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Editorial Policy

The primary purpose of the JTM is to publish managerial and policy articles that are relevant to academics, policymakers, and practitioners in the transportation, logistics and supply chain fields. Acceptable articles could include conceptual, theoretical, legal, case, and applied research that contributes to better understanding and management of transportation and logistics. Saying that, our policy requires that articles be of interest to both academics and practitioners, and that they specifically address the managerial or policy implications of the subject matter. Articles that are strictly theoretical in nature, with no direct application to transportation and logistics activities, or to related policy matters, would be inappropriate for the *JTM*. Articles related to any and all types of organizations, and of local to global scope, will be considered for publication.

Acceptable topics for submission include, but are not limited to, broad logistics topics, logistics and transportation related legal issues, carrier management, shipper management of transportation functions, modal and intermodal transportation, international transportation issues, transportation safety, marketing of transportation services, transportation operations, domestic and international transportation policy, transportation economics, customer service, and the changing technology of transportation. Articles from related areas, such as third party logistics, purchasing and materials management, and supply chain management, are acceptable as long as they are related to transportation and logistics activities.

Submissions from practitioners, attorneys or policymakers, co-authoring with academicians, are particularly encouraged in order to increase the interaction between groups. Authors considering the submission of an article to the *JTM* are encouraged to contact the editor for help in determining relevance of the topic and material.

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Manuscripts. Submit manuscripts to the editor by email attachment at taylorjohn@wayne.edu. Manuscripts should be no longer than 30 double-spaced pages and 7000 words. Guidelines for manuscript submission and publication can be found in the back of this issue.

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From the Editor...

Welcome to the Spring Summer 2014 issue of the Journal of Transportation Management! This issue, being Vol. 25, No. 1 marks the 25th Anniversary of the Journal. This Silvery Anniversary is a really important milestone in the history of the Journal and a tribute to the previous Editors and Authors of the Journal. We look forward to another 25 years.

This issue of the *Journal* contains an article on the issues involved in starting a Ph.D. in Logistics Program, an article on financial leverage strategies in the airline industry, an article on ethical issues in the transportation brokerage industry, and an article that makes the case for considering the Internet as a 6th mode of transportation.

The first article is an excellent review of the costs and benefits of opening a university logistics Ph.D. Program. The article focuses on some of the hidden costs and implications that arise when opening such a program. The second article is an interesting examination of the implications of requiring airline companies to capitalize operating leases and including them as assets and liabilities on their balance sheets. The study demonstrates the distortion inherent in inter-airline benchmarking when operating leases are not capitalized on the balance sheet. The third manuscript deals with the very important topic of individual ethical decision making for common scenarios faced by transportation brokers. The results indicate significant discrepancies between what actions a broker would engage in and what industry leaders perceive to be ethical. The fourth article makes an interesting case for considering the Internet as the sixth mode of transportation. The author argues that the impact of the Internet as a transportation mode needs to be tracked in order to understand its full economic implications.

At the *Journal*, we are continuing to make a number of changes that will improve the visibility of JTM, and improve its position in the supply chain publishing world. These include registering and updating journal information with several publishing guides, placing the journal content with the EBSCO, Gale and JSTOR databases faculty have access to, and placing abstracts of all past journal articles on an open area of the DNA Journal web page. Full journal article PDF's continue to be available to subscribers on the web page at www.deltanualpha.org

I look forward to hearing from you our readers with questions, comments and article submissions. The submission guidelines are included at the end of this issue's articles and I encourage both academics and practitioners to consider submitting an article to the Journal. Also included in this issue is a subscription form and I hope you will subscribe personally, and/or encourage your libraries to subscribe.

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UNINTENDED CONSEQUENCES: LESSONS LEARNED WHEN STARTING A LOGISTICS & TRANSPORTATION DOCTORAL PROGRAM

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ABSTRACT

Many universities evaluate the costs and benefits of academic programs. An important decision is whether to offer a doctoral degree. Most articles and academics focus on the numerous benefits of a doctoral program. While many of the benefits that can stem from a doctoral program are summarized in this manuscript, the primary purpose is to highlight some of the hidden costs to creating and operating a doctoral program. The authors use their experience in developing a doctoral program in Logistics and Transportation to illustrate many of these potentially hidden costs. This should provide academics and administrators with better information to make future choices about specific Business School programs.

INTRODUCTION

Currently approximately 21% of the Colleges of Business accredited by the Association to Advance Collegiate Schools of Business (AACSB, 2012) offer a doctoral program in some area of business. This list of universities contains some of the most prestigious institutions in the world. In fact, a review of current faculty job postings at AACSB universities indicates that these schools often require applicants to have a degree from another AACSB university to be considered for the position. With such a limited pool of doctoral granting universities to choose from many, if not most, of these new academics will begin their career at institutions that have not traditionally offered a doctoral degree. With most academics backgrounds coming from research universities, there is a natural trend for teaching or hybrid universities to evaluate the benefits of including at least one doctoral program at their university. There are many obvious benefits to including a doctoral program: prestige, research opportunities, use of Ph.D. students as

instructors, creating assistant professor candidates, funding possibilities, etc. However, there are many costs that must also be addressed as part of an effective evaluation process.

Effectively evaluating the benefits and costs of adding a doctoral program is a challenge for most academic decision makers. Often, many unintended consequences of the decision result in costs (both financial and psychological) that are not anticipated during the evaluation process. The failure to incorporate a realistic estimate of the short-term and long-term costs of establishing and running a doctoral program within a business school is normally not due to malicious intent, but rather is due to lack of awareness of hidden challenges. The reality of under taking such a complex task is that there can be second or third order effects that are not obvious during an initial planning period.

The goal of this article is to highlight some of the hidden challenges that a College of Business should consider when beginning a doctoral program. While the paper will present a

theoretical underpinning for conflicting views of the benefits and costs of adding a doctoral program, this manuscript is unique in that illustrative examples will be taken from actual events seen in the recent establishment of a doctoral program in a traditional College of Business environment. For the past five years the authors of this manuscript have been participant observers in the development of a doctoral program at their institution; Georgia Southern University. The intent of this manuscript is to use insights gained from that experience to better prepare academics and administrators with concrete examples of the hidden costs of a doctoral program to allow better evaluation and more realistic expectations. The result should be that colleges are better prepared to make the doctoral decision. The goal is not to discourage any university from starting a doctoral program, but rather to increase their understanding of the true costs of the process. The aim is to help schools better implement new doctoral programs and have more success with the development.

To achieve these goals, this article will present a modified literature review to include some relevant data on current doctoral programs and present some of the benefits and costs of such a program. Then, the authors will include the theoretical basis that shapes the decision process. The discussion of the unintended consequences or hidden costs provides a detailed evaluation of challenges that a College should include in the decision process and prepare to address upon adoption. Next, a theoretical model is developed to highlight the challenges of this process. Finally, some key conclusions tie together the key learning points.

LITERATURE REVIEW

As part of any go/no-go program decision, the competitive market should be evaluated. Using the AACSB data as a baseline, one surprising finding was just how few institutions offer doctoral degrees. Currently, AACSB includes 1,270 member institutions. Clearly, this is not a

complete or all-encompassing list of business schools. In fact, in North America, AACSB schools represent less than 60% of total institutions, while outside of North America, AACSB membership is generally less than fifteen percent (AACSB, 2012). Another widely circulated list from the *US News & World Report* lists over 1,600 business schools in the United States (USN&WR, 2012). Regardless of which number is used as a baseline, it is interesting to note that AACSB identifies only 267 Colleges of Business that have a doctoral program or approximately 21% of AACSB member universities. Therefore, the total number of doctoral programs is relatively small. This may be the first indicator of the numerous costs associated with providing doctoral degrees. In addition to the small numbers of programs, a review of the last five years of AACSB records indicates only a handful of new doctoral programs admitted to the membership ranks. The lack of significant growth of doctoral granting universities may highlight some recognition of the challenges of starting a program. However, there are significant advantages to housing a doctoral program within a College of Business as well.

The first major benefit of a doctoral program is prestige. Clearly, the vast majority of doctoral granting universities are considered the premier universities. A look at any ranking system seems to be headed by the traditional research universities that support doctoral education as a key component of the overall educational outcomes. Part of the reputation of these universities is that they are producing first-rate graduates at all levels. Furthermore, their doctoral graduates go on to teach at other universities. If the required “certification” to be a professor is a doctoral degree, then the universities that produce doctoral graduates are the de facto top of the academic pyramid. The presence of multiple doctoral degrees is a visible measure of the prestige of the College of Business. A second key benefit is the increased amount of research output from a doctoral program. In most cases, the ability of a doctoral

candidate to interview and secure an Assistant Professor position is directly related to his/her quality and quantity of research produced during the degree process. Therefore, the host institution benefits from increased scholarly production both from the doctoral candidates and the existing faculty. This further increases the prestige of the College (Gammelgaard, 2001). Another key point from Gammelgaard's research was the benefit to *both* faculty members and students from small classes and/or one-on-one instruction that is typical of doctoral instruction. Participating faculty have an in-load class with 3-5 students typically and this can be perceived by other faculty as very attractive, although the classes can be very demanding on faculty time. An additional benefit is that most Ph.D. students teaching classes can be considered "academically qualified" under AACSB rules. Another benefit of the doctoral program is that it may create opportunities beyond the university. Often, the requirement for doctoral students to gather data for their research spurs faculty to expand their relationships to industry. By increasing interactions with practitioners, universities often identify additional opportunities to generate revenues through projects, executive education or closer ties leading to increased donations. A different set of benefits occur due to the typical structure of dissertation committees. Most institutions require committees to include at least one "outside" member. This opportunity to work with others outside one's discipline often leads to sharing different concepts and techniques. This cross discipline pollination of thought should improve both disciplines as they conduct doctoral research. While there are other advantages to having a doctoral program, the key benefits highlighted present strong arguments to consider implementing such a program.

In addition to the benefits, there are additional factors that may influence universities when considering the introduction of a doctoral program. The pressures to offer doctoral education can be both internal and external. Internal stakeholders may wish to have a

doctoral program(s) due to the many benefits previously highlighted. For example, administrators may wish to increase the prestige of their university, while professors may want to boost their research output. Further, new areas of research or disciplines may be identified in which there may be a "PhD gap." In other words, as new disciplines emerge (e.g., Supply Chain Management – SCM) there is an opportunity to be the university that produces doctoral degrees in the emerging field. In turn, new programs, such as the aforementioned SCM degree, tend to stimulate the need for additional faculty lines to support the additional requirements posed by the new degree and help grow a discipline area.

There are also external factors and a large number of stakeholders that may also apply pressures to start a doctoral program as well. For example, alumni may enjoy the increased prestige of their university, while taxpayers may see additional jobs and economic benefits from increased programs within a College of Business through service types of support and new jobs. In addition, successful implementation of a doctoral program would produce qualified future faculty that may be required to address shortages in a statewide system (i.e., a lack of Assistant Professors at other universities across a state system.)

THEORETICAL FRAMEWORK

There is solid theory that may help to explain the steps in deciding to offer a doctoral program. While the point of this article is to provide background and information to doctoral program decision makers, the theoretical basis helps to explain the process. There are two significant theories that are appropriate to the doctoral program development process. Interestingly, the two theories support opposing positions on whether a university is more or less likely to begin a doctoral program.

The first relevant concept, Prospect Theory, supports the creation of a doctoral program due

to its potential benefits. Kahneman and Tversky first developed prospect theory in the late 1970s (1979). Their Nobel winning work noted that the risk to reward relationship could be identified and calculated in various economic situations. Further research included various studies that expanded the concept to incorporate areas as far ranging as behavioral economics to military/foreign policy decisions (Lynn, 1999). One of the key points of later research is that the gains and losses are not always valued equally. Gains appear to be given higher weights and will favor changes versus preserving the status quo in decision making (Steinacker, 2006). Therefore, the application of Prospect Theory implies that decision makers are likely to be more positively influenced to implement a doctoral program due to the unequal weightings and accentuation of positive impacts from a potential degree program.

Conversely, Neo-Institutional Theory states that organizations are resistant to change and are less likely to create a doctoral program. The basis of this theory began with Weber in the late 1800s as he examined the growth and interaction of bureaucracy and institutions. By the late 1980s, the specific area of Neo-Institutional Theory had developed as the area matured. A complete discussion of the concepts is beyond the scope of any one paper, but DiMaggio and Powell provide an excellent examination (1991). One of the key points of Neo-Institutional Theory is the resistance to change present in many smaller organizations (Diego et al, 2002). Whether it is an academic department or a university wide evaluation to begin a doctoral program, these are relatively small organizations. Therefore, there is a natural reluctance to change established structure or organization. This generates pressure against creating a doctoral program within existing departments or colleges.

Thus, the competing theories generate simultaneous pressures to both maintain the status quo and to begin a doctoral program. The impact of each of these independent forces will play a significant role in determining whether an

institution will push forward with a doctoral degree. In addition to the forces from these theories, the strength of the negative impacts of beginning a doctoral program will play a critical role in the final decision.

CONSEQUENCES OF STARTING A PH.D. PROGRAM

To this point, the foundation of the paper has built upon the background or positives of a doctoral program and the theory that will influence the decision process. However, the key discussion or focus of the paper is the consequences of beginning such a program. There are clear disadvantages or negatives to incorporating one or more doctoral degrees within a College of Business. Many of these difficulties are easily identifiable and are addressed in this section. However, there are also a large number of hidden challenges that occur once a university begins to deliver the doctoral degree. To help understand those costs, the authors will detail some of the unexpected costs that emerged in the development of the doctoral program recently established at Georgia Southern University.

Georgia Southern University is described on its web site as “a Carnegie Doctoral-Research university providing the classic residential campus experience. Georgia’s largest and most comprehensive center of higher education south of Atlanta, 50 states and 101 nations are represented in the student body. The University’s hallmark is student-centered education for undergraduate and graduate students alike” (GSU, 2012). The College of Business Administration at Georgia Southern has approximately 4,500 students and continues to maintain AACSB accreditation. The University chose Logistics and Supply Chain Management as the first Ph.D. program in the mid 2000’s. This was a logical choice as the initial program since the Southern Center for Logistics and Intermodal Transportation has a national reputation and the University is located near one of the busiest logistics corridors in the

nation with the Port of Savannah within 45 miles. All of these structural benefits of beginning a program at Georgia Southern helped to drive the process of beginning a doctoral program. However, neither the faculty members nor administration anticipated many of the negative issues that resulted from implementing a doctoral degree.

Financial Costs

To begin with the more obvious disadvantages, the single greatest challenge is cost. There are a myriad of directed and indirect financial costs with the doctoral program. The first cost is for the faculty and resources required to offer doctoral classes. At Georgia Southern University, the administration's goal was to admit approximately ten doctoral students per year. This is a very expensive proposition since it is also likely to be the most senior, and likely highest paid, faculty members teaching these classes. Even if new faculty members are used, with salary compression in today's market, the return on credit hour production is nearly prohibitive. The second portion of the increased cost is the likely need for new faculty members. This could be due to a number of reasons: additional new classes, required area(s) of technical expertise, or tenured faculty to lead dissertations. There also will be a need for additional faculty to cover the undergrad/MBA classes that the Ph.D. faculty would have been teaching. Regardless of the rationale, one to three new faculty lines are a reasonable expectation. At Georgia Southern University, the new doctoral program required three lines (one in Operation Management to offset minor area courses and two in Logistics and Transportation for additional new doctoral classes.) A third potential cost is due to teaching loads. The most engaged doctoral faculty members face a large number of additional tasks that are beyond the traditional Bachelors and Masters level classes. The most obvious are increased research expectations and dissertation responsibilities. Therefore, a reasonable expectation is that these faculty members will have similar teaching loads as peers at

traditional research universities. A realistic teaching load for these individuals would be some form of a two classes a semester approach or a two-two teaching load. This may or may not be a significant reduction from the current load; however, most non-Doctoral Colleges of Business are more hybrid or teaching institutions. In those cases, a three-three or even a four-four load per semester may be the normal situation. Therefore, there would be a significant cost that may be realized in a greater number of new lines required to replace those classroom hours. The final set of costs is the doctoral students themselves. First, they are likely to be on full scholarships or fellowships while in the program. Depending on the university's accounting system, this may be a real dollar expense if the College of Business is required to transfer resources to another unit (e.g., College of Graduate Studies) or merely an internal cost associated with tuition waivers. The second cost for the students is their stipend. Even with a low cost approach, \$15,000 per student is a very conservative estimate in outflow of capital to the student(s). Students also often need to be supported in the summer with additional research funding. This amount can quickly escalate as the program reaches years two and three and has multiple students participating simultaneously in the process. In short, it can quickly surpass \$100,000 annually. Universities should reasonably budget a minimum of \$25,000 per doctoral students for stipends and miscellaneous costs per year.

