Wedn	Oct. 11	10-12	Risk Management	s205h	LL	BM, part 8, ch. 26-27
Thu	Oct. 12	10-12	cont. & Guest lecture, Financial Sustainability	s205h	LL	BM, part 8, ch. 26-27
WEEK 42						
Mon	Oct. 16	10-12	Financial Planning and Working Capital Management	s205h	LL	BM, part 9, ch. 28-29
Tue	Oct. 17	10-12	cont. & Mergers, Corporate Control and Governance	s205h	LL	cont. & BM, part 10, ch. 31-32
Thu	Oct. 19	10-12	Governance and Corporate	s205h	LL	BM, part 10, ch. 33-34
Fri	Oct. 20	08-11	cont. and Guest lecture, M&A	s205h	LL	cont. & BM, part 10, ch. 33-34
WEEK 43						
Mon	Oct. 23	-10	Deadline to submit Assignment 2.		LL	More information on course web page.
Tue	Oct. 24	-	Preparation for presentations and discussions, Assignment 2.		LL	More information on course web page.
Wedn	Oct. 25	08-17	Presentations and discussions, Assignment 2.	ub338	LL	More information on course web page.
Thu	Oct. 26	08-17	Presentations and discussions, Assignment 2.	s205h	LL	More information on course web page.
Fri	Oct. 27	-10	Deadline to submit Assignment 1.	s205h	LL	More information on course web page.
Fri	Oct. 27	08-10	Open consulting	Office	LL	
WEEK 44						
Mon	Oct. 30	09-13	Exam. Obligatory registration.	Ö.P. 3 & 8		
WEEK 46						
Fri	Nov. 17	15-16	Review of exam	s215h	LL	
WEEK 49						
Mon	Dec. 04	14-18	Re-exam. Obligatory registration.	Ö.P. 4		

APPENDIX 2 (CONTINUED): COURSE READINGS

- Bank of America Roundtable (1997). The link between capital structure and shareholder value. *Journal of Applied Corporate Finance*, 10(2), 40-68.
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**APPENDIX 3: INSTRUCTIONS FOR ASSIGNMENT 1:
FORMULATE AND LOGICALLY DEFEND A POSITION**

- a) Sign-up with a friend/colleague, or student currently registered in this course, via the Google docs link provided at the course web page in Cambro (at the same time, please also consider the formation of groups in assignment 2).
- b) Produce a *written report in English*; a maximum of 5 pages, insert page numbers, no cover page, first page shall include title, authors, e-mail, an abstract (200 words), choose *three* appropriate key words (see example below), page format (A4), font (12 pt., Times New Roman), line spacing (single), margins (top and bottom 2,5 cm and left and right margins 3 cm), foot notes (10 pt., simple line spacing), a maximum of 2 pages of appendices, thus in total a maximum 7 pages. For more on format etc, please see “Thesis writing in Business Administration”, for example chapter10-13 (http://www.usbe.umu.se/digitalAssets/167/167326_manual-eng-h15.pdf).
- c) *Connect/refer* to the Expected Learning Outcomes in the Course Curriculum, main text, and articles when possible.
- d) Prepare a brief (see above) “*research proposal*” including; *a problem background, research problem with arguments supporting (and against) a position (see e.l.o. “formulate and logically defend a position”), purpose, theoretical point of departure*, a suggested methodological approach including preferred data, and *reference list*. State clearly how this proposed study connects to the Expected Learning Outcomes. The chosen position has to be addressed in the current course and main text. Also, discuss how the proposed study may be of relevance for both academics and practitioners.
- e) Please also observe Umeå School of Business and Economics and Umeå University’s policies on *plagiarism* and *attempt to mislead* before submitting the report via Urkund. Mail your document, in Word-format, to lars.lindbergh.umu@analys.orkund.se.
- f) **Submission deadline:** Friday, October 27, 2017, at 10.00 (latest, closed thereafter) by uploading your document, in Word-format (not .pdf), in Cambro (title your document in the format: ACF2017_Assign1_GroupXX_1stSurname_2ndSurname_3rdSurname_4thSurname)

Example, see point 1b:

Advanced Corporate Finance, Autumn 2017
Paper related to assignment 1: Formulate and logically defend a position
Group 1
The Dividend Controversy – Private vs Public corporations in Sweden
FirstauthorName Surname and SecondAuthorName Surname
Umeå School of Business and Economics, Umeå University

Abstract

<<200 words>>

Keywords: keyword 1, keyword 2, and keyword 3

<<Continue with your research proposal, see point 1d etc>>

Examples of titles students have chosen to discuss with regard to the first assignment:

1. Stocks options – is it a beneficial CEO incentive to reduce agency costs?
2. The Principal-Agent Problem - Insider Ownership
3. Why should you do an IPO?
4. Share repurchases are more beneficial than dividend pay-outs to shareholders and companies
5. Payout Policy - Dividends vs. Purchase Stock
6. Going public or not
7. Net present value vs. Internal rate of return
8. How incentives can increase profits in the company
9. Stock Options as a Mean to Solve Agency Problems
10. Agency problems - What is the optimal form of compensation plan to increase manager incentives
11. Net present value is the best project evaluation method!
12. Dividends vs Repurchase in public companies: A positive or negative impact on management performance?

APPENDIX 4: CASE COVERAGE AND STUDY QUESTIONS

Case Study “Catalyzing a Shared Sustainable Future: Responsible Banking at Yes Bank” by Debapratim Purkayastha, Benudhar Sahu, and Trilochan Tripathy, ICMR, IBS Center for Management Research, Hyperbad, India.

- a.) Download the case “Catalyzing a Shared Sustainable Future: Responsible Banking at Yes Bank, via the following link <https://www.thecasecentre.org/educators/courses?id=893154&pdid=137168&opid=603015>. Please download it only once (1 time).
- b.) Produce a written report; a maximum 5 pages, insert page numbers, no cover page, first page shall include title, authors, e-mail, an abstract (120 words), choose appropriate key words (see example below), page format (A4), font (12 pt., Times New Roman), line spacing (single), margins (top and bottom 2,5 cm and left and right margins 3 cm), foot notes (10 pt., simple line spacing), a maximum of 2 pages of appendices, in total a maximum 7 pages. For more on format etc, please see “Thesis writing in Business Administration”, for example chapter10-13 (http://www.usbe.umu.se/digitalAssets/167/167326_manual-eng-h15.pdf)
- c.) Connect/refer to the Expected Learning Outcomes in the Course Curriculum, main text, and articles when possible.
- d.) Some of the assigned questions below are partially also addressed in previous courses (and coming courses and modules). Thus, you may of course refer to previous courses and modules but emphasize on the content of this current course.
- e.) Please also observe Umeå School of Business and Economics and Umeå University’s policies on plagiarism and attempt to mislead before submitting the report via Urkund. Mail your document, in Word-format, to lars.lindbergh.umu@analys.orkund.se. Also, upload your document, in Word-format (not .pdf) in Cambro (title your document in the format: ACF2017_Assign2_GroupXX_1stSurname_2ndSurname_3rdSurname_4thSurname) and e-mail your document to the members in the opposing group. You will find their e-mails at the course web page in Cambro, please see “Roster”.
- f.) *Submission deadline:* Monday, October 23, 2017, at 10.00 (latest, closed thereafter).
- g.) Prepare to present, defend, and discuss your report.
- h.) Presentations will take place on Wednesday and Thursday, Oct. 25-26, 2017. For more details regarding presentation order and time, please see document “ACF Assignment 2 Groups” (that will be) uploaded in folder Resources. Your group is expected to attend one seminar (one seminar is two hours). During the seminar your group will present your report in a maximum of 15 minutes. Use the time wisely. After the presentation, your group should be prepared to answer/discuss a couple of questions from your opponents and the audience. Your group will oppose another group. Please see the above-mentioned document regarding which group your group will oppose on and vice versa. The opposing group and the audience will be asked to fill in a form during your presentation. The form includes a number of questions with regard to your presentation. The questions do not ask much about the content but rather about the way you present it. The form will be given to your group and hopefully it will help you develop your presentations skills in the future.

Specific assigned questions (but NOT excluding other aspects of relevance). On the contrary – you are assumed to add and discuss additional issues of relevance to the case and the course.

1. *What is sustainable finance?*
2. *Is there a need for sustainable finance? How can sustainable finance be an advantage over the traditional financial system as a change agent in the financial sector?*
3. *What is Yes Bank doing different that it claims to be a champion of sustainable finance?*
4. *Why did Yes Bank integrate environmental, social, and governance (ESG) criteria with its investment policy?*
5. *Critically analyze Yes Bank’s sustainable finance approach, an initiative to deliver triple bottom-line outcomes in the long run.*
 - 5.1 *Follow-up question 1: How is Yes Bank performing on the social front?*
 - 5.2 *Follow-up question 2: How is Yes Bank performing on the environment front?*
 - 5.3 *Follow-up question 3: How is Yes Bank performing financially?*
6. *How is Yes Bank communicating its sustainable initiatives to its stakeholders?*
7. *What can the bank do to streamline its communication process so that all the stakeholders value its responsible banking initiative?*
8. *Additional issues relevant to the case and the course.*

APPENDIX 5: FINAL EXAM

Umeå School of Business and Economics
 Umeå University
 SE-901 87 UMEÅ

Code: _____
Hand in time: _____

Examination

Course code: Master's Program in Accounting and Finance
 Module 2 Advanced Corporate Finance, 7.5 ECTS
 Date and time: October 30, 2017, 09.00-13.00
 Examination hall: Examination hall

Instructions*(read carefully)*

Umeå University's and Umeå School of Business and Economics' rules and regulations in the examination halls – rules for examinees apply to the examination.

Students are permitted the use of pocket calculator (*with empty memory*), unmarked language dictionary (*i.e. not a financial/business dictionary*) and a summary of formulas (*appended with the exam*).

The exam encompasses 100 marks, calculations and short answers (*24 marks*), multiple choice questions (*24 marks*), and essay questions (*52 marks*). Please check!

Please provide the code given you by the examiners on each page of your exam response. There is **NO NEED** to use separate sheets for each question. For essay questions, it is required to keep the answers well-constructed. For numerical questions, provide complete solutions, including important assumptions and formulas. Only the result will not receive points. If you for any reason do not understand a question, or part of a question, state and explain a realistic assumption and then continue. The questions are to be answered in English.

Submit the entire examination to the inviligator at the end of your examination period or when you complete the exam. The inviligator will also require you to identify yourself and present a valid ID.

Question	<i>Calculations and short answers</i>			<i>Multiple Choice Questions</i>	<i>Essay questions</i>				Sum
	1	2	3	4:1-8	5	6	7	-	
<i>Max no. of marks</i>	8	8	8	24	16	18	18	-	100
Your marks								-	

APPENDIX 5 (CONTINUED): FINAL EXAM

Note: Material is collected from the test bank associated with the text, so no questions are given, but the outline of the exam is presented.

Calculations with short answers (24 marks)

Question 1 *Cost of Capital and Relative Tax Advantage* (8 marks)

Question 2 *Payout Policy* (8 marks)

Question 3 *Payout Policy and Imputation tax system* (8 marks)

Multiple Choice Questions (24 marks)

Question 4:1-8 *Multiple Choice Questions* (8 questions, 3 marks possible each)

Please mark the one correct answer (*considering the main text of this course*) for each of the following multiple choice questions (*3 marks for each correct answer, 0 marks for each incorrect answer, and 0 marks if you mark two or more answers*):

Essay Questions (52 marks)

Please answer the following essay questions using material from the *text book and articles* associated with the course and the discussions during the course!

Question 5. *Corporate Financing Strategy* (16 marks)

Question 6. *Corporate Control and Governance* (18 marks)

Question 7. *Capital Structure* (18 marks)

APPENDIX 6: COURSE EVALUATION

Course and module name Advanced Corporate Finance		
Course is given by section: Accounting and Finance		
Course code/s 2FE108, 2FE144, 2FE196 2FE180		Year and semester 2017 autumn
Students (single subject, participating programs etc)		
Number of students. 2017: 128 registered	Pass-through-rate (<i>genomströmning</i>) after <u>first</u> examination. 2017: 121 wrote the exam, 86.8% passed (17.4% Pass with Distinction and 69.4% Pass)	

1. Suggestion brought forward from previous summary of course valuation.

Unfortunately a guest lecturer dropped out and thus a recommendation for next year would be to add a guest lecturer.

2. Changes made for this time the course was given. Comments on suggestions in box 1 that have been addressed.

It has become much more difficult to get guest lecturers who are willing to lecture in English on issues related to Advanced Corporate Finance. However, during the duration of the course Umeå School and Economics, fifth consecutive Sustainability Day, was held Thursday, October 12, and thus the students did get a chance to meet a number of guest lecturers from USBE, NCC, Inrego, and Sustainergies.

3. Comments for this course occasion (summary of course valuation).

23 (22% female, 17% male, and 14 not specified) out of 128 students chose to take part in the course examination. More than 86% have participated in more than half of the lectures and 65% have participated in 76-100% of the lectures. 87% state that they participated in seminars and other activities to 76-100% (95% in written assignments). 91% state they have spent more 30 hours on average per week during the course (61% more than 35 h/w and 17% more than 40 h/w). A majority of the students perceive that the expected learning outcomes have been addressed to high or excellent level and would recommend this module to a friend. The majority state that there has been a balance of different learning activities during learning during the course.

The teacher's comments on the course valuation:

The course has been given and developed over a number of years and it seems to be appreciated by the students even the workload is admittedly quite high.

4. Suggestions for the next time the course is given (based on box 3).

4.1 (Changes that only affect how the course should be given and does not require a change of syllabus).

With the changes on the 2nd year level accounting and finance courses, for example change of literature and level, it is reasonable to reduce the amount of reviewing in the beginning of the course even though some students have not followed the mentioned courses.

4.2 Changes that may require a change/revision of the syllabus.

None at this time.

PATENTS, TECHNOLOGY, DOWNSIZING AND CHANGES IN IDIOSYNCRATIC RISK

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ABSTRACT

We examine patent filings, technological intensity and changes in idiosyncratic risk around downsizing announcements using the Fama-French-Carhart 4 factor model for both the short term and the longer horizon. The average market reaction to downsizing announcements is negative. However, a significant portion of our sample experiences a positive market response. We consider analyst following and institutional ownership to further elucidate this result. Our findings suggest that the short-term market response to downsizing decisions for firms that do not file patents is negative and that the filing of patents reduces the impact of the negative market reaction. Similarly, technological intensity in the face of downsizing is important, exacerbating the negative market response for firms that fail to simultaneously announce a technological innovation. In the long-term, we find a greater than 1% level of significance associated with change in idiosyncratic risk, technological intensity, patents filed, analyst recommendations and institutional ownership, suggestive that all of these factors contribute to explaining the overall market impact to human capital downsizing events.

INTRODUCTION

Empirical research concerning market responses to human capital reductions documents an association with financial distress, firm size, economic cycles, offshoring, asset changes, financial changes, business focus changes and technology. Palmon, Sun and Tang (1997), Elayan, Swales, Maris and Scott (1998), Hillier, Marshall, McColgan and Werema (2007) and Marshall, McColgan and McLeish (2012) and Cowan, Denning, Anderson and Yang (2018) demonstrate a clear division between positive and negative market responses for initial announcements of corporate downsizing events. The results of Cowan et al. (2018) further hint that there is some implication for the market response to human capital reductions depending on the technology intensity of the firm. We add to the literature by examining the association between human capital restructuring and technology by focusing on patents, firm self-reporting of technological change and the firm's technology intensity as determined by its NAICs code. We conjecture that corporate downsizing and technology intensity may be positively related and therefore may affect the market response to human capital restructuring.

We employ the Fama-French, Carhart four-factor model to document the market reaction to human capital restructuring announcements. To examine the information effect of this announcement we include analyst recommendations and institutional ownership as potentially important attributes of its strength. Seemingly, the more analyst recommendations and the larger the institutional ownership the more intense should be the market response. Within this context, our first innovation is the categorization of firms according to patents filed, technological intensity and self-reported announcements of technological change.

Our second innovation is the consideration of mediator and moderator variables in the examination of human capital restructuring. Baron and Kenney (1986) document this technique, which to the best of our knowledge, has not been used in an empirical examination of the market response to layoffs and job-cuts. Rather than select financial distress or business cycles (commonly associated with downsizings) as mediator or moderator variable we choose the change in firm specific idiosyncratic risk.

Our final innovation is the empirical examination of the longer run implications of human capital reductions. Denning and Shastri (2011) provides some evidence regarding the impact of human capital reductions and long run accounting outcomes. Dichev and Piotroski (2001) provides a method for examining the longer horizon implication of a news event. Bagnoli, Levine and Watts (2005a, b) examines three alternative classes of corporate information events: standard quarterly announcements, standalone guidance events and strategic events. For the strategic events, the lag is more prolonged and the market requires repetition to interpret the information. It seems reasonable that institutional owners and analysts may require more than a few minutes to understand the profit and stock price implications of patents, technological changes or changes in technology intensity. We consider these as strategic events and examine their long run implications.

We examine 1759 announcements of human capital reductions from 385 firms and associated patent filings, technological change and technological intensity, which result in a positive or negative market response. Sixty-eight percent of the layoff announcements occur during a period when patents are filed and 23% of the layoff announcements are from firms that are classified as technologically intensive. The number of patent filings per firm within six months of a human capital restructuring announcement, as well as the number of employees impacted, tend to follow the economic cycle. Approximately 59% of the market responses due to the announcements of human capital downsizing events are negative and 41% are positive. Thus, the short run, overall market response is on average negative. Alternatively, in the long run, the response to human capital restructuring announcements is evenly split (50%/50%) between positive and negative market responses. There is some slight evidence that the long run average market response is positive. The market response to a human capital event varies depending on whether the firm is technologically intense and whether a patent is filed.

When we include the moderator variable, the change in idiosyncratic risk, and consider, analyst recommendations and institutional ownership, the change in idiosyncratic risk has a dampening effect on abnormal returns for both the negative and positive subsamples. The change in idiosyncratic risk modifies the impact of technology for both subsamples. We reason that the market fears that laying off human capital minimizes potential positive exploitation of the impacts of the patents and technology. In the long-run, technological intensity, idiosyncratic risk, patents filed, analyst recommendations and institutional ownership are all significant at less than 1%, suggestive that these factors contribute to the market response to human capital restructuring announcements.

This paper provides insight for both managers and investors. The results of this manuscript suggest that managers should increase the level and frequency of communications regarding the value of patents and new technologies and their potential market gains more effectively. These communications help minimize the time it takes for the information to create an impact on market valuations. For investors, the results presented in this paper suggest evaluating the long run implications of the quality, quantity and frequency of filed patents on market valuations. Section 2 presents the hypotheses development; section 3 presents our data and methodology; section 4 presents the results; and section 5 discusses our conclusions.

HYPOTHESES DEVELOPMENT

We examine the market reaction to announcements of human capital downsizing events (layoffs, job cuts and early retirements) associated with patents filed and issued, technological intensity, as well as announcements of technological change. In this paper, we differentiate between firms that issue patents, and firms that do not, as well as firms that make announcements of technological changes and those that do not. We also differentiate between firms that are technologically intense and ones that are not. Announcements of technological change may take the form of product or process innovation. We expect a technological change to affect manufacturing or service provision by improving or replacing the existing production process, reducing costs or improving the product or service. Changes in operating processes potentially lead to reductions in a firm's workforce. Ex ante, we expect the market to recognize the effect of these changes and reward the firm with a higher stock price.

Anderson, Cowan and Denning (2015) and Cowan et al. (2018) provide evidence that technology intensity has some impact on market performance. The results in these two manuscripts demonstrate that the market amplifies both the negative and positive responses to human capital reductions for technologically intensive firms. Specifically, technology intensity causes the negative market reaction to be more negative and the positive, more positive. However, neither Anderson et al. (2015) nor Cowan et al. (2018) provides evidence that self-reported announcements of technological change have an impact on market performance. Maresch, Fink and Harms (2016) indicates that patents have a positive but lagged effect on firm performance (revenues and profits), and to be effective, patents must deliver innovations quickly. They also find that there is a time lag for the market to recognize the value of the anticipated market potential. Therefore, we consider hypotheses H1A to H1D and H2 (stated in the alternative form).

H1A: Technological innovation, as reported by human capital reducing firms, occurs for all firms in our sample in the same relative frequency for patents filed, technology intensity and self-reported announcements of technology change.

H1B: The number of negative market responses to human capital reducing announcements is approximately the same as the number of positive market responses to human capital reducing announcements.

H1C: There is no abnormal market response to human capital reduction announcements in conjunction with patents filed, technological intensity or self-reported announcements of technological change.

H1D: The strength of the negative market response to human capital downsizing announcements is equivalent to the strength of the positive market response to announcements of downsizing.

H2: The market does not respond differentially to announcements of human capital reductions made in the face of technological innovation, i.e., patents filed, technological intensity or self-reported announcements of technological change.

To consider the market response to human capital downsizing events associated with patents filed, technological intensity and self-reported announcements of technology change, we include idiosyncratic risk in our analysis. The empirical literature in finance provides multiple examples of the consideration of idiosyncratic risk in investment decisions by institutional investors and analysts. Durnev, Morck and Yeung (2004) defines idiosyncratic volatility as a measure of how quickly security pricing incorporates information. Using idiosyncratic volatility, Fang and Peress (2008) finds that mass media publications influence security prices in a general sense, but do not shape opinion or bring about a consensus across analysts. They find a positive relationship between analyst forecast dispersion and media coverage. George and Hwang (2013) finds that when analyst coverage and institutional ownership is low, the relationship between volatility and returns is stronger. Several researchers find a positive and increasing relationship between institutional ownership and idiosyncratic risk, i.e., more institutional ownership correlates to increasing idiosyncratic risk (Sias 1996; Campbell et al. 2001; Xu and Malkiel 2003). In contrast, others find that when institutional ownership has increased idiosyncratic volatility decreases (Zhang 2010; Brandt et al. 2010). Chichernea, Petkevich and Zykaj (2015) argues that institutional ownership and idiosyncratic volatility are related, but depend on the holding period horizon.

Our perspective is different from the above. Like the aforementioned literature, we use institutional ownership and analyst recommendations as proxies for information flow. Institutional investors and analysts may be interested in the impacts on market returns associated with the combination of idiosyncratic risk, patents filed, technology intensity and technological change. Further, senior management may focus on the firm's specific idiosyncratic risk when initiating a human capital downsizing event. We therefore use the change in idiosyncratic risk to modify the relationship between market returns generated by the human capital downsizing event and the various other variables, including technology intensity, number of patents filed, announcements of technological change, analyst recommendations, and number of institutional investors. Therefore, we consider hypotheses H3A and H3B (stated in the alternative form).

H3A: As a mediator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings.⁵¹

H3B: As a moderator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings.

Theoretically, the market fully captures the information content of an announcement of a corporate event in a few minutes. However, the firm's decision to file a patent or initiate a new technology involves increased uncertainty, the information content of which may not be resolved immediately. Analysts who focus on the firm or the industry will take some time to understand the new patent application or technology and its implications for firm value and stock valuation. Considering R&D investment, a form of technology innovation, Lev and Sougiannis (1996) estimates that the average duration of R&D investment ranges from 5 to 10 years. Total future earnings range between \$1.66 and \$2.63 for each \$1 of current R&D spending. This finding suggests there may be considerable security valuation consequences and time delays associated with patent filings and technology innovations.

Liu (2006) demonstrates the uncertainty and the positive relationship between long run cross-sectional abnormal returns and technology depth. Some innovations are very valuable and others less so. Liu examines one to six-month abnormal returns and the depth of analyst following. Despite eliminating news announcements about negative innovative outcomes, he finds a long run negative drift in abnormal returns despite the positive announcement period abnormal return. This positive abnormal return, followed by the negative one in the long-run is robust to both various benchmarks and various procedures for calculating abnormal returns. Considering R&D reductions, or a decrease in dollars spent on innovation, Chan, Lin and Wang (2015) find a positive abnormal return in the short-run but a long-

⁵¹We measure the change in idiosyncratic volatility around the event (-102,-2) ~ (+2+102).

run negative abnormal return associated with a decrease in innovative technology. Kannan (2016) notes that layoff decisions have long run implications for share price performance and for corporate strategic decisions. Kannan (2016) further finds that nearly 32% of these firms do not actually experience a decline in their work force. The short run abnormal returns appear quite similar for those firms reducing their work force (68%) and those that effectively do not (32%). However, the long-run abnormal returns are different. Long-run abnormal returns are on average higher for firms that do downsize their work force.

The above-mentioned empirical evidence suggests that there are long runs implications for market returns resulting from technological changes, innovations and downsizings. Further, the directional impacts of the long run return are uncertain. Therefore, we consider hypotheses H4 and H5A and B (stated in the alternative form).

H4: There is no long-run market reaction to an announcement of a human capital reduction and the associated technology change.

H5A: As a mediator, the change in idiosyncratic risk does not affect the market's long-run reaction to human capital restructurings.

H5B: As a moderator variable, the change in idiosyncratic risk does not affect the market's long-run reaction to human capital restructurings.

DATA AND METHODOLOGY

Data

Data on patent filings are available from 1980 to 2010 and are not available publicly after 2010 (Kogan, Papanikolaou, Seru and Stoffman, 2018). We obtain the sample of human capital-restructuring events from ProQuest National Newspapers Expanded, which contains 27 national newspapers and 13 databases. Searching ProQuest U.S. National Newspapers Expanded over the period identifies over 100,000 news articles concerning work force reductions which are cataloged as early retirements, job cuts, layoffs and corporate downsizing events. The sample includes firms of varying asset and market sizes and all NAIC industrial classifications. Survivorship bias occurs if we collect the sample in a forward manner; therefore, we collect the sample backward in time to 1981. To make the size of the sample manageable we consider only firms in the Large Capitalization (S&P500) Index, Mid-Capitalization (S&P 400) Index and Small Capitalization (S&P 600) Index. This approach captures both the 2010 S&P Index firms and those deleted from any of the indexes during the previous time-periods. The resulting sample includes 2762 firms with 385 making 1759 announcements of layoffs, job cuts and early retirements. We include a human capital event only if it was the first announcement of a specific downsizing. We exclude any additional follow-on announcement occurring within the six-month window.

Bloomberg provides analyst recommendations and data, such as the number of analysts covering a given stock, the stock rating and the date. Bloomberg identifies the number of analysts covering a given stock, the stock ratings, and the date. We include only observations for which there are two or more analyst recommendations. SEC Edgar filings provide institutional ownership data. Finally, we map the analyst and the institutional ownership data into our human capital reduction sample by ticker symbol and date. Two hundred and fifty-five out of 385 firms in our sample have matched records.

Figure 1 provides a visual depiction of the number of human capital reduction announcements and the magnitude of the labor force affected each year. The number of employees affected peaks during downturns in the economy. The peaks for the announcements of the human capital downsizing events coincide with the recessions in 1991, 1998, 2001 and 2008, with the actual number of employees affected peaking a year earlier in 1990, 1997, 2000, and 2007. Managing the flow of information about layoffs and other human capital events is increasingly important with the ever-growing number and varieties of ways in which information reaches the market place and impacts the market results.

Figure 2 segments the sample of 1759 human capital announcements into a matrix containing technology intensive, patent change and self-reported technological changes. In the horizontal dimension, Figure 2 uses the Paytas and Berglund (2004) NAICs classification scheme to categorize the sample into technologically intensive and non-intensive events. In the vertical dimension, we classify number of human capital announcements by patent changes

(or announcements of technological changes) and no patent changes (or no announcements of technological changes). For firms that are technologically intensive and file patents, there are 401 announcements of human capital downsizing events. For firms that are not-technologically intensive and file patents, there are 791 human capital reorganization events. For the total of both technologically intensive and not-technologically intensive firms that file patents, there are 1192 announcements. For firms that are technologically intensive and do not file patents, there are 32 announcements of human capital reducing events. For firms that are not-technologically intensive and do not file patents, there are 535 announcement of human capital downsizing events. Firms that did not file patents generated 567 human capital reorganization announcements.

Figure 3a displays the total patents filed and issued from 1980 to 2010 in the United States (Kogan, et al., 2018). The total number of patents issued increased from 22,820 in 1981 to 74,615 in 2010.

Figure 3B displays the patents filed and issued for our sample firms. The sample number of patents issued increased from 2,770 in 1981 to 23,810 in 2010. In 1981, our sample contains 12.1% of the total number of patents issued and increases to 31.9% of patents issued in 2010. The peaks for total filed and issued are different, with those filed peaking in 2000 at 82,996 and those issued in 2006 at 78,298. The peaks for the sample filed and issued are different, with those filed peaking in 2002 at 28,210 and those issued in 2006 at 25,379. Figures 3b, 3c and 3d display the increasing importance of patents as proxies for technological innovation in our sample of firms making announcements of human capital restructurings.

