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The Current Situation of Supply Chain Management and Technology Structure at Al-Hassan Industrial Estate in Jordan

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by

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ABSTRACT

Introduction: countries all over the world have competed to develop their economies through different methods. One of the ways is enhancing Logistics and Supply Chain Management (LSCM). The Jordanian government is one of the governments that found out that if it needs to improve the Jordanian economy it has to improve the supply chain management (SCM) in almost every aspect of life.

Problem: The current status of the use of information systems for LSCM at Al-Hassan Industrial Estate (AIE), and the current enterprises' policies for LSCM were not known.

Purpose: The study aimed to answer the following questions: What are the major challenges and developments with the use of information systems for LSCM? What is the actual level of satisfaction of current AIE enterprises' policies regarding LSCM? Finally, what is the actual need of enterprises at AIE for the effective use of information systems for LSCM?

Method: The questionnaire helped in gathering data from enterprises on issues related to challenges, benefits, and development on the use of information systems for LSCM in AIE. The researcher used all the 49 companies as the study population at Al-Hassan Industrial Estate in Jordan. The SPSS program helped in the analysis of the collected data. The descriptive analysis was used to represent the results.

Conclusions: This study provides a first overview of the Jordanian companies regarding the LSCM. This study aimed to explore the state of logistics and supply chain management and the use of information systems to support LSCM at AIE.

Current companies' policies are focusing on suppliers more than customers. Also, the companies have to spend more effort to develop their LSCM planning by using techniques such as employee training. In addition, they are using the standard package systems more than customized systems. Also, most of the companies benefit more than average by using LSCM systems. Finally, the majority of these companies are not satisfied with the current policies.

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Last but certainly not the least, I am proud to acknowledge the generous and enduring support and prayers of my mother, my father and my wife during this work. I dedicate this thesis to them.

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CHAPTER 1

THE PROBLEM AND ITS SETTING

Introduction

Countries all over the world have competed to develop their economies through different ways. One of the ways is enhancing Logistics and Supply Chain Management or LSCM. Governments and firms are starting to be aware of the integration strategy of concepts like systems, technologies, and frameworks with LSCM. These concepts are used to enhance the efficiency of LSCM. Also, the difficulty of the competition in the world market forces government and companies to think more dynamically. Firms build strong relationships with suppliers and customers, by sharing information and knowledge. Governments improve their relationships with their citizens and other countries. Also, by using technology infrastructure, they are increasing the level of sharing important information with other parties. According to integration strategies, firms create a collaborative effective supply chain that is capable of competing in strong ways. Kahn and Mentzer believed that, the integration is "a process of interdepartmental interaction and interdepartmental collaboration that brings departments together into a cohesive organization (1996)." In the literature review chapter, there will be more details about LSCM and technology. Also, it will be shown how integration is important between the management and the technology.

Managing a supply chain strategy consists of managing activities like material resourcing, production planning, and the necessary information that is used in a physical distribution system. There are a lot of techniques, which are used to manage and improve the LSCM's activities, like Material Requirements Planning, Manufacturing Resource Planning, Enterprise Resource Planning, Supplier Relationships Management, and Customer Relationships Management. These days, the most powerful technique in management is technology (Mentzer, 1996). Technologies are used to enhance the LSCM strengths.

One of the most powerful technologies is wireless technology. This technique is used in two ways: the first one is Radio Frequency Identification or RFID. This technology was adopted by Wal-Mart in the United States and by the US Department of Defense or DoD. The RFID technology is supposed to be able to eliminate many of the problems with supply chain efficiency. The second technology is Global Positioning Satellites or GPS. Technologies such as these helped companies to improve tracking processes, processing information and customer relationships (Parvatiyar, 2001). The RFID technology is an example that represents the developed situation of the LSCM in one of the most developed countries, like the United States. This country placed the appropriate technology infrastructure in its place.

The Jordanian government is one of the governments that found out that if it needs to improve its economy it has to improve the supply chain management (SCM) in almost every aspect of life. Also, the Jordanian government found that economic improvement will not be achieved without technology improvements. In addition, it found the importance of the combination between technology and LSCM (Shwawreh, 2006). Applying technology in the Jordanian economy has a lot of support starting with King Abdullah and ending with the economist themselves. HM King Abdullah II says:

> "It is time to widen the scope of our participation in the knowledge economy from being mere isolated islands on the periphery of progress, to becoming an oasis of technology that can offer the prospect of economies of scale for those who venture to invest in our young available talent" (Government, 2006).

A lot of efforts are spent by the Jordanian government to develop the technology sector and the supply chain management programs. According to a United Nations survey, the efforts that were spent to develop the technology sector can be seen through the big improvement in technology between the Jordanian situation in 2005 and the Jordanian situation in 2008 (UN, 2005) (UN, 2008). Also, regarding The Global Information Technology Report 2009-2010 which was conducted by the CIA, Jordan ranked 44 (WorldEconomicForum, 2010). That meant Jordan started to compete with developed countries.