In addition to the direct costs, there are many hidden costs to be considered when evaluating the merits of starting the doctoral program. The unintended financial costs are likely to be smaller amounts, but are a litany of various items that every doctoral program needs to operate. The first is library reference materials. The shift from a hybrid or a teaching university implies a greater need for library research tools. Over the decade prior to starting the doctoral program at Georgia Southern University, the library had reduced subscriptions to physical/online journals and databases. The cost to

restart ABI Inform was significant and was exacerbated by the inability to purchase just the business content areas. In addition, software licenses may represent another cost. To properly teach modern statistical techniques, programs such as AMOS must be licensed to use in the classroom labs and/or on students' computers. Another significant, one-time cost may be the establishment of a doctoral classroom with appropriate technology for seminar types of classes. Next, travel budgets will likely be significantly increased for both faculty members and doctoral students/candidates. To ensure the students are performing good research and would eventually be viable Assistant Professor candidates, the students need to present at various conferences to help build both the university's and the individual brand. This requires sending them to two to three conferences during their time as doctoral students/candidates. Also, the likely coauthor will often be a faculty member who travels as well to supervise the process. Additionally, office space will be needed for students at least in the form of cubicles, and these will have to be furnished. Finally, there are likely to be numerous additional costs to include marketing the program/recruiting doctoral students/advertising, secretarial staff, faculty buyouts for projects/administrative support, technology, unexpected new faculty hiring, etc. that were not clearly identified in initial cost estimates.

Given all of these costs, Georgia Southern University ended up budgeting just under \$1,000,000 a year to start a doctoral program in Logistics/Supply Chain Management. This figure was determined based on the obvious costs but had some "slack" built into it for unexpected costs. The end result was this was a very accurate figure by the time the program reached maturity and was sufficient to cover many of the unexpected or unintended costs as well. It should be noted, that Georgia Southern University was founding the initial doctoral program with one major and three possible support areas or minors. Therefore, the figure was much higher than if a College of Business

already had a doctoral program and was merely adding a new major(s). As part of the study, it was estimated to cost approximately \$250,000 more a year to add a second major to the doctoral program if it was one of the existing support areas or minors.

Institutional Friction

Just as there are specific financial costs to starting a doctoral program, the internal and external pressures exert forces on the institution that create a number of types of friction as a byproduct of the process. These frictions can be with external stakeholders and competitors as well as internal members of the university. An interesting point of the process is there are different levels and types of friction based upon the stage of development or implementation. Also, the source or proponent of the friction shifts through time as well. In general, the friction is likely to begin internally, move to external and then shift back to internal.

Some of the initial friction points will likely be due to monetary considerations. Competition for limited resources will likely create the initial friction. Peer departments may oppose a doctoral program if they believe funding is a zero sum system. In other words, there is likely to be significant opposition if there is not a new source of funding for the program. Peers will view the new doctoral program as a resource drain that will negatively impact their funding opportunities for travel, summer support, research grants, etc. Even with outside or new sources of funding, there is likely to be significant initial internal opposition creating friction within the College of Business and university.

Assuming a doctoral proposal can survive the initial, internal friction, external groups will provide the second set of friction. The most likely group to oppose the proposal and create friction is peer and/or competitor universities. Peer schools may oppose the proposal to maintain the status quo and not be seen as "falling behind" peer institutions. Also, more

prestigious or tier one schools might oppose the proposal since it may create more competition for potential students and state level funding. Both of these groups may be limited to one or two institutions from across a statewide system. However, the consequences of university Presidents competing over budget and programs can have significant and long lasting effects on a university's position within a statewide system. At a lower level, there is also likely to be difficulties and friction between different faculties. For example, two universities' faculties disagreed over whether a satellite campus should teach a curriculum that was very similar to an existing program at a nearby main competitor campus. The resulting friction caused the two universities to cancel all standing agreements within one specific discipline. Therefore, a doctoral program's curriculum or specific major may create friction. For example, one of the premier research universities in the state of Georgia was opposed to the doctoral program proposal from Georgia Southern University because that university was considering adding courses in that area at a future date. Therefore, even when there was a gap in the system, friction resulted from a doctoral program proposal.

After the proposal approval, the next set of friction points will shift back to internal pressures within the university. There are an ample number of unintended problems that create friction within the College of Business. The first area of friction is between administration and faculty members.

The administration and faculty have different views on the benefits and costs of the doctoral program. As identified by the Prospect Theory, both groups will have likely maximized their perceived benefits and failed to adequately evaluate the costs. This is exacerbated by the differing viewpoints of administration and faculty. Administration will see the doctoral program as a means to a number of outcomes. It is a tool to increase prestige and research output for the College of Business. In addition, in some

programs it will be seen as a method to increase revenues through donations, premium tuition and online delivery methods. The faculty members view the doctoral program as an opportunity to train future academics and to work with novice researchers in a one-on-one setting. Neither side will fully recognize the others challenges. For example, administrators may undervalue the time it takes to work on dissertation committees, create/grade comprehensive exams, and develop/improve doctoral curriculum. Simultaneously, faculty will not seriously consider the financial costs of the program due to reduced teaching loads, doctoral student costs, opportunity costs of capital and administrative time/effort/support. In addition, administration members are faculty members; however, they are also policy makers. Therefore, they are likely to impose their beliefs on curriculum, process and other doctoral program decisions based on their experiences and biases. While the administration members are academics, they are likely to have been out of the classroom and the farthest removed from their doctoral experiences (i.e., they earned their doctorate longer ago than most faculty.) The result is a possible friction point over who is best suited to provide input and make doctoral program decisions: the doctoral faculty or the College of Business administrators. This is an important unintended consequence due to the long lasting effects of faculty verses administration conflicts if not carefully considered and mitigated early in the process.

The next set of unintended friction points will be between various disciplines and a number of unexpected problems are likely to occur. First, the primary discipline will likely have a reduced teaching load as previously identified. In a teaching or hybrid university, this may cause differential teaching loads across the College of Business. This will raise questions of equity among disciplines. For example, at Georgia Southern University the primary discipline moved to a two-two load in recognition of the additional efforts required as part of the program. However, other disciplines had mixed

changes. Supporting or minor areas only received a one-course reduction if they were teaching in the program. Other disciplines did not have any reductions. The result was a faculty that taught between two-two and four-four loads depending on discipline and participation in the doctoral program. In addition to teaching loads, another area that causes friction is the inclusiveness of the doctoral program. While it may seem obvious, the question arises of who is the parent discipline with the doctoral degree and possibly the doctoral program. If a PhD in Marketing is started, are Sales faculty a part of the core group? If it is a degree in Supply Chain Management, then who are the parent discipline faculty? Also, how much of a say should the minor areas and other disciplines in the College have in the overall shaping of the program? Finally, if it is the first degree in a series of degrees for an entire doctoral program, there is likely to be a great deal of friction as College policies are agreed upon even if there is only one degree program. Finally, as identified previously, clashes may occur over funding between departments as part of the doctoral debate. This will become readily apparent in later years as minor areas and supporting disciplines (i.e., statistics) are required to teach large numbers of classes for few students. The cost to the departments in terms of capacity will create additional frictions between departments especially if those disciplines do not have doctoral degrees of their own.

The final area of friction may occur within the specific discipline area. There will be many differences of opinion from basic operational areas to philosophic plans for the strategic direction of the degree. Some faculty members will view the degree as an opportunity to do additional research. Others will see it as another burden from administration. Additional members may view it as taking resources from other areas in their discipline (i.e., undergraduate and MBA.) The type of doctoral candidates to be produced is an important strategic decision –

tier one researchers or faculty for teaching colleges and universities. For operational decisions, the questions of how many doctoral students to admit and which students should be accepted can cause friction, as can decisions about dismissals of students from a Ph.D. program. In all likelihood, this group will be the most homogenous in thought and have the least amount of friction. However, one should not underestimate the opportunity for challenges by not considering the possible internal department frictions.

Placement of students and perceptions about success of the program can also create tensions. If students are not placed at research schools some may consider this a failure and reduce their support for the program. Placement can also generate debates about what the placement goals should be regarding types of schools. In any case, placement of students can be a source of additional friction.

The amount of friction caused by the doctoral program at Georgia Southern University was the largest surprise in the process. There were significant amounts of displeasure from the beginning through the actual operational phases of the doctoral program. It may have been heightened by the cross-disciplinary nature of the final, approved degree by the incorporation of Supply Chain Management. Regardless, the amount, breadth and continuous frictions created by the doctoral program were clearly an unexpected consequence that decision makers should carefully consider when making the doctoral program judgment.

Pedagogical and Operational Issues

The final area of unintended consequences rests primarily in the day-to-day teaching and operations of a doctoral program. All of those little details are combined to create a number of unexpected problems. While none were insurmountable, they take time, effort and cost to mitigate any negative consequences.

In terms of teaching the doctoral classes, the first challenge is that the courses that are approved and fit the initial pedagogical model are often unable to be taught as planned. First, some faculty members will simply change the course content to coincide with their beliefs of what should be in the program or to play to their research strengths. In addition to that challenge, there will be teaching capacity constraints from various sources to cover all the doctoral specific classes. Next, the faculty that approves the doctoral program's curriculum are not necessarily going to be the ones that enact it due to attrition and personnel changes. At best, two of three key members will survive the process from concept to execution (Note: it was a seven-year process from first proposal draft to first class taught.) If one of the professors leaves with a very special skill set (i.e., simulation, SEM, etc.) that person will be very difficult to replace in a timely manner to continue the degree's requirements.

Another unexpected challenge is the simple policies that seem to get harder when enacted. Presumably all doctoral programs have some form of comprehensive exam and dissertation. However, the actual implementation of these can be very difficult due to the large number of faculty members involved in the overall process. Simple questions about format and committee composition can become long-drawn out debates that delay doctoral candidate's processes. One example question is what is the role of statistics professors on a comprehensive exam – should they have a question, do they grade the exam, are they advisors, etc. While these areas lead to friction, they are also simple operational matters that are not likely to be included in the initial consideration of the program.

Another unintended area is administrative time required by the faculty member(s) to support the doctoral program. As identified previously, there will be an increase in administrative support needed for a new doctoral program, likely a secretary and/or office manager type of position. Just getting all the catalog changes through the

system seems like a full-time job during the first year or two of a program. All the day-to-day tasks of assigning doctoral students to faculty, teaching schedules for Ph.D. students, preparation of international Ph.D. students for teaching in English, the timing of Ph.D. student class offerings, annual reviews, appeal procedures, etc. are extremely time consuming. One major task that requires a great deal of time over many years involves faculty efforts to place their students and all the networking this may require. Another specific example that was highlighted by McWilliams, et. al. is the changing legal considerations of a doctoral program (2002). There is a high likelihood that a new doctoral program will have an issue with a student at a time when all of the procedures and policies are not fully in place. This could put the university into a difficult legal position if the student is willing to bring suit. Faculty and administrators should note the possible unintended legal complications of a new doctoral program especially since the typical student is probably well into their late twenties or beyond, has significant work experience and has dealt with HRM/legal in other organizations. The administration of the program faces all of these challenges and should be properly evaluated as part of any doctoral proposal.

Finally, the unintended costs that can result from accreditation should also not be ignored. The addition of a doctoral program often moves a College of Business into a "higher" category by AACSB. Therefore, AACSB will have higher standards during five-year reviews when a doctoral program is started. It is important to note that this applies across the College of Business and not to just the discipline that begins the program. By moving into this new accreditation category at Georgia Southern issues arose with both the quality and mix of research output. That is, AACSB began to expect publications in journals that are considered of a "higher quality" and a shift in research focus with a reduction in pedagogical and an increase in basic research. As a result, at Georgia Southern fundamental changes have

been necessary in areas ranging from promotion and tenure expectations, to workload procedures, intellectual contribution guidelines, and Academically/Professionally Qualified standards (AQ/PQ). For example, a doctoral student who is still completing course work or who has not yet passed comprehensive exams is not considered to be AQ. Therefore, if he or she is assigned to teach a course, the College of Business' metric would suffer. However, if a doctoral candidate (i.e., some one that has passed comprehensive exams) teaches, he/she will be considered AQ. AACSB guidelines allow a small percentage of sections to be taught by Ph.D. students and still have them considered academically qualified. Therefore, AACSB places a constraint of when doctoral students/candidates can teach and limits their usefulness to after they have completed comprehensive exams. This reduces the overall value of a doctoral student to the College of Business. It would be difficult to overstate the time and effort needed to transform faculty expectations and workload at Georgia Southern given AACSB requirements for faculty at doctoral granting schools. These unintended costs should not be minimized in evaluating the addition of a doctoral program.

In conclusion, starting a doctoral program creates many unintended consequences. Some may be unique to a specific situation. However, most are likely universal with any new program. They vary from hidden costs to friction to operational items. However, all are likely not properly evaluated and mitigated during the doctoral planning process. The combination of these items may be somewhat overwhelming. However, the point of this article is to highlight the decision makers' challenges and better allow them opportunities to avoid potential unexpected pitfalls. None of these and other hidden consequences is by itself a reason to preclude a doctoral program. Rather, they are realistic challenges to be avoided or addressed when making an honest assessment of the potential pros and cons of starting a doctoral program.

MODEL DEVELOPMENT

Based on the theory and real-world experience of beginning a doctoral program, it is appropriate to develop two models for inclusion to help readers better evaluate the benefits and disadvantages of the process. The first model is based upon propositions developed from the theories that were presented earlier and presents the theoretical view. The second model is an applied representation of the process of developing and implementing a doctoral program.

The two relevant theories in conjunction with reasonable observations provide the foundation for a number of propositions. Prospect Theory highlights the careful weighing of benefits and costs to make a scientific decision. Refinements of the theory include the points that not all considerations are equally weighted and negative items may be undervalued. The first two basic propositions follow from this line of reasoning.

P1: Most universities view a doctoral program as a beneficial element.

P2: Given the overall benefits, most doctoral evaluations will underweight or fail to consider the possible negative consequences.

In addition to these propositions, the Neo-Institutional Theory suggests that the organizations will be more likely to maintain a status quo than change. When considered with the potential amounts and types of friction, this may be further expanded to incorporate specific positions taken by internal and external actors in the overall system.

P3: Most universities, Colleges of Business, or departments are likely to resist change.

P4: Groups and individuals opposed to the creation of any doctoral program or degree will cite the benefits of the status quo as a primary argument against change.

The four propositions help to frame the theoretical model presented in Figure 1. It represents the forces that affect the doctoral program decision. Furthermore, it represents the relationships in simplistic terms throughout the process.

One interesting part of the model is the both positive and negative effects of Proposition 4 on the model (P4+ and P4-). Due to the various external stakeholders, specific stakeholders may have rationales to support or oppose the change. The external stakeholder may use the status quo argument to support or oppose the doctoral program based on their desired outcome. This same argument could be used with internal stakeholders. However, the internal elements that support the status quo are still represented

by Proposition 3 and the negative impact they create on the process (P3-). Furthermore, the internal friction is likely to continue throughout the process and not be limited to the approval phase as indicated by Figure 1.

The end result of the theoretical model is to highlight the various actors and the impact each may have at different stages of the process. However, Figure 2 may present a more useful model. It provides a similar examination of the process and uses the amount of friction or unintended consequences against a timeline to better inform decision makers.

By plotting a time verse friction/unexpected outcomes, the model uses a graphical interface to highlight the changing roles and “costs” to starting a doctoral program. While the specific

FIGURE 1
THEORETICAL MODEL OF DOCTORAL PROGRAM IMPLEMENTATION

values of friction or unintended consequences are subjective, the overall results are a fair representation of at least one doctoral start-up. The specific amounts may change with another doctoral program creation, but there is some basic generalizability from Figure 2. It does clearly identify where decision makers are likely to have challenges throughout the doctoral program creation process.

CONCLUSIONS, LIMITATIONS, AND FUTURE OPPORTUNITIES

Probably the greatest weakness of the article is the lack of a large number of examples to complete a statistically significant study. However, the limited number of new doctoral programs creates an obstacle to gathering data. This does present a future opportunity for research. If enough interest is created, a follow-on qualitative study of new programs could be conducted. However, this article does capture key finding that should be useful.

The primary purpose of this article was not to conduct an academic study. Rather, the purpose was to inform all academics of the challenges of creating a doctoral program. There are a number of serious challenges to starting any type of program. However, the doctoral program includes a number of obvious and hidden ordeals. Decision makers need a clear understanding of all the costs and efforts needed to begin a successful program.