Figure 3c combine our firm sample and the U.S. patents sample by mapping 228 out of 385 sample firms to patents. Figure 3c indicates the number of patents filed and issued per firm. It shows that the amplitude of patents filed and issued increased during the period 1980 to 2010 as technological change accelerated. Figure 3d isolates the patents issued and filed within six months before the human capital layoff event and is relevant for our short-term analysis. Figure 3e isolates the patents issued and filed within six months after the human capital layoff event. This may be an indicator of the long-term relationship between patents and announcements of human capital downsizing events.

Fama-French-Carhart Four-Factor Model

We develop cumulative abnormal returns (CARs) from the Fama-French (1992, 1993, 1996) and the Carhart (1997) value weighted models.⁵²

$$R_{it} - R_{ft} = \alpha_{it} + \beta_{i,MKT}(R_{mt} - R_{ft}) + \beta_{i,SMB}SMB_{it} + \beta_{i,HML}HML_{it} + \beta_{i,MOM}MOM_{it} + \varepsilon_{it} \quad (1)$$

$$AR_{it} = (R_{it} - R_{ft}) - \hat{\beta}_{i,MKT}(R_{mt} - R_{ft}) - \hat{\beta}_{i,SMB}SMB_{it} - \hat{\beta}_{i,HML}HML_{it} - \hat{\beta}_{i,MOM}MOM_{it} \quad (2)$$

Where

AR_{it} = the abnormal returns on the i th stock in time t

CAR_{it} = the cumulative abnormal returns on the i th stock in time t

R_{mt} = the market return in time period t

R_{ft} = the risk free rate in time period t

SMB_t = thereturns on a small – sized portfolio minus a large – sized portfolio

HML_t = the difference in the returns on a high and low book-to-market portfolio

MOM_t = the montly difference in the returns between winners and losers.

⁵² We are grateful to Kenneth French for making the data on the four factors available for download from his website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

$$CAR_{it} = \prod_{\tau} (1 + AR_{\tau}) - 1$$

where

$\tau = (-1, +1)$ and $(0, +1)$ for the short term; and $\tau = (+2, +128)$ for the long term. R_{mt} , R_{ft} , SMB_t , HML_t and MOM_t are obtained from Kenneth French's website. Their definitions can be found at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_factors.html http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_mom_factor_daily.html.

$\hat{\beta}_{i,MKT}$, $\hat{\beta}_{i,SMB}$, $\hat{\beta}_{i,HML}$, and $\hat{\beta}_{i,MOM}$ are the factor loadings of stock i estimated using (1).
 ε_{it} = error term, $E(\varepsilon_{it}) = 0$, $Var(\varepsilon_{it}) = \sigma^2$.

For each event date, we compute a stock's coefficient estimates using the data in the estimation window of 100 days starting on day $t=-150$ and ending on day $t = -51$. We perform a time-series regression for each stock on each event date t . In our short run analysis, we use the event intervals $t = (-1, +1)$ and $t = (0, +1)$ to consider the announcement effect of the corporate restructuring. To develop our long run analysis, we use a six-month interval forward of the announcement date, $(t = +2, +128)$, corresponding to the number of trading days in the six months.

Mediator and Moderator Models

Baron and Kenny (1986) provide a three-step econometric approach to understand the relationship between independent variables and a dependent variable in a time series or cross-sectional regression. Our dependent variable is the cumulative abnormal returns from equation 2 above. Our independent variables include patents filed, technology intensity, self-reported announcements of technological change, analyst recommendations and institutional ownership. We select the change in idiosyncratic risk around an event date as our mediator or moderator variable. Figure 4 depicts an illustrative relationship among three variables: cumulative abnormal returns, patents filed and the change in idiosyncratic risk.

For example, the moderator variable, change in idiosyncratic risk, influences the independent variable, patents filed, to transform how the independent variable (patents filed) explains the dependent variable, CARs. Just as the Fama-French Carhart four-factor model explains a return, we modify the residuals by extracting the change in idiosyncratic risk from them. If the change in idiosyncratic risk is statistically significant when we regress it against CARs, i.e., if it stands alone and acts directly on the dependent variable, then we use it as a mediator variable. As a moderator variable, the change in idiosyncratic risk works in conjunction with other independent variables on the dependent variable, i.e., the Fama-French Carhart four-factor residuals. Intuitively, firms filing patents while simultaneously reducing human capital may experience changes in firm specific risk.

We modify Baron and Kenny's (1986) three-step approach for use in our stepwise regression process. In step one, we regress CARs using ordinary least squares against each independent variable to determine that the relationship is statistically significant. Baron and Kenny's approach requires statistical significance in this step. As an illustration, we use total CARs as well as positive and negative CARs as dependent variables and regress them against patents filed or issued that is:

$$C_{it} = \alpha_{it} + \beta_i v_{it} + \varepsilon_{it} \quad (3)$$

where

v_{it} = patents filed for firm i (we then replicate this step for each of the independent variables).

In step 2, we develop the mediator/moderator variable using a variation of the methodologies of Aharony, Jones and Swary (1980), Unal (1989), Waheed and Mathur (1995) who examine risk changes. We partition the variance of returns ($VAR(R_i)$) on each firm i 's stock into systematic risk (SYS_i) and idiosyncratic risk ($Var(\varepsilon_i)$) and use the four-factor event study methodology to develop the slopes and residuals. We compute the pre- and post-variances for each event using the residuals and calculate the change in idiosyncratic risk for each event on a pre-announcement, $t = (-102$ to $-2)$, to post-announcement, $t = (+2$ to $+102)$ basis. We measure changes in the variance as

$$\Delta Var(R_i) = \frac{Var(R_{i,post}) - Var(R_{i,pre})}{Var(R_{i,pre})} \quad (4)$$

We calculate systematic risk based on the four-factor model of Fama-French (1993) and Carhart (1997), using Bali, Brown and Caglayan (2012), where

$$R_{it} = \alpha_{it} + \beta_{i,MKT}(R_{mt}) + \beta_{i,SMB}SMB_{it} + \beta_{i,HML}HML_{it} + \beta_{i,MOM}MOM_{it} + \varepsilon_{it} \quad (5)$$

where R_{it} is the excess return on stock i and MKT_t is the excess market return. The total risk is the variance of R_{it} :

$\sigma_i^2 = VAR(R_i)$. The idiosyncratic risk is the variance of ε_{it} : $\sigma_{\varepsilon_i}^2 = VAR(\varepsilon_i)$. The systematic risk of stock i is defined as the difference between total and unsystematic variance: $SYS_{it} = VAR(R_i) - VAR(\varepsilon_i)$

We then measure changes in systematic risk as $\Delta SYS_i = \frac{SYS_{i,post} - SYS_{i,pre}}{SYS_{i,pre}}$. We measure changes in idiosyncratic risk as

$$\Delta \text{ idiosyncratic risk} = \Delta Var(\varepsilon_i) = \frac{VAR(\varepsilon_{i,post}) - VAR(\varepsilon_{i,pre})}{VAR(\varepsilon_{i,pre})} \quad (6)$$

We then regress the mediator/moderator variable against the independent variables using ordinary least squares regression to determine whether it is statistically significant, that is

$$ME_{it} = \gamma_i + \sum_{i=1}^n \beta_i V_{it} + \varepsilon_{it} \quad (7)$$

where

$$ME_i = \Delta \text{ idiosyncratic risk} = \frac{VAR(\varepsilon_{i,+2,+102}) - VAR(\varepsilon_{i,-102,-2})}{VAR(\varepsilon_{i,-102,-2})} \quad (8)$$

In the final step, we include the mediator/moderator variable in the stepwise regression. The moderator model is the more general model with both the standalone moderator variable and the interaction terms between the moderator variable and the independent variables.

Short Term Stepwise Regression using the Baron and Kenny Mediator/Moderator Approach

We use Baron and Kenny's (1986) three-step process to develop the mediator/moderator variable (change in idiosyncratic risk) and then we estimate the parameters and statistics using stepwise regression analysis at both a 5% and 10% cutoff level of significance. The regression introduces the independent variables one at a time. If the variable is significant at the 5% stay level, we retain the variable. If it is not significant, then the procedure removes the variable and selects the next variable. Each variable enters at the either the 5% or 10% cutoff level and is retained at the stay level of 5% depending on which stay level we establish in SAS. This process continues through all variables. Equation nine provides the short-run model.

$$C_{it} = \alpha_{it} + \beta_1 x_{1it} + \beta_2 x_{2ikt} + \beta_3 x_{3it} + \beta_4 x_{4it} + \beta_5 x_{5it} + \beta_6 x_{1it} x_{2ikt} + \beta_7 x_{2ikt} x_{5it} + \beta_8 x_{3it} x_{5it} + \beta_9 x_{4it} x_{5it} + \beta_{10} x_{1it} x_{2ikt} x_{5it} + \varepsilon_{it} \quad (9)$$

where

$C_{it} = CAR$ for firm i for time t , where $t = (-1, +1)$, $t = (0, +1)$

$$x_{1it} = \left. \begin{array}{l} 1 = \text{technologically intensive in time } t \text{ for firm } i \text{ classified by Paytas \& Berglund (2004)} \\ \text{six digit NAIC} \\ 0 = \text{not technologically intensive} \end{array} \right\}$$

$x_{2ik(t-6,t)} = \text{patents, } k = 3, 4$

$$k = \left\{ \begin{array}{l} 3 = \text{the natural log of the number of patents filed within the six months} \\ \text{before the event window } (t - 6) \\ 4 = \text{the natural log of the number of patents issued within the six months} \\ \text{before the event window } (t - 6) \end{array} \right\}$$

$x_{1it} x_{2ik(t-6,t)}$ = cross impact of the technology intensive and patents issued or filed for firm i in time t

x_{3it} = the percent of sell or buy recommendations issued by analysts following firm i in month t

x_{4it} = the percent of shares of firm i owned by institutional investors at the quarter end

x_{5it} = the mediator variable, i. e., change in idiosyncratic risk
 $x_{2ik(t-6,t)}x_{5it}$ = cross product of patents issued or filed and moderator variable ($t - 6$)
 $x_{3it}x_{5it}$ = cross product of sell or buy recommendations and the moderator variable
 $x_{4it}x_{5it}$ = cross product of shares owned by institutional Investors and moderator variable
 $x_{1it}x_{2ik(t-6,t)}x_{5it}$ = cross impact of technology intensive, patents issued or filed
($t - 6$), and change in idiosyncratic risk for firm i in time t
 $\alpha, \beta, \varepsilon$ = intercept, slopes and error term respectively

We conduct the analysis on the full sample, and negative and positive market response subsamples. Table 5 presents the short-term results.

Long-term Stepwise Regression model using Baron and Kenny Mediator/Moderator Approach

The market may require time to internalize the implications of changes in technology or patents on firm performance and market returns. Following Dichev and Piotroski (2001), we examine the long run market reactions to human capital reorganizations in conjunction with changes in technological intensity, patents filed and announcements of technological change. We use a similar research design as in the short-term model (see section 3.3). That is, we regress the long-term CARs on the same regressors for full, negative and positive market responses, respectively. We use an uncontaminated six-month interval forward of the announcement date of the layoff to develop the long run CARs ($t = +2, +128$).

$$\begin{aligned}
 LTC_{it} = & \alpha_{it} + \beta_1 x_{1it} + \beta_2 x_{2ikt} + \beta_3 x_{3it} + \beta_4 x_{4it} + \beta_5 x_{5it} + \beta_6 x_{1it} x_{2ikt} + \beta_7 x_{2ikt} x_{5it} + \beta_8 x_{3it} x_{5it} \\
 & + \beta_9 x_{4it} x_{5it} + \beta_{10} x_{1it} x_{2ikt} x_{5it} + \varepsilon_{it}
 \end{aligned} \tag{10}$$

where,

LTC_{it} = the 6 – month CAR for firm i for time, $t = (+2, +128)$

x_{jkit} = j th variable for the k th patent type for firm i in time period t

(see section 3.3 for detailed definition of the variables)

$\alpha, \beta, \varepsilon$ = intercept, slopes and error term respectively

Table 6 presents the long-term results.

RESULTS

Short-Term Results: Frequency, Number and Abnormal Responses to Human Capital Reduction Events and Simultaneous Announcements of Technological Change or Intensity or Patents Issued

Table 1, Panel A shows the actual distribution of announcements of human capital reorganizations by technological intensity and announcements of patent issued. Table 1, Panel B shows the actual distribution of announcements of human capital reorganizations by technological intensity and self-reported announcements of technological change. The Chi-Square statistic is significant at less than 0.0001 probability for patents issued ($X^2 = 162.3017$), but is not significant for self-reported announcements of technological change. Therefore, patents are an important distinguishing characteristic for firms laying off employees, but self-reported announcements of technological change are not. We reject hypothesis 1A for patent filed, but not for announcements of technological change.

In addition, the ratio of negative to positive CARs in Table 2, column 5 for the total sample and the subsample splits of technological intensity and patents issued are statistically significant at the 1% level. Additionally, the ratio of negative to positive CARs in Table 3, column 5 for the total subsample and the subsample splits of technological intensity and announcements of technological change are significant. The combination of these results causes us to reject the null hypothesis (H1B) that the number of negative events is approximately the same as the number of positive events. There are statistically more negative than positive announcements of human capital reorganization events.

Figure 5 depicts the distribution of the four-factor cumulative abnormal returns. Approximately, 59% of the announcements exhibit negative CARs and 41% positive CARs.

The short-run hypothesis H1C considers the abnormal market response to human capital reduction announcements in conjunction with patents filed, technological intensity or self-reported announcements of technological change. Table 2 examines cumulative abnormal returns for announcements of human capital reductions using the classification scheme based on patents filed and technological intensity described in Table 1, Panel A. Table 3 examines cumulative abnormal returns using technology intensity and self-reported announcements of technological change, as in Table 1, Panel B. Table 2 and Table 3 (column 4) demonstrate that hypothesis H1C is rejected. We find a statistically significant negative abnormal response to patents issued, technological intensity and human capital reductions, as well as to self-reported announcements of technological changes, technological intensity and human capital layoffs.

For hypothesis H1D, we consider the strength of the negative market response to human capital downsizing announcements and whether it is equivalent to the strength of the positive market response to announcements of downsizing. The strength of the negative market response for firms that announce a human capital downsizing is greater for firms with negative cumulative abnormal returns than for firms with positive returns. The ratio of positive to negative announcements of human capital layoffs is statistically significantly different from one (Tables 2 and 3, column 5). In addition, the overall market response to human capital reductions as depicted in Tables 2 and 3, column 4 for the total sample is statistically negative. We therefore conclude that the intensity of the negative market response to the layoffs announcements is statistically significantly stronger than the intensity of positive market response to the layoff announcements. We therefore reject hypothesis H1D.

Differences in Market Responses to Human Capital Reductions, Technological Intensity, Patents Filed, and Announcements of Technological Change

For hypothesis H2, we consider whether the market responds differentially to announcements of human capital reductions made in conjunction with technological innovation, i.e., patents filed, technological intensity or self-reported announcements of technological change. Table 4A displays a mean difference test of the market responses for the total sample of announcements. Using the Fama-French-Carhart Four-Factor model, which adjusts the abnormal returns for firm size, market to book effects and momentum, the results indicate that patents filed, technological change and intensity matter. The results in Table 4, Panel A indicate that patent filings, in conjunction with human capital reducing efforts, by both technologically ($t = 3.86$) and non-technologically intensive ($t = 2.77$) firms positively affect the returns of those firms. Firms that do not file patents within a six-month window of a human capital restructuring action and are technologically intensive experience a larger, statistically negative return than those firms that are not technologically intensive ($t = -3.32$).

Table 4, Panel B indicates that firms that are not-technologically intensive and do not announce technological changes within six months of a human resource reduction see a significantly negative impact on their returns ($t = -2.12$), whereas those that are technologically intensive do not ($t = 0.68$). For firms that are not announcing a technological change, but are technologically intensive, the market reacts more negatively than for not-technologically intensive firms ($t = -2.48$). For hypothesis H2, there are differences in market responses to human capital reduction announcements based on patents filed, the technology intensity of the firm and announcements of technological change. We therefore reject hypothesis H2.

The average market response to a human capital reduction announcement is consistently negative. When a firm lays off employees and files a patent, the market responds less negatively than if it does not file a patent. The market responds similarly whether for a patent filing ($t = -1.54$) or there is a self-reported announcement of a technological change ($t = 1.28$).

Stepwise Regressions Using Mediator and Moderator Variables

We examine the market response to human capital reductions using stepwise regressions based on the Baron and Kenney (1986) mediator and moderator model approach. We examine hypotheses H3A and H3B, as a mediator or moderator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings. We do not reject hypothesis H3A, that as a mediator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings. We conclude this since our Table 5 results do not include idiosyncratic risk as a standalone variable. i.e., it was not statistically significant. However, as a moderator variable, we do reject H3B, i.e., that the change in idiosyncratic risk does not modify the relationship between one or more of

the independent variables and the dependent variable. We analyze the data in three segments: the total CARs sample, the negative CARs subsample and the positive CARs subsample. Our process systematically introduces the right-hand side variables at the 5% cutoff level and then on a subsequent iteration at the 10% cutoff level for examination of statistical significance. We show the results of both cutoff levels in Table 5, Panels A and B. Note that we only show variables that have a 5% stay level of significance.

For the total sample, the only variable that is significant is analyst recommendations; seemingly, the negative and positive subsample results offset each other. Analyst recommendations acts as a proxy for information availability and is significant at better than the 1% level. The negative coefficient ($F = 5.37$) associated with analyst recommendations intensifies the average negative market response due to the information value provided by their insights. The overall regression F-statistic is significant at better than the 5% level. Table 2 and Table 3 indicate that there is a statistical difference in the market responses of firms with positive and negative results; consequently, we examine these subsamples separately in Table 5, Panels A and B.

Panel A examines the results using the subsample of firms with negative responses to announcements of human capital reductions, and Panel B, those with positive market responses. We include the change in idiosyncratic risk as our moderator variable in both panels as a cross product with other right-hand side variables. Note that the change in idiosyncratic risk as a standalone mediator variable is not statistically significant at either the 5% or the 10% cutoff level and is excluded from the reported regression results.

Examining Table 5, Panel A for the stepwise regression using the negative subsample, the first column labeled “Variable p-value ≤ 0.05 cutoff with a 5% stay” indicates the cutoff and stay criteria. The only explanatory variable (other than the intercept) that is statistically significant is institutional ownership ($F = 7.15$) which is significant at the greater than 1% level. The regression analysis is complete since there are no other variables that meet the 5% cutoff significance level.

Moving to the right of the Table 5, Panel A to the five columns with the label “Variable p-value < 0.10 cutoff level with a 5% stay level”, we indicate the stepwise procedure results. The first variable added in the sub-column labeled “(1) First statistically significant variable” is again institutional ownership ($F = 7.15$). However, in the next column labeled “(2) Second statistically significant variable”, the cross-product variable, institutional ownership * change in idiosyncratic risk ($F = 3.61$) is added. In the third column, patents filed * change in idiosyncratic risk ($F = 7.35$) is added; in the fourth column, tech intensive * patents filed * change in idiosyncratic risk ($F = 3.81$) is added; and in the fifth column, analyst sell recommendations ($F = 3.53$) is added as a standalone variable. Announcements of technology change as a standalone variable or with the mediator variable, change in idiosyncratic risk as a standalone variable are not statistically significant at the 10% level or better and do not enter the regression. The overall regression F-statistic is 5.51 with a significance of greater than 1% suggests that our proxies for information, that is institutional ownership and analyst sell recommendations, as well as patents filed and technological intensity, as moderated by the change in idiosyncratic risk, are instrumental in explaining the negative market response when firms announce human capital reductions.

Examining Table 5, Panel B for the results of the stepwise regression using the positive subsample, the first column labeled “Variable p-value ≤ 0.05 with a 5% stay” indicates the cutoff and stay criteria. Note that the first statistically significant variable meeting the 5% cutoff criteria is the negative coefficient of analyst buy recommendations*change in idiosyncratic risk cross product ($F = 11.36$); the second statistically significant variable is the negative coefficient of institutional ownership ($F = 7.74$); and the third is the positive coefficient of analyst buy recommendations ($F = 4.19$). All three variables are significant at the 5% level. The final regression using the positive subsample is significant at greater than one percent level with an $F = 7.95$ and an $R^2 = 0.0867$. The coefficient on analyst buy recommendations is significant and positive and reinforces the positive return. Using the moderator variable, change in idiosyncratic risk, along with analyst buy recommendations, the coefficient becomes negative and significant. Therefore, we infer from this stepwise regression of positive announcement period returns corresponding to human capital downsizing events that the market response is associated with an increase in idiosyncratic risk. The higher the change in idiosyncratic risk the larger the dampening effect on the positive market response. In the first round, there are no additional variables added with the 5% enter and 5% stay criteria.

In the portion of the table labelled “Variable p-value ≤ 0.10 cutoff level with a 5% stay,” we add a final column with two additional variables. Starting with the first column under this heading we find that the coefficient of the cross

product of analyst buy recommendations*change in idiosyncratic risk is negative and significant ($F = 11.36$); and in the second column, the negative coefficient of institutional ownership is significant ($F = 7.74$). In the third column, the coefficient of analyst buy recommendations is positive and significant ($F = 4.19$). In the fourth column the coefficient of the cross product of technological intensity*change in idiosyncratic risk is positive and significant ($F = 12.22$); and in the fourth column, the negative coefficient of the cross product of technological intensity*patents filed*change in idiosyncratic risk is significant ($F = 14.2$). The final regression, using the positive subsample, is significant at greater than one percent level with an $F = 7.84$ and an $R^2 = 0.1360$. If firms are technologically intensive and risk increases, there is an amplification of the positive market response, i.e., since the coefficient of the cross product of technological intensity and change in idiosyncratic risk is positive that suggests that when the change in idiosyncratic risk increases then cumulative abnormal returns increase. For technologically intensive firms that layoff human capital and have positive abnormal returns and issue patents, there is a dampening effect on the positive market response ($\beta_{10} = -1.32$ and $F = 14.2$). This is consistent with the negative coefficient associated with institutional ownership. A priori, we would expect that the impacts of institutional ownership and patents filed would have a positive impact on the positive market response. We, however, find that for the positive announcement period market returns, the coefficients on institutional ownership and on the cross product of technological intensity*patents filed*change in idiosyncratic risk are significant and negative.

Due to the dampening effect of institutional ownership, the negative and positive market responses to labor reduction are canceled out in our total sample test. From another point of view, institutional investors tend to look for equity investment opportunities in long term, rather than in short term. They are motivated to get closely involved in the firm's strategic management such as influencing a firm's innovation, in order to benefit from their equity investments in the long-run. However, concerns have been raised that the stock market puts pressure on managerial incentives to generate short-term gains at the expense of long-term innovative value creation. As a result, neither the institutional ownership nor the innovation's impact on firm's long-run performance is clear a priori. This leads us to investigate the long-run CARs after the layoff announcements. We conjecture that institutional owners take a longer time to understand the implications of newly filed patents. (See section 4.4 below).

When we split the sample into negative (Table 5, Panel A) and positive (Table 5, Panel B) market responses to human capital downsizing events, analyst recommendations matter in that it reinforces both the negative and positive market responses, i.e., makes the negative response more negative and the positive response more positive. Institutional ownership dampens the abnormal market responses for both the negative and positive subsamples, i.e., makes the negative less negative and the positive less positive. These results reinforce our use of analyst recommendations and institutional ownership as proxies for information flow.

The change in idiosyncratic risk as a moderator variable increases the explanatory power associated with the variables for both subsamples. For technologically intensive firms laying off human capital, the combination of issuing patents and change in idiosyncratic risk has a dampening effect on the abnormal returns for both subsamples, i.e., makes the positive subsample less positive and the negative subsample less negative. Further, the change in idiosyncratic risk modifies the impact of technology for both subsamples. For the negative subsample, the change in idiosyncratic risk modifies the coefficient of patents filed, and for the positive subsample, it modifies the coefficient of technological intensity. Next, the change in idiosyncratic risk modifies the coefficient of institutional ownership for the negative subsample and modifies the coefficient for analyst buy recommendations for the positive subsample. We interpret these results as being substantively similar, since we use analyst recommendations and institutional ownership as proxies for information and we use technological intensity and patents as proxies for strength of technological innovation.

For firms that are technologically intensive and layoff human capital, and file patents as moderated by the change in idiosyncratic risk, both the negative (Table 5, Panel A) and positive (Table 5, Panel B) market responses are dampened. We reason that the market fears that laying off human capital may minimize potential positive exploitation of the patents. In Table 5, Panel B, the coefficient of the product of technological intensity and change in idiosyncratic risk is positive and the coefficient of technological intensity, patents filed and change in idiosyncratic risk is negative. This implies that filing a new patent has a negative impact on the market response to the announcement of a downsizing of human capital and hence dampens positive market returns. In Table 5, Panel A, the coefficient of patents filed and change in idiosyncratic risk is negative, which implies that either one or the other factor has a negative impact on the negative market response to the announcement of the downsizing. The coefficient of technological intensity, patents filed and change in idiosyncratic risk is positive, which implies that technological intensity is negative, so that the

combination of the three dampens the negative market response to the announcement of the human capital layoffs. Examining all of the evidence in Table 5, Panels A and B, we reject hypothesis H3 that as a moderator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings. However, we do reject the hypothesis that it does not act as a standalone mediator.

Stepwise regressions using mediator and moderator variables: Long Run CARs

The announcement of a layoff for any firm may create uncertainty in the market place. Resolution of this uncertainty may take longer than usual when analysts and institutional investors examine new product and process technologies or the implications of new patents. Due to the potentially longer time horizon required to understand the impacts of these new technologies and patents, we examine the market response to human capital downsizing events using the same mediator/moderator, stepwise regression approach with long-run cumulative abnormal returns as the dependent variable. Reviewing Tables 2 and 3 (with the exception of technologically intensive and announcements of self-reported technological change in Table 3) we do not reject hypothesis H4 that there is no long-run market reaction to an announcement of a human capital reduction and the associated technology change. Along with failing to reject this hypothesis, we note that unlike the short-run, there is no reason to split the sample into negative and positive subsamples because the results of Table 2 and 3, column 5 do not suggest that this is necessary. We draw this conclusion, since the ratio of positive to negative is essentially one and statistically insignificant for the long run interval $t = (+2, +128)$.

Additionally, we examine hypotheses H5A and H5B, as a mediator or moderator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings. As the results in Table 6 illustrate, we do not reject the hypothesis H5A, that as a mediator variable, the change in idiosyncratic risk does not affect the market's reaction to human capital restructurings. However, as a moderator variable, we do reject H5B, i.e., that the change in idiosyncratic risk does not modify the relationship between one or more of the independent variables and the dependent variable.

Following Liu (2006), Chan, Lin, and Wang (2015) and Kannan (2016) and using the Dichev and Piotroski (2001) methodological approach, we examine the long-run market reaction to announcements of human capital downsizing events and technological innovations. Table 6 contains the results of this examination using our stepwise regression and the total sample. We report the results for the regression with a 5% cutoff level and a 5% stay level. Examining columns ten and eleven for the same 587 observations in Table 5, the $F = 8.64$ and is significant at the less than 1% level. The coefficients of technology intensive*change in idiosyncratic risk ($F = 17.97$), Technology intensive*patents filed* change in idiosyncratic risk ($F = 10.56$), analyst recommendations ($F = 14.05$), analyst recommendations* change in idiosyncratic risk ($F = 11.45$), and institutional ownership* change in idiosyncratic risk ($F = 13.49$) are significant at the less than 1% level of significance. Since the change in idiosyncratic risk as a moderator is significant in each of the variables, we reject hypothesis 5 that the change in idiosyncratic risk does not matter. It appears that technological intensity and patents filing impact the long run market response to human capital restructuring. Consistent with the literature, the coefficients of analyst recommendations and institutional ownership are also significant explanatory variables. We interpret the results that technological intensity as modified by the change in idiosyncratic risk dominates the results; however, these results are dampened by the negative information concerning the implications of patents filed and the information flow from analysts and institutional investors. In addition, we find that the coefficients of the standalone variables, institutional ownership and change in idiosyncratic risk, are not statistically significant.

DISCUSSION

For our sample of 1759 announcements of human capital reductions from 385 firms, the average short-run market response is statistically negative. However, the average market response is not indicative of the specific response to an announcement for an individual firm. Approximately, 59% of the market responses are negative and 41% are positive. Technology intensity and patent filings have implications for the market response, whereas self-announcement of technological process or product innovations do not. The market response to downsizing decisions for firms that do not file patents is negative. Filing of patents reduces the impact of the negative market reaction. For firms that do not announce a technological innovation but are technologically intensive, the market reacts more negatively than for non-technologically intensive firms.

Splitting the sample into positive and negative announcement and including the moderator variable, change in idiosyncratic risk, we infer that the market response to human capital downsizing is associated with an increase in idiosyncratic risk. Specifically, the higher the idiosyncratic risk the larger the dampening effect on the positive market response.

