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IS LOGISTICS A VIABLE MINOR FOR INFORMATION SYSTEMS MAJORS: HOW TO CREATE AN OPPORTUNITY

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ABSTRACT

A growing number of Universities and Colleges of Business are creating majors in Logistics and/or Supply Chain Management. The question becomes does this growing major present opportunities for Information System majors to better position themselves in the job market. Assuming this is true, how should IS faculty approach this opportunity at their specific university. This paper presents arguments for and against a Logistics minor and provides models to implement it based on a successful implementation at Georgia Southern University. In a sense, this paper provides an example model for IS Faculty to create a beneficial curriculum opportunity to meet a growing niche market to benefit multiple university stakeholders.

Keywords

Logistics, Supply Chain Management, Minor, Instruction, Pedagogy

INTRODUCTION

Throughout the 1990s, the concept of “Logistics” became a hot topic in various areas of business and academia. The Logistics successes of the Gulf War helped to broaden the term throughout industry. A natural reaction was the inclusion of academic programs in colleges of business to capitalize on this emerging discipline. By 2010, Logistics had become a fairly accepted term and many universities had created programs with either a major in Logistics or including large amounts of the discipline’s content in the general business curriculum.

However, the field of Logistics is still not taught at a majority of universities throughout the United States. This discrepancy provides an opportunity for various universities and specifically Information System (IS) Faculty. At the same time Logistics was growing, the field of IS also became a commonly accepted discipline at many more universities. IS Faculty identified many areas that students could specialize to better position themselves for the workplace market. One niche area that still faces a tremendous shortage of trained individuals is the combined area of Logistics and IS.

After this introduction, this paper will present a more detailed description of process, scale and opportunity of the combined Logistics and IS areas or Logistics Information Systems (LIS). Then it will discuss the specific benefits and challenges of developing a curriculum that might help to fill the LIS gap. Also, it will present two basic models that may be applied to benefit students, employers and faculty. Finally, the conclusions’ section will highlight the realistic costs and benefits of this approach to allow decision makers to determine if this is the correct choice for their institutions.

BACKGROUND

As identified in the Introduction, the emergence of Logistics as a discipline is a relatively recent phenomenon. While Logistics tasks, processes and activities have been performed throughout history, the academic study of the area became an accepted area beginning in the 1960s. The earliest practitioner and academic organization was the National Council of Physical Distribution Management in 1963 (Council of Supply Chain Management Professionals, 2014). This organization was one of the first to recognize the value of a specific discipline focusing on the value of time and place in industry, military

and academic studies. Other organizations and universities also studied portions of Logistics. Many early university programs focused on the transportation area of Logistics. Universities such as Tennessee, Ohio State, Michigan State and Penn State all had degrees in Transportation or Transportation Management.

Logistics includes inbound logistics (i.e. transport and storage of raw materials to manufacturing) and outbound logistics or physical distribution (i.e. transportation and storage of finished goods from manufacturing to markets). Supply chain management (SCM) represents an extension of the logistics concept that includes the total system of interrelated companies for efficient and effective flow of products/materials, services, information, and financials (Coyle, Langley, Gibson, Novack and Bardi 2009). SCM is a broader concept that subsumes logistics management (Mentzer, Min and Bobbitt 2004). For example, SCM knowledge will include purchasing, logistics, inventory management, compliance, and outsourcing. According to the CSCMP an entry level position as SC analyst requires graduates to broad range of computer skills — database, spreadsheet, statistics applications, and logistics software packages.

The field of Logistics began to emerge as a discipline with a uniformed set of areas of study including both the transportation and physical distribution (warehousing, inventory, etc.) areas. This process was further accelerated by the successes of the First Gulf War or Desert Storm. While the ground war itself only lasted a hundred hours, the lead up to the war captivated American television audiences for months. Much of the discussion before the ground combat centered around the Logistics of the operation. Questions became how are we going to get people to Southwest Asia, how much blood will be needed for the hospitals, how much fuel must be moved from where to where, etc. It was a nightly lesson on Logistics on primetime television. Also, briefers demonstrated the old military quote of “Amateurs talk about tactics, but professionals study Logistics” (Barrow, 1980). The final piece of this diffusion of Logistics from the military to the civilian sector came immediately after the war when Lieutenant General Pagonis published his history of the Logistics of Desert Storm in the very successful book *Moving Mountains* (Pagonis, 1992), retired and took a senior Logistics position with Sears.