While the majority of the article focuses on the negative, there are some very large benefits from launching a doctoral program. The authors have very much enjoyed being part of this type of process and would strongly encourage other institutions to consider a doctoral program. The key point is that the administrators and faculty members have a better understanding of the process, benefits and true costs to execute a more successful start-up.

REFERENCES

- Association to Advance Collegiate Schools of Business website. [On-line]. Available: <https://datadirect.aacsb.edu/public/profiles/search.cfm#results>. Accessed: October 2012.
- Allen, Catherine M., Smyth, Elizabeth M., & Wahlstrom, Merlin. (2002) "Responding to the Field and to the Academy: Ontario's evolving PhD," *Higher Education Research & Development*, 21(2): 203-214.
- Dacin M.T., Goodstein, J., & Scott, W.R. (2002), "Institutional Theory and Institutional Change: Introduction and Special Research Forum." *Academy of Management Journal*, 45(1): 45-57.
- Diego Maria Macrì, Tagliaventi, Maria Rita, & Fabiola Bertolotti, (2002), "A Grounded Theory for Resistance to Change in a Small Organization", *Journal of Organizational Change Management*, 15(3): 292-310.
- DiMaggio, Paul J. and Powell, Walter W. (1991), "Introduction," In *The New Institutionalism in Organizational Analysis*, (pp. 1-38), edited by Walter W. Powell and Paul J. DiMaggio. Chicago, IL: University of Chicago Press.
- Frankel, R., Bolumole, Y. A., Eltantawy, R. A., Paulraj, A. & Gundlach, G. T. (2008), "The Domain and Scope of SCM's Foundational Disciplines — Insights And Issues to Advance Research." *Journal of Business Logistics*, 29(1): 1-30.
- Gammelgaard, B. (2001), "The joint-Nordic PhD program in logistics", *International Journal of Physical Distribution & Logistics Management*, 31(7/8): 585-605.
- Georgia Southern University website, (2012), Georgia Southern University Mission Statement [On-line]. Available: <http://www.georgiasouthern.edu/about/mission.html>. Accessed, November 2012.

- Greenwood, R. & Hinings, C.R. (1996), "Understanding Radical Organizational Change: Bringing Together the Old and the New Institutionalism." *Academy Of Management Review*, 21(4): 1022-1054.
- Kahneman, D. & Tversky, A. (1979), "Prospect Theory: An Analysis of Decision under Risk." *Econometrica: The Journal of the Econometric Society*, 47(2): 263-292.
- Lynn, John A. (1999) *The Wars of Louis XIV 1667-1714*. United Kingdom: Pearson Education Ltd.
- McWilliams, Erica, Singh, Parlo & Taylor, Peter G., (2002), "Doctoral Education, Danger and Risk Management," *Higher Education Research & Development*, 21(2): 119-129.
- Olian, J.D., LeClair, D.R., Milano, B.J. (2004), "Supply, Demand, and the Making of Tomorrow's Business Scholars." *Presidency*, 7(2): 30-34.
- Steinacker, A. (2006), "Externalities, Prospect Theory, and Social Construction: When Will Government Act, What Will Government Do?" *Social Science Quarterly*, 87(3): 459-476.
- Trask, M. (2006), "Alvernia to Award Doctorates: A Ph.D. Program in Leadership, which will begin in the Fall, is expected to Graduate its First Class in 2010." *Reading Eagle* (PA), Mar 24, 2006.
- US News and World Reports University Rankings* (2012) *US News and World Reports*, [On-Line]. Available: <http://www.usnews.com/rankings>. Accessed, October 2012.
- Vasquez, G. & Botan, C. (1999), "Models for theory-based MA and Ph.D-programs." *Public Relations Review*; 25(1): 113-122.

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FIGURE 2
PRACTICAL VIEW OF UNINTENDED CONSEQUENCES OF DOCTORAL PROGRAM

DISTORTIONS IN THE MEASUREMENT OF THE EFFICIENCY OF FINANCIAL LEVERAGE STRATEGIES IN THE AIRLINE INDUSTRY WHEN OPERATING LEASES ARE IGNORED

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ABSTRACT

The Financial Accounting Standards Board and the International Accounting Standards Board have set forth a proposal requiring companies to capitalize operating leases and include them as assets and liabilities on their balance sheets. The proposal is motivated by the fact that current methods accounting for operating leases hide a great deal of off-book leverage and thus are misleading to investors. Such a change would have a significant impact on the U.S. airline industry where aircraft and property operating leases are quite prevalent. This study utilizes an in-depth strategic management perspective in examining how well U.S. airlines pursue optimization strategies with regard to the management of financial leverage in order to achieve desired targets of growth and profitability. Such benchmarking is accomplished by utilizing the DEA model suggested by Capobianco and Fernandes (2004). This study demonstrates the distortion inherent in inter-airline benchmarking when operating leases are not capitalized on the balance sheet.

INTRODUCTION

The accounting treatment of operating leases is an ongoing subject of intense discussion by those professional bodies responsible for generally accepted accounting practices. Currently, an operating lease is treated as a mere rental agreement. The lessee records rent expense with each payment, but nothing else. The leased asset and the obligation for future payments of rent are not recorded on the lessee's balance sheet. This gives rise to the familiar phrase "off balance sheet financing." As operating leases are used in the airline industry to a significant degree, capitalizing them to the balance sheet, similar to their capital lease counterparts, would have important impacts on the measured leverage and risk positions of airlines.

Gritta (1974), Gritta, Lippman, and Chow (1994), and Gritta and Lippman (2010) provide a thoughtful and comprehensive analysis of the evolution of the reporting requirements with

regard to leasing instruments on the part of the Financial Accounting Standards Board (FASB). Specifically, Gritta, Lippman, and Chow (1994), describe the change in standards (SFAS No. 13, 1976) that now require that capital leases be classified as leasehold assets and long term liabilities on the balance sheet of companies, that is, they are capitalized to the balance sheet. Any change in the reporting requirements that pertain to leasing activities significantly affects the airline industry as leasing has been and continues to be an important source of financing for air carriers. This research is significant because it highlights the impact of leasing reporting requirements on the reported financial leverage of airlines. Gritta (1974) and Gritta, Lippman, and Chow (1994) demonstrated that a change in reporting requirements for capital leases had a significant and negative impact on leverage ratios.

However, as noted above, operating leases continue to be recorded as off-balance sheet items. Operating leases are treated as mere rental

agreements. Accounting rules do however require certain disclosures in the footnotes that accompany financial statements, including a description of significant leased assets, the obligation for future lease payments for each of the next five years, and a lump sum obligation for all years thereafter. This off-balance sheet treatment of operating leases is attractive to airlines. Park, Park and Hossan (2009) note that this methodology allows operating leases to be used as substitutes for debt financing while they also attenuate the financial distress of the lessee. Depreciation allowances associated with operating leases and lease rentals also provide a “tax shield benefit.” Lewellen, Long, and McConnell (1976) suggest that operating leases reduce the instant investment required to acquire an asset. This would protect an airline’s liquidity. Finally, Ezzell and Vora (2001) observe that operating leases reduce external financing costs for a firm.

In 2013, the Financial Accounting Standards Board (FASB) issued an exposure draft that would significantly change the lease accounting rules in the United States. A similar proposal has been made by the International Accounting Standards Board (IASB). These accounting rule makers believe that with few exceptions, all lease contracts are in essence financing agreements, and as such, all leases should be recorded as capital leases. The proposals would all but eliminate off balance sheet financing and could have a tremendous impact on the financial statements of those companies who currently have significant amounts of operating leases. It is interesting to note that major rating agencies, including Standard & Poor’s and Moody’s, already adjust financial statements so as to estimate the impact of capitalizing operating leases. Gritta and Lippman (2010) demonstrate that for a set of U.S. airlines for the year 2008, capitalization of operating leases, by in large, had a negative impact on air carriers’ financial leverage.

The study above does note an interesting fact. While for nearly all of the airlines in the study

there was an increase in their financial riskiness, inter-firm comparisons of riskiness did not change in terms of relative rankings. The ability to make inter-firm comparisons and the articulation of financial leverage as a strategic instrument subject to managerial discretion are at the heart of the present study.

FOCUS OF THE CURRENT STUDY

The Work of Capobianco and Fernandes

Capobianco and Fernandes (2004) developed a model that presents a managerial approach for the optimization of an airline’s capital structure. Financial leverage is a strategic control variable for airlines that is managed to positively impact operating performance. Thus, in their model, financial leverage is the independent variable that determines the levels of the dependent performance variables. The dependent performance variables in their analysis are firm size, profitability, and tangibility of assets.

Firm size is computed as the natural logarithm of net sales. In an efficiently managed firm, increases in financial leverage should be associated with the acquisition of assets that increase growth and profits. Additionally, Capobianco and Fernandes (2004) argue that large companies have more sources of capital and are more diversified. Therefore, they display a lower probability of bankruptcy than their smaller counterparts. The low expected costs of bankruptcy facilitate greater levels of financial leverage. Thus, for firms managing their probability of bankruptcy, an increase in financial leverage should be associated with an increase in size.

Profitability is computed as the ratio of net income to total assets, or ROA. Basically, what is being represented here is the relationship between financial leverage and the return on equity (ROE). The relationship between ROA and ROE can be illustrated by means of the DuPont decomposition: $ROE = \text{Profits/Sales} \times \text{Sales/Assets} \times \text{Assets/Equity}$. ROA is the first two components of the DuPont decomposition

because $ROA = \text{Profits/Sales} \times \text{Sales/Assets} = \text{Profits/Assets}$. return on equity measures the rate of return on the ownership interest (shareholders' equity) of common stockholders. Therefore, it shows how well a company uses investment funds to generate earnings growth. Return on assets shows how profitable a company's assets are in generating revenue. return on equity measures the rate of return on the ownership interest (shareholders' equity) of common stockholders. Therefore, it shows how well a company uses investment funds to generate earnings growth. Return on assets shows how profitable a company's assets are in generating revenue. return on equity measures the rate of return on the ownership interest (shareholders' equity) of common stockholders. Therefore, it shows how well a company uses investment funds to generate earnings growth. Return on assets shows how profitable a company's assets are in generating revenue. Similar to Myers and Majluf (1984), Capobianco and Fernandes (2004) hypothesize that profitable firms prefer not to raise debt levels by means of internal funding. Additionally, Jensen (1986) notes that the use of debt (as opposed to equity) reduces the agency costs of free cash flow by reducing the cash flow available for spending at the discretion of managers. Therefore, the third term in the DuPont decomposition will increase. Thus, as above, for firms who use financial leverage to acquire assets to increase growth and profits, one should observe that as financial leverage increases so too should ROA and ROE increase.

Finally, "tangibility" is the ratio of fixed to total assets. This ratio is a proxy for operating leverage. Profitable firms will manage their total risk position as represented by the sum of financial and operating leverage. As financial

leverage increases, it is expected that profitable firms will attempt to reduce operating leverage. Capobianco and Fernandes (2004) utilize the inverse of the ratio for tangibility (tangibility^{-1}). Therefore, as financial leverage increases, this inverse ratio will increase.

Capobianco and Fernandes (2004) investigate inter-firm efficiencies in the management of financial leverage by means of data envelopment analysis. They utilize an eclectic sample of airlines, U.S. and international, passenger and cargo. Their pooled sample spanned the years 1993 to 1997 and initially included yearly observations for 53 companies from 32 countries. Not all companies had data for all five years. Companies that displayed negative ROA and negative stockholder equity were eliminated. Additional companies were eliminated if they displayed values for the model variables that were individually greater than three standard deviations above the average for that particular variable.

In addition to the inclusion of non-passenger airlines such as Federal Express, differences in accounting standards across countries make inter-firm comparisons difficult. Capobianco and Fernandes (2004) note that, where the financial reports of international airlines disclosed original accounting entries, they attempted to reconstruct a template that reflects a single set of accounting principles. This was done, as much as possible, in accordance with the standards set forth by the International Accounting Standard Committee and those set forth by the International Transport Association with regard to specific topics that affect the airline industry.

After generating efficiency scores from the data envelopment analysis, Capobianco and Fernandes (2004) examine the relationship between these scores and airlines' rankings on each of the analysis variables in their model. More specifically, they observe the movement of airlines over the five year period with regard to combinations of indebtedness and return on

assets and relate these movements to airlines' efficiency scores.

The Current Study

The model developed by Capobianco and Fernandes (2004) is important in that it provides a proactive managerial context for the strategic management of financial leverage. It is based on an extensive analysis of the finance literature. The relationships between the dependent variables of firm size, profitability, and tangibility and the independent variable of financial leverage are drawn from the Static Trade-Off Model, the Pecking Order Hypothesis and the Agency Cost Model. The authors provide a detailed summary of this literature to provide transparency to the inter-variable relationships that they adopt in their analysis.

This study extends their analysis by re-examining inter-firm efficiencies when directly accounting for operating leases. This is more than a simple academic exercise. As seen in Table 1, for the year 2008, the midpoint of the current study, many airlines had a significant proportion of aircraft financed using operating

leases. As these kinds of leases are treated as off-balance sheet items, it is not immediately obvious, under current accounting rules, what the true efficacy of financial leverage strategies being practiced by airlines really is. Again, as noted above, this is an ongoing concern of both the FASB and IASB.

Interestingly, Capobianco and Fernandes (2004) mention leasing issues in passing, but implicitly recognize capital leases but not the potential impact of operating leases when they assert:

“Yet it is possible to lease rather than purchase airplanes in the aviation industry, which would have an impact on operating costs and not on assets. Despite the apparent paradox, our tests concern efficiency and do not include a dependence relation between variables” (pp. 426-427).

This study explicitly capitalizes operating leases to the balance sheet. It then uses the DEA model of Capobianco and Fernandes to demonstrate that a failure to capitalize operating leases can

TABLE 1
PERCENTAGE OF AIRCRAFT UNDER OPERATING LEASES - 2008

AIRLINE	% UNDER OPERATING LEASES
AIRTRAN	73.53
ALASKA	35.04
ALLEGiant	4.65
CONTINENTAL	56.83
DELTA	18.97
FRONTIER	70.59
HAWAIIAN	66.67
JETBLUE	38.46
REPUBLIC	30.00
SKYWEST	74.38
SOUTHWEST	16.40
UNITED	36.83

cause a significant distortion in the measurement of inter-firm efficiencies and therefore does not accurately capture the skill of managers in utilizing financial leverage as a strategic tool.

METHODOLOGY

Data Sample

An initial sample of 13 U.S. airlines was utilized in this study. The time period over which the sample was drawn and pooled was 2006-2010. The pooling process was done across the years in the sample and across observations both unadjusted and adjusted for the capitalization of operating leases. The sample was restricted to U.S. airlines to avoid the accounting problems encountered by Capobianco and Fernandes (2004) with regard to differences in countries' internal reporting rules. The sample was also restricted to passenger airlines. American Airlines was not in the sample because for four of the five years of the study it reported negative stockholders' equity. To be included in the pooled sample, an airline had to have the necessary data for at least two of the five years.

Using this criterion, USAir was eliminated after an outlier analysis was performed.

Capobianco and Fernandes (2004) identify outliers by examining each of the DEA variables individually and eliminating those observations where a particular variable is greater than three standard deviations from the mean of that variable. In this study the Mahalanobis D^2 measure was utilized to perform a multivariate detection of outliers, as outlined in Hair, Black, Babin, Anderson, and Tatham (2006). This measure is a multidimensional assessment of each observation across a set of variables *simultaneously*. The Mahalanobis D^2 measure evaluates each observation's distance in multidimensional space from the mean center of all observations. The D^2 measure divided by the number of variables under consideration is approximately distributed as a t-value. An extremely conservative approach was taken with a threshold value of 3.00 ($p = .005$) being used. The airlines in the final dataset are listed in Table 2.

TABLE 2
AIRLINES IN POOLED SAMPLE

AIRLINE	Years
AIRTRAN	2006, 2007, 2008, 2009, 2010
ALASKA	2006, 2007, 2008, 2009, 2010
ALLEGiant	2006, 2007, 2008, 2010
CONTINENTAL	2006, 2007, 2009, 2010
DELTA	2007, 2010
FRONTIER	2006, 2007, 2008
HAWAIIAN	2006, 2007, 2008, 2009, 2010
JETBLUE	2006, 2007, 2008, 2009, 2010
REPUBLIC	2006, 2007, 2008, 2009, 2010
SKYWEST	2006, 2007, 2008, 2009, 2010
SOUTHWEST	2006, 2007, 2008, 2009, 2010
UNITED	2006, 2007

DEA Model Utilized

As in the study by Capobianco and Fernandes (2004), the input-oriented BCC data envelopment analysis model with variable returns to scale was utilized. The details of this model are provided in Appendix 1. The BCC model also provides the researcher an advantage in terms of admissible data. Capobianco and Fernandes eliminated those observations which displayed negative ROA. This followed from the fact that, in general, the utilization of DEA requires that input and output variables be greater than zero. However, as summarized in Bowlin (1998), Ali and Seiford (1990) and Pastor (1996) have demonstrated that, for a variable that is not positive, an affine displacement does not alter the efficient frontier. Thus, certain formulations of the DEA model - the additive model for both inputs and outputs and the BCC model for outputs - are translation invariant. Therefore, in this study, a positive amount was added to the negative values of ROA. It is required that the same adjustment must be made to ROA values for all firms in the dataset in order to not alter the efficiency frontier. As an aside, it might be asked as to why the additive model was not utilized which would have, in theory, allowed for the inclusion of observations with negative financial leverage values because of negative stockholder equity. However, the construction of the financial leverage variable does not allow for the utilization of a single, linear affine displacement. Additionally, the additive model does not lend itself to the same straightforward interpretation of results to which the BCC model does.