The literature review chapter will show the Jordanian government efforts in improving the LSCM. The Jordanian government objectives of enhancing technology tools are to improve the government transformation, to attain the critical national goals and improve the Jordanian economy. By providing a strong technology infrastructure, the government will gain a lot of advantages which will attract investors from all over the world to invest. The geographical location for the Middle East, generally, and Jordan, specifically, plays an important role to attract the international firms and that affects the response time of developing an effective LSCM program (Transportation, 2008). International firms believe Jordan's geographical location to be the perfect connection point, which connects them with the world in their commercial supply chains. Some investors believe that the Jordan location gives them a bigger chance to enhance their business to become global (Transportation, 2008). All those reasons and more effect the development of the LSCM program in Jordan.

General Statement of the Problem

In order to investigate the current status of the use of information systems for LSCM, and to review the current enterprises' policies for LSCM, a survey was conducted for the industrial firms at Al-Hassan Industrial Estate (AIE) in Jordan. The results of the study gave an indication about the companies' situation regarding LSCM. The results of this study came with the answers for three questions. The first question: What are the major challenges and developments with the use of information systems for LSCM? The second question: What is the actual level of satisfaction of current AIE enterprises' policies regarding LSCM? Finally, what is the actual need of enterprises at AIE for the effective use of information systems for LSCM? By answering these questions, it was easy to extract a conclusion about the LSCM situation.

Statement of the Hypothesis

The null hypothesis of the study was that the enterprises at AIE are not aware of effective strategies and systems regarding the LSCM. The alternative hypothesis was that the enterprises at AIE are aware of strategies and systems regarding the LSCM, and they are ready to implement the most effective solutions for LSCM. There are three reasons for the alternative hypothesis. The first, the Jordanian government, according to a recommendation from King Abdullah, spent a lot of effort in developing the economy in many different ways. The most effective effort is to enhance the technology sector and the technology infrastructure. That, for sure, will positively affect the LSCM area in Jordan. Second, as mentioned above, the Jordan geographical position can be attractive to the world investors. Third, according to the United Nation survey, there was a big enhancement between the Jordanian situation in technology between 2005 and 2008. Finally, in 2010, the CIA factbook classified the Jordanian economy as an emerging market with a free market economy (WorldEconomicForum, 2010).

The Limitations

There are two limitations for this study. The first one is that there is a shortage of academic research that is conducted for LSCM in Jordan. This affected the literature review and hindered the clear picture of the Jordanian LSCM situation.. The second limitation is that the Arabic translation for the LSCM terminologies can affect the meaning of the original English terminology.

The Delimitations

There are two delimitations found in this study. First, manufacturing and services enterprises were the target sample for this study, because they tend to adopt such these information systems (Ketikidis,2008). The second is that the enterprises that are located outside the AIE were not covered by the study. The lack of money and time restricted the wide distribution of the survey to every city in Jordan.

The Definitions of Terms

Management: Management is the act of organizing people to achieve certain goals. Also, it can be defined according to the Merriam-Webster dictionary as "the conducting or supervising of something as a business" (2010). Henri Fayol, who developed a theory of Management Science, believes that the most important activities of management are forecasting, planning, organizing, commanding, coordinating and controlling (Fayol, 1917).

Technology: The International Network for Small and Medium Sized Enterprises or INSME defined technology as "a human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities" (2003). In other words, technology is any process that can improve the human knowledge and be used to solve problems by making life easier. Finally, Merriam Webster defined technology as "a

manner of accomplishing a task especially using technical processes, methods, or knowledge" (2010).

Information Systems or IS: Information Systems can be defined simply as computerized tools that are used to organize data and information in easy form to extract decisions that help in managing organizations (Skinner, 1985).

Integration: Merriam Webster defined integrate as "to incorporate into a larger unit" (2010). From the definition it can be understood that integration is anything that can work with another to come out with an output or a result. The research purpose of defining this concept is to inform the reader that the integration between management and technology came out with concepts like the automotive SCM. Also, the supply chain management used a lot of technologies to enhance its improvement. The new supply chain management is named automated supply chain management. The literature review chapter will include more explanation about the integration between management and technology.

Information Technology or IT: Simply, Information Technology is using technology resources to facilitate the use of information. Also, it can be defined as "the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data" (Merriam-Webster, 2010).

Supply Chain Management or SCM: SCM is managing the activities that are used to deliver a product from manufacturers to target users. Also, it can be defined as the "management of all the activities along the supply chain from suppliers to internal logistics within a company and to distribution to customers." (ETSU, 2010). The new form of SCM is the automated SCM, which is using technologies to improve the efficiency of SCM. Detailed definitions for SCM will be in the specific section.

Logistics Management: Logistics management is managing the process of moving products or resources from one place to another in order to meet customers' needs. The Council of Supply Chain Management Professionals defined logistics management as:

> "that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements" (2000)

Logistics and Supply Chain functions can overlap, but from the researcher concept the only difference is that Supply Chain tends to focus on purchasing and procurement and the logistics is focusing more on the physical flows of the products and resources.

Hashemite Kingdom of Jordan: Jordan is a country in the Middle East and the capital city is Amman. Jordan is classified as an emerging market with a free market economy by the CIA World Factbook in 2010 (WorldEconomicForum, 2010).

Al Hassan Industrial Estate or AIE: It is an Industrial city that houses several outsourcing companies supported by foreign shareholders with most of the products sold to American and European markets. The AIE consists of 49 manufacturing and service companies which can be classified as light and high- tech industries.

Assumptions

This study is built on three important assumptions. The first assumption is that there is a need for this study to know the current situation for SCM of Jordanian enterprises. The second assumption is that the target population of this study is representative of industry in Jordan. Finally, the researcher assumes that the IT managers are able to understand the survey was which conducted by using the English language.