Additionally, analyst recommendations and institutional ownership seem to be reasonable proxies for information flows. Analyst recommendations reinforces both the positive and negative market responses. Institutional ownership dampens the abnormal market response for both negative and positive subsamples. Therefore, we infer that analyst recommendations and institutional ownership are not redundant proxies for information flow.

For technologically intense firms laying off human capital, the combination of filing patents and change in idiosyncratic risk has a dampening effect on abnormal returns for both subsamples. However, changes in idiosyncratic risk impact the positive and negative subsamples differently. While it modifies the impact of technology for both subsamples, for the negative subsample it modifies the coefficient of patents filed and for the positive subsample it modifies the coefficient of technological intensity. Idiosyncratic risk modifies the coefficient of institutional ownership for the negative subsample and modifies the coefficient of analyst recommendations for the positive subsample. Overall, we interpret these results as not being substantively different since we use analyst recommendations and institutional ownership as proxies for information flow. Additionally, we use technological intensity and patents filing as proxies for technological innovation.

Looking to the long-run impact of human capital downsizing events, our regression results have a statistically insignificant intercept. Additionally we find a greater than 1% level of significance associated with change in idiosyncratic risk, technological intensity, patents filed, analyst recommendations and institutional ownership, suggestive that all of these factors contribute to explaining the overall market impact to human capital downsizing events.

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Figure 1 Sample number of employees impacted and number of announcements of events by year

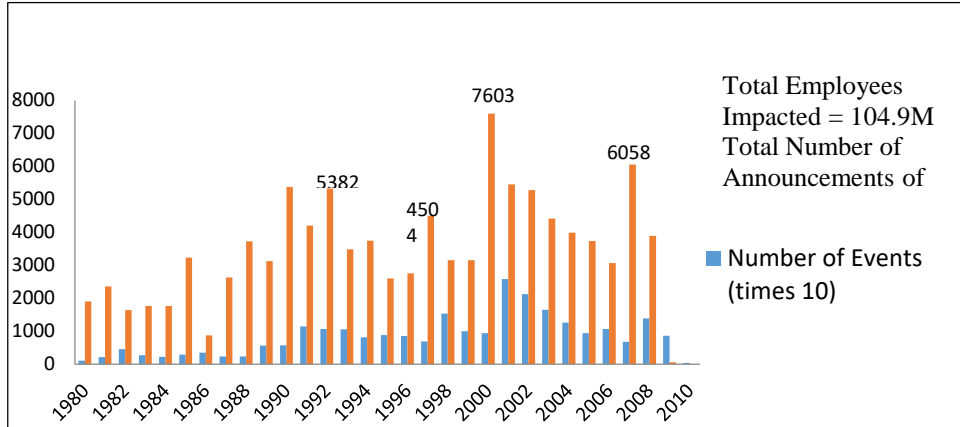


Figure 2 Number of announcements of human capital events for the sample period

	Patent filed / Announcement of Technology Change	No Patent filed /No Announcement of Technology Change
Announcements for Technology Intensive Firms	401 / 41	32 /392
Announcements for Not Technology Intensive Firms	791/97	535/1229
Total Announcements for all Firms	1192/138	567/1621
* Event subsample = 385 firms and 1759 Announcements, i.e., 1192 plus 567 or 138 plus 1621 announcements. Total sample firms = 2762		

Figure 3a Total number of patents filed and issued by year: 1980 to 2010

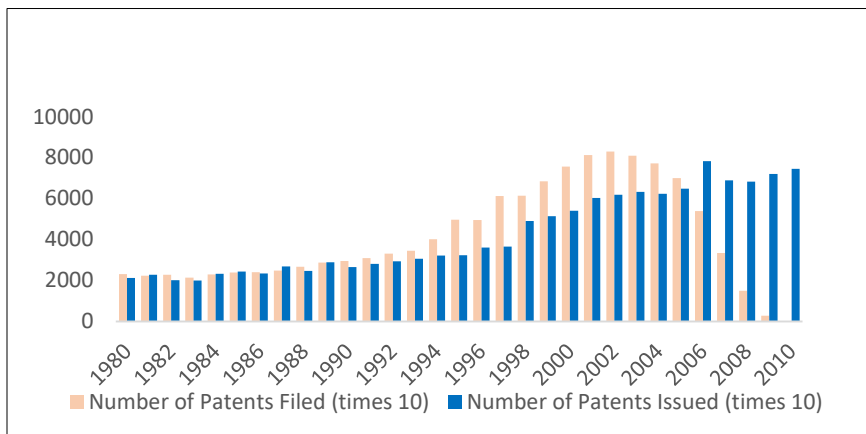


Figure 3b Number of patents filed and issued by year: 1980 to 2010 for our sample

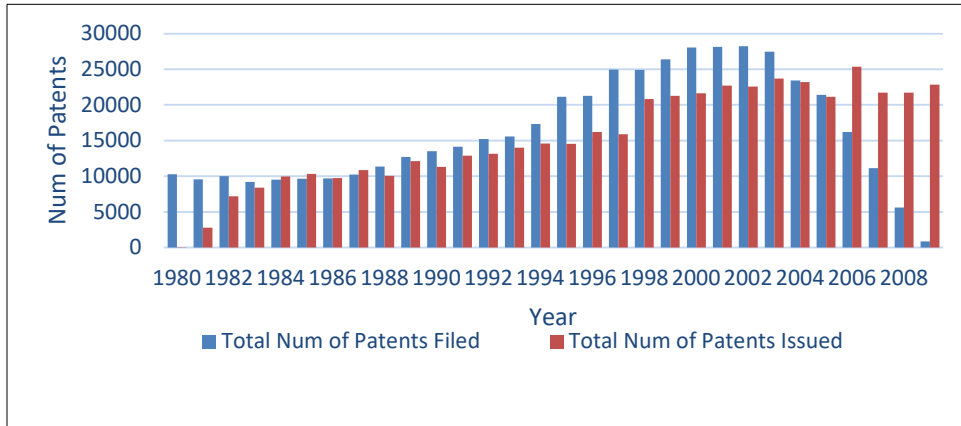


Figure 3c Average number of patents filed and issued per firm for our sample

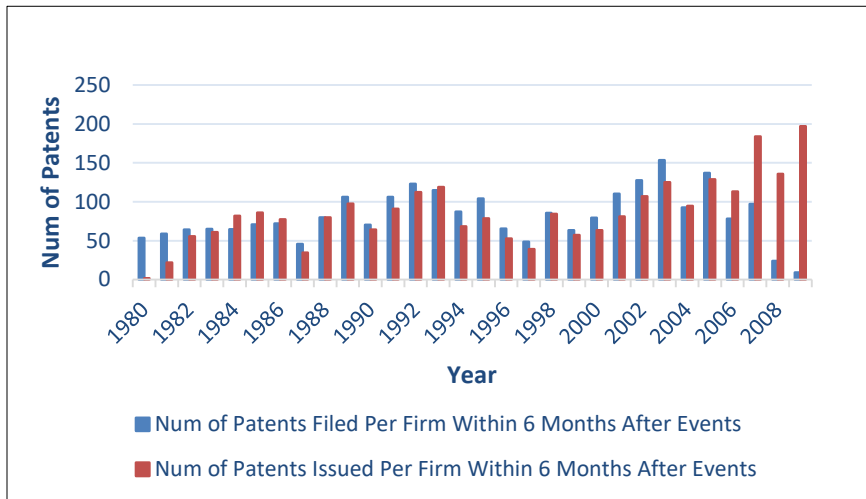


Figure 3d Number of patents filed and issued within 6 months before events for our sample

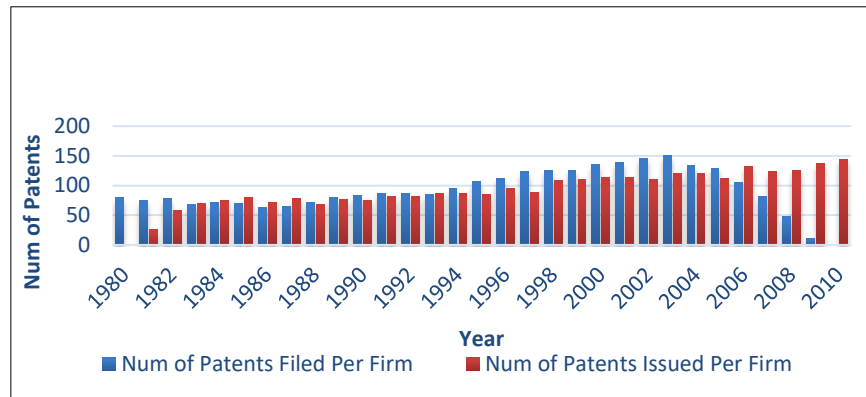


Figure 3e Number of patents filed and issued within 6 months after events for our sample

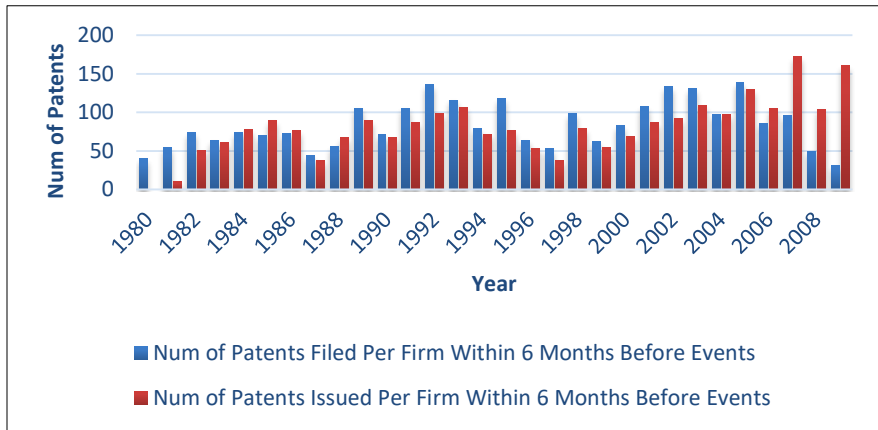


Figure 4: Mediator—Moderator Model Illustration

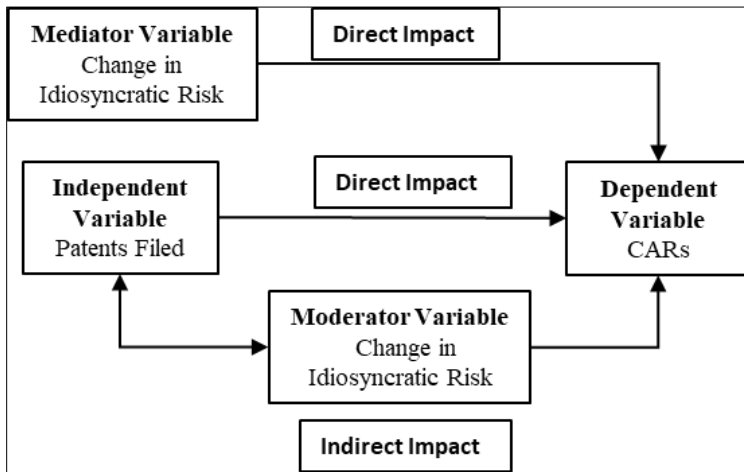


Figure 5: Cumulative Abnormal Returns

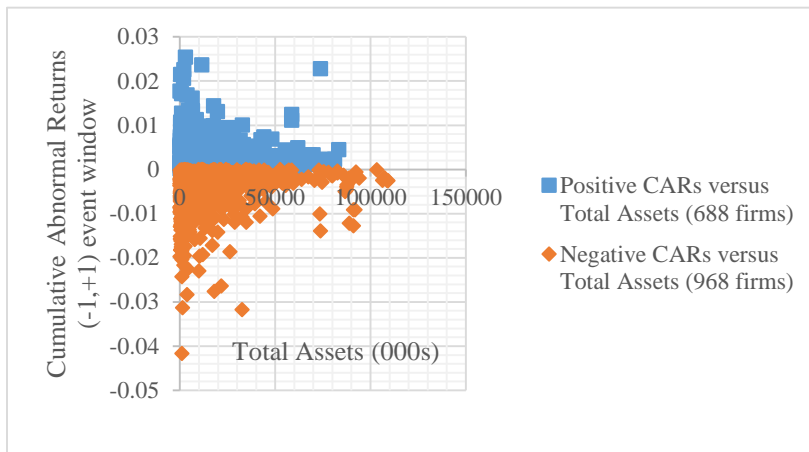


Table 1, Panel A

1759 Human Capital Reduction Announcements Classified by Technological Intensity and Announcements of Patents Issued

	1	2	3	4	5	6
			Technology Intensity by NAICS			
			<i>Not Tech Intensive</i>	<i>Tech Intensive</i>	Total	Row Percentage
Patents Filed		No Patent Filed	535	32	567	32.23%
		Table Frequency	30.42%	1.82%		
		Row Percentage	94.36%	5.64%		
		Column Percentage	40.35%	7.39%		
		Patent Filed	791	401	1192	67.77%
		Table Frequency	44.97%	22.80%		
		Row Percentage	66.36%	33.64%		
		Column Percentage	59.65%	92.61%		
		Total	1326	433	1759	100%
		Column Percentage	75.38%	24.62%	100.0%	

The Chi Square statistic with one degree of freedom is 162.3017 and is significant at the less than 0 .0001 level of probability for the sample of 1759 announcements of human capital layoffs.

Table 1, Panel B

1759 Human Capital Reduction Announcements Classified by Technological Intensity and Firm Announcements of Technological Change

			Technology Intensity by NAICS			
			<i>Not Tech Intensive</i>	<i>Tech Intensive</i>	Total	Row Percentage
Announcements of Technological Change		No Tech Change Announcements	1229	392	1621	92.15%
		Table Frequency	69.87%	22.29%		
		Row Percentage	75.82%	24.18%		
		Column Percentage	92.68%	90.53%		
		Tech Announcements	97	41	138	7.85%
		Table Frequency	5.51%	2.33%		
		Row Percentage	70.29%	29.71%		
		Column Percentage	7.32%	9.47%		
		Total	1326	433	1759	100%
		Column Percentage	75.38%	24.62%	100.0%	

The Chi Square statistic with one degree of freedom is 2.0939 and is not statistically significant for the sample of 1759 announcements of human capital layoffs.

Panel A shows the actual distribution of firms by technological intensity and announcements of patents issued. **Panel B** shows the actual distribution of firms by technological intensity and firm announcements of technological change. We use Paytas and Berglund (2004) to classify firms as technologically intensive (1) and not technology intensive (0). We use Kogan, Papanikolaou, Seru and Stoffman (2018) to map patents to firms. If a firm has filed at least one patent within the six months before a human capital event, it is classified as (1), and (0), otherwise. The number of announcements of human capital events are shown as bold whole numbers. The percentages are listed below.

Table 2

Four-Factor Model -- Cumulative Abnormal Return Evidence for Human Capital Events for Patent Filed and Technological Intensity

1	2	3	4	5
Event Window	CAR Fama-French- Carhart Four-Factor model	# Positive to # Negative	Z-stat for abnormal return	Z-stat to test ratio of positive to negative abnormal returns
Panel A: Total Sample (1759)				
(0,+1)	-0.09%	680:976	-9.35***	-7.27***
(-1,+1)	-0.13%	688:968	-9.30***	-6.88***
(+2,+128)	0.75%	867:879	1.70*	-0.29
Panel B: Patent Filed, Not Technology Intensive (791)				
(0,+1)	-0.05%	308:430	-4.38***	-4.49***
(-1,+1)	-0.08%	306:432	-4.41***	-4.64***
(+2,+128)	1.11%	402:386	1.78*	0.57
Panel C: Not Patent Filed, Not Technology Intensive (535)				
(0,+1)	-0.11%	215:299	-6.21***	-3.71***
(-1,+1)	-0.17%	219:295	-6.16***	-3.71***
(+2,+128)	-0.41%	248:280	-0.53	-1.39
Panel D: Not Patent Filed, Technology Intensive (32)				
(0,+1)	-0.37%	9:22	-4.68***	-2.33***
(-1,+1)	-0.54%	9:22	-4.68***	-2.33***
(+2,+128)	-0.97%	15:16	-0.24	-0.18
Panel E: Patent Filed, Technology Intensive (401)				
(0,+1)	-0.09%	148:225	-4.54***	-3.99***
(-1,+1)	-0.13%	154:219	-4.46***	-3.37***
(+2,+128)	1.71%	202:197	1.65	0.25

In **Table 2**, we examine whether there is an abnormal market response associated with the announcement of work force reductions. This examination includes only firms classified by patent filed and technological intensity. The estimation window for calculation of abnormal returns includes only firms with a minimum of 100 daily observations. The estimation window of 100 days starts on day $t = -150$ days and ends on day $t = -51$. Data for inclusion in this table came from firms with work force reductions that are a minimum of six months apart and the news reporting did not indicate that this reduction was the next step in an on-going lay-off plan. Column 1 indicates the event window, column 2 the cumulative abnormal return, column 3 the number of firms with positive and negative returns, column 4 the Z-statistic associated with the significance of the abnormal return and column 5 the Z-statistic examining the difference between the number of events with positive and negative returns. Results are presented using a value weighted market portfolio proxy with event windows of $t = (0 \text{ to } +1)$ and $t = (-1 \text{ to } +1)$ and for long run CARs $t = (+2, +128)$. (We also used an equally weighted market portfolio and obtained similar results). The CARs are developed based on the methodology in Fama and French (1992, 1993) and Carhart (1997). Three asterisks indicate that the result is statistically significant at the 1% level; two asterisks, 5% level; and one asterisk, the 10% level.

Table 3

Four-Factor Model -- Cumulative Abnormal Return Evidence for Human Capital Events for Announcements of Technological Change and Technological Intensity

1	2	3	4	5
Event Window	CAR	# Positive to # Negative	Z-stat for abnormal return	Z-stat to test ratio of positive to negative abnormal returns
Panel A: Fama-French-Carhart Four-Factor model - Total Sample (1759)				
(0,+1)	-0.09%	680:976	-9.35***	-7.27***
(-1,+1)	-0.13%	688:968	-9.30***	-6.88***
(+2,+128)	0.75%	867:879	1.70*	-0.29
Panel B: Fama-French-Carhart Four-Factor model - Technological Change , Not Technology Intensive (97)				
(0,+1)	-0.14%	32:60	-4.34***	-2.92***
(-1,+1)	-0.22%	30:62	-4.41***	-3.34***
(+2,+128)	0.95%	45:51	0.56	-0.61
Panel C: Fama-French-Carhart Four-Factor model - Not Technological Change , Not Technology Intensive (1229)				
(0,+1)	-0.07%	491:669	-6.67***	-5.23***
(-1,+1)	-0.11%	495:665	-6.64***	-4.99***
(+2,+128)	0.46%	605:615	0.92	-0.29
Panel D: Fama-French-Carhart Four-Factor model - Not Technological Change , Technology Intensive (392)				
(0,+1)	-0.11%	142:222	-5.52***	-4.19***
(-1,+1)	-0.17%	149:215	-5.44***	-3.46***
(+2,+128)	0.86%	193:196	0.80	-0.15
Panel E: Fama-French-Carhart Four-Factor model - Technological Change , Technology Intensive (41)				
(0,+1)	-0.07%	15:25	-1.37	-1.58*
(-1,+1)	-0.10%	14:26	-1.38	-1.90**
(+2,+128)	3.82%	24:17	2.63**	1.09

In **Table 3**, we examine whether there is an abnormal market response associated with the announcement of work force reductions. This examination includes only firms classified by self-reported technological change and technological intensity. The estimation includes only firms with a minimum of 100 daily observations. The estimation window for calculation of abnormal returns includes only firms with a minimum of 100 daily observations. Estimation window of 100 days starts on day $t = -150$ days and runs to day $t = -51$. Data for inclusion in this table came from firms with work force reductions that are a minimum of six months apart and the news reporting did not indicate that this reduction was the next step in an on-going lay-off plan. Column 1 indicates the event window, column 2 the cumulative abnormal return, column 3 the number of firms with positive and negative returns, column 4 the Z-statistic associated with the significance of the abnormal return and column 5 the Z-statistic examining the difference between the number of events with positive and negative returns. Results are presented using a value weighted market portfolio proxy with event windows of $t = (0 \text{ to } +1)$ and $t = (-1 \text{ to } +1)$ and for long run CARs $t = (+2, +128)$. We also used an equally weighted market portfolio and obtained similar results. The CARs are developed based on the methodology in Fama and French (1992, 1993) and Carhart (1997). Three asterisks indicate that the result is statistically significant at the 1% level; two asterisks, 5% level; and one asterisk, the 10% level.

Table 4, Panel A

<i>Mean Difference Test of Market Response (CARs) for Technology Intensity and Patent Filing CARs</i>				
1	2	3	4	5
	Patents filed	No Patents filed	Difference	t-statistic
Technology Intensive	-0.001262	-0.005375	0.0041130***	3.86***
Non-Technology Intensive	-0.0007584	-0.001696	0.0009376***	2.77***
Difference	-0.0005036	-0.003679***		
t-statistic	-1.54	-3.32***		

Table 4, Panel B

<i>Technology Intensity and Firm Announcement of Technological Change CARs</i>				
	Technology Change	No Technology Change	Difference	t-statistic
Technology Intensive	-0.001036	-0.001748	0.000712	0.68
Non-Technology Intensive	-0.002237	-0.001145	-0.001092**	-2.12**
Difference	0.0012010	-0.000603**		
t-statistic	1.28	-2.48**		

In **Table 4**, we use a mean difference test to examine whether there are significant differences in cumulative abnormal market responses associated with the announcement of work force reductions for technology intensive and non-technology intensive firm. Panel A presents the average market results for technology intensity and patent filings; Panel B, for technology intensity and firm announcements of technology changes. The estimation window for calculation of abnormal returns includes only firms with a minimum of 100 daily observations. The estimation window of 100 days starts on day $t = -150$ days and ends on day $t = -51$. Data for inclusion in this table came from firms with work force reductions that are a minimum of six months apart and the news reporting did not indicate that this reduction was the next step in an on-going lay-off plan. Results are presented using a value weighted market portfolio proxy with event windows of $t = (-1 \text{ to } +1)$. We developed the CARs based on the methodology in Fama and French (1992, 1993) and Carhart (1997). Three asterisks indicate that the result is statistically significant at the 1% level; two asterisks, 5% level; and one asterisk, the 10% level.

Table 5, Panel B

Stepwise Regression Positive Subsample Short Run Results

	1	2	3	4	5	6	7	8
	Variable p-value ≤ 0.05 cutoff level with a 5% stay level				Variable p-value ≤ 0.10 cutoff level with a 5% stay level			
	(1) First statistically significant variable	(2) Second Variable added	(3) Third Variable added	(3) Third Variable added	(1) First statistically significant variable	(2) Second Variable added	(3) Third Variable added	(4) Fourth Variable added
Tech Intensive* Change in IR (Moderator)								2.9843***
								(12.22) 0.0006
Tech Intensive* Patents Filed * Change in IR (Moderator)								-1.3022***
								(14.2) 0.0002
Analyst Buy Recommendations				0.00002**				0.00002**
				(4.19) 0.0417				(4.19) 0.0417 (5.40) 0.0209
Analyst Buy Recommendations* Change in IR (Moderator)	-0.0211***		-0.0205***	-0.0197***	-0.0211***		-0.0205***	-0.0197***
	(11.36) 0.0009	(10.95) 0.0011	(10.28) 0.0015	(11.36) 0.0009	(10.95) 0.0011	(10.28) 0.0015	(6.87) 0.0093	
Institutional Ownership			-0.0060***	-0.0060***			-0.0060***	-0.0060***
			(7.74) 0.0058	(7.71) 0.0059			(7.74) 0.0058	(7.71) 0.0059 (6.98) 0.0088
Intercept	0.0050***		0.0087***	0.0075***	0.0050***		0.0087***	0.0075***
	(283.20) <0.0001	(40.87) <0.0001	(25.34) <0.0001	(283.20) <0.0001	(40.87) <0.0001	(25.34) <0.0001	(23.21) <0.0001	
Number of Obs	236	236	236	236	236	236	236	
F-statistic	11.36	9.70	7.95	11.36	9.70	7.95	7.84	
Probability > F	0.0009	<0.0001	<0.0001	0.0009	<0.0001	<0.0001	<0.0001	
R²	0.0430	0.0715	0.0867	0.0430	0.0715	0.0867	0.1360	

In **Table 5, Panel B**, we examine whether there is a positive abnormal market response associated with the announcement of work force reductions. Patents filed, analyst buy recommendations, institutional ownership, and technological intensity coefficients that may be modified by change in idiosyncratic risk. The estimation window for calculation of abnormal returns includes only firms with a minimum of 100 daily observations. The estimation window of 100 days starts on day t = -150 days and runs to day t = -51 with the events measured in the event window t = (-1, +1). Data for inclusion in this table came from firms with work force reductions that are a minimum of six months apart and the news reporting did not indicate that this reduction was the next step in an on-going lay-off plan. We develop the mean CARs based on the methodology in Fama and French (1992, 1993) and Carhart (1997). Patents filed were obtained from Kogan, Papanikolaou, Seru and Stoffman (2018), analyst buy recommendations and institutional coverage from Bloomberg for 1996-2010 using the ANR and FLDS functions, and the methodology of Denning, K. C., Hulburt, H. and Ferris, S. P. (2006) to develop the change in idiosyncratic risk variable. We use Baron and Kenny's (1986) three-step process to develop the mediator variable (change in idiosyncratic risk) and we estimate the parameters and statistics using stepwise regression analysis at both a 5% and 10% cutoff level of significance. Yearly fixed effects pickup year over year effects that other right-hand side variables do not. We used the yearly fixed effect function provided by SAS and STATA to do the regression. All F-statistics are reported after yearly fixed effects are controlled. The numbers below the values of the parameters are F-statistics and the number to the right is the probability. Note that the coefficient, F-statistic and probability for each coefficient are shown in bold print the first time they are reported. Right-hand variables that did not meet the 10% cutoff and 5% stay levels include standalone change in idiosyncratic risk, standalone technological intensity, standalone patents filed, patents filed* change in idiosyncratic risk, technological intensity*patents filed, as well as institutional ownership* change in idiosyncratic risk. Three asterisks indicate that the result is statistically significant at the 1% level; two asterisks, 5% level; and one asterisk, the 10% level.

Table 6*Total Sample, Stepwise regression with Change in Idiosyncratic Risk & Patents Filed Long-Run Results*

	Variable p-value <= 0.05 cutoff level with a 5% stay level											
	1		2		3		4		5		6	
	(1) First statistically significant variable		(2) Second Variable added		(3) Third Variable added		(4) Fourth Variable added		(5) Fifth Variable added			
Tech Intensive* Change in Idiosyncratic Risk						0.02999**		0.07092***		0.23167***		
						(4.13)	0.0426	(9.17)	0.0026	(17.97)	<0.0001	
Tech Intensive*Patents Filed*Change in Idiosyncratic Risk										-0.04349***		
										(10.56)	0.0012	
Analyst recommendations	-0.00308***		-0.00315***		-0.00363***		-0.00316***		-0.00322***			
	(14.15)	0.0002	(15.01)	0.0001	(18.46)	<0.0001	(13.29)	0.0003	(14.05)	0.0002		
Analyst recommendations*Change in Idiosyncratic Risk								-0.000621**		-0.00101***		
								(5.04)	0.0251	(11.45)	0.0008	
Institutional Ownership*Change in Idiosyncratic Risk			-0.05415***		-0.07457***		-0.08286***		-0.07860***			
			(8.26)	0.0042	(12.25)	0.0005	(14.79)	0.0001	(13.49)	0.0003		
Intercept	0.02209**		0.02703**		0.02914***		0.02484**		0.02567**			
	(4.07)	0.0441	(6.02)	0.0144	(6.98)	0.0085	(4.95)	0.0264	(5.38)	0.0207		
Number of Observations	587		587		587		587		587			
F-statistic	14.15		11.30		8.95		8.02		8.64			
Probability > F	0.0002		<0.0001		<0.0001		<0.0001		<0.0001			
R ²	0.0247		0.0390		0.0461		0.0547		0.0723			

In **Table 6**, we examine whether there is a long run abnormal market response, using the total sample, associated with the announcement of work force reductions, patents filed, analyst recommendations, institutional ownership and change in idiosyncratic risk used as a moderator variable. The estimation window for calculation of abnormal returns includes only firms with a minimum of 100 daily observations. Estimation window of 106 days starts on day t = +2 days and runs to day t = +128. Data for inclusion in this table came from firms with work force reductions that are a minimum of six months apart and the news reporting did not indicate that this reduction was the next step in an on-going lay-off plan. We develop the mean CARs based on the methodology in Fama and French (1992, 1993) and Carhart (1997). Patents filed were obtained from Kogan, Papanikolaou, Seru and Stoffman (2018), analyst recommendations and institutional coverage from Bloomberg for 1996-2010 using the ANR and FLDS functions, and the methodology of Denning, K. C., Hulburt, H. and Ferris, S. P. (2006) to develop the change in idiosyncratic risk variable. We use Baron and Kenny's (1986) three-step process to develop the mediator variable (change in idiosyncratic risk) and we estimate the parameters and statistics using stepwise regression analysis at both a 5% and 10% level of significance. Yearly fixed effects pickup year over year effects that other right-hand side variables do not. We used the yearly fixed effect function provided by SAS and STATA to do the regression. All F-statistics are reported after yearly fixed effects are controlled. The numbers below the values of the parameters are F-statistics and the number to the right is the probability. Right-hand variables that did not meet the 10% cutoff and 5% stay levels include standalone change in idiosyncratic risk, standalone technological intensity, standalone patents filed, patents filed*change in idiosyncratic risk, technological intensity*patents filed, and standalone institutional ownership. Three asterisks indicate that the result is statistically significant at the 1% level; two asterisks, 5% level; and one asterisk, the 10% level.