CAPITALIZATION METHODOLOGY FOR OPERATING LEASES

Expanding on the discussion above, a survey of the methodologies used by credit rating agencies to capitalize operating leases revealed two basic approaches – the first as utilized by Moody's and the second as utilized by Standard & Poor's (see Berman, 2007 and Standard & Poor's 2005 and 2008). Moody's employs the so-called factor method. A multiple of current rent expense is

used to capitalize operating lease obligations. This approach is meant to capture the purchase of the whole asset as opposed to the present value of contractual obligations. The notion here is that to sustain cash flow, the firm must have the asset or some replacement thereof. The multiple utilized varies by industry sector with multiples being limited to 5x, 6x, and 8x rent expense. Airlines have the highest multiple reflecting the long economic life of assets employed.

Standard & Poor's utilizes an approach that capitalizes operating leases by calculating the present value of reported minimum lease commitments that appear in the notes of a firm's financial statements. Unlike the Moody's approach, here the objective is to capture the discounted value of future payment obligations and not to recognize the whole asset associated with the lease as though it was actually owned by the firm. This methodology, the one used in this study, is illustrated in Appendix 2. Notice that the discount rate employed is based on an estimate of the firm's actual borrowing costs and hence will be a function of inter-year changes in borrowing costs. Finally, Standard and Poor's, in reflecting on the factor method employed by Moody's suggests that:

“The factor methods use multiples of annual expense to estimate the asset value - typically in a crude or arbitrary fashion. Also, while incorporating the equivalent of owning the entire asset, these methodologies lack the ability to differentiate between the first year of the asset's life, the last year, and all points in between. (An asset actually purchased would be depreciated over its life.) And, by putting leasing and ownership on a supposed “apples-to-apples” basis, they gloss over the potential flexibility associated with leasing only part of an asset's economic life.” (Standard and Poor's, 2005, p. 5)

The means and standard deviations for the unadjusted and adjusted (capitalization of operating leases) are reported in Table 3.

RESULTS OF THE ANALYSIS

The data envelopment analysis was performed via the Efficiency Measurement System (EMS), version 1.3 which is authored by Dr. Holger Scheel of the University of Dortmund. Mean normalization was utilized to make sure the data was of the same or similar magnitude within the data set. The process to mean normalize is taken in two simple steps. The first step is to find the mean of the data set for each input and output. The second step is to divide each input or output by the mean for that specific factor.

Table 4 shows that when unadjusted and adjusted observations were pooled over time, the adjusted observations consistently displayed worse values for operating efficiency, i.e., lower values of θ . In the context of the input-oriented BCC model, $1/\theta$ represents the percent reduction in the input (financial leverage) necessary to move a particular observation to the efficient frontier. An observation is efficient if $\theta = 1$.

These results are interesting, but the real question is whether on average the differences in θ are statistically significant and even more

important is whether these differences are of significant magnitude. To address this issue a t-test of means for a paired two-sample was performed. The expected statistically significant difference in means was found. More importantly, the percentage difference in means ($\theta = 0.5624$ versus $\theta = 0.3882$) was 44.87 percent.

The changes observed in financial leverage efficiency, as captured by θ , is a function of two factors. The first is the relative change due to the capitalization of operating leases to the balance sheet - unadjusted versus adjusted observations. This accounts for part of the shift in θ . The second is a magnification effect. This magnification effect is due to differences in the intensity of use of operating leases. We measure this intensity by the percentage of operating leases relative to total adjusted assets where total adjusted assets include operating leases (OPL/TA). Thus, the second factor is the relative change between unadjusted and adjusted observations and within the adjusted group of observations themselves.

This latter factor is explored in tables 6 and 7. The values for θ (from lowest to highest) were divided into quartiles. Table 6 displays the movement of airlines between worst and best quartile values for θ and their associated values

TABLE 3
MEANS AND STANDARD DEVIATIONS OF VARIABLES

UNADJUSTED				
VARIABLE	FINANCIAL LEVERAGE	(LN) SIZE	ROA	TANGIBILITY ⁻¹
MEAN	6.918	14.936	0.049	1.787
STDEV	7.984	1.109	0.045	0.540

ADJUSTED				
VARIABLE	FINANCIAL LEVERAGE	(LN) SIZE	ROA	TANGIBILITY ⁻¹
MEAN	10.561	14.936	0.037	1.440
STDEV	12.481	1.109	0.038	0.283

TABLE 4
POOLED DEA RESULTS – UNADJUSTED AND ADJUSTED

AIRLINE	θ - UNADJUSTED	θ – ADJUSTED
AIRTRAN 2006	0.4411	0.1878
AIRTRAN 2007	0.4088	0.2030
AIRTRAN 2008	0.2264	0.1127
AIRTRAN 2009	0.4288	0.2222
AIRTRAN 2010	0.4836	0.2416
ALASKA 2006	0.4454	0.3167
ALASKA 2007	0.4424	0.3484
ALASKA 2008	0.2669	0.2181
ALASKA 2009	0.3426	0.2770
ALASKA 2010	0.4441	0.3660
ALLEGiant 2006	0.9580	0.9264
ALLEGiant 2007	1.0000	0.9180
ALLEGiant 2008	0.9795	0.9106
ALLEGiant 2010	1.0000	0.9619
CONTINENTAL 2006	0.0803	0.0409
CONTINENTAL 2007	0.6840	0.1858
CONTINENTAL 2009	0.1179	0.0651
CONTINENTAL 2010	0.6556	0.3563
DELTA 2007	1.0000	0.8452
DELTA 2010	1.0000	0.8136
FRONTIER 2006	0.4116	0.2063
FRONTIER 2007	0.3558	0.1646
FRONTIER 2008	0.2189	0.1291
HAWAIIAN 2006	0.4668	0.1093
HAWAIIAN 2007	0.7726	0.1831
HAWAIIAN 2008	0.2596	0.0575
HAWAIIAN 2009	1.0000	0.1831
HAWAIIAN 2010	0.7759	0.2829
JETBLUE 2006	0.3694	0.2818
JETBLUE 2007	0.3531	0.2797
JETBLUE 2008	0.4051	0.3307
JETBLUE 2009	0.4533	0.3784
JETBLUE 2010	0.4897	0.4079
REPUBLIC 2006	0.3813	0.2798
REPUBLIC 2007	0.2745	0.2059
REPUBLIC 2008	0.2658	0.2129
REPUBLIC 2009	0.2122	0.1609
REPUBLIC 2010	0.2660	0.2028
SKYWEST 2006	0.6069	0.3733

TABLE 4 (Continued)
POOLED DEA RESULTS – UNADJUSTED AND ADJUSTED

AIRLINE	θ - UNADJUSTED	θ - ADJUSTED
SKYWEST 2007	0.6040	0.3846
SKYWEST 2008	0.6164	0.3954
SKYWEST 2009	0.5944	0.3860
SKYWEST 2010	0.6083	0.4033
SOUTHWEST 2006	1.0000	0.8829
SOUTHWEST 2007	0.9279	0.8241
SOUTHWEST 2008	0.8140	0.7275
SOUTHWEST 2009	0.8677	0.7551
SOUTHWEST 2010	1.0000	0.8807
UNITED 2006	0.3442	0.2551
UNITED 2007	1.0000	0.5701
MEAN	0.5624	0.3882

TABLE 5
T-TEST: PAIRED TWO SAMPLE FOR MEANS (θ)

	UNADJUSTED	ADJUSTED	% DIFF
MEAN	0.5624	0.3882	44.87%
VARIANCE	0.0802	0.0750	
OBSERVATIONS	50	50	
PEARSON CORRELATION	0.8408		
HYPOTHESIZED MEAN DIFFERENCE	0		
DF	49		
T STAT	7.824		
P(T d" t) ONE-TAIL	1.7749E-10		
T CRITICAL ONE-TAIL	1.6766		
P(T d" t) TWO-TAIL	3.5498E-10		
T CRITICAL TWO-TAIL	2.0096		

TABLE 6
UNADJUSTED AND ADJUSTED QUANTILES/ OPERATING LEASES AS A PERCENTAGE
OF TOTAL ADJUSTED ASSEST (RANK)

Quartile 1: 0.0409 d'' $\theta < 0.2484$

Quartile 2: 0.2484 d'' $\theta < 0.3853$

Quartile 3: 0.3853 d'' $\theta < 0.7413$

Quartile 4: 0.7413 d'' $\theta \geq 1.000$

AIRLINE	θ - UNADJ	QUART	θ - ADJ	QUART	OL/TA	RANKOL/TA
AIRTRAN 2006	0.4411	3	0.1878	1	57.41%	1
AIRTRAN 2007	0.4088	3	0.2030	1	50.34%	3
AIRTRAN 2008	0.2264	1	0.1127	1	50.03%	4
AIRTRAN 2009	0.4288	3	0.2222	1	46.16%	9
AIRTRAN 2010	0.4836	3	0.2416	1	48.48%	7
ALASKA 2006	0.4454	3	0.3167	2	24.54%	27
ALASKA 2007	0.4424	3	0.3484	2	21.26%	31
ALASKA 2008	0.2669	2	0.2181	1	18.15%	37
ALASKA 2009	0.3426	2	0.2770	2	18.19%	36
ALASKA 2010	0.4441	3	0.3660	2	15.00%	41
ALLEGiant 2006	0.9580	4	0.9264	4	1.86%	50
ALLEGiant 2007	1.0000	4	0.9180	4	4.70%	47
ALLEGiant 2008	0.9795	4	0.9106	4	4.52%	48
ALLEGiant 2010	1.0000	4	0.9619	4	3.81%	49
CONTINENTAL 2006	0.0803	1	0.0409	1	48.91%	6
CONTINENTAL 2007	0.6840	3	0.1858	1	46.95%	8
CONTINENTAL 2009	0.1179	1	0.0651	1	44.54%	10
CONTINENTAL 2010	0.6556	3	0.3563	2	38.54%	14
DELTA 2007	1.0000	4	0.8452	4	15.48%	40
DELTA 2010	1.0000	4	0.8136	4	18.64%	34
FRONTIER 2006	0.4116	3	0.2063	1	49.88%	5
FRONTIER 2007	0.3558	2	0.1646	1	53.73%	2
FRONTIER 2008	0.2189	1	0.1291	1	41.01%	12
HAWAIIAN 2006	0.4668	3	0.1093	1	38.01%	16
HAWAIIAN 2007	0.7726	4	0.1831	1	35.19%	20
HAWAIIAN 2008	0.2596	2	0.0575	1	43.60%	11
HAWAIIAN 2009	1.0000	4	0.1831	1	39.64%	13
HAWAIIAN 2010	0.7759	4	0.2829	2	36.38%	17
JETBLUE 2006	0.3694	2	0.2818	2	23.72%	30
JETBLUE 2007	0.3531	2	0.2797	2	20.79%	32
JETBLUE 2008	0.4051	3	0.3307	2	18.38%	38
JETBLUE 2009	0.4533	3	0.3784	2	16.52%	39
JETBLUE 2010	0.4897	3	0.4079	3	16.71%	38

TABLE 6 (Continued)
POOLED DEA RESULTS – UNADJUSTED AND ADJUSTED

AIRLINE	θ - UNADJ	QUART	θ – ADJ	QUART	OL/TA	RANKOL/TA
REPUBLIC 2006	0.3813	2	0.2798	2	26.63%	23
REPUBLIC 2007	0.2745	2	0.2059	1	24.99%	26
REPUBLIC 2008	0.2658	2	0.2129	1	19.90%	33
REPUBLIC 2009	0.2122	1	0.1609	1	24.18%	28
REPUBLIC 2010	0.2660	2	0.2028	1	23.78%	29
SKYWEST 2006	0.6069	3	0.3733	2	38.50%	15
SKYWEST 2007	0.6040	3	0.3846	2	36.33%	18
SKYWEST 2008	0.6164	3	0.3954	3	35.85%	19
SKYWEST 2009	0.5944	3	0.3860	3	35.07%	21
SKYWEST 2010	0.6083	3	0.4033	3	33.71%	22
SOUTHWEST 2006	1.0000	4	0.8829	4	11.71%	44
SOUTHWEST 2007	0.9279	4	0.8241	4	9.79%	46
SOUTHWEST 2008	0.8140	4	0.7275	3	10.62%	45
SOUTHWEST 2009	0.8677	4	0.7551	4	12.97%	42
SOUTHWEST 2010	1.0000	4	0.8807	4	11.93%	43
UNITED 2006	0.3442	2	0.2551	2	25.89%	24
UNITED 2007	1.0000	4	0.5701	3	25.66%	25

of operating leases as a percentage of total adjusted assets. Table 7 displays the Pearson correlation coefficients between the values of OPL/TA and the difference between the unadjusted value for θ and the adjusted value for θ (DIFF) as well as the absolute value of the percentage difference between the unadjusted value for θ and the adjusted value for θ (PDIFF). In both cases, the correlation is statistically significant at the .01 level.

These relationships are explored in more detail in another manner in Table 8.

The values of OPL/TA across the total sample (from lowest to highest) were divided into quartiles. To investigate the statistical significance of the differences in DIFF and PDIFF between the quartiles, the Tukey-Kramer method (Tukey 1953, Kramer 1956) was utilized. The original Tukey test (1952) was designed specifically for pair-wise comparisons based on the studentized range ratio (see formula

below) and controls the maximum experiment-wise error rate (MEER) when the sample sizes are equal. Tukey (1953) and Kramer (1956) independently proposed a modification for unequal cell sizes and it is the Tukey-Kramer method that was used in this study. Hayter (1984) provided proof that the Tukey-Kramer procedure controls the MEER and it has also fared well in Monte Carlo studies (Dunnnett 1980). Specifically, for two groups y_i and y_j , with n_i and n_j observations in each group respectively and s being the root mean square error based on i degrees of freedom, their means $\bar{y}_i$ and $\bar{y}_j$ are considered significantly different by the Tukey-Kramer criterion if:

$$|\bar{y}_i - \bar{y}_j| / s \sqrt{(1/n_i + 1/n_j)/2} \geq q(\alpha; \kappa, \nu)$$

where $q(\alpha; \hat{e}, i)$ is the α -level critical value of a studentized range distribution of $\hat{e}$ independent normal random variables with i degrees of freedom. The software utilized is the GLM (General Linear Model) procedure in the SAS (2002) statistical package, which calculates

TABLE 7
PEARSON CORRELATION COEFFICIENTS

	DIFF	PDIFF	OPL/TA
DIFF	1.0000***		
PDIFF	-0.7679***	1.0000***	
OPL/TA	0.4443***	-0.8470***	1.0000***

***: Significant at the .01 level

DIFF = Difference between the unadjusted value for θ and the adjusted value for θ

PDIFF = Percentage difference between the unadjusted value for θ and the adjusted value for θ

OPL/TA = Operating leases as a percentage of total adjusted assets

TABLE 8
TUKEY STUDENTIZED RANGE TESTS BY QUANTILES FOR OPL/TA

Quartile 1: 0.0186 d" OL/TA < 0.1671

Quartile 2: 0.1671 d" OL/TA < 0.2533

Quartile 3: 0.2533 d" OL/TA < 0.3964

Quartile 4: 0.3964 d" OL/TA d" 0.5741

QUANTILE COMPARISON VARIABLE: DIFF	DIFFERENCE IN MEANS	
1 versus 2	0.0062	
1 versus 3	-0.1983	**
1 versus 4	-0.1508	**
2 versus 3	-0.2044	**
2 versus 4	-0.1570	**
3 versus 4	0.0475	

** : Statistically significant at the .05 level

QUANTILE COMPARISON VARIABLE: PDIFF	DIFFERENCE IN MEANS	
1 versus 2	-0.1057	
1 versus 3	-0.3389	**
1 versus 4	-0.4506	**
2 versus 3	-0.2332	**
2 versus 4	-0.3450	**
3 versus 4	-0.1118	

** : Statistically significant at the .05 level

significance for the Tukey-Kramer statistic at the 5% level. As can be seen in table 8, the differences in the mean values of DIFF and PDIFF for all of the non-adjacent quartiles (1 versus 3 and 4, 2 versus 3 and 4) are statistically significant at the .05 level.