While the military events of Desert Storm highlighted the value and importance of Logistics, other factor helped to demonstrate the opportunities to the private sector. The recession at the end of the Carter Administration created a difficult period for American companies. The prime rate peaked at 20.0% in April of 1980 (Prime Interest Rate History, 2008). This created a significant challenge to companies that traditionally financed their inventory. Furthermore, President Carter and Congress passed a series of deregulation acts to remove government economic regulation from the transportation industry: Motor Act of 1980, Staggers Rail Act of 1980, Airline Deregulation Act of 1978. The net effect was that industry was forced to look at Logistics as an area that was both critical and an opportunity for competitive advantage for the first time.

An additional factor came shortly with the rise of Walmart. Walmart itself says that “Logistics and distribution [are] the heart of its operations” (Alyea, 2012). The massive successes of Walmart are attributed by many to their world-class Logistics system. Competitors and other industries began to study, benchmark and mimic Walmart’s Logistics systems and processes. (Bergdahl, 2008). The growth of a Logistics obsessed retail company to be ranked as one of the largest companies in the world clearly identified that Logistics was an area that deserved further opportunity (Fortune, 2013).

While these changes were occurring in industry, organizations and academics also began to evolve. The National Council of Physical Distribution Management renamed itself as the Council of Logistics Management and eventually the Council of Supply Chain Management Professionals (CSCMP). Also, more universities recognized the growth and popularity of Logistics and either transformed transportation programs into a Logistics major or simply started new degree or minor areas in Logistics. By 2013, CSCMP website identify approximately 250 universities within the United States with some program in Logistics (CSCMP, 2013). While that may be a small number when considered against the total number of business schools in the United States, it is a dramatic increase in the last thirty years from the few transportation programs in the 1980s.

OPPORTUNITIES

While the background section identified the growth of Logistics in industry and academia, it did not fully identify the opportunity for business students or specifically the possibilities for IS majors. It is important to recognize that a key goal of most college of business students, regardless of major, is to find a good job in their career field upon graduation. Furthermore, there is an implied belief that the job be well paying. Logistics and specifically LIS may have a tremendous opportunity to help students reach these goals.

To examine the macro level opportunity, the Annual State of Logistics report provides excellent data to highlight the sheer size of the opportunity for future Logistics and LIS majors. This annual study commissioned by CSCMP year examines a

number of critical elements in the Logistics and supply chain management areas. Figure 1 (next page) highlights the scale of the industry and illustrates the financial costs, and opportunities, to the economy (adapted from CSCMP, 2013). The initial point is the staggering amount of spending in the United States to perform Logistics on an annual basis. In 2012, the country spent over 1.3 trillion dollars on Logistics functions. Furthermore, approximately \$400 billion was spent on warehousing/distribution and \$800 billion on transportation services. The Logistics industry accounts for approximately 10% of the total economy on any given year. The magnitude of the Logistics industry presents significant opportunities.

This size of the industry should also then be compared with the approximately 250 universities that have some form of Logistics program. A careful examination of the institutions will highlight that many only have certificate programs or associate degrees. Also, most of the programs are fairly small for a number of reasons. Therefore, it is clear there is a shortage of trained Logistics majors entering a trillion dollar industry each year. This is reflected at our university by a starting average salary of approximately \$47,000 for newly graduated majors in 2008. These students are not exceptionally talented when compared to other business majors, but the national shortage has made them among the highest paid graduates from the College of Business.

A longitudinal study that compared higher ranked logistics skills from 1991 and 2007 identified logistics information management as a new necessary skill for senior level logistics managers (Murphy and Poist 2007). A study that examined which skills and knowledge are necessary for logistics professionals to perform their job successfully, identified that the use of logistics specialized software as well as the information system management skills are critical now and will be more important in the future (Thai, Cahoon and Tran 2011). From the top four logistics/SCM course areas, logistics (29 percent), other (14 percent), information technology (12 percent), and operations management (11 percent). "The perceived importance of IT in logistics prompts logisticians to develop their knowledge on the field." (Wu 2007, p. 511).