DISCOVERY OF INSIGHTS ON GENTRIFICATION USING ANALYTICS FROM TWITTER

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ABSTRACT

This study collects big data from Twitter, and discover patterns and insight to determine the perception of gentrification and its pattern over time as well as sentiments towards gentrification using IBM Watson Analytics. The discovered insights reveal that the interest on the topic is going down in 2017 from years 2015. Furthermore, 70% of the tweets have a neutral opinion towards gentrification with only a 2% point difference between negative and positive sentiment. In cities with larger, progressive cities except Washington DC and San Francisco, positive sentiment was slightly greater than negative sentiment. Therefore, this research demonstrated that artificial intelligence (AI) based solution allow us to collect and discover useful insights from big data created from social media postings and gives a meaningful platform for further discovery. The implication of the results are policy makers need to consider and discover insights from social media while making policies and decision that affect citizens.

BACKGROUND

Gentrification

While there is no precise definition, some researchers describe an area or community as "gentrified" if there is a significant increase in relative income, education, or rents in initially low-income, central city neighborhoods, i.e., Census tracts with incomes in bottom 40th percentile of the metropolitan statistical area. Many studies regarded this as a negative effect on the culture and population; other studies on neighborhood change have found both positive and negative socioeconomic effects, and such change has been given many names in dialogue, such as revitalization, reinvestment, gentrification, and displacement (Brown, 2009). Some view the revitalization and reinvestment process as involving government and businesses embracing entertainment, demographic changes, and a more youthful migration into the area (Bounds, 2006; Kennedy, 2001). Meanwhile, other researchers view gentrification in the context of displacement, which is viewed as a process to remove less educated, underfunded, larger families and many times people of color from an existing community (Ley, 1992; Smith, 1996; Smith, 2005). By definition, gentrification is "the process of renewal and rebuilding accompanying the influx of middle-class or affluent people into deteriorating areas that often displaces poorer residents." (Merriam-Webster, 2017).

Freeman and Braconi (2004), McKinnish (2010), and Ellen and O'Regan (2011) each empirically examined the idea that gentrification also referred to as neighborhood change may cause displacement, finding that the under-educated and underfunded were less likely to move from a neighborhood experiencing neighborhood growth. McKinnish (2010) suggested that the original, low-income residents in such neighborhoods might possibly have experienced an increase in average income during the time period of growth. Ellen and O'Regan (2011) examined whether members of low-income groups who stayed in growing neighborhoods were "incumbent upgraders," a term described by Clayton (1979) as naming an existing low-income subgroup that has possibly gained from a neighborhood's transition to higher-income status. Though 70% of income gains in the growing neighborhoods were from in-migrants, Ellen and O'Regan (2011) found that 21% of income gains went to the neighborhood's existing residents. This finding supports the idea that neighborhood change fosters economic viability for both new and existing residents, reducing the consequences of displacement.

Big Data and Analytics

Recently citizens are using social media to connect, communicate and express their opinions on several issues. This leads to enormous amounts of digital data generated about various topics, issues or organizations (e.g.) on their products, services and other issues on cyberspace including in Facebook, Twitter, forums, reviews, video descriptions and comments, blogs, and news on daily basis. As a result, big data is generated in high volume, velocity and variety as well as with veracity. IBM estimates that every day we create 2.5 quintillion bytes (2.3 trillion giga bytes, i.e., about 10 million Blu-ray discs) of data. The data come in different formats: structured and non-structured documents, images, audio and video. The data come with high frequency; per minute, it is estimated that 204 million emails, 216

thousand Instagram posts, and 72 hours of video are added (IBM Big Data & Analytics Hub). As of June 2016, the numbers of monthly active twitter users worldwide are about 313 million; of which 67 million users are from USA.

It is important that such resources are mined to discover insights and provide patterns. Text analytics has been in use to unlock meaning from these huge text resources. There is significant advance in text analytics in recent years. One of the leading systems is the IBM Watson Analytics, a product of the IBM research team. Developed in 2010, IBM Watson is a system designed to answer questions raised in human language. It employs text mining and a deep natural language processing (High, 2012). In 2011, the 1st human-versus-machine match-up, in the three Jeopardy Episodes during February 14-16 was presented. Watson did not have access to the INTERNET, but had access to 200 million pages of structured and unstructured content using 4TB storage. Watson out performed both the biggest money winner (Brad Rutter) and the record holder for the longest championship streak for 75 days (Ken Jennings) (Sharda, Delen, & Turban, 2015).

There are rather limited studies that have explored the sentiment analysis and other analytics on several topics, products, services and organizations in the past based on Twitter data. For instance, Bian, et al., (2016) mined Twitter to understand the public's perception of the Internet of Things (IoT). Search keywords used to define the trend of the IoT were variations of the word "Internet of Things" (e.g., "IoT", and "InternetOfThings") as well as their hashtag versions (e.g., "#IoT" and "#InterentOfThings"). Researchers collected over 2.9 billion raw tweets, however only a fraction of the data (30, 454 tweets) was deemed relevant to the study. Through sentiment analysis using Linguistic Inquiry and Word Count (LIWC), the authors discovered that the public's perception on the Internet of Things is mostly positive for the period of (2009–2015). Based on our search of the literature, there is no previous study that has *conducted the sentiment and other analysis on gentrification based on Twitter data.*

In this paper, we use text analytics, also referred as analytics for social media, to analyze invaluable social media content, particularly tweets from the Twitter, and identify patterns and discover insights on gentrification including sentiments. The discovered insights are important, first for decision makers and then to the public to understand the sentiments and interest towards gentrification. The paper is organized into five sections. Section 2 presents the methodology. Section 3 presents the results and discussions, followed by the conclusion in sections 4. Section 5, finally presents implications and future research.

METHODOLOGY

The main research questions addressed in this study are:

- What are the temporal patterns of the tweets as indicator of public interest about gentrification?
- What are the sentiments of tweets about gentrification? Are positive sentiments larger than negative sentiments
- What are the demographics (such as gender) of authors of the tweets?

In order to retrieve and analyze twitter data, we will utilize a multi-step process that is presented in figure 1. First we will identify the Hastings that will be utilized and the time frame we will use. To analyze the content of tweets and generate dataset a qualitative method, i.e. NLP, is used. Quantitative method is used to analyze the dataset to determine trends and other outcomes. There has been enormous progress in the field of business intelligence and analytics through the application of AI techniques for natural language processing (NLP) and machine learning, and visualization for knowledge discovery. Advanced analytic tools like IBM Watson and SAS analytics are products with these capabilities. We use IBM® Watson Analytics™ to retrieve, parse and analyze the tweets as well as for visual analytics (e.g. word clouds and heat maps) on the resulting dataset. The contents were from Twitter with hashtag #gentrification, and the time frame selected was from July 2015 to June 2017.

Trends

Figure 4 shows trend of tweets on the topic by dates. Overall the level of interest on gentrification was high in 2015 and going down afterwards. It also shows a few periods of high picks in early November 2015 and April 2016. In analyzing this data in conjunction with Figure 2, we find that the cities of Brooklyn, NY and Oakland, CA experienced similar trends in population growth related to Figure 4 interest tweets. For example, Kings County, NY is home to Brooklyn, NY. Table 1 displays positive population growth in this county from 2013-2014 up until 2015 to 2016. During the 2016 to 2017 period the population growth begin to decline. Table 2 shows Oakland, CA located in Alameda County, CA also experienced significant increases in population growth during the 2014 and 2015 and smaller gains during 2016 and 2017. Comparing twitter analysis with population changes for popular hashtags cities for gentrification shows that many of the tweets were a reaction to a increase in population and possibility demand for housing in this population cities.

Table 1 Kings County (Brooklyn, NY) Population Change

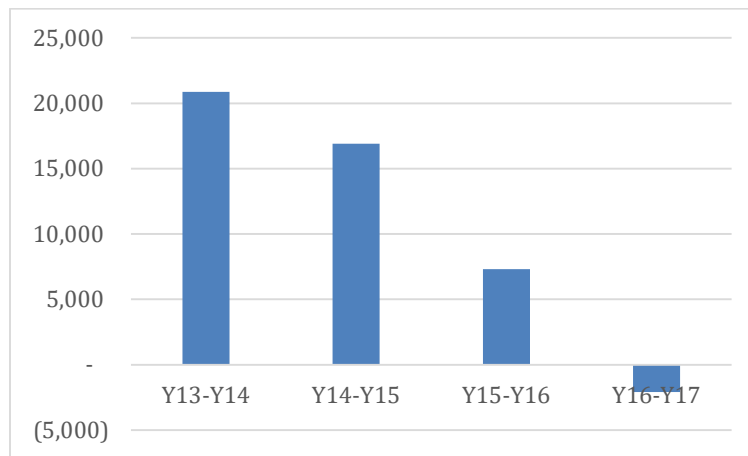
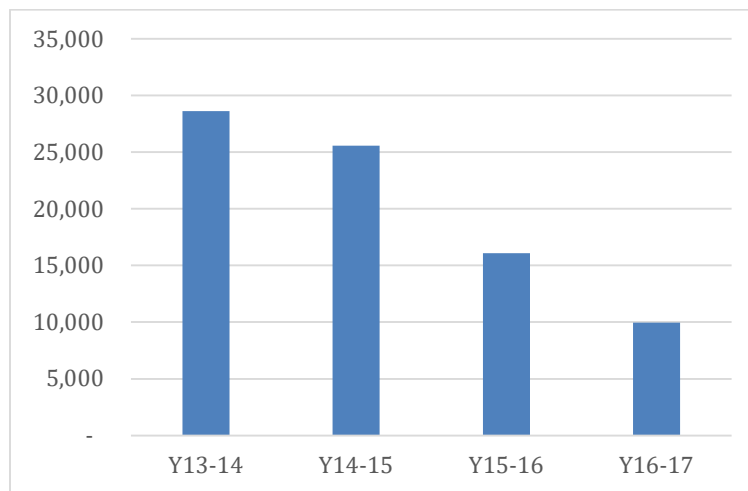


Table 2 Alameda County, California (Oakland, CA) Population Change



A comparable trend is also found using Google trends, see Figure 4.

What is the trend of the number of Tweet (X) over Year (Posted time) (X) ?
 Filtered by Year (Posted time): Includes 3 of 3



Figure 3. The trends of tweets about gentrification



Figure 4. Trend of Interest over time (based on the number search on Google)
 Source: <https://trends.google.com/trends/>

There are more, about 1.5 times, tweets from males (3.14K) compared to females (2.07K), see Figure 5.

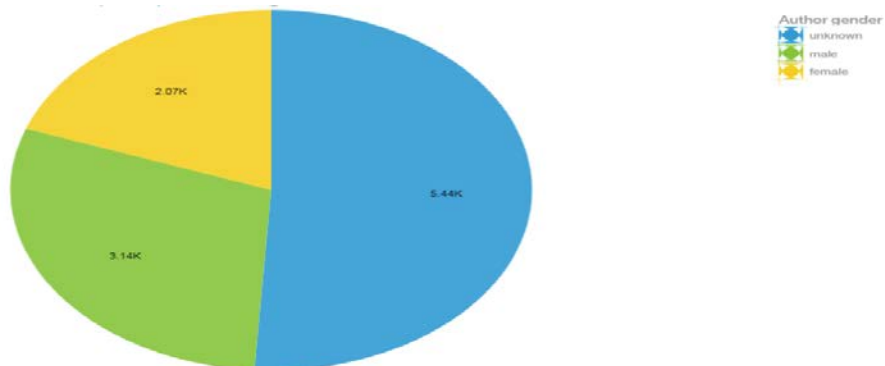


Figure 5. Numbers of Tweets by Gender

Sentiment Analysis

One of the most useful applications of text mining is sentiment analysis. Sentiment analysis tries to answer the question, “What do people feel about a certain topic?” by digging into opinions of many using a variety of automated tools. It is also known as opinion mining, subjectivity analysis, and appraisal extraction. Sentiment analysis process involves several steps. The first step is called sentiment detection, during which text data is differentiated between fact and opinion (objective vs. subjective). This is followed by negative-positive (N-P) polarity classification, where a subjective text item is classified on a bipolar range. Following this comes target identification (identifying the person, product, event, etc. that the sentiment is about). Finally come collection and aggregation, in which the overall sentiment for the document is calculated based on the calculations of sentiments of individual phrases and words from the first three steps (Sharda, R., Delen, D., & Turban, E., 2015).

When applied to a tweet, sentiment terms are words that measure the tone of a tweet. It indicates whether a tweet is positive, negative, ambivalent, or neutral. A tweet is categorized as positive when it has more number of positive than negative sentiment terms. A tweet is categorized as negative when it has more number of negative than positive sentiment terms. A tweet is categorized as ambivalent when it has the same number of positive and negative sentiment terms. A tweet is categorized as neutral when there are no sentiment terms that are detected in it. Figure 6 shows the sentiment distribution by year. Comparing the positive and negative sentiments by the years shows that there is slight higher positive sentiments in 2015 and 2016.

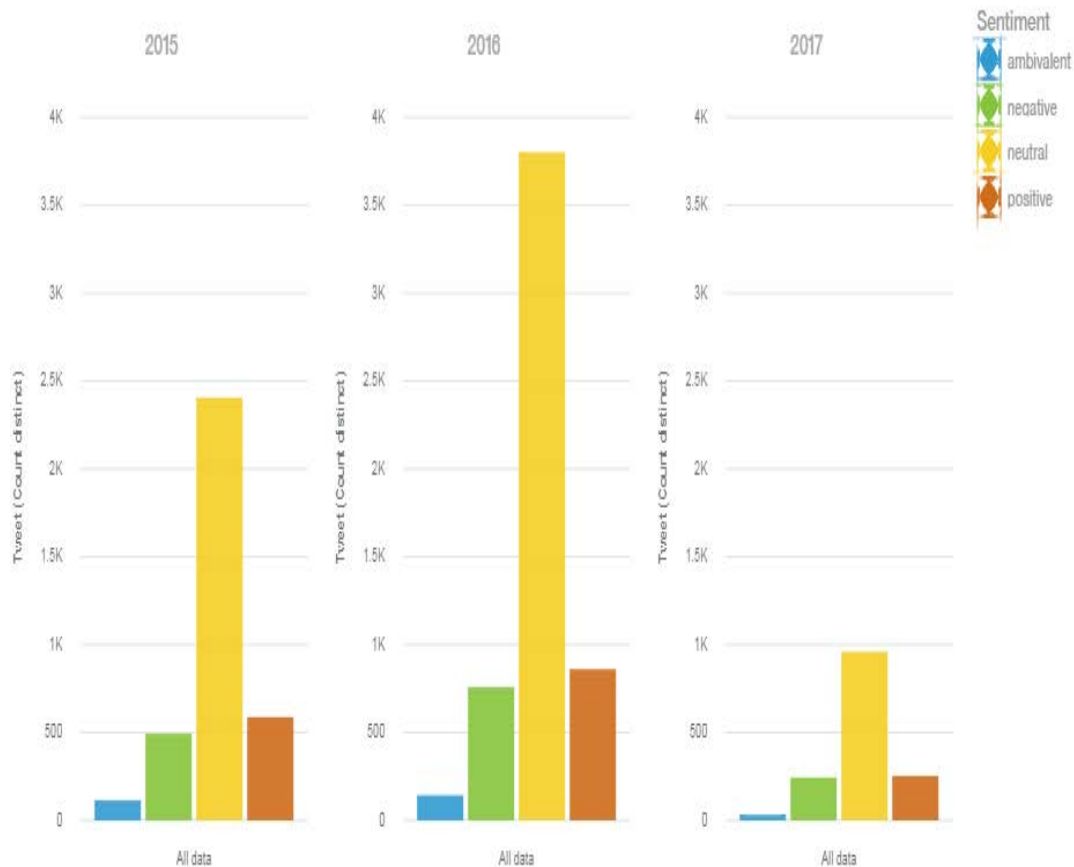


Figure 6. Sentiment distribution by year

We reviewed the sentiment signals and how many times this was shared. We selected the top 50 positive sentiment signals and were able to observe in Figure 7. The largest positive sentiment signals was “wow” or “Thanks”. Other prominent words are “Genius”, “Luxury”, “Noticeable” and “better”. The average retweet count fell between 5.75 retweets and 81.24 retweets.

Figure 8. The top 50 negative sentiment signals

To investigate if there are difference in sentiment based on region, we selected large metropolitan cities that have known gentrification issues and compared the sentiments in Figure 9. What we found was that in cities with larger, progressive cities except Washington DC and San Francisco, positive sentiment was slightly greater than negative sentiment.

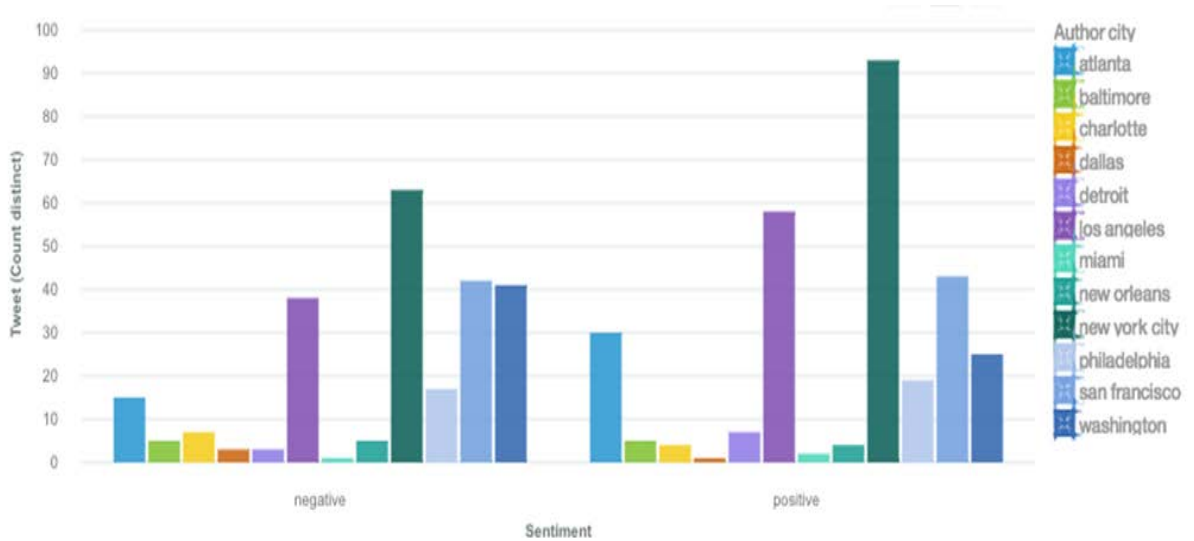


Figure 9. Sentiment in major cities

Figures 10 and 11 represent positive and negative sentiment based on gender. We discovered that based on gender, there are relatively equal proportions of sentiment regarding gentrification among the gender groups with men holding the larger percentage of positive (57%; Ratio M:F - 401/184=2.18) and negative (68%, Ratio M:F - 301/142=2.11) sentiments.

What is the breakdown of the number of **Sentiment positive signals** by **Author gender** ?
 Filtered by **Author gender: female, male**

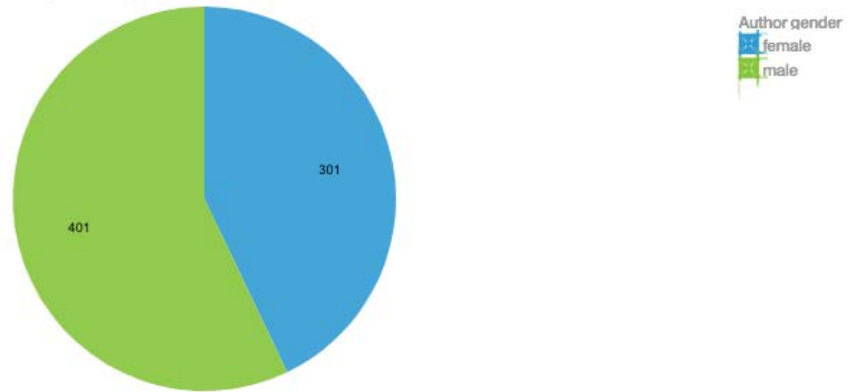


Figure 10. Positive sentiment by gender

What is the breakdown of the number of **Sentiment negative signals** by **Author gender** ?
 Filtered by **Author gender: female, male** and **Author country: Includes 1 of 93**

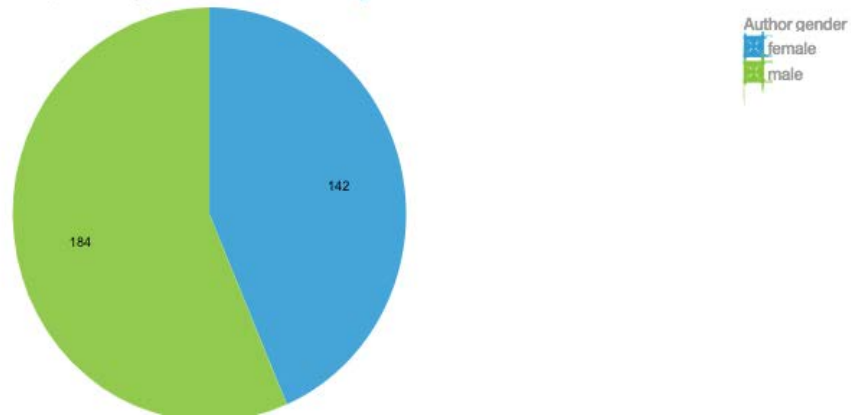


Figure 11. Negative sentiment by gender

CONCLUSION

Social media such as Twitter data provides a large platform for research on gentrification and public perception as it provides people a space to provide unfiltered opinions regarding gentrification. Using Watson Analytics, we retrieved tweets, analyzed them, and created a dataset consists of 10,651 tweets. We also identified patterns and discover useful insights. Regarding the temporal patterns of tweets about gentrification, it had been decreasing. Overall the sentiment was slightly positive with respect to gentrification except DC and San Francisco. Moreover, both males and females did show more positive than negative sentiment with larger numbers from males. This research shows that we can gain useful insight regarding gentrification from twitter, which is daunting task for human to do it manually, using advanced AI-based analytic solutions.

IMPLICATIONS AND FUTURE RESEARCH

The results of this study support the fact that legislators, developers, community leaders, corporations and any group that seeks to understand perceptions to create meaningful actions regarding public space and communities in a way that benefits them or their constituents need to utilize the growing huge data that exist in social media such as Twitter and the advanced analytics solutions to discover actionable information and insights for decision making. The discovered insights on gentrification, for example can be used for policy and program development in housing in different cities by considering the trends and sentiments of the citizens. Analysis of twitter data around topics, such as gentrification offer policymakers insight and solutions to curtail into the issues surrounding controversial initiatives. In addition, analyzing additional hashtags associated with gentrification offers planners and policy makers a more in-depth understanding of other phenomena associated with gentrification policy

One limitation of this study is the possible inaccuracy of contents on social media due to short length (e.g. 140 characters for tweets), informality of the language, and credibility of sources. Future research will include topic modeling, predicative and perspective analytics on the social media data about the gentrification as well as correlation and regression analysis of the discovered insights, and economic and population data.

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Thursday November 1, 2018

Registration –Days Inn Atrium **7:30 am – 3:15 pm**

Breakfast – Center/Arbor Room **7:30 am – 9:00 am**

Welcome –Center/Arbor Room

Norman Sigmond, Kutztown University of Pennsylvania

Chairman, NABET Executive Board

8:00 – 8:15 am

Session 1: Center/Arbor Room 8:30 am – 9:30 am

NABET Proceedings Publishing Information/General Interest Topics

Session Chair: *Linda Hall, State University of New York at Fredonia*

NABET Conference Proceedings Information

Norman Sigmond

Jerry Belloit

Cori Myers

Kutztown University of Pennsylvania

Clarion University of Pennsylvania

Lock Haven University of Pennsylvania

The Stall of the Mall

Denise Ogden

Shruti Gupta

James Ogden

Penn State-Lehigh Valley

Penn State– Abington

Kutztown University of Pennsylvania

Malls throughout the U.S. are experiencing high vacancy rates. Once a popular format, many malls are now empty. Green Street Advisors, an analysis firm that tracks real estate investment trusts (REITs), forecasts that 10 percent of large malls in the U.S. will fail within the next 10 years. This paper explores the history of the mall format, the current status of malls, characteristics of successful malls and what is being done to reinvent malls.

An Industry in Transition: Mergers and Acquisitions in Higher Education

John Grigsby

Thomas Jefferson University

Private colleges and universities are facing financial challenges like never before due to declining enrollments, fierce competition, reductions in funding, and skepticism about the value of a college education. As deficits continue to rise, many of these institutions are realizing that closure is a possibility. To confront these challenges, innovative leaders have experimented with a number of vehicles, including partnerships, joint ventures, sharing arrangements, and matriculation agreements and others. When these strategies fail, as they often do, institutions are left with little choice but to merge with another institution. Although mergers can result in many benefits like increased efficiencies and economies of scale, they are complicated, expensive, time consuming

and offer no guarantees. In these turbulent times with many closures looming, one thing is certain, mergers of private colleges and universities are here to stay.

Session 2: Sylvan Room

9:35 am – 10:35 am

Pedagogical Topics

Session Chair: *Gerard Martorell, Lock Haven University of Pennsylvania*

Structured Undergraduate Leadership Development: Utilization of Skills Over Four Years-Phase 1

Annette Rogers
Celia Lofink

University of Hartford
University of Hartford

The purpose of our longitudinal study is to explore how undergraduate students evolve their leadership skills and behaviors during their four year undergraduate tenure – phase 1 complete. For the purposes of this study we selected the framework of Kouzes and Posner's (2012) identifying five behaviors of good leaders: model the way, inspire a shared vision, challenge the process, enable others to act, and encourage the heart. Data was collected through a quantitative leadership assessment and personal journals (free form plus specific questions).

The premise for this research includes the beliefs:

- Undergraduate students have a current framework for how they perceive leadership,
- Undergraduate students have a perception of their own skills and behaviors in the context of the framework modeled in their environment,
- Undergraduate student's transition from adolescent to adult thinking and behavior permits self-exploration and formulation of new ways to consider leadership including the skills and behaviors needed to succeed as leaders,
- Undergraduate students are accountable for their own personal development.

Phase I was completed and data collected on a group of 18 students drawn from three categories: student club leaders, self-nominated freshmen, and participants from prior career ready programs. All three groups of students were provided training and completed assessments to ascertain their understanding of leadership and how they perceived themselves. The data will be presented at the conference session and used for discussion and feedback regarding Phase II design of the study.

The Business Plan as a Higher-Value Educational Experience that Increases the Level of Engagement Among Students

Gerard Martorell
Elisenda Tarrats
Nuria Arimany

Lock Haven University of Pennsylvania
Universitat de Vic (Barcelona)
Universitat de Vic (Barcelona)

High impact practices (HIPs) are important co-curricular educational experiences in college education, as they promote learning, development, and persistence among students. The objective of this study is to expand the research on high impact practices and explore their connections with the development of the business plan by college students. Using the National Survey of Student

Engagement NSSE questionnaire, this study explores whether the participation of students in the development of a business plan has a positive impact on the level of commitment, engagement, and motivation of the Lock Haven University Business students. A control group and an experimental group have been asked to complete the survey. Results suggest that there is some relationship between the students who had been asked to develop a business plan and their engagement either at the college or in the community. The development of business plans can help students create their own venture and also develop entrepreneurial skills that contribute to the creation of businesses and jobs.