CONCLUSION

The model developed by Capobianco and Fernandes (2004) describes the strategic decision process on the part of managers with regard to an airline's chosen capital structure. The framework chosen draws upon the substantial finance literature pertaining to the optimization of said capital structure. Furthermore, the efficacy of a given manager's strategic decisions with regard to the nature and sources of capital for a given airline can be benchmarked against those of peer airlines. This is done by means of data envelopment analysis.

However, this study demonstrates that any such benchmarking results that are generated need to be called into question when operating leases are "hidden" by not capitalizing them to the balance sheet. This is a source of ongoing debate for both the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB). The variables that are central to the Capbianco and Fernandes model are compromised when operating leases are not capitalized to the balance sheet because both the operating and net income of the firm will be lowered, the debt and capital for the firm will be understated, and the return on equity and capital will be much higher (Damodaran, 2006, pp. 86-88).

Thus, not capitalizing operating leases to the balance sheet creates significant distortions in the perceptions and assessment of the abilities of managers to utilize financial leverage to make investments that enhance firm profitability. This is very much noted by Standard & Poor's (2008, pp. 22-23) who note that:

"...We view the accounting distinction between operating and capital leases as substantially artificial. In both cases the lessee contracts for the use of an asset, entering into a debt-like obligation to make periodic rental payments..."

They further add with regard to their own adjustment methodology:

"...The operating-lease-adjustment model is intended to bring companies' financial ratios closer to the underlying economics and more comparable, by taking into consideration all financial obligations incurred, whether on or off balance sheet. The model improves our analysis of how profitably a company employs its leased and owned assets..."

This then is the underlying rationale that motivates the empirical investigation undertaken in this paper. The results suggest an approach to better understanding the economic consequences of managerial behavior as it relates to the efficacy of financial leverage strategies.

REFERENCES

- Berman, Mindy (2007), "Capitalization of Operating Leases by Credit Rating Agencies," *Financial Watch*, February, 12-18.
- Bowlin, William F. (1998), "Measuring Performance: An Introduction to Data Envelopment Analysis (DEA)," *Journal of Cost Analysis*, 15(2): 3-27.
- Capobianco, Heloisa Marcia Pires, and Fernandes, Elton (2004), "Capital Structure in the World Airline Industry," *Transportation Research A*, 38(6): 421-434.
- Damodaran, Aswath (2006), *Damodaran on Valuation: Security Analysis for Investment and Corporate Finance*, Hoboken, NJ: John Wiley & Sons.

- Dunnett, Charles W. (1980), "Pairwise Multiple Comparisons in the Homogeneous Variance, Unequal Sample Size Case," *Journal of the American Statistical Association*, 75(372): 789-795.
- Ezzell, John R., and Vora, Premal P. (2001), "Leasing versus Purchasing: Direct Evidence on a Corporation's Motivations for Leasing and Consequences of Leasing," *The Quarterly Review of Economics and Finance*, 41(1): 33-47.
- Gritta, Richard D. (1974), "The impact of the Capitalization of Leases on Financial Analysis," *Financial Analysts' Journal*, 30(2): 47-52.
- Gritta, Richard D., Chow, Garland, and Lippman, Ellen (1994), "The Impact of the Capitalization of Leases on Financial Analysis: An Issue Revisited," *Logistics and Transportation Review*, 30(2): 189-202.
- Gritta, Richard D., and Lippman, Ellen (2010), "Aircraft Leasing and Its Burden on Air Carriers Debt Burdens: A Comparison over the Past Several Decades," *Journal of the Transportation Research Forum*, 49(3): 101-110.
- Hair, Joseph F., Black, William, Babin, Barry J., Anderson, Ralph E., and Tatham, Ronald L. (2006), *Multivariate Data Analysis*, Saddle River, NJ: Pearson Prentice Hall.
- Hayter, Anthony J. (1984), "A Proof of the Conjecture that the Tukey-Kramer Method is Conservative," *The Annals of Statistics*, 12(1): 61-75.
- Iqbal Ali, Agha, and Seiford, Lawrence M. (1990), "Translation Invariance in Data Envelopment Analysis," *Operations Research Letters* 9(6): 403-405.
- Jensen, Michael C. (1986), "Agency Costs of Free Cash Flow, Corporate Finance and Takeovers," *American Economic Review*, 76(2): 323-339.
- Kramer, Clyde Young (1956), "Extension of Multiple Range Tests to Group Means with Unequal Numbers of Replications," *Biometrics*, 12(3): 307-310.
- Lewellen, Wilbur G., Long, Michael S. and McConnell, John J. (1976), "Asset Leasing in Competitive Capital Markets," *The Journal of Finance*, 31(3): 787-798.
- Myers, Stewart C., and Majluf, Nicholas S. (1984) "Corporate Financing and Investments Decisions when Firms Have Information that Investors Do Not Have," *Journal of Financial Economics*, 13(2): 187-221.
- Park, Sang-Bum, Park, Jin-Woo, Hossan, Mohammad Akter (2009), "Investigating the Effects of Financial Benefits of Operating Leases on Air Carriers' Profits," *Journal of Air Law and Commerce*, 74(1): 55-69.
- Pastor, Jesús T. (1996), "Translation Invariance in DEA: A Generalization," *Annals of Operations Research*, 66(2): 91-102.
- SAS Institute, Inc. (2002) *SAS/STAT User's Guide, Version 8*, Cary, NC.
- Scheel, Holger (2000), *EMS: Efficiency Measurement System, Version 1.3*, available at <http://www.wiso.uni-dortmund.de/>.
- Standard & Poor's (2005), "Corporate Ratings Criteria - Operating Analytics," *Global Credit Portal/RatingsDirect*, June 9, 1-6.
- Standard & Poor's (2008), "2008 Corporate Criteria: Ratios and Adjustments," *Global Credit Portal/RatingsDirect*, April 15, 1-44.
- Tukey, John W. (1952), "Allowances for Various Types of Error Rates," Unpublished IMS Address, Chicago: IL.
- Tukey, John W. (1953), "The Problem of Multiple Comparisons," Unpublished Manuscript.

APPENDIX 1

THE BCC INPUT-ORIENTED MODEL

$$\underset{\theta, \lambda, s^+, s^-}{\text{minimize}} \theta - \epsilon \cdot e^T s^+ - \epsilon \cdot e^T s^-$$

$$\begin{aligned} \text{subject to } & Y\lambda - s^+ = Y_0, \\ & \theta X_0 - X\lambda - s^- = 0, \\ & e^T \lambda \geq 1, \\ & \theta, s^+, s^- \geq 0. \end{aligned}$$

where X is the input vector utilized, Y is the output vector produced, ϵ represents a non-archimedean constant which is smaller than any positive real number that ensures no input or output is given a zero weight, e^T is a row vector of 1s, and s^+ and s^- are the slack vectors for outputs and inputs. θ represents the level of efficiency of the firm defined by (X_0, Y_0) . A firm is efficient if $\theta = 1$ and $s^+ = s^- = 0$. The optimal value of θ forms a composite unit outperforming the decision making unit (DMU) under consideration and provides targets for the DMU in the identification of the sources of its inefficiency.

APPENDIX 2

S&P METHODOLOGY FOR CAPITALIZATION OF OPERATING LEASES*

EXAMPLE OF ALASKA AIRLINES 2006 (000s)

		2006	2005
TOTAL REPORTED DEBT		1,150,800	1,082,600
TOTAL INTEREST (INCLUDING CAPITALIZED INTEREST)		78,000	63,000
IMPLIED INTEREST RATE		6.98%	
ACTUAL RENT EXPENSE		320,600	324,800
FUTURE MINIMUM			
LEASE COMMITMENTS	2007	246,800	
	2008	237,300	
	2009	218,200	
	2010	207,700	
	2011	177,400	
	THEREAFTER	680,600	
	TOTAL LEASE OBLIGATIONS	1,768,000	
S&P - PRESENT VALUE OF LEASE COMMITMENTS		1,326,229	
TOTAL REPORTED DEBT AND CAPITALIZED LEASES		2,477,029	

*To compute the present value of the lease obligations, a judgment is made with regard to the lump sum commitment in year 6. Based on the average annual lease commitment over the first 5 years (\$217,480) an annuity of 3 years is arrived at $(\$680,600/217,480) = 3.13$ or 3 using the integer component (Damodaran, 2006).

All data is taken from the relevant 10-K reports.

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AN EXAMINATION OF ETHICAL STANDARDS AND BEHAVIORS IN TRANSPORTATION BROKERAGE

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ABSTRACT

The manuscript examines individual ethical decision making for common scenarios faced by transportation brokers, including unauthorized double brokering, booking and bouncing, and a failure to disclose all terms to a shipper. The results indicate significant discrepancies between what actions a broker would engage, what brokers perceive that others in the same industry would do, and what industry leaders perceive to be ethical.

INTRODUCTION

One of the challenges for companies in the field of transportation brokerage is to identify bases for differentiating brokerage services. Ethical conduct by transportation brokerage firms can serve as a basis of differentiation for carriers and shippers who place value on building viable relationships, as opposed to focusing on executing individual freight transactions. Schniederjans and Schniederjans (2008) have noted a negative effect on business performance when perceptions of ethical values and trust are low between supply chain members. Transferring these findings to the transportation brokerage industry, it is suggested that when perceptions of ethical values and trust are low, shipper and carrier development/retention would also be low.

A popular framework for understanding ethical decision making in marketing is the Contingency Framework (Ferrell and Gresham, 1985) which posits that the ethics of individual decision making are a function of three primary contingencies: *individual factors* (knowledge, value, attitudes, and intentions), *organizational factors* (peers and members of disparate social groups), and *opportunity* (professional codes, corporate policy, and rewards/ punishment), and is the most cited approach to marketing ethics

during the past fifty years (Schlegelmilch and Oberseder, 2010). The Ferrell and Gresham contingency framework indicates that the combination of individual factors, organizational factors, and opportunity interact to trigger decision making, with feedback to the decisions reinforcing/altering future decisions.

The adapted contingency framework suggests that it is the interaction of individual, organizational, and opportunity factors that guide ethical decision making for a transportation broker. This is inconsistent, however, with a commonly cited belief within transportation brokerage that says, "if you want ethical behavior, hire ethical employees" (Drea and Drea 2010). Since ethics is a code/pattern of behavior determined by an entity (a society, a company, an individual, etc.) to be ethical, what is judged as ethical is often context-specific, with considerable variation from individual to individual and from company to company. This context-specific view would explain why some brokers view a behavior as ethical, yet others view the same behavior as unethical.

Ethical standards across cultures often show considerable variation (Pitta, Fung, and Isberg, 1999). Rules used to judge whether a behavior is ethical vary considerably, ranging from utilitarian approaches that apply a hedonic

Figure 1: Contingency Framework of Transportation Broker Ethics

(Adapted from Ferrell and Gresham 1985)

calculus to assess which activity provides the greatest good, to deontological approaches that empathize adherence to accepted rules independent of consequences, to ethical egoism in which individuals are responsible for their own happiness and not beholden to others.

The field of transportation brokerage provides an ethical environment that is distinct from other aspects of supply chain management. Discussions of supply chain ethics frequently focus on areas such as the environmental effects of SCM decisions, health and safety issues, and consumer rights (Zaman, 2006). These are ethical issues that extend outside of a supply chain to produce tangible effects on stakeholder groups. For example, using child labor to produce clothing in Indonesia, or having a manufacturing process that produces legal but toxic environmental effects over the long term are visible actions to stakeholder groups from outside the organization and may have

potentially severe financial consequences for the organization. Stated differently, there is likely to be little public pressure brought to bear on an organization which drops one truck load in order to move a more profitable truck load, but the public pressure is likely to be greater when risks to public health and safety are apparent.

For many transportation brokerage firms, decisions involving the movement of freight have historically focused on compliance with a myriad of federal, state, and international laws and regulations, rather than on accepted industry standards. Ethical standards often differ between freight brokerage companies, and the industry is replete with stories of carriers who agree to move loads but cancel when a higher paying load becomes available, or 3PLs who cancel an agreement with a carrier when they find a cheaper truck ("booking and bouncing"), unauthorized re-brokering of loads, or brokers who do not inform shippers of the ramifications

of an underinsured load. In response to such ethical issues, increased scrutiny of ethical decision making has occurred within the freight brokerage industry. Industry groups such as the Institute for Supply Management (ISM 2012) and Transportation Intermediaries Association (TIA 2012) maintain ethics codes to which their members must adhere, and both organizations provide online training to support ethics education within the industry.

The practical challenge is: what should a brokerage manager do to improve ethical behavior among employees? The contingency framework suggests that efforts to improve brokerage ethics need to include hiring ethical employees, running effective ethics training programs, and establishing/enforcing a code of ethics; and that success is likely if all three actions are undertaken in a coordinated manner, while efforts that focus only on one area are unlikely to produce optimal results.

METHODOLOGY

Data collection involved a two-step process: a primary survey of transportation brokerage personnel, followed by a “jury of executive opinion” survey of senior transportation brokerage executives.

Survey

An e-mail was sent to 3,892 broker and sales personnel in the transportation brokerage industry. The list was provided by Transportation Intermediaries Association, a trade association serving the 3PL industry. The e-mail contained an invitation to participate and a link to an online survey. Only individuals in operations (dispatch) and sales positions were contacted, and only one submission was accepted from each IP address. A total of 386 responses were obtained for a response rate of 9.92%.

Participants were presented with scenarios covering six ethical issues confronting brokers:

- unauthorized re-brokering,

- unauthorized double brokering,
- loads held hostage,
- booking and bouncing by a broker,
- booking and bouncing by a carrier, and
- failure to disclose all terms in a transaction.

These scenarios were developed by the authors based on several years of experience within the transportation brokerage field and reviewed by a third party logistics trade association representative. Data was also collected regarding the size of the company (based on sales), years of experience in the current position and in the transportation brokerage industry, and gender.

Jury of Executive Opinion

The jury of executive opinion is a marketing research technique used to identify if an idea or concept is germane to a research study. The basic model seeks the opinions of a small group of high level experienced managers within a specific field. It is a qualitative (opinion-based) tool that incorporates judgmental and subjective factors into an assessment (Green and Tull, 1978). Nineteen TIA member Presidents/CEOs were contacted to participate on the jury, and seventeen executives chose to participate (response rate of 89%.) The jury of 3PL executives was selected from members of the Transportation Intermediaries Association. Jury participants were highly experienced executives (average industry experience = 27.4 years) with the job titles of Presidents, CEOs, COOs, EVPs, and VPs covering brokerage operations (see Table 1). Jury respondents evaluated the response categories for each of the six ethical scenarios that had been presented to the main study sample. The task of the jury was to determine whether each response category was (in their judgment) ethical or unethical.

TABLE 1
JURY OF EXECUTIVE OPINION, POSITIONS HELD

Position	Number of Jury Participants	%
President/CEO	11	65%
Chief Operating Officer	2	12%
Executive Vice President	3	17%
Vice President	1	6%
Total	17	100%

RESULTS

In the main survey, each broker respondent was asked to read six ethical scenarios (listed below). Brokers were asked to choose an action for each scenario, and to indicate which action he/she believed others in the brokerage industry would choose. In the jury of executive opinion, brokerage executives were asked to evaluate whether each of the alternative actions were ethical.

SCENARIO #1: UNAUTHORIZED RE-BROKERING					
ABC Brokerage is looking to move loads for a shipper between Chicago and Atlanta. ABC Brokerage tenders the loads to XYZ Trucking because of its outstanding safety record. XYZ Trucking accepts the loads, but they do not have the capacity to move the loads, so they re-broker the load to Tovey Logistics, who finds another trucking company with a lower price and a weaker safety record to handle the loads. If the contract between XYZ Trucking and ABC Brokerage does not specifically prohibit re-brokering, is XYZ Trucking's action to re-broker the load unethical?					
Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is the action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Re-broker the load to Tovey Logistics and say nothing.	6	1.7%	236	63.1%	Unethical (82%)
Re-broker the load to Tovey Logistics and inform ABC Brokerage after.	1	0.3%	19	5.1%	Ethical (82%)
Contact ABC Brokerage and ask for permission to re-broker the load.	185	47.9	39	10.4%	Ethical (94%)
Contact ABC Brokerage and cancel the load due to lack of capacity.	156	40.4	80	21.4	Ethical (100%)

There was agreement between transportation brokers and the jury of brokerage executives that unauthorized re-brokering without informing the shipper is unethical. Nearly all brokers indicated that if a trucking company does not have the ability to move an accepted load, the trucking company should inform the original broker.