CHAPTER 2

A REVIEW OF THE RELATED LITERATURE

Overview

The Jordanian government has a lot of basic required to LSCM, like technology tools and professional skills, which can build strong LSCM solutions. A lot of effort is spent to enhance the LSCM area. This effort can be summarized in two sectors, health care and transportation. This chapter will give the reader an overview of past research. First, it will discuss the integration between the management and technology. Then, it will discuss the supply chain management topic. Finally, it will focus on the Jordanian effort in enhancing the LSCM area.

The Technology, Management, and Effective Integration

Henry Mintzberg defines a manager in his research as "that person in charge of the organization or one of its subunits" (1975)**.** According to Mintzberg's research, he found that the traditional duties for managers are to write and execute the plans after evaluating and collecting information to help in managing the organization. Also, he found some facts in his research, which are that managers work at an unrelenting pace, that their activities are characterized by brevity, variety, and discontinuity, and that they are strongly oriented to action and dislike reflective activities. Wickham Skinner defined technology, in chapter nine of his book *Manufacturing, the Formidable Competitive Weapon,* as "the set of physical processes, methods, techniques, tools, and equipment by which product are made or service rendered" (1985). From Skinner's definition, it can be understood that technology can serve any production system, and

it can be effective. In addition, from the definition of Skinner, it can be found that technology can be applied to companies' management to improve it. Skinner believes that "an intelligent manager can learn to understand and to deal effectively with technology" (1985). The Information Era has generated new technologies able to improve almost every aspect of business, and one of these aspects that are affected by technology is SCM. By making a combination between management and technology concepts, it will find a new output named information technology, or IT. As mentioned above, IT is a system used to control and manage. IT now has become the backbone of every business. IT was a revolution for the business world. "Information technology is no longer a business resource; it is the business environment" is what John Browning indicated as a result of his survey that he made in 1990 (Choure, 2004). As mentioned above, SCM is one of the business activities that were affected by technology, which became a more effective system by applying technology. Technology enables firms to improve their business operations. All organizations now are aware of the effects, benefits and implications of technology in SCM, and also its ability in creating its own competitive advantages. A creative SCM can also add value to a firm by reducing cost or increasing revenue. The creativity in SCM can be formed by using effective technologies.

Supply Chain and Supply Chain Management

Overview

Forrester, through his management research, was able to define and build the basics of the SCM idea that "Management is on the verge of a major breakthrough in understanding how industrial company's success depends on the interactions between the flows of information, materials, money, manpower, and capital equipment" (1958). Also, he was aware of the technology impact he believes that "The way these five flow systems interlock to amplify one

another and to cause change and fluctuation will form the basis for anticipating the effects of decisions, policies, organizational forms, and investment choices" (1958). Even though Forrester's article is more than 50 years old, he forecasted the new shape of SCM and how the technology systems will play an important role in managing SCM.

The concept of SCM has risen and become popular during the last 10 years (Martha, 1997). There are two important reasons for the popularity of this concept. The first one is global sourcing, "this globalization of supply has forced companies to look for more effective ways to coordinate the flow of materials into and out of the company." The second reason is the rapid changing in technology and economics. These reasons force enterprises to implement a more effective and flexible supply chain system (Mentzer, 2001).

Opinions about Supply Chain

La Londe and Masters believe that a supply chain is a group of enterprises that pass materials forward (Londe, 1994). Christopher believes the Supply Chain is "the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer" (1992). In simple words, supply chain consists of manufacturing, distribution, and target customers.

Supply Chain Types

There is confusion in the supply chain classification. Hicks, Earl and McGovern, in their research, divided supply chain into two types. The first type is the external supply chain which involves companies' relationships with customers and with suppliers. Also, it may include external firms as a third party. The second type is the internal supply chain. The internal type

involves the relationship between different units within an organization. The figure below shows the two types (Hicks, 1999) (Dobler, 1996).

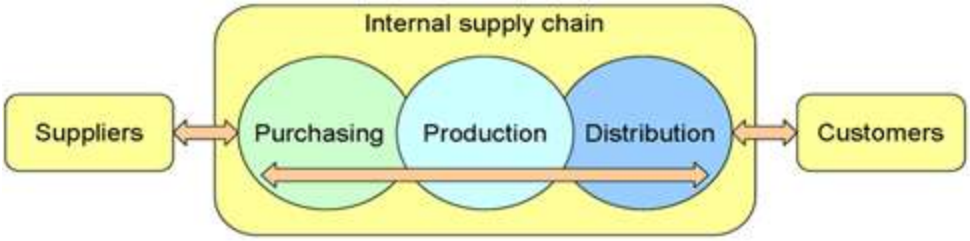

Figure 1: The Types of Supply Chain (Hicks, 1999)

Another researcher was concerned with defining supply chain in depth and divided it into three degrees of complexity (Mentzer, 2001). These three degrees are a direct supply chain, an extended supply chain, and an ultimate supply chain. A direct supply chain is when the flow processes of products, services, and information is divided between three parties, the firm itself, a supplier, and a customer. The figure below shows the simple level of SC.

Figure 2: Direct Supply Chain (Mentzer, 2001)

The extended supply chain is when the flow process of products, services and information is divided between "suppliers of the immediate supplier and customers of the immediate customer (Mentzer, 2001)." The following chart shows this level.