While the size of the Logistics segment of the economy highlights the opportunities for Logistics majors, the question becomes what, if any, impact is there for IS/LIS majors. There is not as easily identifiable number on the amount spent on Logistics software and hardware each year. However, there is a very large market with many companies participating in various Logistics software applications. A Gartner study states that the 2013 spending on enterprise software which is "a key segment in supply chain management" would be \$297 billion (Kanaracus, 2013). Figure 2 examines satisfaction with Warehouse Management Software (WMS). The purpose of this figure is to illustrate the large number of companies that participate just in this narrow market that were survey in Dr. Frazelle's study (Frazelle, 2003). While it is not a complete list of companies, it begins to illustrate the potential for IS/LIS majors in this field.



Figure 1. Domestic Spending on Logistics

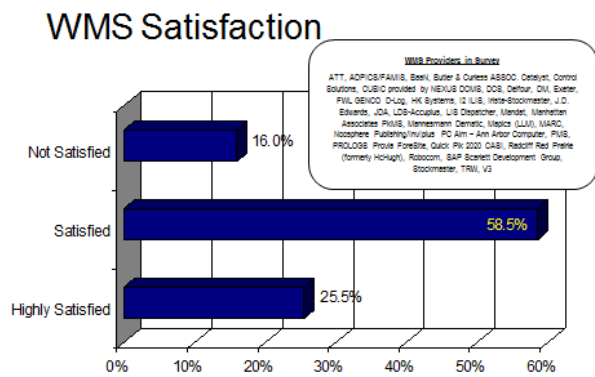


Figure 2. Example of Warehouse Management Systems and Vendors

In addition to the WMS opportunities, there are numerous other Logistics software solutions that exist. For example, there are transportation management software (TMS), facility location programs, freight bill auditing, tracking/tracing, yard management solutions and a host of other specific applications. The number of software opportunities, and hence companies with a need for IS/LIS professionals, is extremely large. Furthermore, a recent, 2012 study by *Logistics Management* identified that 48% percent of Logistics respondent companies were planning to increase spending on technology (hardware and software) and approximately half were considering upgrades to their WMS (similar results for TMS). And even though many of the companies were small to medium size enterprises, 51% planned to spend in excess of \$100,000 (McCrea, 2012). While that may not be a large number in itself, the cumulative effect of half the companies in a trillion dollar industry investing in technology quickly becomes a significant amount.

The overall result of the size of the Logistics industry and its needs for IS presents a tremendous opportunity for both the Logistics major and the IS major. The question then becomes, how much benefit is there to a combination of some form and what are the skills needed to meet the demand from employers.

SKILLS, BENEFITS AND COSTS

Given that there appears to be opportunities for IS majors, the question becomes what skills are needed and what is the related benefit of acquiring those skills. The Council of Logistics Management published *Career in Logistics* which included a section on “Logistics Software Manager” as a job title. Some key points made were that “There is a small group of Logistics software specialists and the demand for (their) skills sets is exceptional.” Furthermore, the work highlighted that the key skills for this type of person included “Extremely good technical/computer skills and knowledge and an understanding of Logistics operations.” One respondent stated, “We use information to increase productivity, improve customer service and cut cost in our effort to be a world class organization” (Gibson et al., 1998). In short the key skills would include the traditional IS skills learned as a major, but also would include a solid foundation in the Logistics area including warehousing, transportation, customer service, cost accounting, problem solving, human resource management and others.