SCENARIO #2: UNAUTHORIZED DOUBLE BROKERING					
Taylorville Manufacturing Inc. has ten loads per month to move between Minneapolis and St. Louis. TMI tenders the loads to Tim Wise with Tovey Logistics, based on Tovey's past record of excellent service and carrier capacity in other lanes. However, Tim is unable to find a carrier for TMI's loads in the Minneapolis to St. Louis lane. The reason Tim is unable to find a carrier in this lane is due to his company's tough standards for qualifying carriers (virtually no dropped loads, on-time, excellent safety records.) As a result, Tim wants to double-broker TMI's first few loads in this lane with a friend of his at Transbreakit Logistics, which has much more lenient standards for qualifying carriers and as a result, has carriers with available capacity. Tim hopes this will buy him time to find a carrier Tovey can qualify in this lane to handle TMI's loads. If the contract between TMI and Tovey Logistics does not specifically prohibit double-brokering, is Tim Wise's plan to double-broker the load unethical?					
Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Double-broker the load to Transbreakit Logistics and say nothing.	14	4.7%	216	67.7%	Ethical (65%)
Double-broker the load to Transbreakit Logistics and inform TMI after.	3	1.0%	19	6.0%	Ethical (88%)
Contact TMI and ask for permission to double-broker the load.	150	50.3%	48	15.0%	Ethical (100%)
Contact TMI and cancel the loads due to lack of capacity.	131	44.0%	36	11.3%	Ethical (100%)

Brokers utilized a higher ethical standard than industry experts in regards to unauthorized double brokering. There was a strong consensus among *brokers* that unauthorized double brokering is unethical; however, nearly 2/3 of *industry experts* disagreed (65%), indicating they would consider double-brokering without permission to be ethical. This finding may be explained by the pressure to deliver bottom line results. Carrier capacity and margin compression likely affected the responses of main study respondents.

SCENARIO #3: LOAD HELD HOSTAGE

Dan Tiffin at Pawnee Logistics has contracted with Marginal Trucking to move a load of plasma TV sets for a new shipper, and Dan hopes to make this new shipper a regular customer. Dan tendered the load to Marginal Trucking for \$1800, but while in route with the load, the driver stops, calls Dan, and says “\$1800 isn’t enough for this load. Pay me \$2100 or I’m just going to sit here with the load until you do.” Pawnee Logistics policy is not to pay for loads held hostage and to call law enforcement to get the load moving; however, Dan knows that he’ll likely lose this new shipper as a customer if he does and he’ll have to explain to his supervisor why he wasn’t more careful before selecting Marginal Trucking to move such an important load. He also knows this isn’t a major priority for law enforcement, so it may be days before anything occurs (if at all). He thinks he could pay the \$300 out of his own pocket without anyone knowing about it, and that would get the load to its destination and he would never use Marginal Trucking again. What should Dan do?

Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Do nothing at all and hope the driver is bluffing.	2	0.7%	33	11.2%	Ethical (100%)
Pay the \$300 from your own pocket directly to the driver and say nothing.	34	12.2%	85	28.9%	Unethical (94%)
Follow company policy: Contact law enforcement, and then call the shipper to explain the load is being held hostage by the trucking company you selected.	143	51.3%	85	28.9%	Ethical (100%)
Ask my supervisor for guidance in the situation.	100	35.8%	91	31.0%	Ethical (100%)

Industry experts were clear that it is unethical for a broker to pay out of his/her own pocket to get a load held hostage moving. Additionally, nearly every executive noted he/she would be shocked if an employee ever engaged in this behavior. Most brokers (81.9%) were likely to defer to a supervisor on this issue, and this action was viewed as ethical by industry experts.

SCENARIO #4: BOOKING AND BOUNCING BY A BROKER					
Donna Smith is a broker with Tovey Logistics. A shipper tenders her a load from Chicago to Pittsburgh for \$1400, and she books the load with XYZ Trucking for \$1200, thereby generating a margin of \$200. After she books the load with XYZ Trucking, Donna continues to check rates with other carriers and eventually finds another carrier, ABC Trucking, that agrees to haul the same load for \$1000. Donna is debating whether to call back XYZ Trucking and tell them her shipper has cancelled the load, then book the load with ABC Trucking and then call the shipper back and say “XYZ Trucking cancelled the truck , but don’t worry – I’ve already arranged for ABC Trucking to handle the load, and your price will remain \$1400.”					
Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Re-book the load with another carrier and make \$400 total.	18	6.0%	211	70.6%	Unethical (94%)
Do not re-book the load – stay with the original carrier and make \$200 total.	263	87.1%	72	24.1%	Ethical (94%)
Contact the shipper and ask permission to switch the load to a different carrier (but don’t tell the shipper that the new carrier is cheaper)	8	2.6%	11	3.7%	Unethical (94%)
Contact the shipper and ask permission to switch the load to a different carrier and tell the shipper why (the new carrier is cheaper)	5	1.7%	1	0.3%	Unethical (94%)
Ask my supervisor for guidance in the situation.	8	2.6%	4	1.3%	Ethical (100%)

Transportation brokers and industry experts were consistent that “booking and bouncing by brokers” is unethical. 87.1% of brokers indicated they would not re-book a load to make a larger profit, and this course of action was judged by nearly all industry experts as being ethical.

SCENARIO #5: BOOKING AND BOUNCING BY A CARRIER

Joe Torricelli is a broker for Tovey Logistics. Joe has booked a load with XYZ Trucking for \$1800. After agreeing to the price and filling up its capacity, XYZ Trucking is contacted by a broker from Pawnee Logistics who needs to move a load in the same lane and is willing to pay \$2200 - \$400 more than what Joe Torricelli and Tovey Logistics would pay. XYZ Trucking is debating about whether to cancel the load from Tovey Logistics and tell Joe “sorry, the truck broke down” or “the driver didn’t get unloaded on time” and then accept the load from Pawnee Logistics. XYZ is pretty sure Joe Torricelli will never know about the load it accepted from Pawnee that bumped his load.

Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Cancel the load from Tovey Logistics, book the load from Pawnee Logistics and make \$400 total.	32	10.8%	213	72.0%	Unethical (100%)
Do not cancel the load– stay with the load from Tovey Logistics and make \$200 total.	253	85.5%	75	25.3%	Ethical (100%)
Ask my supervisor for guidance in the situation	11	3.7%	8	2.7%	Ethical (100%)

Both brokers and industry experts were in agreement that “booking and bouncing by carriers” is unethical. All industry experts perceive booking and bouncing by carriers is unethical and only 10.8% of brokers indicated they would “book and bounce.” Brokers believe such practice is commonplace, however, as 72% believe carriers would book and bounce in order to earn a higher return on a load.

SCENARIO #6: FAILURE TO DISCLOSE ALL TERMS					
<p>Carlos Ruiz is a broker for Tovey Logistics. Carlos has been contacted by Far East Electronics (FEE), a manufacturer of discount electronic items. FEE needs to ship several loads with a value of \$180,000 per load from Long Beach, CA to Dallas during the next 30 days. Carlos knows that items being shipped are expensive and any freight can be damaged in transit, so proper insurance and safety ratings for a carrier are important. He knows he has capacity with Transbreakit Freight, a carrier with low prices and an average safety rating, but Transbreakit will only provide \$100,000 coverage for items damaged in transit. FEE is willing to pay Tovey Logistics \$2500 for each load shipped during the 30 day period. Transbreakit Freight will move each load for \$1800, while an alternative carrier with \$250,000 of coverage would cost \$2300. Carlos is wondering whether to use the lower costing Transbreakit Freight and not tell FEE about the \$100,000 coverage limit (unless they ask).</p>					
Alternatives	What would YOU do?		What do you think OTHERS in the transportation brokerage industry would do?		Is action ethical or unethical? (% of experts who believe the action is ethical or unethical)
	n	%	n	%	
Book the load with Transbreakit Freight, earn \$700 margin per load. If something happens and a damage claim is filed, tell FEE they should have requested a minimum of \$180,000 coverage.	4	1.5%	131	45.8%	Unethical (100%)
Book the load with the alternate carrier that has \$250,000 coverage and earn a \$200 per load.	222	81.3%	114	39.9%	Ethical (100%)
Contact FEE, tell them they need at least \$180,000 coverage on the load, and that they should be prepared to pay more than \$2500 (knowing this may cost you their business).	36	13.2%	31	10.8%	Unethical (100%)
Contact FEE and tell them you'll book the load with a carrier that provides only \$100,000 coverage (knowing this may cost you the loads)	11	4.0%	10	3.5%	Unethical (100%)

Industry experts were unanimous on the need to disclose all contract terms to a shipper. To industry experts, the only ethical course of action is to make sure that each load has proper insurance coverage, even if that results in a lower return for the broker. For industry executives, ethical behavior is tied directly to risk management and to developing/maintaining strong customer relationships. This also explains why all industry executives categorized an action that would potentially result in the loss of a customer (telling a customer who has agreed on a price that they should pay more for proper coverage) as unethical. The judgments of industry executives suggest they were simply avoiding risk. Failing to disclose all terms can result in lawsuits and claims.

How Ethical are Brokerage Employees?

Table 2 compares the percentages of broker decisions that were judged by the jury of executive opinion as ethical. The results indicate that the majority of decisions made by brokers would be considered to be ethical by industry executives, with over 81% of brokers choosing an alternative for each scenario that was judged to be ethical by industry.

It is worth noting that some scenarios (load held hostage, booking and bouncing, and failure to disclose all terms) had rates of unethical behavior that could be problematic for brokerage companies, especially in the scenario regarding the failure to inform shippers of all terms. Nearly one out of every five brokers (18.7%) selected chose a response for this scenario that industry executives defined as unethical. Given

that this response would also create significant potential liabilities, these results should concern brokerage companies.

Importance of Each Ethical Issue.

Overall, the most significant ethical issue as identified by transportation brokers is the potential deception of a shipper and/or broker regarding who is actually in control of the load. The two most important ethical issues facing the transportation brokerage industry were unauthorized re-brokering by a carrier and unauthorized double-brokering (Figure 2). At least one of these two variables was cited by 78.5% respondents as a “most important ethical issue” in the field of transportation brokerage. Unauthorized re-brokering by a carrier was the single most important ethical issue cited by respondents, with over two-thirds (68.1%) of

TABLE 2
ETHICAL JUDGMENTS OF BROKER ACTIONS

Scenario	% of responses judged as ETHICAL by industry executives
#1: Unauthorized re-brokering	98.3% of broker actions were judged as “ethical”
#2: Unauthorized double-brokering ¹	100% of broker actions were judged as “ethical”
#3: Load held hostage	87.8% of broker actions were judged as “ethical”
#4: Booking and bouncing by a BROKER	89.7% of broker actions were judged as “ethical”
#5: Booking and bouncing by a CARRIER	89.2% of broker actions were judged as “ethical”
#6: Failure to inform shippers of all terms	81.3% of broker actions were judged as “ethical”

¹ - All categories for unauthorized double-brokering were judged as “ethical” by transportation brokerage executives.

respondents listing unauthorized re-brokering of loads by carriers as a top issue. Unauthorized double-brokering was also identified as a critical ethical issue by over half of survey respondents (52.3%). One finding that hurts 3PL's credibility is the fact that booking and bouncing by a carrier was more than twice as likely to be cited as an ethical issue than booking and bouncing by a broker. No significant differences were noted for these variables based on the size of the company, number of years as a transportation broker, or by number of years in the industry ($\div^2$ signif. > .05). Overall, these findings show the

importance of each ethical scenario to the firms in the industry.

Brokers were asked to distinguish between what is an important ethical issue and what is a common ethical issue. While unauthorized re-brokering and unauthorized double brokering were identified as the most important ethical issues, booking and bouncing by carriers is the most common ethical issue facing the brokerage industry. Given how tight the truck market was during the time of data collection, this is an expected finding.

TABLE 3
IMPORTANCE AND FREQUENCY* OF EACH ETHICAL ISSUE
 (* How common is the ethical issue)

					95% Confidence Interval for Mean	
Rank	How Important? (7=very important, 1=unimportant)	Mean	SD	N	Lower Bound	Upper Bound
1	Is unauthorized re-brokering an important issue?	6.47	1.111	312	6.34	6.59
2	Is unauthorized double-brokering an important issue?	6.27	1.300	312	6.13	6.42
3	Is failure to disclose an important issue?	5.97	1.459	309	5.80	6.13
4	Is "load held hostage" an important issue?	5.87	1.660	309	5.68	6.06
5	Is "booking and bouncing" by a <i>carrier</i> an important issue?	5.61	1.491	306	5.44	5.78
6	Is "booking and bouncing" by a <i>broker</i> an important issue?	5.18	1.751	310	4.98	5.37
					95% Confidence Interval for Mean	
Rank	How common? (7=very common, 1=not common)	Mean	SD	N	Lower Bound	Upper Bound
1	Is "booking and bouncing" by a <i>carrier</i> common?	5.08	1.575	309	4.90	5.25
2	Is unauthorized double-brokering common?	4.26	1.776	312	4.06	4.45
3	Is "booking and bouncing" by a <i>broker</i> common?	4.17	1.784	308	3.97	4.37
4	Is unauthorized re-brokering common?	4.15	1.619	312	3.96	4.34
5	Is failure to disclose common?	3.90	1.693	307	3.71	4.09
6	Is "load held hostage" common?	2.76	1.409	311	2.60	2.91

Findings Regarding Ethical Behavior and Experience:

Booking and Bouncing - The results indicate that increased experience is associated with ethical decisions in regards to “booking and bouncing” (Table 4.) Brokers with more experience were significantly *more* likely to choose ethical behaviors when dealing with a scenario of both “booking and bouncing by a broker,” and “booking and bouncing by a carrier” scenarios. When responding to a “booking and bouncing by a broker” scenario, ethical brokers had an average of 20.5 years in the industry, compared to 16.2 years in the industry for brokers who chose unethical behaviors ($t = 2.067$, $p = .04$). When responding to a “booking and bouncing by a carrier” scenario, brokers who chose ethical behaviors had an average of twenty years in the industry, compared to 15.7 years of experience for brokers who chose unethical behaviors ($t = 2.081$, $p = .038$). No significant differences were noted for the number of years in the current position, only for the number of years in the industry.

These findings highlight the importance of trust in creating and maintaining relationships between brokers, shippers, and carriers. “Booking and bouncing” is at the core of the relationship, and more senior brokers appear to

understand that “booking and bouncing” undermines the ability to build trust with shippers and carriers. Obtaining repeat business from carriers is critical to building a good operations foundation for a brokerage firm. If either side continually “bounces” the other side, the chance to build a strong carrier base for a lane is reduced. Additionally, developing a good carrier base reduces the number of truck orders not used, which reduces overhead costs.

Brokers with more experience were significantly **MORE** likely to perceive that others in the industry would behave ethically in both booking and bouncing scenarios in comparison to less experienced brokers, regardless of whether “experience” is measured by years in the industry or years in the position (Table 5). In short, longevity drives ethical behavior. Brokers who perceive that others in the industry would behave ethically when confronting a “booking and bouncing by a broker” scenario had an average of 24.2 years of experience in the industry, compared to 18.2 for brokers who perceive that others in the industry would behave unethically ($t = 4.176$, $p = .000$). Brokers who perceive that others in the industry would behave ethically when confronting a “booking and bouncing by a carrier” scenario had an average of 22.8 years of experience in the industry, compared to 18.3 for brokers who perceive that

TABLE 4
ETHICAL BEHAVIOR AND EXPERIENCE

Scenario	Test Variable	Broker Chose <i>ETHICAL</i> Action?		Broker Chose <i>UNETHICAL</i> Action?		t	Signif.
		n	Years	n	Years		
Booking and bouncing by a BROKER	# of years in current position	253	20.528 yrs.	30	16.183 yrs.	2.067	.040
Booking and bouncing by a CARRIER	# of years in the industry	249	20.024 yrs.	31	15.742	2.081	.038
Load held hostage	# of years in current position	222	9.399	31	14.613	3.667	.000
Failure to disclose all terms to a shipper	# of years in the industry	208	20.183	50	17.100	1.821	.070

TABLE 5
PERCEPTIONS OF BEHAVIOR BY OTHERS AND EXPERIENCE

		Broker Perceives Others Would Chose <i>ETHICAL</i> Action?		Broker Perceives Others Would Chose <i>UNETHICAL</i> Action?		t	Signif.
		n	Years	n	Years		
Booking and bouncing by a BROKER	# of years in current position	73	11.788	208	9.046	2.782	.006
Booking and bouncing by a BROKER	# of years in the industry	73	24.240	207	18.174	4.176	.000
Booking and bouncing by a CARRIER	# of years in current position	80	11.713	199	8.829	3.053	.002
Booking and bouncing by a CARRIER	# of years in the industry	79	22.766	199	18.299	3.108	.002

others in the industry would behave unethically (t = 3.108, p = .002).