Figure 3: Extended Supply Chain (Mentzer, 2001)

The ultimate supply chain is when all the organizations shared in managing the flow processes of products, services, and information "from the ultimate supplier to the ultimate customer (Mentzer, 2001)." The figure below can summarize this level of SC.

Figure 4: Ultimate Supply Chain(Mentzer, 2001)

Opinions about Supply Chain Management

The Council of Supply Chain Management Professionals considers supply chain management as:

> "The planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners which can be suppliers, intermediaries, third party service providers, and customers" (2000).

There are a lot of opinions about SCM, but it can be summarized by three opinions. The first opinion is from Monczka, Trent, and Handfield**.** They believe SCM is a concept "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers" (1984). The researchers' opinions simply can be summarized as the most important activities for SCM and how enterprises can organize these activities. Other researchers, La Londe and Masters, classified it according to the strong relationship between two parties "the development of trust and commitment to the relationship" between two or more firms (1994). Finally, Stevens believes that SCM is "the objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to affect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost (1989)." In Stevens's opinion there is a sign for the importance

of customers' relationships with a firm, and how it is important for a firm to improve this relationship to be stronger. From these three opinions it can be said SCM is a way to manage three things: the material flow process, customers' relationships, and others firms' relationships. From that, the SCM can be considered as a technique that firms use to make a balance between material processing, customers' satisfaction, and partner firms' relationships. The enterprises have to keep low inventory to manage their inventory perfectly and high quality with lower prices to keep customers satisfied. Finally, the firms have to find other firms to be partners who can help them to stay strong in the market. It can be concluded that the enterprises that possess stronger SCM systems are the enterprises that can easily compete in the market, and they will stay longer.

Supply Chain Management Goal

The researchers' opinions about SCM can lead to goals that must be achieved through implementing SCM systems. There are a lot of goals and advantages of SCM, but the most important goal from a firm's perspective is reduction of costs. The A.T. Kearney Management Consulting Company conducted a study about SCM. The main finding of the study was "supply chain costs can represent more than eighty percent of the cost structure in a typical manufacturing company" (A.T.Kearny, 2008). Most of the costs came because there were losses in sales regarding insufficient customer service or sold out products. Also, the study concludes that "for every dollar of inventory in a system, there are one to two dollars of hidden supply chain costs: working capital costs, asset costs, delivery costs, write downs and so on" (A.T.Kearny, 2008). The study also found the importance of a SCM system, "companies leading in supply chain performance achieve savings equal to three to seven percent of revenues compared with their median performing peers" (A.T.Kearny, 2008). Another study, about

efficient consumer response, was sponsored by the Food Marketing Institute. The study "estimated that forty two days could be removed from the typical grocery supply chain, freeing up $30 billion in current costs, and reducing inventories by forty-one percent" (Mentzer, Fundamentals, 2004). Hence, it can be concluded, from the A.T. Kearney and Food Marketing Institute studies, that the most attractive goal in the SCM topic is cost reduction, which will lead to quality improvement and stronger relationships with customers.

Logistics and Supply Chain Management in Jordan

There is a lot of effort spent to enhance SCM in Jordan. The Jordanian government was the leader in developing the supply chain management area in Jordan and that does not mean there is nothing going on in the private sector. The business sector did a lot of things regarding SCM, but it was too difficult to find research studies about that. Regarding previous research, SCM development in Jordan is in two government areas, the health care and the transportation, and one private company which is LG Electronics. The shortage of academic research that is conducted for LSCM in Jordan will affect the literature review and may hinder the clear picture of the Jordanian LSCM situation that will be presented.

SCM in the Jordanian Health Area

Overview

Effective supply chains help in success or failure of any public health program. Starting from that point, the Jordanian Ministry of Health or MOH asked for contraceptive logistic system estimation for the new SCM system to be used in MOH. This estimation had to be accomplished by the end of 1996. That decision was taken because the MOH was afraid of the weakness of contraceptive supply. This weakness of the supply system would affect its family planning programs. Therefore, it identified the importance of needing to improve the logistics

system as a high priority (Chandani, 2004). The estimation results can be summarized by the following points:

- ❖ The logistics system is weak and fails to identify an individual responsible for managing the contraceptive distribution system (Chandani, 2004).
- ❖ All reports were missing important logistics data elements, which will affect the future forecasting and other important logistics management efforts (Chandani, 2004).
- ❖ The logistics system was informal and lacked guidance (Shawkey, 2003).
- ❖ There is confusion about the ordering process for contraceptive supplies (Shawkey, 2003).

From the previous points, it can be found how the MOH situation was worse during that time. United States Agency for International Development or USAID helped the government to develop and enhance the MOH logistics and supply chain. USAID provided a combination of short and long term projects to Jordan. These optimal solutions can be summarized by transferring the necessary skills and technology to the Jordanian health care sector.

Building the Logistics System

The logistics procedures were designed by Jordanian nationals (Shawkey, 2003). By the end of the first quarter of 1997, a complete situation analysis for all parts of the system was conducted. After the analysis process was completed, the design process was started by gathering the recommendations from all health providers at all levels (Chandani, 2004). After that, the MOH policy makers gave their approval to the new inventory control system. The next step was building the training strategies. One important step in building the system was a skill test for quality control. The system was simple, and some of the reports were done manually. Then, it was developed by collecting feedback from health employees. In the first quarter of 1999, a

computerized Central Information System or CIS was developed. The new system helps in improving the efficiency of MOH (Chandani, 2004) (Shawkey, 2003).