Session 3: Willow Room

9:35 am – 10:35 am

Leadership and Innovation Topics

Session Chair: *Marlene E. Burkhardt, Juniata College*

Variability Hypothesis of Spiritual Intelligence in Organizations: Bi-Model Male

Distributions

Marlene E. Burkhardt

Juniata College

Donna Rhodes

Juniata College

Loren Rhodes

Juniata College

Spiritual intelligence is considered a form of intelligence that measures the ability to apply and embody spiritual resources and qualities to enhance functioning and wellbeing (Amram, 2010) and is thought to aid in organizational leadership (Amram, 2007). Utilizing the Integrated Spiritual Intelligence Survey developed by Dr. Joseph Amram, research (Rhodes, 2015) investigated the relationship between Spiritual Intelligence and several demographic variables. Specifically, data was collected from over 100 participants to test hypotheses that there would be significant differences in aspects of spiritual intelligence across age, gender, education level, and career sector (specifically for profit and nonprofit distinctions). Many of the expected differences were substantiated. A significant relationship between spiritual intelligence and gender was not found using standard correlational analysis. However, upon further investigation, a relationship revealed itself. Specifically, five clusters of observations using K-means Euclidean distances as the clustering measure produced two clusters consisting of only males and two clusters of only females. The measure of spiritual intelligence was similar between the female clusters; however, the results were strikingly different in the two male clusters. Original use of the variability hypothesis first addressed by Darwin declared variability differences in physical and mental characteristics of males and females based on the occurrence of extreme measures within the male population. This study regarding Spiritual Intelligence can possibly support the variability hypothesis. However, as Shields (1982) noted, environmental factors may explain these results.

Impacts of Manufacturing Firms' Culture, Structure, and Leadership on Innovation: A Systemic Approach

Jeffrey Yi-Lin Forrest

Slippery Rock University of Pennsylvania

Reginald Tucker

Louisiana State University

Canchu Lin

Carroll University

Sunita Mondal

Slippery Rock University of Pennsylvania

This paper employs a method of holistic thinking to see which of the twenty plus internal factors empirically identified in the literature are primary forces underlying the innovativeness of a manufacturing firm and which ones are secondary or appear naturally after the primary forces are created. Based on how organizational culture is formed in general, the effects of firms' culture on innovation are analyzed. By using a general cost-benefit analysis, the effects of firms' general characteristics on innovation are studied. Though modelling a firm systemically, the effects of firms' structure on innovation are seen clearly. With the concept of leaders well explained, the effects of firms' leadership on innovation are shown. At the end, practically useful recommendations for managerial decision making are provided.

Is Our Mission to be the Same as Our Competition? An Examination of Differentiation through Mission Statements

David Gargone
Kelli-Ann Gargone

Misericordia University
Misericordia University

Mission statements serve as tools for companies to establish a vision and create a foundation for core business decisions. Mission statements are a way to tell not only shareholders, but consumers and employees, who the company is and what the company hopes to accomplish. Effective mission statements should promote differentiation from competition. However, little research exists in determining the effectiveness of differentiation through mission statements. The purpose of this study was to evaluate mission statements from competing companies, in the same market, to see if they differentiate from one another. Results suggest companies competing in the sports apparel market are having difficulty distinguishing themselves from the competition.

Session 4: Logan/Harris Room

9:35 am – 10:35 am

Healthcare Management Topics

Session Chair: *John Grigsby, Thomas Jefferson University*

The Impact of Tax Reform on Hospitals and Health Care Systems

John Grigsby

Thomas Jefferson University

The Tax Cuts and Jobs TCJA of 2017 (TCJA) made sweeping changes to the US tax code for both for-profit and tax-exempt hospitals and health care systems. The effects of the TCJA will vary for different hospitals and health care systems. Financially strong for-profit systems will likely benefit from the repeal of the corporate alternative minimum tax and the lowering of the corporate tax rates while highly leveraged systems could suffer from the new limitations on the deductibility of interest. Tax-exempt institutions are anything but exempt from the TCJA. They bear the greater burden of the TCJA by having to deal with significant new taxes on unrelated business income and compensation arrangements, and modifications to certain employee benefit arrangements. Organizations that are proactive in analyzing these changes will find ways to benefit from the TCJA while others will have to face the consequences of their passive responses. Leaders of these systems will need to assess the efficiency of their organizations and evaluate whether tax exemption remains viable.

Comparative Analysis of Step Therapy Protocol Health Care Legislation

John Cameron

Penn State-Great Valley

Health insurance companies impose management practices for controlling health care expenditures. Regarding pharmaceuticals, pharmacy benefit managers utilize a cost savings technique known as step therapy protocols, or fail first protocols as part of their health coverage approval process. These control measures stipulate that prescription drugs may only be utilized in a specific sequence in order to receive authorization or payment of health care benefits for needed services. The step therapy business strategy enables the insurer to deny coverage for effective medications, basing decisions on cost rather than patient need. In response to consumer health advocacy concerns, states have introduced legislation to regulate these insurance management practices. The legislative initiatives enable the prescribing provider to override the step therapy protocols of the plan sponsor. If the patient and the prescribing provider comply with certain conditions, the plan sponsor is mandated to authorize coverage for the requested prescription drug. The latest account indicates that such reform legislation has been approved in fourteen states and is pending in twelve additional states (American Academy of Dermatology, 2018). Prior research to examine provisions associated with the regulation of the step therapy practices within the United States has been limited. To address this gap in the literature, this paper will examine the regulatory exceptions to step therapy practices including clinical review criteria, patient protection measures, explicit and transparent process requirements, conflict of interest disclosure and exemption provisions.

Comparative Analysis of Interstate Health Care Insurance Legislation

John Cameron

Penn State-Great Valley

States regulate the business of insurance within their jurisdictions in accordance with the McCarran-Ferguson Act of 1945. Health insurance products are specifically regulated by the states. Recently, several states have enacted interstate health insurance legislation that permits health insurance companies to sell health insurance policies across state lines. The federal government has also enacted the Patient Protection and Affordable Care Act which contains a provision to allow individual states to form compacts authorizing health insurance companies to sell insurance across state lines. A recent account indicates that such reform legislation has been approved in six states and is under consideration in seventeen additional states (National Conference of State Legislatures). In addition, health insurance companies and employers may take advantage of the reform legislation and expanded access to small-business association health plans, further intensifying competition in the healthcare insurance marketplace. Insurance companies may offer a wider range of health insurance products and alternative coverage options to consumers. The state legislative insurance initiatives vary in terms of scope and consumer protection standards. Prior research to examine provisions associated with the interstate sale of health insurance within the United States has been limited. To address this gap in the literature, this paper will examine health insurance reform measures including financial reserve requirements, annual reporting requirements, payment of state taxes, grievance procedures, resolution of disputes, actuarial standards, disclosure statements and filing requirements.

Economics Topics

Session Chair: *Craig R. Erwin, Eastern Connecticut State University*

An Investigation of the Risks Women Face in Preparing for Retirement

Craig R. Erwin

Eastern Connecticut State University

Many American women are ill-prepared financially for retirement, in part due to a variety of disadvantages they have long faced. As a result, after retiring many women end up living near or below the poverty line and some are forced to return to the workforce. Due to financial constraints, retirees may also be forced to make difficult choices about their lifestyles and about where, how, and with whom they live. In this presentation, I review the literature on the risks women face as they prepare for retirement and their golden years. I conclude by discussing what can be done to increase women's retirement preparedness.

Financial Condition of Five Paradigmatic Shrinking Cities in the United States

Daniel Hummel

University of Michigan - Flint

This proposed paper presentation is an extension of another paper I published in the journal *Public Budgeting and Finance* ("Right-sizing Cities and Fiscal Health: A look at Five Cities," *Public Budgeting & Finance*, Vol. 35/No. 2 pp. 1 – 18, 2015). This study compared the financial condition of five paradigmatic shrinking cities in the United States that are like each other in the extent of decline, their economic base and their approaches to stabilizing their population and economy. These cities are Buffalo (NY), Cleveland (OH), Detroit (MI), Flint (MI) and Youngstown (OH). The years for the original study were from 2006 to 2010. This proposed paper presentation will extend this from 2011 to 2016 for the same cities. The purpose of this comparison is to see if these cities are making improvements in their financial condition over time and whether some of these cities are improving over others. The possible reasons for the trends as well as an exploration of the elements of their financial condition based on the series of ratios used to calculate the scores will be discussed in the presentation.

Earnings Differentials Between Rural and Urban Labor Markets

Insoo Cho

York College of Pennsylvania

This study explores earnings differentials between urban and rural labor markets. I estimated the probability that each college educated individual in Iowa State University alumni database selected one of the full-time farming, non-farm rural self-employment, rural wage work, urban self-employment, and urban wage work. I then estimated the wage differential for each occupation group relative to its nearest matched control using propensity score matching technique. I found that urban wage workers earn more than rural wage workers, consistent with urban wage premium. Likewise, urban non-farm self-employed earn more than rural wage workers, whereas rural non-farm self-employed earn similar earnings as rural wage workers. Full-time farmers, however, earn less than observationally similar persons working as off-farm wage workers in rural. There exists a substantial urban premium for earnings but net loss from farming.

Technology Topics

Session Chair: *Lisa Mare Walters, State University of New York at Fredonia*

Where's the Cloud? Dire Impact of Missing the Cloud ERP Revolution

Edward C. Keller

Bloomsburg University of Pennsylvania

Carolyn LaMacchia

Bloomsburg University of Pennsylvania

This research addresses the decision to either manage the Enterprise resource planning (ERP) information technology infrastructure or contract cloud computer services through the software vendor. ERP integrates business functions into a single information technology system to support enterprise-wide operations and decisions. Although challenging to implement and manage, these systems provide essential benefits of a single database platform and uniform usability. The vast majority of organizations use an ERP application that has been developed by a relatively small set of vendors and are on-premise (on-prem) installations. Cloud computing refers to vendors hosting resources and applications for organizations to access through the Internet. Customers then purchase the rights to use the Cloud-ERP functionality via subscriptions. Cloud computing can replace a private datacenter by utilizing licensed facilities to provide organizations with high levels of computing power. Accessing software through the cloud is referred to as software-as-a-services (SaaS). Although implementation and management of ERP application is a very active area of research, there is a gap in the literature in the decision process of an ERP implementation through cloud computing. This research reports on the conversion of the major ERP vendors to SaaS. The advantages and disadvantages of each implementation choice is describe to support decision making for ERP adoption and conversion efforts.

Evaluation of Firm Performance and the Complexity of IT Investments

Jorge A. Romero

Towson University

This study investigates whether the complexity of IT investments that firms incur have an effect on firm performance. Not every IT investment implies the same level of complexity. Some IT investments were more expensive to implement, more difficult to implement, and took a longer period of time possibly having an important effect on the cash flow of the firm and its profitability. This study looks at publicly traded firms over a long period of time using the Dupont Profitability analysis. In the Dupont Profitability analysis, return on assets is broken down into its two components in order to evaluate performance of firms.

Cryptocurrency: A Case of the Social Construction of Reality

Marlene E. Burkhardt

Juniata College

Berger and Luckmann (1966) identified and codified the process whereby individuals as part of a social unit interact with one another to create meaning. Over time, socialization produces agreed upon concepts and roles, which we define as reality. Today, we see this process occurring within

the fields of technology and economics to create value in a system of monetary transactions institutionalized as a form of currency. Satoshi Nakamoto, who developed what he called a Peer-to-Peer Electronic Cash System, officially announced Bitcoin in 2008. Other attempts to build a digital cash system failed. Nakamoto's success came by utilizing a peer-to-peer network whereby every entity in the network has a list with all transactions to validate spending. This social construction of digital cash is tantamount to the social construction of reality as identified by Berger and Luckmann. The question lies in whether this system will be institutionalized over time. This analysis reviews the technological, economic and political determinants of the construction of a digital cash system to determine the likelihood of the institutionalization of cryptocurrencies.

Session 7: Willow Room

10:55 am – 11:55 am

Pedagogical Topics

Session Chair: *Ron Petrilla, Misericordia University*

Bringing the Real World of Health Care Management into the Classroom

Ron Petrilla

Misericordia University

The benefits of inviting guest speakers into the classroom have been well documented in academic literature on innovative classroom learning. Yet some instructors who have employed this technique have experienced mixed results. A good guest speaker seems to make the class time fly-by while engaging students in real world management scenarios, while others fall short of providing a worthwhile experience for the students. This workshop will reveal some of the potential pitfalls of inviting speakers into the classroom, as well as some steps to ensure a worthwhile experience for the students, as well as for the guest. While the focus will be on undergraduate health care management classes, the material may be transferrable to other disciplines.

Does Ear-Training Improve Technical Listening Skills for Audio Engineering Students?

Edward Goguen

Husson University

Students enrolled in the audio engineering and live sound technology programs at Husson University's New England school of Communications engage in focused technical ear-training in various courses across four different levels. This paper examines the impact of the level one portion of that ear-training curriculum. Data from previous semesters indicate that student scores do not increase over the course of the level one training raising questions regarding the effectiveness of the ear-training altogether. Pre-tests were added for this study, which did not exist in previous semesters, before students were assigned drill-sets designed to prepare them for the post-tests. Data from the last two post-tests indicates improvement in scores while scores dropped for the first two post-tests. A student survey was also conducted to get student opinions on the overall impact of the ear-training at the end of the study.

Maintaining and Expanding a CFP Board Registered Program

Bradley C. Barnhorst

DeSales University

DeSales University successfully launched two CFP Board Registered Programs in 2016, but there were multiple complications to meeting internal and external requirements. Since this time, the existing programs have needed to be revised, reported upon, and evaluated, and a graduate program has been developed and launched. This paper will compare the internal and external processes, examine which elements caused the most slowdown during the application, evaluate if all controls and requirements were truly necessary to secure quality, and attempt to value the resources expended compared to a more streamlined process.

Session 8: Holmes/Foster Room

10:55 am – 11:55 am

Entrepreneurship and Leadership Topics

Session Chair: *Annette Rogers, University of Hartford*

#IB4E Except After C: Introverts as Virtual Team Leaders

Annette Rogers

David Moore

University of Hartford

Werthmoore Associates

The ebb and flow of society dictates the values, beliefs and acceptable behaviors of groups of people, including corporations. Modern movements embrace the inclusion of fundamental liberties such as diversity and equality; individuals with physical and emotional challenges; self-designation; and psychological, physical and emotional safe spaces. Societal beliefs move the needle in organizational thinking and conduct, evidenced by today's organizational movements. Nonetheless, discrimination based on personality characteristics is yet to make the radar of social movements. Specifically, Introvert as Leader must be elevated to the level of inclusion dialogue in our society and hash tagged # IB4E movement. This paper seeks to show the biases in thinking that favors one personality style over another and attempts to give voice to a conversation that is long overdue – the introvert leader. Moreover, this paper will explore the potential for introvert leaders to fill a growing need in organizations- the leadership of virtual teams.

A Gender Comparison of Perceived Barriers Faced by Entrepreneurs

Denise Ogden

Penn State-Lehigh Valley

Despite the increase in the number of new businesses, significant barriers still exist for entrepreneurs. This research examines barriers faced by business owners. A survey to compare men and women business owners was conducted to determine if barriers for operating a business were different based on gender. Results indicate significant differences between genders in several areas including legal knowledge, knowledge about financing operations, leadership skills, discrimination and creating technology infrastructure. The mean for women was significantly higher in these areas compared to men which indicated higher levels of perceived barriers in these areas for women.

The All-Electric Vehicle: Is It Time?

Jerry Douglas Belloit

Clarion University of Pennsylvania

In the summer of 2017, Professor Tony Seba gave a compelling presentation on disruptive technologies. In it, he suggested that the convergence of changes in battery technology, Doppler Lidar, computing power and computer storage, and self-driving vehicle technology will lead to the demise of the internal combustion engine within a decade. At the same time the automobile industry has introduced several all-electric powered vehicles. This paper will examine the costs and benefits of the move to an all-electric powered vehicle relative to gasoline-powered vehicles along with a cost-benefit analysis of the additional solar capacity necessary to provide sufficient capacity to provide for powering the vehicle.

Session 9: Sylvan Room

1:00 pm – 2:00 pm

Management, Administration, and Regulatory Topics

Session Chair: *Noel M. Criscione-Naylor, Stockton University*

Evaluating Post-Acquisition Strategy and Implementation in the Casino Industry

Noel M. Criscione-Naylor

Stockton University

Commercial gaming has become a critical source of revenue for state budgets. In 2017, HB271 was signed into law expanded gaming through the creation of 10 additional mini-casino licenses and the legalization of online gaming and sports betting, both recently approved by federal law. In response to these policy changes, two notable sales have occurred in the Eastern Pennsylvania market. The sale of Valley Forge Casino Resort to Boyd Gaming and Sands Bethlehem to Wind Creek Hospitality. Acquisitions naturally result in employee uncertainty and for these casinos it is coupled with the opening of two previously closed Atlantic City, New Jersey casinos, Ocean Resort Casino (Revel) and Hard Rock Atlantic City (Taj Mahal). The employee populations at Sands Bethlehem and Valley Forge Casino Resort are vulnerable without appropriate acquisition implementation and retention strategies. Kim and Olsen (1999) define a five dimensions construct to implement and evaluate post-acquisition implementation that includes approach, people, culture, organization, and strategy. The purpose of this exploratory, quantitative study is to replicate this model within these casinos to identify the relationship between employee commitment and turnover intentions of casino front-line employees and supervisors during the post-acquisition integration phase of a merger and reopening of two Atlantic City casinos. Data will be anonymously collected and findings will provide important insights for talent retention, change leadership, and employee turnover intentions to help organizations more effectively manage organization change and competition.

Preliminary Studies for Development of a Testable Theoretical Model of Buddhist Business

Hideki Takei

Central Washington University

Chester Claar

Central Washington University

Buddhist business, a Buddhism-based management system, has been discussed especially among Asian scholars of business and economics. These scholars have studied various extensions of

Buddhism to business conducts or top executives' Buddhist beliefs in business. While there are many studies, Buddhist business has not been established as an independent management system. This is because we do not have a generally accepted model of Buddhist business which will show Buddhist philosophies and teachings in critical elements of business conducts such as human resources, capital, and goods/service.

Based on our literature reviews, we believe there have been sufficient data and information to develop the generally accepted model. The model is also very important because it will be used for comparative studies, development of Buddhist business in various industries, and actual assessment of effectiveness of Buddhist business.

As a first step to develop the generally accepted model, we will develop a testable theoretical model of Buddhist business through intensive literature reviews. Once we develop the testable model, we will test and polish it later with various case studies to develop the generally accepted model.

Our literature reviews started with Schumacher (1974) to find all principles, values, teachings, and characteristics of a Buddhist economics model. Then, we moved on to Payutto (1994), Field (2007), Guruge (2007), Peeters (2016), and Proyukvong (2017) to find all principles, values, teachings, and characteristics of a Buddhist Business model.

All Bets are Off: Potential Regulation of Insider Information in Collegiate Sports

Gambling

Joshua D. Winneker

David Gargone

Misericordia University

Misericordia University

The Professional and Amateur Sports Protection Act of 1992 was recently struck down by the United States Supreme Court paving the way for legalized sports gambling throughout the country. Several states, including New Jersey, Delaware, Mississippi, and West Virginia, have already opened legal sportsbooks with Pennsylvania and Rhode Island rumored to be following within the year. With sports gambling now legal, the idea of players, coaches, trainers and staff having significant "insider information" about the games presents an interesting issue. The professional sports leagues and the NCAA, however, have been relatively silent on how to regulate this type of information. The NFL and the NBA already require injury reports on the players and the NCAA has been discussing a similar requirement of its member institutions. A required injury report from college athletes presents a variety of issues, most important being the student-athletes' right to privacy. For this reason, the NCAA should refrain from requiring the student-athletes to release their medical information to the public.

Accounting/Finance/Marketing Research Pedagogical Topics

Session Chair: *Michael J. Gallagher, DeSales University*

Teaching Students to Find the Hidden Story: How Effective Research Techniques Can Be Used to Develop a Complete Picture of the Market

John M. Zych

University of Scranton

Digital data bases provide students with quick access to secondary data they can use to analyze the marketing environment. Students need to be shown that primary data also is needed and that the crucial part of their analyses involves determining whether they have complete information and identifying what input is missing.

An assignment was developed requiring students to research a consumer product and find data to answer questions relating to the product's current market conditions. Students present their findings and discuss how they are supported by primary and secondary data sources. A follow-up discussion is moderated by the professor to encourage the presenter and classmates to evaluate the findings with a critical eye and determine what data is missing. The follow-up discussion enables the entire class to appreciate how expanding the scope of the research provides a more complete profile of the marketing situation. This process engages classmates, models the research process, and helps develop students' creativity.

The conference presentation will illustrate this approach with examples from groceries and automobiles. Student reactions to the assignment also will be discussed.

Onward and Upward: A Swedish Corporate Finance Course

Timothy L. Wilson

Umea Universitet (Sweden)

Lars Lindbergh

Umea Universitet (Sweden)

Business education in Sweden has been characterized as the meeting of Mercury, the god of merchants, with Minerva, the patron of science. The understanding of corporate financing typifies that association, i.e., commerce is depicted in accepted, systematic formulations. The course that is described herein is a final year finance course at Umeå University in Sweden – Advanced Corporate Finance. The primary purpose of this course is to provide an integrated overview of the most important concepts in Corporate Finance in theory, practice and in some cases method. The course is designed to develop students' ability to

- assess the impact of information asymmetry on corporate financial policy decisions,
- explain the theoretical basis and applicable strategies applied in corporate control,
- compare and contrast leverage strategies in ideal versus real capital markets and ably explain the impact of alternative taxation systems on the use of debt,
- argue for optimal levels of corporate debt and be able to value an offering under different financing strategies, and

- formulate and logically defend a position in regard to current issues, which confront corporations today

Highlighted and discussed are measures such as how business valuation can affect various stakeholders and potential implications are related to ethics and sustainability. A group exercise and case study analysis, used in the course, are covered in the paper. The paper should be of interest to educators and administrators because of Michael Porter's reflection that one of the competitive advantages of Sweden is the universally high educational level of its population.

Implementing Case Studies to Enhance Student Learning in Corporate Taxation Accounting Courses

James Meersman

Juniata College

This paper analyzes previous research conducted regarding enhanced student learning through the use of case study materials. These materials are then further tested by implementing a case study related corporate taxation that was based off of a real world issue and designed to enhance student learning. The case study was implemented both in and outside the classroom, with various modifications resulting from student input and instructor reflection. Any appropriate changes to the case study were then implemented for further instructor observation. The case study was designed to be used in an upper level accounting taxation course with enough students to work in groups of 3-5.

Session 11: Logan/Harris Room

1:00 pm – 2:00 pm

Management and Leadership Topics

Session Chair: *Sunando Sengupta, Bowie State University*

Narcissism, Millennials, and the Supply Chain

Mark Arvisais

Stevenson University

In business, it is well known that the generation known as the millennials (Gen Y) are afflicted with higher levels of narcissism. Today, millennials are on the trajectory to become the dominant inhabitants in organizations. However, what is not clear is how the millennials and their elevated levels of narcissism are impacting organizational performance, specifically as it relates to the supply chain. This paper examines the literature on narcissism's influence on organizational decision making and millennial behavior, and how this personality trait can destructively impact supply chain performance. An amalgamation of the research suggests that narcissistic millennials can cause negative supply chain outcomes. These effects informs organizations on the need for countermeasures to maintain business viability.

Human Resource Perceptions of Bullying

Kathleen Geary Voss

Temple University

Workplace bullying is a pervasive problem in many organizations. While opposite gender bullying such as a male bully and female target (male-female) can be presented as sexual harassment, there

is no Title VII protection for female-female workplace bullying in the United States (U.S.). In addition, workplace bullying is often measured by self-report, i.e., the target. Prior research has not investigated human resource professional (HRP) observations of female-female workplace bullying behaviors. Using an online survey sample of 97 complete-data U.S. HRPs, this study tested two research questions: (1) are there relationships between HRP gender, age, career tenure to frequency of self-reported observations of female-female workplace bullying; and (2) is there a relationship between HRP need for approval to frequency of self-reported observations of female-female workplace bullying? Results did not show any relationships of HRP gender, age or career tenure to self-reported observed female-female workplace bullying, but did find a significant negative relationship of HRP need for approval to self-reported observed bullying. Implications for HRPs as well as study limitations are discussed.

Perceptions of Leadership

Patrick M. Mulvihill
Dennis D. Frketich

Point Park University
Indiana University of Pennsylvania

The purpose of our research is to illuminate the definition of leadership as understood by degree seeking students enrolled in undergraduate and graduate business programs within institutions of higher education. The researchers' classroom and professional experience anecdotally demonstrates that individuals, when asked, evoke characteristics of leadership rather than illuminating the relationship between leaders and followers that underpins much of the seminal work related to leadership theory (Cox, 2017; Johns & Moser, 1989; Senge, 2005). The researchers agree with the literature that demonstrates a correlation between a set of characteristics, when present, often results in great leadership. Absent from the body of knowledge are two key ideas. The first, the realization that we have shifted our leadership paradigms away from relationship-based models. Secondly, the idea that the intensity of these characteristics is directly correlated to the strength of the relationships of the individuals involved.

The body of scholarly knowledge has demonstrated that leadership permeates an organizations culture, in both positive and negative ways, beyond our well-defined organizational structures. More specifically, leadership is the direct result of the sphere of influence of each member of an organizations community (Thrasher, 2018). It is this very idea that requires a fundamental shift in the way that we come to understand the concept of leadership.

Traditionally, when we consider the definition of leadership, there is the propensity to identify the more visible and measurable elements of this concept. For example, individuals will often define leadership as:

- The ability to Motivate;
- Someone who is Charismatic;
- The ability to Communicate a Vision;
- Someone who is Courageous;
- Someone who is Empathetic

Rarely mentioned is the word Relationship.

If the definitions of leadership as understood by degree seeking students enrolled in our institutions of higher education are illuminated, it can be determined in a more rigorous manner the anecdotal experiences underpinning this study. These results can then be applied towards future research that work towards identifying if we have shifted the interpretation of our leadership paradigms away from relationship-based models, and furthermore, the idea that the intensity of leadership characteristics is directly correlated to the strength of the relationships of the individuals involved.

Session 12: Holmes/Foster Room

1:00 pm – 2:00 pm

International Entrepreneurship and Tourism Topics

Session Chair: *Evelyn Wamboye, Penn State-DuBois*

The Development and Benchmarking of Contemporary Sustainability Indicators for Rural Ethnic Chinese Villages: A Case Study of the Social, Economic, and Ecological Issues of Two Gelao Villages Near Chongqing Municipality

John Golden

Slippery Rock University of Pennsylvania

Li Pu

Slippery Rock University of Pennsylvania

Based on our fieldwork done in Wulong Gelao and Pengshui Miao Villages in China's Chongqing Municipality, we explore opportunities and challenges associated with sustainable rural development in terms of socioeconomic development, ethnic community building, and identity maintenance in the context of Southwest China. The case study of these two particular Chinese ethnic villages will help to better understand the interplay of tourism and modernization initiatives with environmental and social variables at the local level.

Walking on the Shoulders of Giants to Foster Entrepreneurship in Africa

Christopher J. Speicher

Marywood University

Sr. Kevin Karimi

Marywood University

Caroline Millen

Marywood University

Melissa Saddlemire

Marywood University

This incubator project targets to bridge the gap in success and failure identified through research findings, which show 60% of incubators fail in several case studies in Africa. Such gaps arise from exclusion of potential leaders among innovative youth from those already successful in entrepreneurship. This project will train participants as trainers in transfer of skills, by merging theory and practice on evidence-based enterprises, largely borrowing from current studies' noble recommendations, like longitudinal studies to foster a creation of collaborators than unhealthy competition in business. This recruitment process projects to get participants take ownership from its inception, opening the incubator project to measurable goals for sustainability after implementation. An initial group of 30 members will be recruited based on proposals for ideas they hope to implement, specifying what they lack to attain their stipulated goals, and adoption of a curriculum tailored to their perceived needs. A collaborative field assessment of available resources like farms for agribusiness training, natural springs to create a supply of clean water, use of technology, other enterprises like industrial tailoring, provision of nutritional services for

mothers and children, data collection and ongoing research for winning enterprises, marketability of the goods and services, organized internships for college students to merge theory and practice. This model will utilize a grounds-up approach to create the incubator, where other approaches have been found to be low in success rate, by conducting joint field assessments, then providing skills in finance administration and mentorship in business planning.

What are the Determinants of International Tourism in Tanzania?

Evelyn Wamboye

Penn State-DuBois

This study empirically investigates the relevant determinants of international tourism demand using panel data for Tanzania's top fifteen tourists' source countries during the 2000-2016 period. Results indicate that income of tourists and infrastructure development are the two main determinants of international tourism demand for Tanzania. These findings hold across model and sample specifications. From a policy perspective, the government of Tanzania and stakeholders should work towards making Tanzania tourism products more competitive by developing/improving infrastructure in the country. Moreover, there should be a policy that encourages developing tourism packages that fit the demands of tourists from relatively high income countries, and also make conscious efforts to market these products in the target countries. Lowering the cost of living and improving the exchange rate are also some of the areas that the government could work on to help grow the tourism industry.