Load Held Hostage. Brokers with more experience in their current position were significantly less likely to behave ethically in a “load held hostage” scenario (Table 6). Brokers who would behave unethically when responding to a “load held hostage” situation had an average of 14.6 years of experience in their current position, compared to 9.4 years of experience for brokers who would behave ethically (t = 3.667, p = .000). This suggests that the more industry experience a broker has, the more likely the

broker has actually been the victim of a load held hostage, and that this would cause them to perceive that this practice is ethical.

Failure to Disclose All Terms. No significant differences were found between the level of broker experience and whether a broker would choose an ethical course of action in a “failure to disclose all terms” scenario. While more experienced brokers who have been in their current position longer were slightly more likely to behave ethically in a “failure to disclose all terms” scenario, the difference was not statistically significant (Table 7).

TABLE 6
LOADS HELD HOSTAGE AND EXPERIENCE

		Broker Chose <i>ETHICAL</i> Action?		Broker Chose <i>UNETHICAL</i> Action?		t	Signif.
		n	Years	n	Years		
Load held hostage	# of years in current position	222	9.399	31	14.613	3.667	.000
Load held hostage	# of years in the industry	221	19.224	31	23.000	2.223	.031

TABLE 7
FAILURE TO DISCLOSE ALL TERMS AND EXPERIENCE

		Broker Chose <i>ETHICAL</i> Action?		Broker Chose <i>UNETHICAL</i> Action?		t	Signif.
Scenario	Test Variable	n	Years	n	Years		
Failure to disclose all terms to a shipper	# of years in current position	209	9.849	50	9.800	.042	.966
Failure to disclose all terms to a shipper	# of years in the industry	208	20.183	50	17.100	1.821	.070

TABLE 8
ETHICAL BEHAVIOR AND ORGANIZATIONAL FACTORS

		Broker Chose <i>ETHICAL</i> Action?		Broker Chose <i>UNETHICAL</i> Action?		t	Signif.
Scenario	Test Variable	n	5 pt. scale	n	5 pt. scale		
Booking and bouncing by a broker	We rarely discuss ethics at my company	264	1.47	31	1.94	2.690	.008
Booking and bouncing by a broker	Having higher ethical standards results in lower financial performance	264	1.99	31	2.35	1.518	.130
Booking and bouncing by a broker	Unethical behavior towards carriers is not tolerated in my company	264	4.59	31	4.32	1.716	.087

Findings Regarding Ethical Behavior and Organizational Factors

Booking and Bouncing by a Broker. Brokers who work for companies that rarely discuss ethics were significantly more likely to choose an unethical behavior in a “booking and bouncing by a broker” scenario. The mean for the item “We rarely discuss ethics at my company” for individuals who chose an unethical response to the booking and bouncing by a broker scenario was 1.94 (5 point scale, where 5 = agree and 1 = disagree), compared to a mean of 1.47 for brokers who chose an ethical response to the booking and bouncing by a broker scenario ($t = 2.69$, $p = .008$).

No differences were found between brokers who chose ethical vs. unethical behaviors regarding the belief that higher ethical standards in transportation brokerage trigger lower financial performance. Brokers who chose an unethical action had a mean of 2.35 on the five point measure, compared to a mean of 1.99 among brokers who chose an ethical action. Brokers who work in companies where unethical behavior towards a carrier is not tolerated showed no relationship to whether they would choose an ethical/unethical course of action. The scale item “unethical behavior towards carriers is not tolerated at my company” resulted in a mean of 4.59 for brokers who chose an ethical action compared to a mean of 4.32 for

brokers who chose an unethical action (sig. = .087).

The findings indicate that brokers perceive ethical behavior to be unrelated to financial performance. In a bottom-line oriented industry, this suggests that ethical behavior and financial performance are compatible, non-mutually exclusive goals. It is interesting that no relationship was found between a tolerance for unethical behavior towards carriers and the ethical behavior chosen by brokers. This is largely a function of the fact that very few brokers believe their company will tolerate unethical behavior towards a carrier (overall mean = 4.55 on a five point scale, std. deviation = 0.845). Interestingly, the 31 brokers who chose an unethical behavior for the “booking and bouncing by a broker” scenario also indicated that unethical behavior will not be tolerated at their company.

Booking and Bouncing by a Carrier.

Significant differences were noted between brokers who believe others would behave ethically and those who believe others would act unethically in a “booking and bouncing by a carrier” scenario. Specifically, brokers who believe that others would behave unethically in a “booking and bouncing by a carrier” scenario:

- Are *more* likely to believe that high ethical standards would lead to lower financial performance ($t = 2.134$, $p = .034$).
- Are *more* likely to believe that brokers and sales personnel would benefit from additional ethical training ($t = 2.098$, $p = .038$).
- Are *less* likely to agree with the statement “unethical behaviors towards carriers are not tolerated in my company” ($t = 2.518$, $p = .013$).

There were no significant differences reported between organizational factors and whether a broker chose an ethical solution to a “load held hostage” or “failure to disclose all terms” scenarios.

Findings Regarding Ethical Behavior and Company Size:

No significant effects were noted between company size and ethical decisions by brokers. This is interesting because some might have thought that smaller firms would be more likely to engage in unethical behavior, while other observers might have perceived that bigger firms would be more unethical. One potential explanation of this lack of significance would involve alternative ways that large and small brokerage companies may address ethical issues. It is possible that the use of mentoring and normative influences at smaller brokerage companies may have the same effect on ethical behavior that more formalized ethics codes and training programs have at larger brokerage companies. There is a need for additional research in this area..

Findings Regarding Ethical Behavior and Gender:

Women were more likely than men to believe that other individuals within the industry would behave unethically when confronted with “booking and bouncing” scenarios. 87.9% of female brokers believe that others in the transportation brokerage industry would behave unethically in a “booking and bouncing by a broker” scenario, compared to 71.4% of men ($\chi^2 = 6.74$, $p = .009$). 85.0% of female brokers believe that others in the transportation brokerage industry would behave unethically in a “booking and bouncing by a carrier” scenario, compared to 69.3% of men ($\chi^2 = 5.917$, $p = .015$).

DISCUSSION AND CONCLUSIONS

One of the challenges of assessing and improving ethics within a company is that ethical standards vary from person to person and from company to company. Individuals have different approaches to ethical decision making, with some focusing on the effect of an act and what creates the greatest good for the greatest number, while others adopt a rules-based interpretation to assessing the ethics of an action,

while a small number seem to focus on their own self-interest. One of the roles that a code of ethics can play within a brokerage business is to provide a consistent context for ethical decisions by clearly articulating the ethical standards for decisions within the company. While some may argue whether codes of ethics are effective at shaping employee behavior, it is reasonable to assume that such codes of ethics are preferable to having no code of ethics. The Transportation Intermediaries Association has encouraged ethical behavior among its members by asking all to sign and adhere to a code of ethics and administering a board designed to handle ethics disputes between members.

As shown in Table 3, the majority of brokers responding to the survey indicated they would choose a course of action that was judged as ethical by industry experts. The largest areas for unethical actions (discrepancies between the actions chosen by brokers and the actions chosen by experts as being ethical) were in the areas of the need to disclose all terms, loads held hostage and booking and bouncing. Brokerage companies should review their codes of ethics and ethics training programs in regards to these three issues to make sure employees clearly understand company expectations in these areas.

One of the consistent trends in the current research is the large discrepancy between what actions a broker reported he/she would do in each scenario and what he/she perceived others in the industry would do. While most brokers indicated they would not personally engage in an action judged to be unethical by transportation brokerage executives, these same brokers believe that others in the industry would choose an unethical course of action, especially for three specific scenarios: Booking and bouncing by a broker (respondents believe 74.6% of others would act unethically), booking and bouncing by a carrier (72%), and a failure to disclose all terms (60.1%). If the perceptions of brokers regarding unethical behavior across the industry in these three areas are accurate, there is a need

for industry-wide standards on appropriate ethical conduct within the field of brokerage.

The adapted contingency framework (Figure 1) suggests that *organizational factors* are one of the three broad categories of influences on ethical decision making (along with individual factors and opportunity.) One of the key components of organizational factors is the perception of how others in the same industry would judge a specific action. The present research found that the majority of brokers believe that others in the industry would act unethically in three of the six scenarios, and this raises a “red flag” as a potential influence on organizational ethics. Broker perceptions regarding industry-wide ethical norms are a potential negative influence on transportation broker ethics. Trade associations can occupy a key role in changing these perceptions, and both the Institute for Supply Management (2012) and Transportation Intermediaries Association (2012) have developed codes of ethics for members and ethics training courses. Changing the perceptions of transportation brokers regarding industry ethics is likely a long-term undertaking requiring an emphasis on shared codes of ethics and ethics training.

The third component of the Contingency Framework is *opportunity*. This component is operationalized through the use of company codes of ethics, policies, and rewards/sanctions for ethical actions of employees. The current research found 31 brokers who chose an unethical behavior in a “booking and bouncing by a broker” scenario. Either these brokers do not perceive their behavior as unethical (a potential problem with how a code of ethics is communicated to brokers), or they do not believe they will be caught or sanctioned for their behavior (a problem of implementation of the code of ethics.) Future research is needed to focus on the presence, content, and implementation of codes of ethics in transportation brokerage, the presence of rewards and sanctions for employee actions in

regards to ethics, and the perception by brokerage employees of the likelihood of incurring reward or sanction based on their individual ethical decisions.

Managerial Implications and Recommendations

Recommendations for improving ethical decision making have been previously suggested by Ferrell and Gresham (1985). Adapted to transportation brokerage, these recommendations would include:

- Hiring individuals with a moral philosophy consistent with the code of ethics of the brokerage company.
- Training employees on what is considered to be ethical decision making within the company.
- Increasing interaction between brokers and employees who are considered ethical, especially those in a supervisory capacity (and decrease interaction with peers who have lower ethical standards)
- Establishing a code of ethics, enforcing it, and examining the rewards structure to ensure that unethical behavior is punished and not rewarded.

REFERENCES

Anonymous (2012), "Three Ideas: Make Your Supply Chain More Ethical," *Smarta – Suppliers and Trade*, [On-line] Available: <http://www.smarta.com/advice/suppliers-and-trade/business-suppliers/three-ideas-make-your-supply-chain-more-ethical>. Accessed 1/15/14.

Drea, John T. and Drea, Thomas L. (2010). *Ethics in Transportation Brokerage*, Alexandria, VA: Transportation Intermediaries Association.

Ferrell, O.C. and Gresham, Larry G. (1985), "A Contingency Framework for Understanding Ethical Decision Making in Marketing," *Journal of Marketing*, 49(2): 87-96.

Green, Paul E. and Tull, Donald S. (1978). *Research for Marketing Decisions*, 4th ed. Prentice Hall International Series in Management.

Institute for Supply Management (2008), "Principles and Standards of Ethical Supply Management Conduct," [On-line]. Available: <http://www.ism.ws/tools/content.cfm?ItemNumber=4740> Created 1/12, Accessed 1/15/14.

Institute for Supply Management (2012). "Principles and Standards of Ethical Supply Management Conduct, with Guidelines," [On-line] Available: <http://www.ism.ws/files/SR/PrinciplesandStandardsGuidelines.pdf> Created 8/22/2102, Accessed 7/14/13.

Levin, Michael R. and Cellini, Richard J. (2008), "Building an Ethical Supply Chain," *PharmPro* (September 30), available at <http://www.pharmpro.com/Articles/2008/10/Building-An-Ethical-Supply-Chain/> Created 9/30/08, Accessed 7/15/13.

Lilywhite, Serena (2004), "Responsible Supply Chain Management: Ethical Purchasing in Practice," *Brotherhood of St. Laurence*, pp. 1-5, available at http://www.bsl.org.au/pdfs/Lillywhite_Oslo_Ethical_purchasing_checklist.pdf Created 10/04, Accessed 8/1/13.

Pitta, Dennis A., Fung, Hung-Gay, and Isberg, Steven (1999), "Ethical Issues Across Cultures: Managing the Differing Perspectives of China and the USA," *Journal of Consumer Marketing*, 16(3): 240-256.

Schlegelmilch, Bodo B. and Oberseder, Magdalena (2010), "Half a Century of Marketing Ethics: Shifting Perspectives and Emerging Trends," *Journal of Business Ethics*, 93(1): 1-19.

Schniederjans, Marc J. and Schniederjans, Dara (2009), "Perceptions of Culturally-Based Ethics, Trust and their Impact on Global Supply Chains," *The Global Studies Journal*, Volume 1(4): 125-138.

Svensson Göran and Bååth, Hans (2008) "Supply Chain Management Ethics: Conceptual Framework and Illustration," *Supply Chain Management: An International Journal*, 13(6): 398 – 405.

Transportation Intermediaries Association (2012). "TIA Code of Ethics," [On-line]. Available at: <http://www.tianet.org/staticcontent/staticpages/Code%20of%20Ethics.pdf>

Wild, Nigel and Zhou, Li (2011) "Ethical Procurement Strategies for International Aid Non-Government Organisations," *Supply Chain Management: An International Journal*, 16(2): 110 – 127.

Zamaan, Abedullah (2006), "Ethics in Supply Chain Management," notes from a presentation series on Professional Ethics in Science and Engineering at Malarden University.

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THE 6TH MODE OF TRANSPORTATION

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ABSTRACT

The five modes of freight transportation are normally characterized as motor carriers, railroads, airlines, water carriers, and pipelines. This paper will attempt to position the Internet as the sixth mode of transportation. This paper compares the strengths and weaknesses of the traditional five modes of transportation against the proposed 6th mode of the Internet. Without including the Internet as a mode of transportation, and tracking the economic value that it adds to the economy, the economic impact of the Internet as a mode is not considered. The recommendation of this study is that the Internet should be added to the list of modes of transportation of goods and therefore making the Internet the sixth mode of transportation.

INTRODUCTION

At the beginning of the 20th century, there were four modes of transportation. They were the railroads, water carriers, pipelines, and the horse. Today, transportation textbooks state that there are five modes of transportation for the movement of goods. The five modes of freight transportation are characterized as motor carriers, railroads, airlines, water carriers, and pipelines. Rodrigue, Comtois, and Slack (2006) stated that “Transport modes are the means by which people and freight achieve mobility.” The currently accepted five modes of transportation obviously meet this definition, but the topic to be addressed in this paper is can the Internet be considered a mode of transportation. This paper is written in the form of an analytical essay and will attempt to make the case for the Internet as the sixth mode of transportation.

Background

Global electronic commerce (e-commerce) revenues are projected to be \$963 billion by 2013 (Nguyen, DeCenzo, & Drucker, 2012), and as of 2012 e-commerce made up approximately 8% of U.S. retail sales (Bell, Choi, & Lodish, 2012). Electronic commerce ranges from retail shopping that must be delivered through the traditional transportation system to online downloadable media. Electronic commerce is expected to continue to grow well into the future

and has become a part of daily life for many people. Shoppers that use e-commerce normally do not care how they receive a product as long as it is fast, and the faster the better. It is commonplace in today’s e-commerce world to be able to instantaneously download music, computer software, and books, however most other physical products must still be delivered by one (or a combination) of the five traditional modes of transportation. With the continuing shift towards providing more products electronically and the advent of the three-dimensional (3-D) printer the Internet is being used more and more for the delivery of products.

Research Question

Using a qualitative analytical essay format the objective of this research is to explore the current status of e-commerce on the Internet and the transportability of products over the Internet. The research question explored in this paper is should the Internet be considered a mode of transportation? Thinking about the Internet as a mode of transportation raises interesting questions about the savings to shippers from reduced transportation costs. It also raises a number of questions about the societal benefits of using this mode in place of other modes. For instance, using the Internet in place of traditional transportation modes saves a great deal of fuel, reduces greenhouse gas emissions, and results in fewer truck/car accidents.

Significance of the Study

An extensive online search of the ProQuest, Transportation Research Board, and Northwestern University Transportation Library (Tran Web) databases revealed no academic literature that proposes that the internet should be considered as a mode of transportation. There is extensive literature that outlines the use of the Internet in supporting transportation and the global supply chain; however, the literature tends to focus on the movement of timely and accurate shipping information not physical products. This paper intends to justify the Internet as a standalone mode of transportation, not just to support the other modes. Since a literature search revealed no specific academic literature on the subject, this study will contribute to the body of knowledge on transportation research, and could affect the teaching and management of transportation.