The reports from the new system were helpful in finding logistics problems, such as stock imbalances or an unusual number of losses or adjustments. Any problem faced by the health providers was resolved by the system developer via collecting the feedback (Chandani, 2004).

All the effort that was spent in developing the system was with help from USAID, but by the end of 1999 the government was able to manage the system without any help. Chandani mentioned that "training on the new system could have started earlier, but it was more important that the MOH first approve it as the official system" (Chandani, 2004). The MOH recognized that the system will be helpful in its family planning program. Also, politicians support the logistics system in a stronger way than before after they found the advantages and the results of building a system such as the new logistics system. The new system was able to improve the functions of the family planning program, which was proved by continuous contraceptive availability (Chandani, 2004) (Shawkey, 2003).

By implementing the logistics and supply chain system, the Jordanian government gained a lot of advantages. The advantages can be summarized by the following important points:

- Improving the relationship between the citizens and the MOH. By implementing the system, it was easy for the MOH to satisfy the citizens' needs. They are feeling more confident about the family planning program (Shawkey, 2003).
- Improving quality of care. The new effective logistics system improves quality of care, not only in the family planning program, but throughout the health care system (Shawkey, 2003).

- ❖ Improving cost effectiveness. The new system reduced the cost in different ways, such as reducing losses due to overstock or damage (Shawkey, 2003).
- ❖ Improving the reporting techniques which help in meeting the health centers' requirements. "The system in Jordan was designed to enhance timeliness of reporting" (Chandani, 2004). Also, that helps in cutting the costs (Shawkey, 2003).
- ❖ Using the system enables the MOH to prepare national forecasts (Chandani, 2004).

The following chart shows a comparison between the stock outs situation of the health centers before and after implementing the system. Also, the chart summarizes the important results of the logistics and supply chain management system.

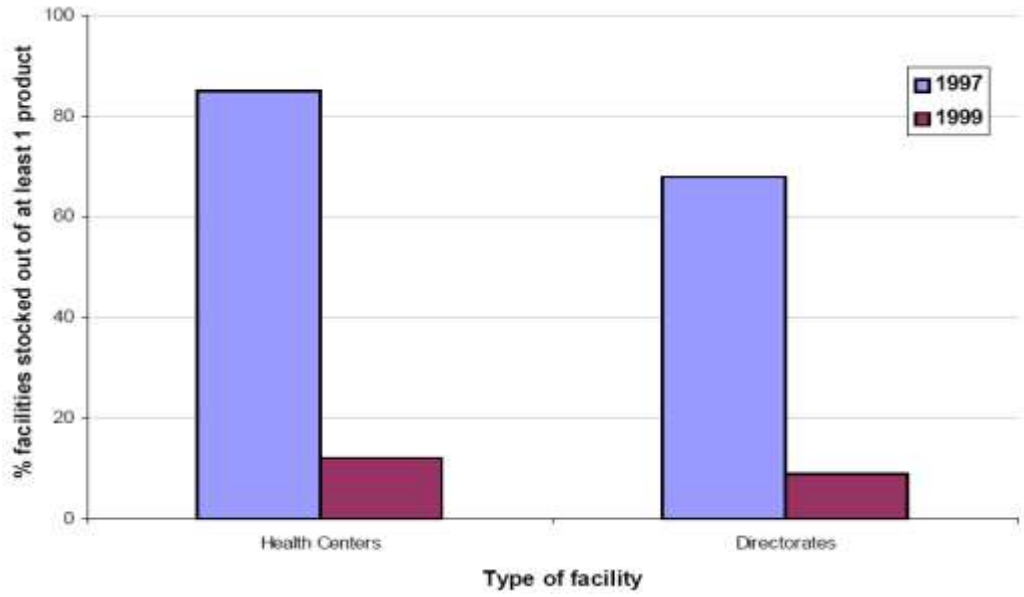

Figure 5: Contraceptive Stockouts at Health Centers (Chandani, 2004)

SCM in the Jordanian Transportation and Trading Across Borders

Overview

Logistics and supply chain management affects almost every aspect of life. One important area that was affected by LSCM was the transportation area. Also, this aspect was

affected by technology. Technology and LSCM improvements created a new economy in the world. The new economy was characterized by producing a large flow of goods with few differences (Shwawreh, 2006). Also, the technology infrastructures helped in enhancing the quality level of products transportation processes, especially with using the electronic data interchange techniques. One example of the new transportation method that appeared because of the technology development is the way that it is used in electronic commerce or E-commerce. Jordan is one of the countries where E-commerce is still not developed. The reasons for this weakness can be summarized by the weakness of the Jordanian logistics and supply chain management, and the weakness of the technology infrastructure (Shwawreh, 2006). Even though there are a lot of efforts to develop the LSCM in Jordan it is still a weak area. The next section will show the government effort in this area.

The Government Efforts in Developing LSCM in the Transportation Area

The government realized that to improve its ability to trade across borders it has to develop the logistics and supply chain management system which was used in the Jordanian Customs Department or JCD (BizCLIR, 2006). To achieve this goal the government developed the system through two programs with help from USAID.