Session 13: Sylvan Room

2:05pm – 3:05 pm

Business Education Topics

Session Chair: Mark Nickerson, State University of New York at Fredonia

Building Statistical Understanding Through Progressive Coursework and Project-Based Learning

Lisa Marie Walters

State University of New York at Fredonia

Reneta Barneva

State University of New York at Fredonia

Jennifer Cameron

State University of New York at Fredonia

Individuals who make organizational decisions are often college-graduates who have had statistical courses ranging from introductory coursework to advanced work where statistics are used to solve problems with fixed and known outcomes. This work explores using project-based learning in a course designed to provide data-driven recommendations for a live organization by using the Six Sigma problem-solving cycle. The students use data to define the organizational problem; measure the current state; analyze root and contributing causes; and offer improvement actions. Students use both Excel and Minitab, determining the most appropriate tools to employ in each stage to best interpret the data voice and arrive at sound conclusions. Credible, sound solutions are derived for the organization's challenges, thereby providing the students with a much more realistic model of what they may face when met with a management problem in their career and building their confidence in solving organizational problems with data.

The Finances Surrounding Starting, Operating, and Exiting a Small Business: A Pedagogical Case Study

Mark Nickerson
Julie Fitzpatrick

State University of New York at Fredonia
State University of New York at Fredonia

A case study is developed to provide students with a realistic situation to advance and exercise critical thinking and analytical skills while addressing issues that any small business entrepreneur should consider when starting, operating, or exiting their venture. The case also serves to increase student's awareness, understanding, and execution of basic to intermediate skills in Microsoft® Excel® which serves as the template for student solutions. This instructional case provides students with an experiential learning tool to develop a more robust understanding of small business finance. The instructor-developed case study is used in an undergraduate Small Business Finance course to assess the impact of a case study on student learning outcomes (SLOs).

This case involves Bill and Fiona Russell, a married couple and aspiring entrepreneurs. He currently works as a Sales Manager for a local payroll and benefits firm while she is an elementary school teacher. Together they have always had a passion for home -brewing on a small scale mainly sharing their unique creations with friends and family while also winning some local beer making competitions. Over the years Bill and Fiona have always been encouraged by those that have tasted their beer to open a small brewery but until now have brushed it off as unrealistic. Recently, some changes at Bill's employer have led him to research the potential to open a small brewery and restaurant to pursue their joint passion while also replacing his current salary and providing a better lifestyle. Through an attorney, Bill and Fiona have organized Rusty Bucket Brewing Co. LLC. While still in the development stage, they are dedicated to seeing this venture through and have hired you, a financial consultant, to assist in helping them with all financial aspects relating to their small business.

The researchers plan to discuss the development, pedagogical methods introduced, and measurement of SLOs before and after implementation of the case study.

Note: This is a fictitious instructional case.

Making the Case for Student-Written Business Cases

Luanne Amato
Don Goeltz

Holy Family University
Holy Family University

This session reviews the benefits of student-written business cases, including practice in industry and company research, gaining a deeper understanding of learning objectives, practice in academic writing and the art of storytelling, and the potential for a publication as an undergraduate student. The presenters then describe the approach that they have used in the classroom and as a special summer project to completing and publishing student-written cases. The process starts with lessons in storytelling and case reviews, moves to the students' choice of a topic, and end with a completed business case. Obstacles, team issues, and pits of despair are all overcome when the students "get it." Examples of student-written cases conclude the session.

Economics/Finance Related Topics

Session Chair: *M. Arshad Chawdhry, California University of Pennsylvania*

Determinants of Consumer Bankruptcy Filing Rates Across the U.S. States 2000-2015

Ismail M. Cole

California University of Pennsylvania

M. Arshad Chawdhry

California University of Pennsylvania

The significant rise in U.S. bankruptcy filings that started in 2008 peaked in 2010 when almost 1.6 million bankruptcies were filed. The trend in such filings since then has generally been declining with, for example, a modest decline of 1.8 percent in 2018 compared to 2017. These fluctuations in the filing rates have important implications for the cost and availability of credit and, thus, economic growth and development. Accordingly, the underlying causes of the fluctuations have received much attention in the literature. Much of this attention, however, has focused at the national and state levels with relatively little attention given to smaller geographical areas like counties which play an important role in the bankruptcy filing process. In this paper, we attempt to shed some light on the causes of differences in bankruptcy filing rates in the counties in Pennsylvania by applying dynamic panel data estimators to data for the 2000 to 2016 period.

The Role of South Africa's Rand and its Trade Balance: A Linear and Non-Linear Analysis

Hanafiah Harvey

Penn State-Mont Alto

With the new approach to evaluate relationship between real exchange rate and trade balance, this paper focus on treatment of asymmetry analysis and nonlinear models. Recent empirical analysis shows that by applying non-linear approach provide positive outcome. I have augmented this information and evaluate South Africa and its 13 trading partners. The results reveal that exchange rate changes do have short-run asymmetric effects in 2 models, both short-run and long-run asymmetric effects.

Forecasting GDP and Unemployment in Berks County, PA, USA

Muhammed Dalgin

Kutztown University of Pennsylvania

Abdulwahab Sraiheen

Kutztown University of Pennsylvania

In this paper we develop a parsimonious Structural VAR model to forecast Berks County GDP and unemployment, and output of eleven sectors, such as manufacturing, healthcare, professional services, etc. Availability of small number of years and variables that can be used to do the forecasting limits to model to admit very few VAR variables and lags. In each sector of the local economy, according to various criteria such as forecasting mean square error, we pick the best performing model and use it to forecast the output and unemployment in the sector for the next three years. We also include a couple of exogenous variables such as federal funds rate, interest rate spread, inflation, in accordance with the structural VAR model in order to anchor our forecasts. Overall the performance of the forecast looks good. This forecasting exercise is useful for the

industrial planners as the county level GDP data is only made available with a two-year lag although unemployment data made available monthly and comes only with a few months lag.

Session 15: Logan/Harris Room

2:05 pm – 3:05 pm

Finance and Accounting Related Topics

Session Chair: *Jane Brooker, Bloomsburg University of Pennsylvania*

Probability of Bankruptcy and Market Performance During an Exogenous Shock

Rajeeb Poudel

Slippery Rock University of Pennsylvania

Ravi Jain

University of Massachusetts Lowell

Dev Prasad

University of Massachusetts Lowell

The main goal of our study is to investigate whether the impact of an exogenous shock to the financial markets on the stock returns of firms is conditional on the firms' probability of bankruptcy. We predict that firms with higher probability of bankruptcy experienced more negative impact on stock returns following the attacks of September 11, 2001, a negative exogenous shock to the financial market. When we examined the stock market performances of the firms after the crisis, we found that stocks of firms that were deemed to be in financial distress based on Z-Score were more negatively impacted by the September 11 crisis than the stocks of firms deemed financially safe.

Session 16: Holmes/Foster Room

2:05 pm – 3:05 pm

Business Education Topics

Session Chair: *Robert S. Fleming, Rowan University*

Real World Business Experience: Is Your School in the Goldilocks Zone?

Robert John O'Connell

York College of Pennsylvania

Many business schools tout that they provide students with real-world experience to prepare them for business world entry. Most schools have internship programs that expose students to varying degrees of experience in selected aspects of a business, most likely in a specific discipline at or near the college graduate entry level. Such internship assignments serve a useful purpose of exposing the student to an environment they may enter upon graduation, and sometimes, the experience helps the students adjust their education goals to a specific business discipline. Although these internships typically last a semester and delve in-depth into the position of the internship, the internship may not provide scope across multiple disciplines, and it may not expand vertically into senior leadership of the business. A complement to the typical internship program can be a mentorship program, as presently in use by York College of Pennsylvania. This program does not replace a student's choice to enter an internship program. Rather, it is a capstone business course that exposes small teams of students to senior and mid-level leaders in a local business. The students analyze their company and the industries within which the business operates, and they also research a specific problem concerning the company. This paper will explain how the course

is constructed, managed, and executed, and will delve into the community business demographics that need to be present to build such a program; basically, is the school in the Goldilocks Zone?

An Innovative Approach to Delivering the Business Capstone Course During the Winter Intersession

Robert S. Fleming

Rowan University

Michelle A. Kowalsky

Rowan University

This presentation will discuss an innovative approach to delivering the undergraduate business capstone course, Business Policy, during an intensive two-week intersession without compromising course learning objectives or quality. The use of a pre-course briefing in advance of the course will be examined from the standpoint of ensuring that the course fully achieves the stated learning objectives, incorporates the necessary skill development activities, and ensures that all students are prepared to commit the time and effort necessary to complete the various consulting team activities involved in the consulting projects. Operational challenges and concerns as well as lessons learned will be shared.

Diary of a Senior Marketing Professor: Advice on How to Get the Most from Student Projects

Audrey Guskey

Duquesne University

Thirty years of teaching experience bestows valuable knowledge and know-how on a professor as to how to be an effective teacher. Throughout my 30-year tenure teaching Introduction to Marketing, I have assigned students a project to “invent” a new product or service and develop a complete strategic marketing plan. This paper gives recommendations to instructors regarding student projects to increase student learning and assist faculty in the execution of a new product development project. This paper outlines some do’s and don’ts for this NPD project that I have learned and which can be generalized to other student marketing projects.

Session 17: Sylvan Room

3:20 pm – 4:20 pm

Data Management Related Topics

Session Chair: *Loren F. Selznick, Bloomsburg University of Pennsylvania*

Cybersecurity Liability and Small Businesses: A Study of One State’s Approach

Loren F. Selznick

Bloomsburg University of Pennsylvania

Carolyn LaMacchia

Bloomsburg University of Pennsylvania

Businesses often collect and store sensitive personal information in order to perform necessary functions like satisfying customer orders. When cybersecurity breaches cause this information falls into the wrong hands, businesses face liability. Although nationwide cybersecurity breaches are the ones that make the news, these events affect large and small businesses alike. Ohio Senate Bill 220 creates safe harbor for business that comply with certain cybersecurity standards. Critics of the law stated that emerging state-by-state standards will make it difficult for federal courts to address liability for nationwide cybersecurity breaches. This article addresses whether Ohio

Senate Bill 220 was needed for intrastate events and whether it contains sufficient protection from potentially crippling liability for small businesses.

Discovery of Insights on Gentrification Using Analytics from Twitter

Azene Zenebe

Bowie State University

This study collects big data from Twitter, and discover patterns and insight to determine the perception of gentrification and its pattern over time as well as sentiments to words gentrification using IBM Watson Analytics. The discovered insights reveal that the interest on the topic is going down in 2017 from years 2015, and nearly 70% of the tweets have a neutral opinion towards gentrification with only a 2% points of difference between negative and positive sentiment. The results reveal that in cities with larger, progressive cities, positive sentiments were greater than in cities considered to be within the Bible belt -- southern and southeastern states. There may be a correlation between education level and gentrification based on these finding. Therefore, this research demonstrated that artificial intelligence (AI) based solution allow us to discover useful insights from big data created from social media postings and gives a meaningful platform for further discovery. The implication of the results are policy makers need to consider and discover insights from social media while making policies and decision that affect citizens.

Using Analytics to Predict Student Classroom Achievement

Timothy J.Stanton

Mount Saint Mary's University

Increasingly, publishers create and professors use online learning resources to help students master their coursework. Cengage Publishing's online learning system, MindTap, provides such resources and additionally collects data on student engagement with the online material for each course. This research applies data mining techniques, frequently dubbed 'analytics' in nowadays usage, to that data with the goal of predicting student achievement on exams given in the course. After contrasting traditional statistical methods with modern analytics practices, it specifically employs linear regression, neural networks, and regression trees to analyze the data with the intent of predicting student exam scores. Following the recommended method of an analytics approach, the paper employs a multi-model strategy, a so-called ensemble, for prediction purposes.

Session 18: Willow Room

3:20 pm – 4:20 pm

Institute of Higher Learning Related Topics

Session Chair: *David W. Jordan, Slippery Rock University of Pennsylvania*

University Students' International Travel Immunization Preparedness

David W. Jordan

Slippery Rock University of Pennsylvania

Kristina Benkeser

Slippery Rock University of Pennsylvania

Peter M. Eberle

Penn State-Fayette

This study examines the likelihood of three university student cohorts to follow Center for Disease Control (CDC) vaccination guidelines prior to international travel. Two intervention cohorts and a control group participated. Students in one cohort received literature outlining CDC

recommendations specific to their travel destination, while a second cohort received both the literature and a university student health services staff presentation about CDC vaccination recommendations. Findings for the research are intended to improve student safety through more effective education and coordination of pre-travel planning and precautions. International educational experiences in higher education grew over 3.8 percent in the 2015-16 academic year, which included 325,332 students in the US who traveled abroad as participants of university international programs (National Association of Foreign Student Advisors, 2018). Furthermore, initiatives such as the Liberal Education and America's Promise (LEAP) program continue to promote Essential Learning Outcomes that include "civic knowledge and engagement (local and global), and intercultural knowledge and competence" which have led to increased integration of university curricular and extra-curricular efforts such efforts as travel abroad for experiential learning (<https://aacu.org/leap/essential-learning-outcomes>). However, little research examines immunizations for students who travel outside the United States. The Center for Disease Control (CDC) have well established protocols that include routine, required, and recommended vaccination prior to travel depending on the destination country (<https://wwwnc.cdc.gov/travel>). Unfortunately, many students have little or no knowledge of the associated risks. While a high percentage of travelers believe vaccinations confer essential protection, many question the safety of vaccinations (Crockett M., Keystone J., 2005). One study finds that only 15 percent of travelers to Hepatitis B endemic countries recalled being immunized, while another finds that 48% of travelers, 28% of whom were advised of vaccination necessity by a medical professional, declined such (Zuckerman and Hoet, 2008; Jacqueline Howard, 2017). One finding by Crockett and Keystone, 2005 is that pre-travel education is essential for vaccination uptake. This study evaluates vaccination rates for students who travel internationally, examines vaccination rates associated with two intervention approaches, and the potential to implement more effective pre-travel planning for student safety.

Difficulties Encountered During an Undergraduate Research Project

Joseph Cunningham
Emely Tremols

Wilson College
Herbein & Company

Some college programs that focus on undergraduate research may benefit from experiences gained in conducting programs where students perform and report on original research. We hypothesized that the cost of an accounting degree in Pennsylvania varies widely among those whom attained a bachelor's degree by either starting in a community college versus entering directly to a four year program. Other variable costs included transportation and housing costs. Pennsylvania community colleges and state affiliated universities were surveyed to gather the costs related to earning a Bachelor's of Science degree in Accounting. These costs included programming costs, housing costs, transportation costs and others related to living expenses and undergraduate fees. It was somewhat difficult and frustrating obtaining information at times. Factors had to be overcome; these factors include planning, limited resources, and locating willing participants. Using a researcher with limited experience and having a demanding schedule also presented challenges, at times. Mentoring original undergraduate research is a rewarding part of the teaching experience in academia for both student and instructor. It requires planning, training, patience and resourcefulness in order for everyone to benefit.

An Update for Research on Financial Comparisons on 50 Private Colleges and Universities in Pennsylvania

Michael Gallagher

DeSales University

This paper provides the results of a common size analysis for fifty private colleges and universities in Pennsylvania. The colleges are grouped in five tiers based on the size of the endowment at the institution. The 990 tax form is used as the base for the financial results for the fiscal year ending June 30, 2016. The analysis uses the total revenue at the universities as the base to create a comparison of the revenue stream and the expense allocations for these fifty institutions of higher learning. In addition, revenue is compared to the total assets, liabilities, and net assets for these entities. This paper will use three base points in the analysis 2010, 2013 and 2016.

Session 19: Logan/Harris Room

3:20 pm – 4:20 pm

Auditing and Knowledge Management Topics

Session Chair: *Bronwyn M. Laughner, Bloomsburg University of Pennsylvania*

Place Branding and “Things-to-Do”

Rosane K. Gertner

College of Staten Island at City University of New York

Joao Freire

IPAM, Universidade Europeia, Portugal

Worldwide, countless places compete for tourists and vacationers. Hence, place marketers continuously strive to find unique and compelling brand positioning for place brands, wishing they will occupy special places in prospects' minds. Previous research has suggested that the two top motivations to go on vacation are “escape from routine” and/or “seek for new experiences.” Thus, this paper investigates the relevance of the dimension ‘activities’ or ‘things-to-do’ to places perceived mostly as sun and beach tourism destinations. It concludes that 'activities' or 'things-to-do' might fulfill the two foremost tourists' and vacationers' needs/wants. "Activities" or "things-to-do" could, potentially, help place marketers to differentiate destination brands and enhance vacation destinations' images and appeal.

Knowledge Management in Small- and Medium-Sized Enterprises

Bronwyn M. Laughner

Bloomsburg University of Pennsylvania

Over the next 15 years, the baby boomer generation will reach retirement age. With the impending exodus of such a large portion of the United States workforce, how will companies capture the knowledge of those retiring workers and pass it on to the new workers? In many cases, large corporations have, or will, implemented an Enterprise Resource Planning (ERP) system and in that implementation have captured and recorded their business processes and codified workflows and responsibilities. Implementing an ERP system is an expensive endeavor for any company and one that is cost prohibitive to many small- and medium-sized enterprises (SMEs). In this paper, I will explore how SMEs collect and transfer knowledge among an inter-generational workforce.

Blockchain and the Future of Audit Profession

Ermira Mazziotta

Muhlenberg College

Blockchain, originally used for Bitcoin trading, is one of the most important and innovative technologies developed in the recent years (Jun Dai, Miklos A. Vasarhelyi 2017). This technology is considered to be as important as internet and it could fundamentally change the nature of auditing by revolutionizing supply chains, payments and revenue streams through the way it documents and reconciles complex and disparate information from multiple sources. A blockchain is effectively a type of a decentralized database known as a distributed ledger. Unlike traditional databases, blockchains have no sole administrators. As each transaction is recorded it is time-stamped in real time onto the “block”. Each block is linked to the previous block, and each user has a copy of that block in his or her own device. That process creates an audit trail (Hoelscher, Internal Auditor, February 2018). A technology that increases transparency, improves audit trail and gives real time access to transactions is good news for auditing profession. This paper will focus on both the benefits and the pitfalls related to the blockchain technology by reviewing recent research related to the blockchain. This paper will also address the impact that blockchain technology will have in the future of audit profession.

Session 20: Holmes/Foster Room

3:20 pm – 4:20 pm

Workshops: Business Analytics and Economics

Session Chair: Gordon H. Dash, University of Rhode Island

Business Analytics 2018: A Comparison of AI and Machine Learning to Parametric Data Analysis

Gordon H. Dash

Nina Kajiji

University of Rhode Island

University of Rhode Island

Operational Research (OR) is a discipline that is committed to the design and implementation of advanced analytical methods to support better decisionmaking. Applied OR supports decision-making by promoting the use of the tools, modeling programs, and hands-on experience needed to solve real-life resource allocation problems. Quantitative finance (quant-fin) is a professional branch within applied OR. Today, the shift within quant-fin from traditional parametric modeling (OLS regression, Logit methods, ANOVA, etc.) to the nonparametric methods of 21st century algorithms involving machine learning and artificial intelligence (AI) is not always an intuitive one. The purpose of this hands-on workshop is to offer attendees direct access to the real-time implementation of AI for econometric modeling, forecasting and classification. Researchers and educators working in the fields of price prediction (equities, futures, options, etc.), modeling educational assessment, ESG stock classification, and more will find the state-of-the-art results from using new OR-based algorithms intuitive and newly insightful. Specifically, this hands-on demonstration will feature the use uni- and multivariate radial basis function artificial neural networks (RANNs) and Kohonen self-organizing maps. The RANNs will be demonstrate with alternative transfer functions (e.g., standardize vs. multiquadric, etc.) that are tailored to generate solutions for mapping, prediction, and discrete choice. Specifically, at a minimum, the demonstration will use an Excel datafile for input to show the difference between an OLS

regression and a RANN regression. Also planned is a demonstration of how use intelligent algorithms to classify ESG generated stock residual returns. We compare solutions generated by factor analysis to those produced by application of the RANN (softmax transfer function). The concepts demonstrated in the workshop are rich in research ideology but, as the supporting documentation presents, all demonstrated methods are easily incorporated in the senior/graduate-level business classroom (see the appendix for a student submitted homework assignment). Attendees are encouraged to bring an Internet-connected device (preferably a computer or tablet) to the workshop. Attendees are also encouraged to submit a dataset prior to the start of the conference. Up to two submitted datasets will be used to demonstrate the methods presented in this workshop (note: workshop presenters are willing to abide by an accompanying NDA). This 2018 workshop is designed to be a hands-on extension of session 33 on the 2017 NABET conference program, "Active and Experiential Learning in the Evolving Quant-FIN Classroom."

Ending the Great Inflation

William Carlson
Conway Lackman

Duquesne University (ret.)
International Consulting Group

This paper has seven sections. The first three are background. The last four follow historic events. Part 1 describes major problems of 1979: Disintermediation from the banks, stagflation (high unemployment, high inflation, and high interest rates), Banks leaving the Federal Reserve System, and zombie S&Ls (bankrupt on a mark to market accounting basis as opposed to historic cost). Part 2 discusses economic thought prevalent in 1979: Keynes, incomes jawboning policy, the Phillips Curve, and McChesney Martin's punchbowl approach. Part 3 discusses the problems of measuring money caused by the invention of NOWs (negotiable orders of withdrawal) and money market fund balances. Were they savings, transactions balances, or a hybrid? Money-GNP regressions are conducted. Part 4 shows that the old policies of Part 2 were not working and that a new one was needed. Part 5 describes Volcker's new plan to control money growth along with its flaws. Inflation regression results are presented. Part 6 resumes the quarterly historic narrative of 1979-83 events featuring the back to back recessions of 1980 and 1981-2. Part 7 analyzes the end of the Great Inflation and recovery.

Special Session: Center/Arbor Room

4:25 pm – 5:15 pm

Best Paper Presentation

Session Chair: *Loreen Powell, Bloomsburg University of Pennsylvania*

Patents, Technology, Downsizing and Changes in Idiosyncratic Risk

Xiaohui Yang
Karen C. Denning
E. James Cowan

Fairleigh Dickinson University
Fairleigh Dickinson University
Fairleigh Dickinson University

We examine patent filings, technological intensity and changes in idiosyncratic risk around downsizing announcements using the Fama-French-Carhart 4 factor model for both the short term and the longer horizon. The average market reaction to downsizing announcements is negative. However, a significant portion of our sample experiences a positive market response. We consider

analyst following and institutional ownership to further elucidate this result. Our findings suggest that the short-term market response to downsizing decisions for firms that do not file patents is negative and that the filing of patents reduces the impact of the negative market reaction. Similarly, technological intensity in the face of downsizing is important, exacerbating the negative market response for firms that fail to simultaneously announce a technological innovation. In the long-term, we find a greater than 1% level of significance associated with change in idiosyncratic risk, technological intensity, patents filed, analyst recommendations and institutional ownership, suggestive that all of these factors contribute to explaining the overall market impact to human capital downsizing events.

Friday, November 2, 2018

Registration – Days Inn Foyer/Atrium 7:30 am- 2:00 pm

Breakfast - Center/Arbor Room 7:30 am - 9:00 am

Welcome and Annual Business Meeting 7:45 am - 8:20 am

*Norman Sigmond, Kutztown University of Pennsylvania
Chairman, NABET Executive Board*

Session 21: Center/Arbor Room 8:20 am – 8:50 am

Special Presentation

Discussion of the NABET Conference Proceedings and the Journal of Business, Economics and Technology (JBET)

Norman Sigmond

Jerry Belloit

Cori Myers

Kutztown University of Pennsylvania

Clarion University of Pennsylvania

Lock Haven University of Pennsylvania

This presentation will comprise a discussion regarding the history, and the current status the two NABET publications. How conference attendees can submit for possible publication will be discussed, as well as, suggestions that could prove helpful for the attendees. We will also discuss an improved team approach that will be employed to expedite publication of the Conference Proceedings. How interested parties can become reviewers for these publications will also be discussed. A key focus in this presentation will be to encourage those who have never been published. The various steps and procedures and ideas for efficiently completing work that is currently in-process will be discussed. The manner of discussion will be based on the experience of the three presenters. However, input from experienced authors in the audience, as well as, questions will be encouraged.

Session 22: Sylvan Room 9:00 am – 10:00 am

Marketing, E-Commerce, and Social Media Topics

Session Chair: *Christine A. Lai, SUNY Buffalo State*

Carvana: The Death of a Salesman

Moriba K Weedor

University of the Incarnate Word

The use of a 22 billion dollar technology in a trillion-dollar industry sets Carvana apart from other company in the automobile industry. Technology is diminishing the role of cars dealerships in the United States and posed a numerous threat to new and used car dealerships. However, multiple online car dealers in the U.S. are now chipping away at the advantages held by used car dealers and the traditional marketplace style of online sales platforms. The internet has made it easy for customer to complete much of the process of selecting and purchasing a new car. This article addressed the advantages that Carvana has over its competitors and dealerships in the United States. As a the only used car vending machine company in the U.S. for purchasing used cars, the organization is transforming the used car buying experience by giving consumers the option to select from over thirty-six different car makers, great value and quality, transparent pricing, and a simple no-pressure transaction. The focus of this article is to portray a clear image of a purchasing experience through technology and a custom business model that will forever change the future of car buying. Although there is limited information available for this organization due to its recent establishment, the objective of this paper is to not only explore the organization's technological infrastructure and growth strategies, but to also contribute to the existing literature about vehicle shopping experience.

Impact of Social Media on Consumer Attitude Towards Privacy

Kuan-Pin Chiang

Central Connecticut State University

Social media has provided tools to consumers to engage in social interaction on the Internet. A study by Pew Research Center estimated that about 69% of US adults use social media. Consumers use social media to share content and to network with others. As social media become part of consumers' life, studies have shown that consumers are concerned about their personal information. A 2014 survey by Pew Research Center found that 91% of respondents "agree" or "strongly agree" that people have lost control over how personal information is collected and used. Some 80% of social media users said they were concerned about businesses accessing the data they share on social media. Another survey in 2017 found that about half of users were not at all or not too confident their data were in safe hands. In a longitudinal study, Kelly et al. (2017) found that although consumers tend to trust social media sites to protect their private information, they don't trust advertising or brands on the sties. Their findings suggest that overtime consumers have "felt their social life was more important than their privacy concerns." Potentially, there is a trade-off between growing use of social media and privacy concerns. Therefore, this study seeks to explore the influence of social media on consumer attitude towards privacy.

The Influence of Information and Communication Technologies on e-Commerce: A Case Study of Online Shopping in Indonesia

Kustim Wibowo

Indiana University of Pennsylvania

Indonesia's current e-Commerce market is similar to early China's and also mimic the beginning of the U.S.'s online market place where large pool of entrepreneurial sellers providing goods and services with customers who wary to trust online payments and retailers. Indonesia's e-Commerce relies heavily on mobile platforms which specifically targets the mobile user as the captured

demographic. This model allows sellers to use smartphones to their advantage, gathering hyper-personalized data to target individual Indonesian e-Commerce consumers as opposed to just specific demographics or group among Indonesia's more than 260 million population. This research is to study how different online media apps will target different type of users towards their online purchasing behavior.

Session 23: Willow Room

9:00 am – 10:00 am

Investing and Decision Analytics Topics

Session Chair: *Jerry Belloit, Clarion University of Pennsylvania*

ESG and Shortfall Constrained Multiobjective Portfolio Diversification for Nonprofits

Gordon H Dash

University of Rhode Island

Nina Kajiji

University of Rhode Island

The merit of a non-profit organization lies in its ability to advocate on behalf of a well-defined social cause. Organizations such as the Boy and Girl Scouts of America, Feeding American, and the Bill & Melinda Gates Foundation exemplify contemporary goal-directed nonprofit organizations with investable endowment funds. Typically, the endowment philosophy for these organizations embraces socially responsible investing (SRI) objectives. SRI is an investment process that screens candidate portfolio assets for their commitment to social and environmental consequences. Although SRI is laudable, fiduciaries are often concerned about a possible adverse effect such a screen might impute to a portfolio's risk and return performance (see: (Lai 2012) and (Friede, Busch et al. 2015) for a more comprehensive discussion). To satisfy long-term objectives, nonprofits have typically relied on a single-factor total return strategy (realized and unrealized capital gains plus current yield) within prudent risk constraints to meet risk adjusted performance targets. While there is substantial academic evidence on the role factors (e.g., risk-premia, behavioral biases, market frictions, etc.) play in the portfolio return-generating process (Fama and French 2015) price-influencing factor extraction remains a fertile research question. In this paper we propose an interactive mixed-integer nonlinear goal programming (MINLGP) model as a flexible method to achieve efficient ESG and shortfall compliant portfolio diversification given the complex hierarchical objectives expressed by a typical non-profit. To specify the model, we are obligated to implement a protocol for identifying priced ESG risk factors that consistently capture factor premia. Additionally, the results from solving this model formulation should prove generalizable to a broad array of non-profit organizations.