DISCUSSION

Transportation adds value to a product by giving it time and place utility. Time utility is reflected in the concept that a product must be delivered to the market when it is needed (Coyle, Novack, Gibson, & Bardi, 2011). For example, snow blowers have little demand in the spring; however they have much more demand and therefore value in the fall or early winter. Place utility on the other hand is the concept that a product must be delivered to a geographical area where there is a demand for the product (Coyle et al., 2011). For example, snow blowers in Florida have very little demand, therefore little value, and no place utility.

According to Coyle, Novack, Gibson, and Bardi (2011) “the interrelationship between transportation and mass production points out the dependency of our global economy on transportation.” Overall, transportation accounts for 10.5 percent of U.S. Gross Domestic Product (GDP), and freight transportation alone accounts for approximately nine percent of GDP according to Coyle et al. (2011). The availability of transportation is a major determining factor in

the location of production facilities, and as changes in economic activity occur, so does the demand for transportation (Coyle et al., 2011).

Coyle, Novack, Gibson, and Bardi (2011, p. 11) stated that “the demand for freight transportation is usually dependent upon demand for a product in another location.” The primary definition of a mode of transportation is the ability to move products from one location to another. Transportation bridges the supply demand gap and adds value to a product by giving it place utility, in other words transporting the good to a location where the product can be used. The traditional five modes of transportation satisfy this requirement to bridge the supply demand gap, but transportation over the Internet also achieves the objective of time and place utility. Not only can the Internet move a digital product, but with the advent of the 3-D printer can now be used to locally produce tangible goods.

Three-dimensional (3-D) printing has been around for over 20 years however it has only recently been refined to the point where detailed objects can be produced at home or at a business point of use (Holland Herald, 2012). 3-D printing is the process of making objects by gradually laying down successive layers of material in an additive fabrication process. 3-D printing is fast leaving the realm of the hobbyist; and is being integrated into more mainstream commercial applications every day. In short, the science fiction *replicator* as used on the Star Trek Enterprise is becoming a reality. Theoretically almost anything can be printed, including cups, car parts, furniture, jawbones, cloths; and research is being conducted on printing of food and human organs (Holland Herald, 2012).

Products can now be designed and the print files transmitted over the Internet for printing locally (Maxwell, 2012). In the future, instead of going to the store to go shopping a customer will be able to simply go into a 3-D print shop and request a product be made while they wait or even better print out the product at home.

Likewise, slow moving products, such as replacement parts for older cars, can be printed at the dealership where the car is awaiting repair. Other applications in industry are emerging daily.

Through the use of 3-D printing, and the digital movements (downloads) of goods across the Internet, inventory holding cost and product obsolescence are virtually eliminated. A true just-in-time manufacturing process can be used for the production of goods. Manufacturing will become decentralized and large-scale production operations, which in the past have provided *economies of scale*, will be rendered unnecessary. In addition, *geographic specialization*, the idea that each geographic area specializes in the production of products for which they have the greatest advantage will be rendered pointless. This creates its own transportation economics issues, however this is beyond the scope of this paper.

Shopping and Transporting Goods on the Internet

The shopping, purchasing, and immediate downloading of music, books, computer software, and other digital content is an everyday occurrence on the Internet. In fact, Amazon (2011) now sells more electronic books than printed books. In addition to the commonly downloaded music, books, and computer software, many services are increasingly being purchased and transmitted via the Internet. For example, this paper can be transmitted over the Internet to an editor, editing services paid for electronically, and the final edited paper returned to the author via the Internet. In the past, this paper would have to be printed and mailed to the editor who would then edit the paper, and mail the final edited product back to the author. The mailing of these items would have been accomplished using the traditional transportation system. Likewise, commercial services can be transported from suppliers directly to offices or service locations. Blueprints would be one example, digital movies another.

Environmental and Social Impact

Transportation has a significant negative environmental and social impact. Most modes of transportation rely on the use of internal combustion engines so are a contributor to air pollution and related effects such as acid rain, CO₂ emissions, and ozone reduction.

Transportation can also have a negative effect on water quality through oil spills, garbage dumped from ships, and hazardous material losses (Coyle, Novack, Gibson, & Bardi, 2011). In addition, transportation is a contributor to noise pollution, with noise emissions from aircraft, trucks, and rail operations. Noise can decrease property value near transportation facilities and routes, and increase congestion, both of which can have a negative economic impact (Button, 2010). And last, is the environmental issue of *land take*, in which large expanses of land are needed for roads, ports, airports, and railroads and pipeline right of ways (Rodrigue, Comtois, & Slack, 2006).

By eliminating the need for the movement of goods through the traditional transportation system, the Internet in combination with 3-D printing could eliminate transportation cost and the associated fuel emissions, and therefore provide a benefit to the environment (Maxwell, 2012). At the same time, this 6th mode can and has had a dramatic impact in reducing fuel consumption, and reducing costs for shippers and ultimately consumers. Lastly, transporting goods through the Internet has the added benefits of the zero generation of waste packaging.

Comparisons of the Modes of Transportation

There are five traditional modes of transportation plus the new mode of the Internet for which this paper argues, available for use in the movement of goods. Each mode has its strengths and weaknesses, which must be considered when making a modal selection. Table 1 provides a comparison of strengths and limitations for the six modes of transportation. The Internet as a mode of transportation has strengths such as accessibility, speed, low cost, and international capabilities; however, for the

moment has limited flexibility in regards to the types of products that it can transport at this point in time.

When purchasing transportation a firm must take into consideration the different modal capabilities to determine which mode is best suited for their needs. Often time's shipment will occur on more than one mode of transportation (intermodal) which takes advantage of each modes strengths and minimize their limitations. One of the negative aspects of the Internet as a mode of transportation is the inability to integrate the Internet into intermodal transportation operations.

Another form of comparison which is typically used in transportation textbooks and within the transportation industry is the consideration of the operating characteristics of each mode of

transportation. Table 2 compares the operating characteristics for each mode of transportation. Speed indicates the total movement time, availability is the characteristic that a mode can service any location, dependability refers to deviations from the expected delivery schedule, capability refers to the ability to handle any transportation requirement, and frequency is the number of schedule movements. Using this criterion, the Internet is the most capable mode of transportation; however the Internet has the major drawback of limited capability and currently can only move digital products. As discussed above, with the future development of 3-D printing the Internet will be able to transmit the plans and drawings needed for local production of almost any product. Currently, the type of product to be transported, and the geographic location of the production facility and the end-user must be taken into

TABLE 1
COMPARISON OF MODAL CAPABILITIES

Mode	Strengths	Limitations
Motor carrier	Accessibility Fast and versatile Customer service	Limited capacity High cost -
Railroads	High-capacity Low-cost	Accessibility Inconsistent service damage rates
Airlines	Speed Freight protection Flexibility	Accessibility High cost low capacity
Water carriers	High-capacity Low-cost International capabilities	Slow Accessibility -
Pipeline	In transit storage Efficiency Low-cost	Slow Limited network -
Internet	Accessibility Fast Low-cost International capabilities	Limited products - - -

Note: Adapted from "Transportation: A Supply Chain Perspective" by Coyle, Novack, Gibson, & Bardi, 2011, Table 10-4.

consideration when determining the overall best mode of transportation.

If the internet argument is accepted then many of the transportation economic models will need to be reconsidered. For example, the classic transportation economic model of the influence of distance on cost will have to be reconstructed (see Figure 1). Unlike other modes of transportation, distance does not influence cost so the cost for transportation over the internet is essentially a flat line on the zero cost line.

CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

This study has attempted to justify adding the Internet as a mode of transportation of goods. Transportation of goods is essential to the world economy. So important that governments and academia track the quantity and value of goods being moved by each mode of transportation. Governments regulate the transportation system and provide funding for the expansion and maintenance of transportation infrastructure. Without including the Internet as a mode of transportation, and tracking the economic value

that it adds to the economy, the economic impact of the Internet as a mode is not considered. By not considering the Internet as a mode of transportation, and the added economic value that it brings, government regulation and financial support cannot be properly allocated to support its growth for the future transportation of products. Until the use of 3-D printers becomes more affordable and widespread the Internet will be mostly relegated to moving of digital products. However as the 3-D printing industry expands, decentralization of production will occur and the need to move a physical product will decrease. Of course, the movement of goods by the other modes of transportation will never be completely eliminated. At a minimum, they will be needed to transport the printing material for 3-D printers.

The recommendation of this study is that the Internet should be added to the list of modes of transportation of goods and therefore making the Internet the sixth mode of transportation. Additional justification and research will be needed to determine how best to compare the digital transportation of goods with the five traditional modes of transportation.

TABLE 2
RELATIVE OPERATING CHARACTERISTICS BY MODE

Mode	Motor			Water		
	Carrier	Railroads	Airlines	carriers	Pipeline	Internet
Speed	3	4	2	5	6	1
Availability	2	3	4	5	6	1
Dependability	3	4	6	5	2	1
Capability	3	2	4	1	5	6
Frequency	3	5	4	6	2	1
Composite Score*	14	18	20	22	21	10

Note: *lowest rank is best. Adapted from “Supply Chain Logistics Management” By Bowersox, Closs, and Cooper, 2010, Table 8.5.

FIGURE 1
GENERALIZED RELATIONSHIP BETWEEN DISTANCE
AND TRANSPORTATION COST

Adapted from *Supply Chain Logistics Management* by Bowersox, Closs, and Cooper, 2010, Figure 9.1

Nevertheless, like a number of the futuristic gadgets used on Star Trek that have now come into reality, the *replicator* is just around the corner.

Future research on this topic should attempt to quantify the benefits to shippers and society from use of this 6th mode of transportation. For industry the benefits that should be estimated relate to reduced transportation costs. For society, the analysis should consider the savings in fuel costs, greenhouse gas emissions, and the reduction in car/truck accidents that result from having less trucks on the road.

These savings from use of this 6th mode could be calculated by estimating the total ton-miles of freight that no longer has to be shipped using the traditional modes. The approach would involve enumerating a list of some of the most important products that are now being 3D printed or transported digitally. For each product category the mix of modes could be estimated, and then for each mode, the volume that might have moved over that mode could be estimated. Likewise typical distances could be estimated using federal statistics. Based on an estimate of

total ton-miles of freight that has been eliminated from a particular mode, an estimate of fuel savings, emissions reductions, and reduced accidents could be calculated. Freight cost savings could also be calculated. These estimates could then be summed across modes for each commodity, and then summing all commodities. Another approach would be to estimate the total dollar value of 3-D printing based on various articles that have been written with such estimates. Then an average weight and distance could be estimated for each dollar of product that is 3-D printed. This would allow for a ton-miles estimate and rather straightforward calculations of the reduced negative impacts of less truck, air, or rail ton-miles.

Estimation of these benefits would be very useful to those advocating for increased use of this 6th mode. The estimates would also allow corporations to calculate the reductions in greenhouse gases they are achieving through use of digital transmissions and 3-D printing, information they could report in their annual sustainability reports. Federal policymakers

could also use this information in planning federal policy and promotion programs that would support increased use of this 6th mode.

It would also be useful for future research to estimate the rate at which the 6th mode will grow and the impact that such use would have on the need for additional transportation infrastructure. For instance how many fewer highway lane miles of roadway might need to be added in the future? What might the impact be on the need for additional air freight capacity? Such information could also be useful for companies that build aircraft and trucks.

REFERENCES

- Amazon 2011 Annual meeting of shareholders Amazon (2011), Annual Meeting of Shareholders, Retrieved November 2, 2012, from <http://amazon.com>
- Bell D R Choi J Lodish L 2012 What matters most in Internet retailing. Bell, D. R., Choi, J., & Lodish, L. (2012), "What Matters Most in Internet Retailing," *MIT Sloan Management Review*, 54(1): 27-33.
- Bowersox D J Closs D J Cooper M B 2010 Supply chain logistics management Bowersox, D. J., Closs, D. J., & Cooper, M. B. (2010), *Supply Chain Logistics Management* (3rd ed.), New York, NY: McGraw-Hill Irwin.
- Button K 2010 Transport economics Button, K. (2010), *Transport Economics* (3rd ed.), Northampton, MA: Edward Elgar.
- Coyle J J Novack R A Gibson B J Bardi E J 2011 Transportation: A supply chain perspective Coyle, J. J., Novack, R. A., Gibson, B. J., & Bardi, E. J. (2011), *Transportation: A Supply Chain Perspective* (7th ed.), Mason, OH: South-Western.
- Holland Herald 201209 Another dimension. Holland Herald (2012, September), "Another Dimension," *Holland Herald*, 47(9): 42-44.
- Maxwell C 201206 3D printing: Taking business to another dimension. Maxwell, C. (2012), "3D Printing: Taking Business to Another Dimension," *Director*, 65(10): 60-63.
- Nguyen H DeCenzo M Drucker M 2012 Tax challenges for electronic – commerce activities. Nguyen, H., DeCenzo, M., & Drucker, M. (2012), "Tax Challenges for Electronic – Commerce Activities," *Journal of Applied Business Research*, 28(5): 861-870.
- Rodrigue J P Comtois C Slack B 2006 geography of transport systems Rodrigue, J. P., Comtois, C., & Slack, B. (2006), *The Geography of Transport Systems*, New York, NY: Routledge.

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7. All references to journals, books, etc., are *italicized*, NOT underlined. Examples are as follows:

Journal Article:

Pohlen, Terrance L. (2003), "A Framework for Evaluating Supply Chain Performance," *Journal of Transportation Management*, 14(2): 1-21.

Book Chapter:

Manrodt, Karl (2003), "Drivers of Logistics Excellence: Implications for Carriers," In J. W. Wilson (Ed.), *Logistics and Transportation Research Yearbook 2003* (pp. 126-154) Englewood Cliffs, NJ: Prentice-Hall, Inc.

Book:

Coyle, John J., Bardi, Edward J., and Novack, Robert A. (2004), *Transportation*, 6th ed., Cincinnati, OH: South-Western College Publishing.

Website:

Wilson, J. W. (2003), "Adapting to the Threat of Global Terrorism: Reinventing Your Supply Chain," [On-line]. Available: <http://georgiasouthern.edu/coba/centers/lit/threat.doc>. Created: 11/01/02, Accessed: 11/12/03.

MANUSCRIPT SAMPLE

A FRAMEWORK FOR EVALUATING SUPPLY CHAIN PERFORMANCE

Terrance L. Pohlen, University of North Texas

ABSTRACT

Managers require measures spanning multiple enterprises to increase supply chain competitiveness and to increase the value delivered to the end-customer. Despite the need for supply chain metrics, there is little evidence that any firms are successfully measuring and evaluating inter-firm performance. Existing measures continue to capture intrafirm performance and focus on traditional measures. The lack of a framework to simultaneously measure and translate inter-firm performance into value creation has largely contributed to this situation. This article presents a framework that overcomes these shortcomings by measuring performance across multiple firms and translating supply chain performance into shareholder value.

INTRODUCTION

The ability to measure supply chain performance remains an elusive goal for managers in most companies. Few have implemented supply chain management or have visibility of performance across multiple companies (Supply Chain Solutions, 1998; Keeler et al., 1999; Simatupang and

Sridharan, 2002). Supply chain management itself lacks a widely accepted definition (Akkermans, 1999), and many managers substitute the term for logistics or supplier management (Lambert and Pohlen, 2001). As a result, performance measurement tends to be functionally or internally focused and does not capture supply chain performance (Gilmour, 1999; *Supply Chain Management*, 2001). At best, existing measures only capture how immediate upstream suppliers and downstream customers drive performance within a single firm.

Table 1 about here

Developing and Costing Performance Measures

ABC is a technique for assigning the direct and indirect resources of a firm to the activities consuming the resources and subsequently tracing the cost of performing these activities to the products, customers, or supply chains consuming the activities (La Londe and Pohlen, 1996). An activity-based approach increases costing accuracy by using multiple drivers to assign costs whereas traditional cost accounting frequently relies on a very limited number of allocation bases.

$$y = a^2 - 2ax + x^2$$

REFERENCES

Manrodt, Karl (2003), "Drivers of Logistics Excellence: Implications for Carriers," In I. W. Wilson (Ed.), *Logistics and Transportation Yearbook 2003* (pp. 126-154) Englewood Cliffs, NJ: Prentice-Hall, Inc.

Coyle, John J., Bardi, Edward J. , and Novack, Robert A. (2004), *Transportation*, 6th ed., Cincinnati, OH: South-Western College Publishing.

Wilson, J. W. (2003), "Adapting to the Threat of Global Terrorism: Reinventing Your Supply Chain," [On-line]. Available: <http://georgiasouthern.edu/cobaJcenters/lit/threat.doc>. Accessed: 11/12/03.

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