The first program is The Golden List Program. This program "was designed to make JCD a global leader in trade and customs efficiency" (BizCLIR, 2006). Basically, it enhanced the supply chain security measures. Also, it enabled the JCD to be more prepared to meet the international standards which were mandated by institutions like the U.S. Container Security Initiative or CSI. In addition, it helped in reducing risk for both JCD and the private sector business through increasing the transparency of the process (BizCLIR, 2006). The Golden List Program did not affect the government procedures to approve the necessary operations for

import or export, but it motivated other countries “to enact reciprocal agreements for accepting the low-risk shipments of Jordanian Golden List members” (BizCLIR, 2006). That affects the procedures overall by reducing delays in those countries.

The second program is the Customs Integrated Tariff System or CITS. The goal of the CITS was to build a professional integrated system that helps the government sector and the private sector. This system could be used to find a full listing of all government rules related to imports, exports, and transfer goods in Jordan. One advantage of this program is reducing the costs and bribery related to exports and imports (BizCLIR, 2006). To achieve the goal of this program, a web based program was built and it was accessible to both the private and public sectors.

It can be concluded that the effect of these programs was significant. CITS helped the Jordanian government stay away from these economic obstacles by providing a website including a database for all customs and government policies. The Golden List Program minimized the obstacles that businesses face in exporting or importing goods, which made the process of the trade across borders in Jordan easier. These programs were beneficial to the Jordanian economics by building more efficient systems for the trade across borders and by making the import and the export processes more competitive globally. After developing these programs, there was a significant improvement in the export and import process. This development can be seen through the following graph which compares the days required to import and export goods in 2006 and 2008.

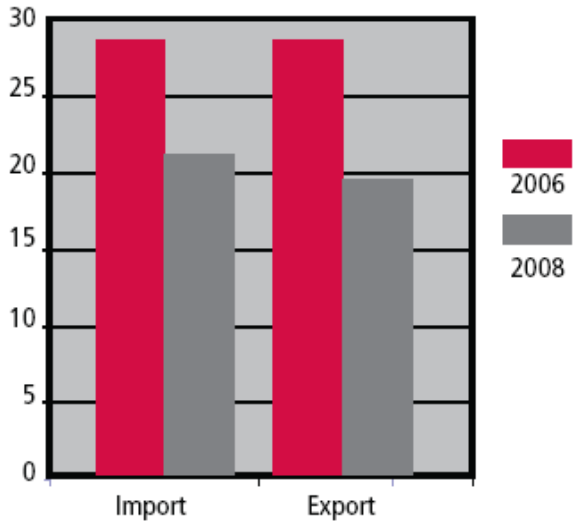

Figure 6: Days Required to Import and Export Goods in Jordan (BizCLIR, 2006)

LSCM and the Private Sector in Jordan

Overview

The business sector is concerned about developing LSCM more than the government sector because firms aim to maximize profits and minimize costs. Any successful LSCM system can help in achieving these goals. In Jordan, the business sector is also aware of the advantages that can be gained by enhancing a LSCM system to be more effective. Regarding the lack of research studies for the private sector, one company will be used as an example. The company is LG Electronics.

LG Electronics and LSCM System

LG worked to develop its system of supply chain management. LG Electronics obtained the benefits of developing its supply chain management. In Dubai International Financial conference was declared that one of the benefits that LG got through the new SCM system is cutting costs which reached 350 million dollars during the period from January to September 2009. Also, the company expects to close the financial year of 2010 by cutting costs up to 400 million and an increase in the cash flows of over 800 million dollars. One of the important

issues in SCM is the rate of stock turnover. By using the new system, LG was able to increase the rate of inventory turnover by 10 days, at the end of the third quarter of 2009, compared with the previous year. That led to a decrease in costs up to 150 million dollars. Also, by developing the new system, LG decreased the costs of logistics operations by 15% compared with 2008 (Dubai-Center, 2009). Another advantage that LG gained through the new system was improving the sales forecasting by 40% in 2008. The last advantage was improving the accuracy of time delivery by 10%. Finally, LG electronics is still improving its system to be applied to all company's branches during the first half of 2010, specifically after the advantages that were gained through applying the system in Jordan. The company has a long plan to develop supply chain management. The plan extends over three years to achieve the best practices in supply chain management at the operational level, implementation by 2012 (Dubai-Center, 2009).

Summary Of State Of Art

From the review of the literature it can be concluded that the government sector is the leader of implementing LSCM systems in Jordan. Also, USAID spent a lot of effort to help the Jordanian government in enhancing the LSCM in two sectors, health care and transportation. The LSCM ranged from enhancing the security rules to online database systems. On the other hand, the review of the literature failed to provide the readers with the correct situation for the effort that was spent by the Jordanian business sector. The review of the literature gave the case of LG Electronics Company as an example for the business sector.

The review of the literature indicates that it is important to conduct a survey. The survey will answer the research questions about the LSCM situation in Jordanian companies. Also, the results of this study will be a good reference for the LSCM systems in Jordan. This study can be used for future research studies.

CHAPTER 3

METHOD OF INVESTIGATION

Overview

In order to investigate the current status of the use of information systems for LSCM in the AIE and to review the current enterprises' policies for LSCM, a survey was conducted. This chapter defines and explains the procedures employed, and specifies the minimum requirements that the study must meet. Also, in this chapter, there will be a description of the designing tools that were used in the study.