There are many benefits to an IS major to acquire these additional skills out of field. First, the incorporation of softer or people skills would benefit any individual. This might be practically true in a high tech field such as IS or engineering where the focus is more on the technology and not the people. Next, the specific skills in Logistics help the student to better understand the needs, motivations and processes of potential customers. The industry is replete with examples where misunderstanding between logisticians and IS personnel created humorous and sometimes serious issues. The better understanding would benefit both sides of the process. Therefore, a LIS person would be uniquely situated to ensure that logisticians properly explain their requirements and IS personnel accurately implementing them. (Case et al., 2013)

However, there are costs to this approach as well. The primary cost is borne by the student that will have to take courses outside of their major to become conversant in the Logistics field. Furthermore, universities without a standing Logistics program may have additional costs in adding courses to provide this opportunity. However, there is a means to mitigate some of that cost. Finally, there is a cost to IS Faculty to allow their majors to spend some the precious few credit hours on topics/courses outside of IS. The question is will the student/faculty/university/industry better benefit with additional IS classes or some Logistics classes. These are difficult questions and frankly all universities should not arrive at the same answer. But, there are a number of options that can help business faculty when trying to make this decision.

MODELS

While there are an infinite number of options on how to address this opportunity, two are presented for the sake of brevity and common sense. The first is a current model from Georgia Southern University that has an existing Logistics degree program. The second is a theoretical model for a university that does not have a Logistics major, but does have an IS program. In both cases, the students are assumed to take some typical first two years of course work which includes English, Math, Social Sciences, etc. Also, both assume some traditional business core of classes: Principles of Marketing, Finance, Accounting, Economics, Capstone Business, etc. Therefore, those portions will not be discussed except where they are specifically relevant. Rather, the focus of the two models will be on the IS and possible Logistics course work that would meet the needs of potential LIS students. It should be noted that while the acronym of LIS is used, it is still a IS major with a Logistics minor and the LIS does not imply that they are Logistics majors; but rather, LIS is a fairly common industry term.

Figure 3 (adapted from the Georgia Southern University Catalog, 2013; next page) presents the key courses in the model from an existing program. The students are all IS majors with a minor area in Logistics. The required classes include five IS classes (note: there are prerequisite classes not shown – Intro to Java as an example.) Also, it requires the two “Principles” type courses in transportation and distribution/Logistics. These seven classes are then augmented with two electives from the six options below. The color coding highlights the IS verses the Logistics classes. It is possible for the LIS major to only have five of the critical IS courses and four of the Logistics classes. There are a number of advantages to this model. First, there are numerous existing Logistics courses which allows flexibility and removes and burden to the IS faculty for providing minor area support. Also, it provides a solid foundation in both Logistics and IS coursework. Its two biggest disadvantages are that it requires an existing Logistic program at the university and clearly it reduces the number of IS classes taken by an IS major. This model has worked very well for approximately four academic years. Recruiters have been very pleased with the students that complete this curriculum. The benefit to the university is that now companies that recruited for Logistics

students are now recruiting for both LIS and IS majors. The reverse is true with companies that only recruited IS are now recruiting LIS and Logistics majors. It has been a success for both majors as well as individual graduates.

Perhaps the more challenging model is for universities that do not have existing Logistics programs. In today’s tight academic budgets, it is unlikely that many new programs will be created despite the demand for Logistics majors. Therefore, the challenge is to create a process to provide LIS with little new resources or support. In those cases, which is likely to be the majority of colleges of business, there is an alternative that may work.

Without repeating differences of Supply Chain Management (SCM), it is possible to use SCM as a substitute for Logistics to create a LIS or even SCMIS major. This model would be similar to the previous figure. However, the critical difference would be to cherry pick specific courses from across the existing catalog to gather the similar skills taught to a Logistics major. For example, purchasing or procurement is often included as part of the Logistics courses’ content. Many schools have a similar class in the Marketing department. Inventory control is a fundamental part of the Logistics education and often there is an inventory class in Operation Management course work. Using this approach, Figure 4 (previous page) presents a hypothetical model built from the catalog at Georgia Southern University. The key was to not use any Logistics classes, but rather build a similar set of skills from other existing courses. Since this university has a Logistics program, it provides a significant challenge since there are not duplicate courses across majors. For example, a purchasing class would not exist in both the Marketing and Logistics areas. The key point is that if Figure 4 can be built at a university that has a Logistics program; it should actually be easier with a wider selection of courses.