Advanced Predictive Analytics for Decision Making

Satish Mahadevan Srinivasan

Penn State-Great Valley

Abhishek Tripathi

The College of New Jersey

Predictive analytics embraces an extensive range of techniques including but are not limited to statistical modeling, machine learning, Artificial Intelligence and data mining. It has profound usefulness in different application areas such as data-driven decision making, business intelligence, public health, disaster management and response, as well as many other fields. In this

study, we design and implement a predictive analytics system that can be used to forecast the likelihood that a diabetic patient will be readmitted to the hospital. Upon extensively cleaning the Diabetes 130-US hospitals dataset containing patient records spanning for over 9 years i.e. from 1999 till 2008, we modelled the relationship between the predictors and the response variable using the XGBoost classifier. Upon performing hyperparameter optimization for the XGBoost, we obtained a maximum AUC of 0.671. Our study reveals that attributes such as lab procedures, number of medication, time in hospital, discharge disposition and number of inpatient visit are strong predictors for the response variable (i.e. re-admission of patients). Findings from this study can help hospitals design suitable protocols to ensure that patients with a higher probability of re-admission are recovering well and possibly reducing the risk of future re-admission. In the long run, not only will our study improve the life quality of diabetic patients, it will also help in reducing the medical expenses associated with re-admission.

An N-Gram Based Feature Selection Technique for Emotion Classification

Satish Mahadevan Srinivasan
Abhishek Tripathi

Penn State-Great Valley
The College of New Jersey

In this study, we have explored the potentiality of KNN classifier to recognize four basic emotions (anger, happy, sadness and surprise) on three different heterogeneous emotion-annotated dataset which combines sentences from news headlines, fairy tales and blogs. For classification purpose, we have chosen the feature set to include the bag-of-words generated by our proposed n-gram based feature selection technique. Our study reveals the fact that the use of the resampling filter and the features generated by our n-gram based feature selection technique together contribute towards boosting the prediction accuracies of the classifiers.

Session 24: Logan/Harris Room 9:00 am – 10:00 am

Health Care and Economics Topics

Session Chair: *Bradley C. Barnhorst, DeSales University*

A Socio-Cultural Analysis of the Danish Health Care System from an American Perspective

Justin C. Matus

Wilkes University

Denmark's health care system is noteworthy for both its efficiency and effectiveness. The average life expectancy in Denmark is currently 80.8 years (ranked 27th among 183 countries) versus the United States at 79.3 years (31st ranked among 183 countries). Conversely Denmark's percent of GDP spending on health care is at 10.3 percent while the United States spends 17.9 percent of its GDP on health care. This begs the question, how does Denmark achieve such a result? The answer may well lie in something much more complex than a simple explanation of a single payer/universal coverage model. This presentation will focus on the socio-cultural perspective of Denmark and its influence on the development of the Danish health care system and health care policies. Comparisons and contrasts to the U.S. culture and health care system will also be presented.

Quality Elasticity of Demand in Healthcare: Unraveling the Puzzle

Mike Dillon

Millersville University of Pennsylvania

The goals of this paper are: to identify key issues concerning quality elasticity of demand in healthcare and, to identify pertinent findings from the theoretical and empirical literature on this topic. The theoretical economics literature on quality elasticity, and the theoretical health economics literature on this topic are reviewed. The empirical findings are surveyed and assessed.

Measuring quality elasticity in healthcare is difficult. Quality is usually defined in terms of the characteristics of goods other than the physical units in which the goods are priced. Nursing homes price their services in terms of patient days but provide a package of commodities and services that include medical care, social activities, and room and board. Note that, “patient days” is a measure of quantity, and the package of commodities and services are quality characteristics. Additionally, the number of quality characteristics may well be quite large and difficult to measure. One study identified 383 discrete quality indicators currently in use. Most often no single commonly accepted indicator captures all the dimensions of care quality.

As a result, empirical researchers have needed to intuitively construct techniques to measure quality elasticity. One study models quality elasticity such that it requires no explicit specification of a quality measure. Instead, income and quantity elasticities are first estimated, and the quality elasticity is then derived as the difference between the two. Yet a different approach used to understand quality elasticity of demand is through the lens of the structure of production: economies of scale and average and marginal cost curves. Here findings suggest that quality elasticity is solely a function of the economies of scale in quality regardless of the cost.

Quality elasticity of demand has also been measured by stated preference theories like contingent valuation (CV). Because it creates a hypothetical marketplace where no actual transactions are made, CV has been successfully used for commodities that are not exchanged in regular markets, or when it is difficult to observe market transactions under the desired conditions.

Shadow prices can be derived for quality attributes. The term “shadow price” refers to monetary values assigned to currently unknowable or difficult to calculate costs. Informally, a shadow price can be thought of as the cost of decisions made at the margin without consideration for the total cost. More formally, the shadow price is the Lagrange multiplier at the optimal solution in a producer efficiency model.

The authors note that economic theory does not provide an unambiguous model of quality discrimination in healthcare, but it does provide guidance for thinking about the issue.

Welfare Dependence and the Importance of Math and Science in Breaking the Cycle

Kerry Adzima

Penn State-Erie

Using survey data from the National Longitudinal Study of Adolescent to Adult Health (Add Health) from 2008-2016, this paper examines the factors contributing to a reliance on welfare assistance. In particular, the paper focuses on students’ high school math and science course sequences to see if higher levels of achievement in these areas lead to lower levels of welfare

dependence. Preliminary results indicate that students who take higher levels of math and science in high school are less likely to depend on welfare assistance in adulthood. These results are consistent with numerous studies that find that education is a key factor in breaking the cycle of welfare dependency.

Session 25: Holmes/Foster Room

9:00 am - 10:00 am

Pedagogy Workshops

Session Chair: *Dorene Ciletti, Point Park University*

Video Prompts to Stimulate the Accounting Classroom

Joshua Michael Chicarelli

California University of Pennsylvania

This workshop will discuss the merit of using video prompts prior to class as a means of encouraging student participation and engagement in the classroom. Specifically, we will discuss the utilization of brief videos serving as an introduction to the daily material prior to daily class meetings in a principles of accounting course. These videos serve to present the concepts of the discussion to the students ahead of time, allowing them to gain an understanding of them outside of class. This allows professors and students to use classtime for more hands on application problems.

Developing Reciprocal Partnerships through Community-Engaged Service Learning

Natalie Dick

Slippery Rock University of Pennsylvania

Dorene Ciletti

Point Park University

Ron Dick

Duquesne University

University education provides an opportunity for students to build knowledge. Yet McHann and Frost (2010) suggest that a gap exists for students between knowing and doing. Doing – or applied learning – can be facilitated through experiences. Experiential learning, particularly with community partners, is considered a high impact educational practice (Kuh & O'Donnell, 2013). With experiential learning, “[k]nowledge is continuously derived from and tested out in the experience of the learner” (Kolb, 1984, p.27). Students apply knowledge they learn in the classroom to real-world problems and situations.

These experiential opportunities have added value. Employers believe that requiring students to complete a significant applied learning project in college would improve both the quality of learning and the quality of graduates’ preparation for careers, and are more likely to consider hiring recent college graduates who have completed an applied learning or project-based learning experience. (Hart Research Associates, 2015).

Building experiences into the curriculum through service learning and community engagement can better prepare students to enter the workforce, engage civic-mindedness, and build problem-solving and critical thinking skills that can continue to serve them long after graduation. In addition, students provide reciprocal value to community partners through knowledge sharing and transfer in a mutually beneficial exchange.

In this special session, we share three experiential learning initiatives successfully integrated into distinct business courses. The existing Long Term Care Management course at Slippery Rock University has recently integrated community and civic engagement into course design and outcomes. Through community and campus partnerships with OCEL, Quality Life Services, and Don't Stop Dreamin', students in this course experience reciprocity in action while building civic and community identities. The Principles of Marketing course at Point Park University was adapted to integrate a community and civic engagement experience with the City of Pittsburgh Office of Nighttime Economy as a partner in three sections of the course in a way that immerses students in the community while supporting marketing course objectives, enhancing student learning and providing the community partner with valuable, needed marketing support. The Sales and Revenue Generation course at Duquesne University was designed to integrate experiential learning as a means to achieve course outcomes with an academic unit partner, enhancing students' understanding of professional selling while assisting university athletics with ticket sales.

Session 26: Sylvan Room

10:20 am – 11:20 am

Accounting and Pedagogy Topics

Session Chair: Joseph Cunningham, Wilson College

Development of a Periodic Table of Elements for Accounting, Version 5

John Olsavsky

State University of New York at Fredonia

Since 1869 physics has been developing a periodic table of our world's natural elements. This paper describes the development of a Periodic (and point in time) Table of Elements for Accounting, Version 5 (TEA5). TEA5 a visual model of accounting's version of its elements promulgated by the FASB in Statement of Financial Accounting Concepts No. 6 Elements of Financial Statements. The table shows the contents, structure and interrelationships of the ten existing elements and the articulation of the financial statements in which they are contained in a one-page handout. A set of three proposed additional elements for the statement of cash flows is included.

Designing an Effective Data Visualization Course: A Quality Assurance Case Study

Cory Ng

Temple University

Sheri Risler

Temple University

Data has become an increasingly important asset to businesses because of the valuable insights that can be gained through analysis. Demand for employees with expertise in business analytics will continue to rise in the foreseeable future. However, traditional business curricula typically do not adequately prepare students to perform data analytics for decision making. Colleges and universities can help students develop their data analytics and visualizations skills by integrating this content into existing courses such as accounting and finance, or by creating stand-alone courses.

This paper discusses how business instructors can design an effective introductory data visualization course by utilizing an integrated course design model, providing students with an opportunity to master all levels of Bloom's cognitive taxonomy. We accomplish this by describing the course design structure and assessment methods used in a graduate-level data visualization accounting course at a large public university in the Northeast region of the United States. The pedagogical methods described in the paper include traditional lecture, active learning techniques, out-of-class reading and writing assignments, summative assessments through multiple choice exams, project-based assignments, and peer learning. This paper also describes the training and teaching resources available for instructors interested in teaching a data visualization course. We conclude by reporting the results of student feedback surveys, pre-test and post-test scores, and final projects as part of a quality assurance initiative to determine whether or not course learning objectives were met. The results suggest the integrated course design method was effective.

Course Re-Design with Technology: A Comparative Assessment of the Learning Outcomes

Elkanah Faux
Augustin Ntembe

Montgomery College
Bowie State University

Business Statistics course is a graduation requirement for all undergraduate programs in the College of Business at BSU. A high percentage of failures and poor student's performance, lack of motivation by students to work consistently throughout the semester, and a pattern of low concept retention led to a redesign in 2014. Before the redesign, the average rate of success in the course, as measured by the proportion of initial enrollees who ultimately achieve a grade of C or better, typically was around 50%, which by all standards was considered low. It is against this backdrop that a transformation initiative was launched by the University to enable a new paradigm of teaching and learning leveraging technology and to adopt new ways to improve teaching and student learning outcomes. The approach utilized in Business Statistics was to modify the mode of course delivery in order to improve the learning outcomes. The key performance outcome measure was the students' percentage grade at the end of the course. This variable was hypothesized to be affected by students' demographics, failure rates, grades in specific assignments, amount of efforts spent on reading and practice measured with the performance in Hawkes certification. Non-parametric tests for independent samples was used to find the difference in performance between a control group which was another section of the course taught by another instructor and an experimental group taught by me. The results show that the null hypothesis for both groups are similar no matter the mode of instruction.

Session 27: Willow Room

10:20 am – 11:20 am

Business and Organizational Strategies Topics

Session Chair: *Laurie Powers Breakey, Penn State-DuBois*

Influencer Based Marketing: The New IBM

Matt Fuss

Geneva College

The paradigm for merchandise marketing has shifted. The new frontier is what may be called Influencer Based Marketing or IBM. IBM has particular traction in the online merchandise arena

where the popularity of a single internet personality drives the consumptive behavior of customers. In established marketing paradigms, consumptive behavior is driven by the 4-P's: product, price, promotion and placement (distribution). IBM encompasses all the P's, but completely revolutionizes promotion. In order to connect to the millennial and i-generation, IBM makes use of social media stars as purveyors of branded merchandise. The originator and guru of IBM is a company called Moby Dick Unlimited (MDU) out of Columbus, Ohio. The founder and CEO Brandon Fuss-Cheatham has created a system in which brands are crafted around social media stars and sold to their followers via websites created and maintained by Moby Dick Unlimited. The IBM system created by Moby Dick Unlimited is particularly revolutionary in that it is scalable and works for burgeoning stars as well as those personalities with much more market clout. IBM is a comprehensive re-visioning of marketing strategy for the 21st century. This analysis examines IBM, focusing on the practical market applications of the new system. By juxtaposing traditional marketing promotional activities and the new IBM strategies, analysis suggests IBM is far more effective for reaching today's younger generations.

Restructuring of General Motors in Global Market: The Case of GM South Korea

Won Yong Kim

Sadie Paulsen

Augsburg University

Augsburg University

The world is nowadays becoming more connected than ever with internet access. With this change also came a shift in the business world, allowing companies to expand into new markets. One example is General Motors' global expansion to places such as South America, India, and South Korea. However, success is not promised in every country. We focused our research on GM South Korea and how it makes decisions to restructure financially and operationally based on its relation to other global subsidiaries and to South Korean economy. We define different types of restructuring in a company and how they would apply to our specific case. Then, we examined the circumstances around General Motors' entrance of Korean market through the purchase of Daewoo Motors. We also analyzed the effects of bankruptcy on the Korean subsidiary in the financial crisis of 2008, rumor circulation in the business world, and the response of the car manufacturer to mass-scale worker strikes and union protests in years to come. By looking at these changes, we can pinpoint when operational restructuring, such as selling subsidiary companies in time of crisis, would be used in addition to financial restructuring, such as offering workers redundancy packages during the shutdown of one of the production plants. Furthermore, we look at General Motors' restructuring plans in specific countries to compare global restructuring to domestic. By exploring the subjects, we can also apply GM's case to other businesses to better understand how global strategy of Multinational companies affect each international subsidiaries.

Pecunia Non Olet: Business Models and Management Practices of The Catholic Church

Brosh M. Teucher

Western Connecticut State University

With an estimated net worth of over 30 billion USD, The Catholic Church is a global organization affecting nearly 1.3 billion people worldwide. Given the scope of the Church's reach and economic impact, this paper aims to identify the dominant business models and management practices of the Catholic Church. The paper opens with a review of academic business research on the Church. Next, a selective and critical evaluation of recent public information is presented. Last, this information is mapped onto contemporary management theories to identify dominant management

practices and business models. The paper concludes with a discussion of future business research on the Church and implications for Catholic Church's management practitioners.

Session 28: Logan/Harris Room

10:20 am – 11:20 am

Business, Ethics and Legislation Topics

Session Chair: *Cori Myers, Lock Haven University*

Effect of Shareholder Value Perspectives on Ethical Decisions in Emerging Market: The Role of Egoism and Ethics of Autonomy

Fuan Li

William Paterson University of New Jersey

The shareholder value model of corporate social responsibility has been shown to be the root cause of the widespread unethical business practices in emerging economies, which have drawn increasing attention from both policy makers and business ethicists. The present study aims to extend previous research by investigating how two different ethics, i.e., ethical egoism and ethics of autonomy affect business decision makers' shareholder value perspective as well as ethical decisions. Ethical egoism and ethics of autonomy are both originated from market ethic introduced by economic reforms in the emerging markets. However, these two ethical systems relate to ethical decision making in different ways. Ethical egoism positively relates to shareholder value perspectives and negatively relate ethical decisions. In contrast, ethics of autonomy has a negative effect on shareholder value perspectives but a positive effect on ethical decision making. The findings demonstrate a clear distinction between ethical egoism and ethics of autonomy in their effects on the relationship between shareholder value perspectives and ethical decision making. The theoretical and managerial implications of the results are discussed.

Honesty is the Best Policy

Peter Huegler
Cori Myers

Lock Haven University
Lock Haven University

Rhetoric on business ethics indicates that some of the best ways to break the cycle of unethical behavior include espousing business values with ethics as a focal point, establishing a code of conduct, recruiting employees who share those values, training employees about ethical norms, and implementing strict policies with heavy punishment for unethical behaviors alongside attractive rewards for being ethical (Goldfield, 2015; Dubois, 2012; Bazerman & Tenbrunsel, 2011). Part of the solution may reside in dealing with ethics and honesty more during college and high school to address unethical and dishonest behavior during these formative stages. Developing a comprehensive approach to ethics and academic honesty at a given institution requires a study of the issues that exist there. This paper describes the study and results of student perceptions of academic (dis)honest behavior in the business and accounting programs at a small public university as a first step in taking a more proactive approach to developing managers, employees, and people who are better equipped for ethical decision making.

Technology Topics Workshops

Session Chair: *Andrew Mangle, Bowie State University*

Engaging Digital Natives Through the Use of Digital Content Curation for Research

Jayanthi Rajan
Soma Ghosh

Albright College
Albright College

Background: Connecting with Digital Natives and engaging them in the process of research continues to be a challenge. Students are extremely comfortable with social media. They are already engaged in the process of personal content curation through Facebook, Twitter, Snapchat, or Instagram accounts. They can apply the same process of judgment, filtering, and connection techniques to more academic endeavors like database usage, academic research, and class projects.

Digital Curation is the process of collecting, grouping and sharing digital content. Curation forces students to judge and organize their resources by categorizing information. In terms of Bloom's taxonomy of educational objectives, digital curation covers a variety of thinking skills: labeling, naming, listing, organizing, applying, judging, evaluating, analyzing, and synthesizing.

This workshop will showcase the use of Digital Curation for research in a first-year seminar course. The objective of this active learning pedagogy is to enhance student attention by integrating context and purpose in their research process. Curation helps students make relevant connections between different content and organize it into categories and themes.

Popular tools like Scoop.it, Pearltrees, Lessonpaths and Pinterest are used by students to collect and curate information. Curated collections or playlists of information are followed by other students in class who can take advantage of filtering that has been done.

Our workshop will illustrate the methodology of the use of digital curation for research during the course project. The interactive workshop will include hands on experience with digital curation tools. We will share effective teaching tips, assessment and evaluation of the process.

Ending Poverty Through Cryptocurrency

Andrew Mangle

Bowie State University

A solution proposed for ending property is Universal Basic Income (UBI). UBI is the concept citizens would receive funding to cover the cost of living without any preconditions or constraints. Historically, UBI is considered challenging to audit and administer without adequate technology and policies to monitor and track effectiveness. Several of the critical properties of Cryptocurrency and the underlying features of Blockchain technology offers a chance to reflect on UBI. Cryptocurrency initiatives to address UBI have already started, and the panel provides an opportunities to discuss existing and propose better ways of constructing UBI specific cryptocurrency solutions to end poverty.

Security, Digital Citizenship, and College Students. Is the IoT Changing Students' Perception of Personal Security?

Michalina Hendon
Jet Mboga
Cassandra Bennett

Bloomsburg University of Pennsylvania
Bloomsburg University of Pennsylvania
Bloomsburg University of Pennsylvania

The need to increase education in digital security is becoming a prevalent issue as the arms race to secure cloud storage and vulnerabilities of critical data is survival of the fittest. Digital security is a common theme in the news again and again, as many involved in the new age of the IoT (internet of things) have an understanding in the process of storing and retrieving data from their devices, the security of that data should also come into question. As IT (information technology) students engage in coursework to understand the propensity of their digital actions online, IT students are not the only ones affected, security is a multidisciplinary issue. Students' digital citizenship and education in their personal security will be explored in this review of literature.

Session 30: Sylvan Room

11:25 am – 12:25 pm

Taxation, Accounting and Finance Topics

Session Chair: *Joshua Michael Chicarelli, California University of Pennsylvania*

College Funds: Accumulation - Distribution - Taxation

Mary Recor
College of Staten Island at City University of New York

The thought of attending college brings about a kaleidoscope of emotions: excitement, learning, adventures well as expense. There are many thoughts that come to the minds of both parents and students when it comes to the task of dealing with college expense. The focus of this paper is to examine the options available to handle or deal with this process. It will examine different vehicles available to assist in the accumulation of funds such as 529 Plans, both private and public plans. In addition, custodial accounts and trusts will be examined. Also, a discussion regarding 529 Plan contribution limitations on an annual basis and the total accumulation limitation will be reviewed. Also, financial aid possibilities will be analyzed. Different saving approaches impact financial aid in a different manner. Both assets and income of both parents and students must be considered. These concepts will be developed by considering tax strategies and techniques such as current gifting and the 5 year approach. New developments brought about by The Tax Cuts & Job Creation Act has impacted Educational Savings and will be discussed. By using the method of comparison concerning the different vehicles, the tax consequences and the financial aid impact, one will be able to make the best choice. Parents, students, and grandparents too, can be better prepared.

The Relative Valuation of Income Tax Avoidance Methods and the Moderating Impacts

Joshua Michael Chicarelli
California University of Pennsylvania

This research explores whether corporate size has a moderating effect on the valuation of alternative income tax avoidance methods. It expands on the work of Inger (2013), who determined that shareholders value alternative methods of income tax avoidance differently. Specifically, this research aims to determine whether there is an optimal income tax position, which can be determined based upon corporate size. Utilizing a multivariate regression model for both large and small companies in this sample, this research does not find evidence supporting an optimal income tax avoidance position based upon size. The findings are useful to practitioners as they fail to support the proposition that income tax avoidance methods are valued by shareholders and the extent to which they are valued.

Advantages and Challenges of Using a Personal Finance Budgeting Assignment

Rick Hedderick
Brian Boscaljon
Phil Stuczynski

Penn State-Erie
Penn State-Erie
Penn State-Erie

In an introductory personal financial planning course students are introduced to personal budget planning concepts. Students are assigned the task of creating their personal financial budget based on the time period of when they graduate from college, begin their career, and move out of their parents' home. The purpose of this assignment is to prepare the student to plan for saving and managing expenses that were most likely previously paid for by the students' parents. Additionally, students learn about income taxation, different investment accounts available to individuals to help them save money to achieve their financial goals as well as various insurance products available to help manage potentially major financial losses. All of these have a monetary cost that must be accounted for in the budget. In the second week of the semester students are required to research apartment rent costs and starting salaries for their career major in the geographic area they plan to live after graduation. This information is the basis of their forecasted starting salary and housing costs that the student will use to begin to design their budget. Throughout the semester students learn about 401ks and IRAs along with insurance products covering health, auto, homeowners, life, disability and long term care. These are all additional line items on the student's budget. The benefit of this assignment is that the day the student graduates they already have a realistic spending/saving plan in place.

Session 31: Willow Room

11:25 am – 12:25 pm

Human Resources Management and Consumer Behavior Topics

Session Chair: *Woosoon Kim, Alvernia University*

Martial Arts Industry: Literature Review on Martial Arts Participation

Woosoon Kim

Alvernia University

The increase in the number of and participation in recreational activities and competitive sports is a global trend, as awareness of health and well-being has increased. In line with this global change,

the martial arts industry also has been evolving into a competitive marketplace (Hackney, 2013; Ko, Kim, & Valacich, 2010). However, there were not many studies conducted to define the martial arts participation motivation. The current study reviewed literature to develop a better understanding of motivational factors associated with martial arts participation. The martial arts participants have a diverse need, but their primary motivations are in the four primary domains: physical, psychological, behavioral and social. The psychological domain has two sub-domains including affective and cognitive. The six domains have the following motivational factors such as strength, endurance, fitness, fun, autonomy, self-esteem, concentration, self-discipline, leadership, affiliation, social facilitation, and others. This literature review can provide a better understanding of martial arts consumption behavior to develop consumer profiles. Administrators of martial arts programs also may use the findings of this study to formulate the marketing strategies.

Fear and Loathing in the US: A Somber Journey to the Heart of the American Workforce

Brosh M. Teucher

Western Connecticut State University

This paper examines a multi-dimensional trend that challenges both the US workforce and US organizations. The trend is composed of: Dope, debt, disease, distraction, disillusionment, dumbing-down, and delayed adulthood. The “Dope” dimension relates to the rise in use of both legal and illegal drugs. “Debt” relates to the growing college and credit debt that is amassed by individuals. “Disease” addresses the rise of debilitating health conditions affecting both youth and adult populations. “Distraction” refers to the increasing use and negative impact of technology on individuals’ cognitive, emotional, and social functioning. “Disillusionment” focuses on the negative shift in attitudes towards work, employment, and institutions. “Dumbing-down” identifies declines in performance in the K-12 and postsecondary education systems. Last, “Delayed adulthood” refers to the growing tendency of young adults to push the achievement of adult roles to older ages. Drawing on diverse disciplines and lines of research the paper proposes that individually, each dimension presents major challenges to the education, skill level, job-preparedness, and performance of the U.S. workforce. Furthermore, it is proposed that dimensions combined pose a significant threat to all American organizations and institutions. The paper concludes with a discussion of future business research and implications for management practitioners.

Assessments of Undergraduate Health and Fitness Programs

Scott Bradshaw

Kutztown University of Pennsylvania

Nationwide, universities and colleges are participating in health initiatives such as exercise in medicine, health and wellness expositions, and administering assessments to promote a healthy and active lifestyle for all. Among some of the assessments conducted at the health and wellness expo hosted each semester by Kutztown University, were the hand dynamometer and push-up assessments. The purpose of this research was to determine and compare the upper body strength and endurance of students using the two assessments. The participants included 400 males and females, ages 18 and older over the course of one academic year. The maximum push-up test was based on correct technique while the hand strength test was based on a 3 second grip, attempted 3 times on both the dominant and non-dominant hand. Descriptive statistics were used to analyze the data collected from the assessments.

The descriptive results indicated that males possess greater upper body strength than females for both tests. The sophomore's upper body strength and endurance were also greater across the classification, and 27% of male and 8% of female had equivalent push-up and handgrip strength and endurance. When comparing the dominant hand grip test, the dominant hand scores were higher by 135 for females while the males were higher by 9%.

These findings reveal student's lack muscular strength and endurance, a key component of fitness. However, with simplistic assessments like the push-up max test and the handgrip test being conducted each semester, this could generate and encourage activities geared towards improving upper body strength and endurance among all college students.

Session 32: Logan/Harris Room

11:25 am – 12:25 pm

Economics/Accounting Topics

Session Chair: *Lisa Marie Walters, State University of New York at Fredonia*

The ABC Mechanism for Incentive Compatible Elicitation of both Utility and Probability Weighting

Yi Li

Slippery Rock University of Pennsylvania

A new payoff mechanism under a multiple-round experiment setting, Accumulative Best Choice (ABC) mechanism, is introduced. I show that ABC is incentive compatible with general risk theories with well-behaved preferences. I also report a necessary and sufficient condition for a payoff mechanism being incentive compatible for general risk models. Also, I test the empirical validity of ABC in the lab and find that individuals' choices under ABC are statistically not different from those observed with the one-task design. ABC supports unbiased elicitation of both utility and probability weighting as well as testing risk models with or without the independence axiom.

The Influence of Distance on the Decision to Naturalize

Melissa Groves

Towson University

This paper uses individual level data to investigate the extent to which the distance an immigrant travels from their home country influences their propensity to naturalize in the United States. By merging Integrated Public Use Microdata Series (IPUMS) data downloaded from the Minnesota Population Center at the University of Minnesota for the United States with other forms of publically available data, we are able to model the ways in which proximity to home country influences an individual's decision regarding naturalization. We utilize composite variables and fixed effects in a simple least squares framework to maximize sample size and control for standard variables that influence an individual's naturalization decision. We anticipate finding that immigrants traveling a greater distance will have a higher probability of naturalization and become fuller participants in US society. We hope that this research will help us to better understand the motivation behind naturalization and how factors may impact the likelihood that an individual will choose to fully integrate into US society. By doing so, it will expand upon our prior work (Woroby

and Groves (2016) and Woroby, Groves and Sullivan (2018)) and contribute to the growing body of literature on naturalization decisions. Preliminary findings suggest that distance has a strong and positive impact on origin and well as other compounding factors (geographic/political/economic) that may complicate the relationship between naturalization and distance.

Improving the 1040 Process through the Application of Lean Principles: A Case Study

Mark Nickerson

State University of New York at Fredonia

Linda Hall

State University of New York at Fredonia

Processing of individual tax return forms (Forms 1040) are the mainstay of many CPA firms. In fact, 2016-17 NSA Income and Fees of Accountants and Tax Preparers in Public Practice Survey Report reports that 57.3% of gross income from those firms surveyed comes from tax-return preparation. Thus, the management of the process to complete these forms in a timely fashion is a critical component to the increased profitability of the firm. Although several workflow management systems already exist and are used by firms, studying the efficiencies of processes can help improve Form 1040 realization; that is, net client fees as a percent of total fee revenue.

This paper documents the investigation into an accounting firm's existing workflow processes for preparing individual tax returns with an emphasis on identifying the predominant wastes as categorized by the principles of lean management. Lean management is an approach to process-management well-regarded within the manufacturing and healthcare arenas. Hallmark to lean is the identification of "muda" or waste that burden a process, followed by an evaluation of issues that contribute or cause the muda. Actions are then taken to address these issues, resulting in greater efficiencies for the process under study. We hypothesize that this approach can be readily applied to accounting firms and improve the existing workflow processes, thereby improving the profitability of the Forms 1040 preparation system.