Description of the Procedures

Combinations of two methodologies were used in this study, a literature review and a questionnaire survey. Studying the previous literature helped the researcher to understand the situation of information systems that were used for logistics and supply chain management in Jordan. Also, that helped in knowing what the major challenges are. The literature review methodology helped to implement an online questionnaire powered by freeonlinesurvey.com. The questionnaire helped in gathering data from enterprises on issues related to challenges, benefits, and development on the use of information systems for LSCM at AIE. The researcher used all of the 49 companies as the study population at Al-Hassan Industrial Estate in Jordan. The researcher sent the survey to IT managers of those companies to partake in the exercise. Also, the researcher got the subject names from the Jordanian yellow book. The officials of the

companies that filled out the survey were the IT managers. In addition, the researcher asked permission from the participants by introducing himself, his background and research to the participant companies. An Institutional Review Board (IRB) considered the study as an exempt study. An introduction of the researcher, his background and objectives of the study, along with contact information of the researcher, the academic advisor, and the IRB was in the informed consent. The participants voluntarily participated in the study.

All of the 49 companies responded to the survey. This high rate of the response was because of the small sample size. The researcher was using phone and video conferences to track, follow up with the participants and explain the survey questions. Also, these techniques were used to contact the participants that did not respond from the first time. The number of companies that were responded the survey from the first time was 28 companies. On the other hand, 21 companies did not respond the survey from the first time. The researcher spent extra effort to follow up with them by using the phone and video conferences.

After collecting data, the analysis process started. The SPSS program was used in the analysis of the collected data. The descriptive analysis was used because the sample size is small. Finally, the results of the analysis helped in building the answers of the study questions.

Description of Subjects and Equipments

The success of this study depends on two important tools, using the Statistical Package for the Social Sciences or SPSS program and a survey builder program. The following is a description for each of these:

Survey Builder Program*:* building the survey needs a lot of time and effort. Powerful programs are used to facilitate this issue. An example of these programs is freeonlinesurveys.com, which is a web site built particularly to facilitate the survey process. By

using this web site, the survey of this study was built. This web site does not need specific software to install and it was easy to use. It was assumed that the participants will feel more comfortable by using this website because it will save their privacy. Finally, this web site prevents the participants from taking the survey more than once by using the cookies technique.

Statistical Package for the Social Sciences Program*:* it is a computer program built for statistical analysis purposes. SPSS software helps researchers studying current situations for specific situations and forecasting future trends. Also, it is a tool used by firm managers to make correct decisions about their products. By using this software, firms are "able to direct and automate decisions to meet business goals and achieve measurable competitive advantage" (spss.com, 2010). This software was helpful for this study. By using SPSS, it will be easy to analyze the data that will be collected from the target enterprises and results can be converted to graphics which will facilitate reading the results.

Given the type of data that was collected, the analytic technique that is most suited in this study is the descriptive analysis. This technique is the most appropriate for the small sample size. The analysis will be presented in tables and charts which will give a better understanding of the results. One of the descriptive statistics methods that had been used in this research is measuring the central tendency by using the mean which enables the researcher to determine the average number of the companies that are participating in a specific behavior regarding LSCM. Another descriptive statistics method that had been used in this research is measuring the variability by using variance and standard deviation. The variance indicates the degree of variability among the companies for a given variable. The standard deviation is the square root of variance providing an index of variability in the distribution of scores.

Research Design and Procedures

The study procedures depend on the survey that was built. The survey consists of thirteen closed questions based on the literature review. A trial study for the questionnaire was built to collect the participants' feedback regarding the questionnaire. Three companies were randomly chosen from the 49 AIE companies for this refinement process. The questionnaire was updated regarding recommendations from the participants. Also, by using the trial study, the needed time to answer the questions was determined. About 15 minutes were needed to answer the questions which are divided into three parts. Dividing these questions into three parts made the analysis process easier to find the answers for the study's questions. Each part answered a specific study question.

The study questions are: What are the major challenges and developments with the use of information systems for LSCM? What is the actual level of satisfaction of current AIE enterprises' policies regarding LSCM? Finally, what is the actual need of enterprises at AIE for the effective use of information systems for LSCM?

Questions one and two identify the demographics of the companies that are participated in the study.

Study question number one is answered from the survey question number three to question number eight. This part asks about the strategic planning for managing supply chains and the success degree in managing supply chains. Also, this section asks about the efforts which are spent in developing supply chains. That includes asking about the logistics strategic plan and logistics training programs which are conducted through logistics departments. The answers for the questions in this part will make it easy to understand the major challenges and developments for LSCM. That will be the answer for the first question.

Study question number two is answered from the survey question number nine to question number eleven. This part asks about the current information system that is used in firms and the benefits for that system. Also, in this section, the participants were asked about the obstacles that are faced if a new system will be implemented. This part will help to answer the second research question about the enterprises' current information systems.

The answer of the last study question is answered from the last two questions in the survey, question number twelve and thirteen. These questions were designed to investigate the public policy regarding LSCM and the factors that will help improve the LSCM and these factors are needed from the companies at AIE. By answering the questions in this part, it will be easy to extract the answer for the last question which is about the actual need in developing LSCM at AIE enterprises.