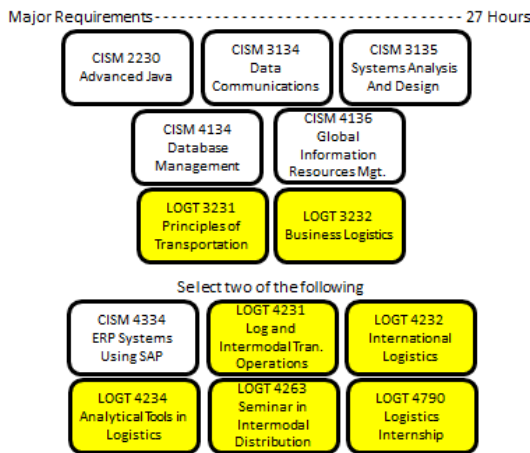


Figure 3. Example of LIS Course Requirements for Georgia Southern University

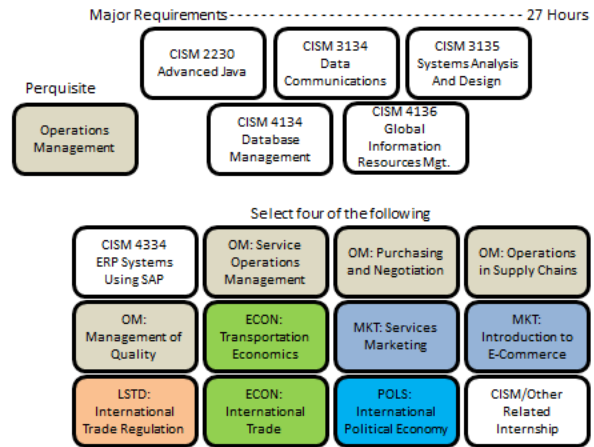


Figure 4. Example of Theoretical LIS Course Requirements

First, it should be noted that Principle of Operations Management (OM) is substituted for the two principles type of classes in Figure 3. Most business majors will require the OM class for all majors. However, when trying to demonstrate to potential employers of LIS students, it highlights skills that are often similar between the operations and Logistics majors. Therefore, it is shown to highlight that some of the key Logistics skills are also found in an OM fundamental course.

Next, the Figure 4 is similar to previous figure in the required classes. It uses the same catalog as Figure 3, but does not include any Logistics classes. While the two basic Logistic classes are missing, some of the content that would likely be covered there is shifted to OM. Instead of having seven required classes and two electives, the mix changes to five required and four electives with this example model. The big difference is the wide range of Logistics related classes from across a number of departments and colleges. The color coding is just to align classes by department (gray is OM, green is Econ, etc.) The critical point is that there are numerous classes across a college of business and campus that are very similar to skills taught in Logistics courses. Just to provide one example, the concept of the deregulation of transportation was mentioned earlier in the paper. While the material would not be exactly similar, the concepts of regulation in international transportation would be covered in the Legal Studies class in this model. Another example might be elements of customer service would be imbedded in the Introduction to E-Commerce along with the concepts of drop-shipping, cross-docking and international transportation as well as the IS side of implementation.

The key to Figure 4 is it demonstrates that it is possible to build a Logistics or SCM minor using existing courses at most universities. The challenge to IS faculty is to identify and build a solid curriculum in Logistics. This can be helped by using Figure 4 as a guide and contacting Logistics Faculty at other institutions. And while Figure 3 is likely to provide a deeper understanding of Logistics for LIS students, Figure 4 presents a realistic, suitable and practical alternative for IS Faculty to consider. The cost of implementing a Figure 4 type model should be insignificant (no new faculty, no new resources, etc.) Also, Faculty from other disciplines would be likely to support Figure 4 since it should increase enrollment in their classes with high achieving IS majors. The challenge for the IS Faculty would be to identify appropriate courses at their universities to create an appropriate set of skills for their LIS majors.

CONCLUSIONS

The purpose of this paper was to present an opportunity for IS Faculty to examine the role of Logistics within their curriculum. There is little doubt of the size and need of Logistics market and its corresponding IS needs. There is a huge, but niche, market that LIS majors can tap. The results at one university highlight the benefits to both programs' stakeholders. The two models provide starting points that every university will then have to tailor. It is not a quick or easy process, but at least at Georgia Southern University, it has worked well. There are costs and benefits to this process and not every IS program or college should undertake it. However, it is an untapped niche that could benefit a large number of stakeholders.

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