In our investigation, specific lean tools are applied to assist in the identification of muda within the firm's individual income tax return preparation process. An evaluation of the predominant sources of muda are made to understand the factors that contribute to these sources, followed by a recommendation of corrective actions to minimize or eliminate the predominant waste contributors. We also recommend a strategy to sustain the improvement. Lastly, we recommend avenues of further study regarding lean applications within the accounting field.

Session 33: Holmes/Foster Room

11:25 am – 12:25 pm

Technology, Education, and Social Responsibility Topics

Session Chair: *Susan Aloi, West Virginia Wesleyan College*

Application Development for Business: Deploying Before Regulations and Policy

Loreen Powell

Bloomsburg University of Pennsylvania

All technology including the financial technology (FINTECH) moves faster than regulations and policy. Too often, an application (app) is created and placed into the market to see what happens; a simple concept gone wild because of a "free" perception. As a result millions of consumer's

data are risk and millions of aging consumers are excluded. This paper discusses the wave of FINTECH innovations including 3rd party smartphones apps for mobile banking, investing services and cryptocurrency that are competing with traditional financial methods. Specific generational cases and challenges with regards to regulation and policy for FINTECH are also presented.

Deliberative Dialogues on the Role of Business in Society

Susan Aloï

Joshua Ray

Glenn King, Jr

West Virginia Wesleyan College

Tusculum University

Wallace Community College Selma

According to the World Economic Forum (January 2014), the role of business over time has remained fairly constant: to provide goods and services that people need and want. Decades ago, business students were taught that the primary, or even sole, role of business was to maximize profit for the owner(s). As famously stated by economist Milton Friedman, “The social responsibility of business is to increase its profits...our first social responsibility is to maximize shareholder profits” (NYT, Sept. 1970). More recently, however, society has developed higher expectations of business due to increased community and global problems, consumer demands, and changes in employee motivation.

Our communities face growing challenges in areas such as public health, education, social inequality, and environmental pollution. Market-based organizations can play an important role in addressing these challenges through healthcare provision, better housing, improved nutrition, help for the aging, greater financial security, environmental sustainability, etc. (HBR; Stephan, et al). Due to increasing reports of fraud, corruption, and wrong incentives driving business decisions, society has grown to distrust businesses (HBR). We now expect more of businesses than simply the provision of goods and services – we want these goods to be safe, well-made, and provide good value. We want business leaders to be ethical, and we want businesses to contribute to the well-being of our communities. In addition, today’s new employees, the “millennials,” are concerned with the mission and goals of the organization in which they spend their working days. Research (Pink, 2011) indicates that most employees are at least as much, if not more, motivated by purpose as they are by profit.

What do these more recent trends regarding perceptions on the role of business in society mean for the education of business students? What is the responsibility of business schools and their faculties in ensuring that business students are introduced to a variety of perspectives and approaches regarding the role of business? While “debate about the business of business schools continues to rage in academic journals,” some faculty are advocating for a “substantial change in business schools so that they produce, and engage with, knowledge and practices that serve the public interest” (Contu, ACBSP, January 2017).

To explore these questions, the three authors (Aloï, King, Ray) from three small, private colleges utilized the Kettering Foundation framework of deliberative dialogue as a pedagogy in several of their business courses. The Kettering Foundation framework involves training groups to address and respond to difficult issues in a systematic fashion by asking a series of questions. Example questions include: When you think about this problem, what worries you? What is the deeply held

belief or principle that drives your concern? This framework is used to facilitate discussions involving difficult subjects. Specifically, for our purposes, business students from our schools participated in naming and framing an issue - the role of business in society - and weighing alternatives utilizing the deliberative dialogue process. We were interested in how this process would function across the different contexts presented in our respective schools. What we found was that this process was effective regardless of the type of student (i.e. traditional vs. non-traditional), the level of student (i.e. undergraduate vs. graduate), and the supporting pedagogy (i.e. class discussion, interaction with advisory board, community involvement). (Abridged.)

Using Business Skills to Fight Addiction

Tracie Dodson
Kelly Terhune Sharp

West Virginia Wesleyan College
West Virginia Wesleyan College

For the past several years, the drug epidemic has grown at an alarming rate and has had significant impacts both nationally and locally. In West Virginia, the nation's per capita leader in overdose fatalities, more people die annually from drug overdoses than from car accidents. While Business Schools and their faculty and students may not be able to have a direct impact on the drug epidemic, there are ways to make an impact using business-related knowledge, skills, and abilities. This presentation will focus on how to transfer business knowledge, and the associated soft skills, to meet the needs of local residents in active recovery. Specific areas covered will include understanding the problem, creating relationships, conducting a needs analysis, determining direction (based on identified need and capacity), designing the curriculum, administration of workshops, program evaluation, and reflection. While the information presented will be based on a single institution and partner-program, the presentation will provide enough data for replication on other campuses.

Session 34: Sylvan Room

1:40 pm – 2:40 pm

Finance Topics

Session Chair: *Pawan Madhogarhia, York College of Pennsylvania*

Determinants of REIT Entries and Exits

Jiajin Chen

Stockton University

This study analyzes 545 entry and 459 exit events of publicly traded real estate investment trusts (REITs) during the period of 1973 to 2015 and examine if the stock market valuation and property market valuation of REITs affect the timing of REIT entry and exit. The evidence of this study indicates that more REITs enter (exit) the stock market when the estimated total returns of the income properties are low (high). The evidence also indicates that the general stock market performance does not seem to affect the net entries of equity REITs. Mortgage REIT net entry seems not to be correlated with the mortgage interest rate nor with the stock market index during the same period.

Optimal Capital Structure Based Market Reaction to Altman Z-Score

Jason Eric Heavilin

Clarion University of Pennsylvania

The market compensates firms that increase risk. However, when high bankruptcy risk is reached, the market penalizes firms. We analyze the market reaction to risk to identify the point the market goes from compensating to penalizing firms. We use the Altman Z-Score to measure risk levels and study the market reaction to changes in the score. This method identifies optimal capital structure through market reaction to changes in bankruptcy risk. This method identifies short term and long term adjustments that can be executed to achieve immediate optimal capital structure and subsequently long term sustainable optimal capital structure.

Can Simple Strategies Beat S&P 500?

Pawan Madhogarhia

York College of Pennsylvania

Buy and hold strategies typically outperform active management of portfolios. Few active strategies though outperform passive strategies on a consistent basis. This study is an attempt to back-test some simple active strategies that most investors can replicate with little effort. Criteria for these strategies include size and/or value strategies applied within the S&P 500 index. Other criteria included short interest and comparable ratios. These strategies consistently outperform the S&P 500 index total return over a long period of time. Size factor generated an excess annualized return of 8.54% over a 15 year period and a combination of size, value and other factors generated excess annualized return of 20.4% over the same period. Combination strategy generated a cumulative return of 2849% relative to 704% for the size factor and 1019% for the value factor over this 15 year period. This study corroborates the emergence of smart beta strategies and factor based investing that is becoming popular in this era.

Session 35: Willow Room

1:40 pm – 2:40 pm

Economics and Organizational Behavior Topics

Session Chair: *Uldarico REX Dumdum, Marywood University*

Employment Change in Virginia and its Workforce Investment Areas from 2000 to 2017

David Doorn

West Chester University of Pennsylvania

In this paper we investigate the employment experience of Virginia through the last two economic recessions and subsequent recoveries. While many are familiar with how the nation as a whole has done in the employment arena, we find it informative to take a closer look at the diversity of employment growth experiences across the state and investigate some of the drivers behind those differences. One important factor in this is variation in employment distribution across industries within each of Virginia's fifteen Workforce Investment Areas (WIA) across the state, with some industries being more important to growth in some areas of the state than in others. The employment distribution in conjunction with the performance of each industry in an area, relative to both statewide industry performance and the aggregate performance of all industries, goes a long way toward explaining the disparity in employment growth rates across the state. To break

this down we apply a dynamic shift-share analysis that decomposes the employment experience of each MSA in each year into separate components based on relative industry performance across NAICS Supersectors. We then construct graphics that facilitate the discussion and illustrate the differing contributions of each industry in a straightforward fashion.

Workplace Violence and Fatalities: A Macro Perspective

Ray Gibney
Marick F. Masters
Ozge Aybat
Thomas T. Amlie

Penn State-Harrisburg
Wayne State University
Penn State-Harrisburg
Penn State-Harrisburg

Employees bring non-work stressors to work. Criminology and sociology researchers have frequently focused on environmental factors, such as economy, that are correlated with violence in the community; whereas organizational and psychology scholars have focused on individual factors such as personality. The current study compares known correlates of communal violence, both fatal and non-fatal, with workplace violence. The data for fatal and non-fatal workplace violence were collected from the Bureau of Labor Statistics (Bureau of Labor Statistics, 2012) and State populations were collected from the United States Census Bureau (www.census.gov). The initial results suggest differences between communal and workplace violence. Different factors were associated with fatal and nonfatal violence. For example, population density of males was positively correlated with workplace fatality, but negative correlated with non-fatal violence; unemployment was significantly correlated with workplace violence in all sectors; and poverty density was not significantly correlated with workplace fatalities nor with nonfatal workplace violence. This research offers practical implications for workplace safety as well as directions for future research.

Building Sensemaking Capacity: Drawing Insights from Anthropological Thinking

Uldarico REX Dumdum
Matt Artz

Marywood University
Azimuth Labs

Businesses, according to an IBM global study of 1500 CEOs, are facing a rapid escalation of complexity. Capitalizing on complexity and customer intimacy to create innovative ways of delivering value are business' significant challenges. The study further revealed that "enterprises today are not equipped to cope effectively with this complexity in the global environment." To help address this problem, we advocate drawing insights from anthropological thinking.

Increasingly, traditional business practices are proving not fully adequate to identify, interpret and robustly understand implications of emerging developments. This is due to our tendency, whether we are trying to make sense of consumer markets, design products or lead a corporate culture, to often try to understand problems we face based on what we already know, instead of seeking that which we truly do not.

The value-add of drawing insights from anthropological thinking is found in its ability to help uncover unknown unknowns that exist and explain the "why." To more effectively address the most pressing business problems and make better strategic decisions, we need to build

sensemaking capacity to “make the strange familiar and the familiar strange” while developing empathy to understand humans and giving them a voice.

This paper provides examples of successful corporate breakthroughs aided by insights drawn from anthropological thinking. It highlights how theories and methods of anthropology, particularly ethnography and phenomenology, can be applied to help develop a rich understanding of complex business situations. The paper also provides some suggestions for incorporating anthropological thinking towards building our sensemaking capacity.

Session 36: Logan/Harris Room

1:40 pm – 2:40 pm

Corporate Reporting and Finance Topics

Session Chair: *Roger Hibbs, Kutztown University of Pennsylvania*

Extending Corporate Reporting: Identifying Fundamental ESG Indicators of SDG Achievement

A J Stagliano

Saint Joseph's University

Business leaders say they must measure what they seek to manage. In recognition of this basic assumption, companies need to take action on significant new facts about their presence in the economic marketplace: (1) the rate at which they consume resources—resources such as water, soil, biodiversity, clean air—now exceeds the pace of renewal for these input factors; (2) the actual risks that firms are exposed to include non-financial aspects including demographic change, environmental modifications, and alteration in climate; (3) stakeholders increasingly demand that the full-cost impact of company operations/existence be disclosed forthrightly by management.

Corporate reporting should clearly identify SDG-related performance goals right alongside the standard financial targets that management expects to achieve. Unfortunately, while commonly accepted measures of economic outcomes are well-established, the reporting of social, environmental, and sustainability results is not. Companies should report what impact they seek to have on the SDGs. Then, they must disclose whether the objectives that were set have been met. Reporting of that type necessitates measurement; neither the model for such measurement nor the collateral disclosure has yet to be fully developed.

This research seeks to assist in the emergent broadening of disclosure standards that stretch beyond mere financial results. Adding new metrics in the environmental, social, and governance (ESG) areas will allow companies to send more transparent messages about their effect on the people and planet portions of the inimitable “triple bottom line” reporting paradigm.

Corporate Blockholders and Financial Leverage

Thuy Bui

Slippery Rock University of Pennsylvania

This research investigates the relationship between corporate block ownership and firm financial leverage. Corporate blockholders, which are nonfinancial firms who hold more than five percent equity in a target industrial firm, can affect the target firm’s policies through their business

relationships, monitoring, or expropriations. I find that corporate block ownership is negatively related to the target firm's financial leverage. In addition, corporate blockholders often obtain board seats of the target firm, indicating an active involvement of corporate blockholders in governance activities. Further analysis indicates that the negative relationship between corporate blocks and leverage becomes stronger when corporate blockholders have greater board representation on the target firm, when the firm has higher agency costs, and when there is no product market relationship between corporate blockholders and the target firm. Overall, my findings suggest that corporate blockholders play an important monitoring role and can substitute for other monitoring mechanisms including leverage and institutional investors.

The Asset Location Decision: A Canadian Study

Curtis Davis

Jonathan Kramer

John Walker

Munulife, Canada

Kutztown University of Pennsylvania

Kutztown University of Pennsylvania

While much attention has been given to the asset allocation decision in the literature on investing, much less attention has been given to the asset location decision. The asset location decision refers to the decision to hold investments in a tax-free or tax-deferred account versus a taxable account. In this paper, we focus on the tax cost in dollar terms and use Canadian tax rates to calculate when it makes sense to invest in each type of account. We also use historical rates of returns to determine the frequency with which these decision rules reverse.

Session 37: Holmes/Foster Room

1:40 pm – 2:40 pm

Marketing, Innovation, and Information Technology Topics

Session Chair: *Roderick Lamar Lee, Penn State-Harrisburg*

An Integrative Model of Service Experience – Customer Value as a Missing Link Between Restaurant Quality and Behavioral Intentions

Gauri M Kulkarni

Mika Yrjola

Hannu Saarijarvi

Timo Rintamaki

Johanna Joensuu

Towson University

University of Tampere, Finland

University of Tampere, Finland

University of Tampere, Finland

University of Tampere, Finland

Customer experience has become an increasingly important construct in service research and management. Restaurant and hospitality management make no exception: restaurant experience has gained a vast amount of scholarly attention during the past decade. Prior research has addressed restaurant experience through perception of restaurant attributes, such as food quality, service, and restaurant environment, i.e. uncovering what restaurants are like, and linking those perceptions with key outcome measures. However, only limited attention has been placed on understanding what kind of value customers eventually perceive (economic, functional, emotional, symbolic) as a result of those attributes. Understanding what type of value customers perceive, however, determines their preference formation and future behavioral intentions, and provides important insight for managing customer experiences. Consequently, the purpose of this study is to introduce

a customer value perspective to restaurant experience that connects the quality attributes to value perceptions, as well as the behavioral intentions representing the outcomes of the restaurant experience.

Data from a large quantitative survey (n=1533) is used to verify the proposed integrative model of restaurant experience. The dynamics of the model are further explored by using the model to contrast two different restaurant contexts that prior literature has addressed as different in nature: dining and lunch restaurant experiences.

The study introduces an integrative model for analysing the antecedents, outcomes, and implications of restaurant experiences. It extends prior research by incorporating economic, functional, emotional, and symbolic customer value dimensions as key constructs in understanding restaurant experiences.

Online Seniors Social Network Site Activity, Social Capital, and Social Support

Roderick Lamar Lee
Rhoda C. Joseph

Penn State-Harrisburg
Penn State-Harrisburg

The global population of aging adults continues to increase at a rapid rate. Aging adults tend to experience major life changes (e.g. retirement, mobility issues, moving to retirement communities, etc.) that result in disruptions in their social networks. The negative consequences include social isolation. Despite a growing body of research on older adults social network site (SNS) use, scholars have not fully explored how online seniors appropriate SNS in order to maintain social relationships and access social benefits (i.e., social, emotional, and informational support). In order to address this problem, this study examines the relationship between online seniors SNS activity, SNS features, and the social benefits derived from bonding and bridging forms of social capital. We conclude with implications for research as well as a broader understanding of how SNS can better be designed to support the development and maintenance of social capital of older adults.

Effects of Manufacturing Firms' Strategies on Innovation: A Holistic View

Jeffrey Yi-Lin Forrest
Sunita Mondal
Reginald Tucker
Canchu Lin

Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania
Louisiana State University
Carroll University

This paper examines both theoretically and holistically which of the sixteen strategy-related factors empirically identified in the literature actually represent the primary forces underlying the innovativeness of a manufacturing firm and which ones are secondary. After developing a general systemic theory of why the firm needs to have clearly stated missions and a long-term, unwavering ambition, on the basis of the systemic yoyo model the rest of the paper classifies the sixteen particular variables, regarding the overall strategic orientation, growth strategies, and operational strategies, into primary and secondary forces underlying the innovativeness of the firm. And practically useful recommendations for managerial decision making are provided, showing the potential real-life benefits of this research.

Business Education and Technology Topics

Session Chair: *Kustim Wibowo, Indiana University of Pennsylvania*

Closing the Skills Gap Through Open-Education Training Programs

Joseph A. Rosendale

Indiana University of Pennsylvania

Eric Zeglen

Pennsylvania State System of Higher Education

In the ever-expanding higher education marketplace, online and distance offerings continue gaining momentum with students, faculty, and administrators. One specific area relevant to organizations struggling to efficiently and effectively close the skills gap -- evidenced in myriad national reports -- include Massive Open Online Courses (MOOCs) and similar non-degree, free-sourced courses.

Using data obtained from over 200 hiring managers, this presentation will discuss research supporting organizations' exploration and utilization of MOOCs and similar free-sourced, online education courses as a means of employee training and development in a quasi-outsourcing capacity. Positive implications suggest potential time and cost savings to the organization, increased employee efficacy on the job, and increased employee morale. Consequences associated with the absence of personal interaction with faculty, perceptions of academic dishonesty, and lack of communication-related development will also be discussed.

Determining and predicting the extent to which MOOCs can mitigate current workforce needs is not a primary focus of this presentation. However, within the exploration of the topic area, extant literature and empirical research points to non-degree, online training programs as having the educational potential to increase skilled labor in many workforce sectors while filling the short-term, technology-specific training gap faced by employers.

A Readability Analysis of Undergraduate Textbooks in Operations Management

Mojtaba Seyedian

State University of New York at Fredonia

Lisa Marie Walters

State University of New York at Fredonia

John Olsavsky

State University of New York at Fredonia

Selection of a textbook for use in introductory operations management courses can be challenging. Many criteria may be considered in such decisions, including a textbook's readability. Applying a widely-used readability index, this study analyzes the predicted readability of five popular operations management textbooks. ANOVA testing is performed to determine whether significant differences exist between the texts. The study finds no compelling evidence, regarding readability, to select any one textbook over any other within the study. The findings can be useful to adopters and editors of introductory operations management textbooks.

Accounting - Our Numbers are Down: Are Millennial Students Afraid of a Challenge?
Karen Robinson
York College of Pennsylvania

This proposal is intended to incite a panel discussion of what to do about the decreasing enrollment in accounting programs. This researcher observed that students tend to change major from accounting to one they consider easier when a grade of B or higher is not earned in one or both introductory accounting courses. A discussion with instructors in the same department suggest like suppositions. The purpose of this research is to determine if other accounting programs are undergoing similar experiences and, if so, examine current literature to explore the bases for this issue and the recommended resolutions. The tools to success in accounting courses and careers are readily available; however, students apparently no longer enjoy the challenge of learning the key concepts that would likened them to a successful career in the field. The use of outcomes from this panel discussion may aid instructors in improving students' success rates and increase enrollment in accounting programs.

Session 39: Willow Room

2:45 pm – 3:45 pm

Healthcare Industry and Technology Topics

Session Chair: *Sushma Mishra, Robert Morris University*

Inbound Health Tourism: Measuring Attitudes of Health Industry Employees

Christine A. Lai

SUNY Buffalo State

Kvarner Health Tourism Cluster (KHTC), located in Western Croatia, includes members from medical, touristic and university sector, as well as accompanying services with the goal of creating a recognizable and competitive health tourism product on the local and international level. To better understand the attitudes of the practitioners associated with KHTC regarding inbound medical tourism, a questionnaire was distributed to the members in the summer of 2017. The questionnaire consisted of forty-four criteria that were presented in Likert scale format and four open ended questions. Sixty-seven percent of the survey participants were marketing managers in their respective KHTC organizations. Remaining participants were classified as non-marketing members. To determine if the marketing managers responded differently than non-marketing employees a one-way ANOVA was performed to compare their mean scores of responses to Likert questions. The analysis revealed that both groups of respondents, marketing managers and non-marketing employees, had similar means ratings for forty of forty-four question variables. A Pearson Correlation was performed to compare respondent years employed in the medical tourism industry and respondent ratings scores of Likert criteria. The Pearson Correlation revealed that some criteria were negatively correlated with rating scores. As respondents had less time employed in the medical industry, they were more likely to rate seventeen of the forty-four Likert measured criteria higher than respondents working in the industry for a longer period of time. Overall, analyzes show that employment “type”, marketing v. non-marketing employment, had a lesser impact on the respondents' ratings than years employed in the medical tourism industry.

Factors that Influence the Use of “Work Around” Due to Technologies Used by Nurses in Health Care

Sushma Mishra
Peter Draus
Natalya Bromall

Robert Morris University
Robert Morris University
Robert Morris University

The use of Electronic Medical Records (EMR) and other technologies is prevalent in healthcare settings today. However, there is multiple situations where nurses could be “working around” a given practice/process in order to get their job done in time. This study explores factors that potentially lead to working around a given process and notes possible implications of these non-compliance scenarios by nurses on hospital floors providing quality service to patients. A survey with possible scenarios suggesting workarounds was administered. Respondents suggest that they have at least one or more than once worked around a process to get the job done. The possible workarounds that are used informally and the nurses find, at a varying degree, it acceptable to be able to do their work. Implications are drawn.

Why Analytics Needs Ethnography

Matt Artz
Uldarico REX Dumdum

Azimuth Labs
Marywood University

Big Data analytics have increasingly gained prominence in business because it has provided beneficial insights regarding emerging trends, behaviors and preferences. Relying exclusively on analytics to address the vast majority of business uncertainties, however, is detrimental to our ability to solve problems. Madsbjerg and Rasmussen, in a WSJ article, insightfully captures the essence: “By outsourcing our thinking to Big Data, our ability to make sense of the world by careful observation begins to wither, just as you miss the feel and texture of a new city by navigating it only with the help of a GPS.”

If we are to gain a better understanding of our customers and the business itself, we must not miss “the feel and texture.” We need to see problems and opportunities in terms of human experience and capture and interpret data with a human context. We need to examine and understand how people live their lives from their own perspective, rather than from traditional business’ perspective. This applies to markets and products, as much as it applies to corporate culture because humans are complex and difficult to qualify and quantify. By using ethnographic research methods, we can uncover and understand the needs and desires – the whys and the feel and texture - that drive the emotional lives of customers.

This paper argues that business need to combine analytics with ethnography for richer and even more valuable insights to move ahead in a global market. It also provides some suggestions how to combine analytics with ethnography.

Session 40: Logan/Harris Room

2:45 pm – 3:45 pm

Cryptocurrency and Cybersecurity Topics

Session Chair: *Cory Ng, Temple University*

The Future of Value: From Bitcoin to Central Bank Digital Currencies

Aaron Kohn
Abdullah Uz Tansel

Baruch College
Thammasat University

Bitcoin, due to its decentralized design, is censorship resistant without any need for a centralized authority. It has caused much speculation over the course of current socioeconomic models in terms of banking, money, privacy, and government. We examine the history of money, and how Cryptocurrencies may disrupt the current global economy by challenging the U.S. dollar standard. Furthermore, we look structures and operations of speculated and emerging Central Bank Digital Currencies (CBDC) and their mechanics. We differentiate CBDCs from current commercial digital fiat issued by banks and analyze their role as potential tools for monetary policy and examine CBDCs currently in development in Venezuela, Estonia, & Russia. We look to how CBDCs would affect tax policy, its security, monetary controls and speculate their impact in domestic markets. We argue that Bitcoin will be considered ‘good money’, Gold for the digital age, representing a new standard for international commerce.

Distributed Ledger Integrity Canary

Andrew Mangle

Bowie State University

A permission-based distributed ledger (PBDL) of node-based hashes is a novel approach to creating autonomy and resiliency in cybersecurity through the immutability and trust created by Distributed Ledger Technologies (DLT). DLT's applications already include finance, supply chain, and smart contracts highlighting current innovative approaches to a plethora of use cases across different industries. The preliminary research investigates the capabilities of storing calculated hashes on permission-based distributed ledgers in diverse operating environments including Internet of Things (IoT) and cyber-physical systems. A hash captures a specific data point - a fingerprint – of a particular system to ensure the integrity of the system. Manipulation of a single byte on the system alters the hash. The distributed ledger (DL) stores the hash in a permanent record and trust. The research refines and applies existing DLT solutions to the cybersecurity domain by evaluating the merits of DLT and integrity checks to enhance situational awareness through threat detection. Additional benefits of the approach may include increased attack effort and improved vulnerability discovery. The research contributes to the state of both technology and cybersecurity through combining DLT and hashes to create a trusted system which can be applied to industry as well as integrated into operational infrastructures.

Session 41: Holmes/Foster Room

2:45 pm – 3:45 pm

Entrepreneurship Topics

Session Chair: *Dwight N. Carey, Temple University*

Experiential Entrepreneurship, Everything Educational (4Es of Success)

Dwight N. Carey

Temple University

Can each student launch a legal business venture with only their money in two weeks, then by the tenth week of the semester break even and be profitable? Yes! is the answer.

I created a course four years ago based on these goals. Approximately ten weeks into the semester all the students in this class must have customers, break even and be profitable. They must be seriously developing an income generating startup venture that will “hire” them upon their graduation. How is this possible, when almost all text books state that a startup will take “one” to “three” to “five” years to break even?

The time line is simple and very demanding, but also very positive and supportive. “Fast failure” and “pivoting” are a given. Conservation of resources and customer acquisition and retention become each student’s daily goal.

One week before the semester starts, I email to every student the Syllabus, the Course Description, a Pre-Startup/ 1st12 month’s Cash Flow Proforma work sheet and a Questionnaire. The later encourages each student to think and write about their entrepreneurial experiences, if any, their personal strengths, interests, hobbies and their current business ideas. This Questionnaire must be e-mail returned to me before school starts. This gives me an insight into the drives, desires and skills of each student before I greet them in the first class.

This “Welcome Package” alerts them to the facts that this is a very real-world course where the possibility of failure is losing their own money (not anyone else’s) and not realizing their entrepreneurial dreams. It also shows them that the course goals during this semester are to help them launch a financially viable and sustainable business and to become very self-confident presenters and successful entrepreneurs.

This paper/presentation and workshop are to help educators to learn how to teach their students to be real time financially independent entrepreneurs.

A Brief History of Entrepreneurship Education in China

Roger Hibbs

Chun Li Ni

C.J. Rhoads

Kutztown University of Pennsylvania

Dalian Polytechnic Institute, China

Kutztown University of Pennsylvania

Higher Education in China has been late in getting on the entrepreneurship education (EE) bandwagon. EE can be viewed as starting in 1997 at Tsinghua University and continues today. This change can be viewed as one response in China to dealing with the issues of high economic growth, the business cycle, displaced workers, and the increasing numbers of college graduates that cannot find meaningful employment. As EE has developed in China, they have looked to outside models for input into their EE pursuits. This has had mixed results and has resulted in a developing model that focuses on regional economic issues and the adaptation of EE models to those regions in China. This is seen as a better fit in China as the country is largely organized by region. This paper describes the evolution of EE education in China with key milestones.

Driving and Hindering Factors of Implementing Total Quality Management in Small Industries in Central Pennsylvania

Mengsteab Tesfayohannes Beraki

SUNY- Farmingdale State College

Small Industries (SIs) play a dominant role in the Commonwealth of Pennsylvania (PA) economic development in general and in the industrial development process in particular. The contribution of SIs to GDP and their role in large scale employment creation ameliorate their fundamental importance in the PENN state economy. Therefore enhancing their competitiveness and sustainable growth in several dimensions, including organizational and managerial performance, is a mandatory initiative. At this time, customers' demand for goods and services is so complicated and diversified. This formidable pushing factor induces SIs to strive for continuous improvement in their operational and strategic activities. They do this mainly by the implementation of efficiency enhancement tools and methods including Total Quality Management (TQM). Their continuous improvement endeavor should focus on customers' satisfaction, process innovation and a strategic quality plan. TQM is an effective system of enhancing the overall performance of firms in terms of higher quality, efficiency and effectiveness. These are the required mandates for achieving success and sustainable growth. Shreds of evidence in the literature indicate that TQM has become a major strategy for most firms in all sectors of a national economy. This study aimed to identify and explore the critical deriving and hindering factors affecting the implementation of TQM in SI engaged in industrial activities in PA. This study focused on SI located in three Central PA counties: Union, Northumberland and Snyder. It can also enrich the understanding of TQM implementation approaches in other countries elsewhere in the United States and beyond.

Conference Concluded**4:30 pm**

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