Finally, by putting all the findings of the three parts together, it will give an overview of the information systems that are currently in use for LSCM at AIE.

CHAPTER 4

FINDINGS

Introduction

Chapter three describes the methods used in the research study. This chapter will present the data that have been gathered through the questionnaire survey and convert it into information after analyzing it by SPSS. It will also describe the techniques used in the analysis of the data that was collected. A description of the findings relevant to the problem and hypothesis will be explained. First, descriptive statistics about company profiles will be presented. Then, it will be used to answer the research questions. In addition, some charts will be used to represent the results. Finally, in the last section, there will be a summarizing of the research results.

Overview

Using the questionnaire described in chapter three, the study was built and the appropriate data were collected. Again, the statement of the problem was as follows: In order to investigate the current status of the use of information systems for LSCM at AIE, and to review the current enterprises' policies for LSCM, a survey must be conducted. All of the data collected will either confirm or deny the hypotheses. The null hypothesis of the study was that the enterprises at AIE are not aware of effective strategies and systems regarding the LSCM. The alternative hypothesis was that the enterprises at AIE are aware of effective strategies and systems regarding the LSCM. The research questions are: What are the major challenges and

developments with the use of information systems for LSCM? What is the actual level of satisfaction of current AIE enterprises' policies regarding LSCM? Finally, what is the actual need of enterprises at AIE for the effective use of information systems for LSCM?

Analytic Techniques

Given the type of data that was collected, the analytic technique that is most suited in this study is the descriptive analysis. This technique is the most appropriate for the small sample size. The analysis will be presented in tables and charts which will give a better understanding of the results. One of the descriptive statistics methods that had been used in this research is measuring the central tendency which enables the researcher to determine the average number of the companies that are participating in a specific behavior regarding LSCM. Another descriptive statistics method that had been used in this research is measuring the variability by using variance and standard deviation. The variance indicates the degree of variability among the companies for a given variable. The standard deviation is the square root of variance providing an index of variability in the distribution of scores.

Description of Finding

Overview

The data analysis showed interesting results in six significant issues related to the aim and objectives of this study. These issues are the need for improvement in the LSCM strategic planning, the current situation and the type of the systems, benefits that were gained from LSCM systems, problems that were faced while using LSCM systems, satisfaction with current policy and the factors that will help in developing the LSCM.

Company profiles

The following charts show the descriptive statistics about companies' profiles at AIE. The first chart Figure 7 shows the number of companies that participated in the study. Also, it can be found that the two main sectors were involved in the study: 67.35% for manufacturing companies and 32.65% for services companies.

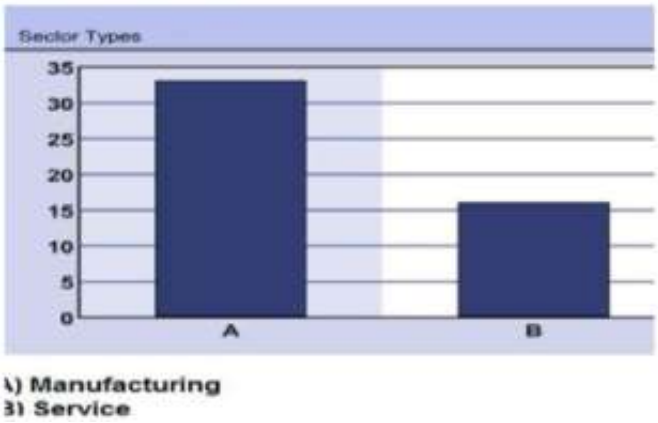

Figure 7: Sector Types

The next chart Figure 8 shows the industry types for the companies that participated in the study. From the chart, it can be found that there are five categories for the companies: food, plastic and rubbers, chemicals, textile and IT. From the chart, it can be seen that 70% of the sample were textile manufacturing and 30% of the study sample consisted of chemical, plastic and rubbers manufacturing, food and IT services.

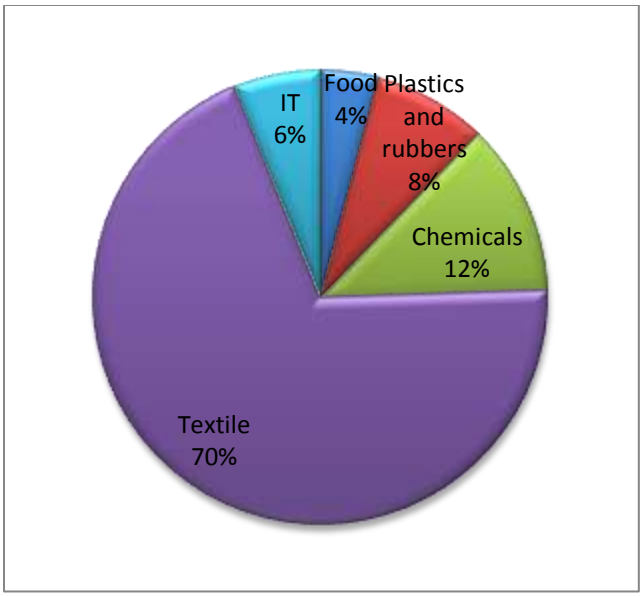

Figure 8: Industry Types

Supply Chain Management Strategies at AIE

Table 1 shows that the companies at AIE believe that they need to improve their strategic planning concerning LSCM by using third party logistics strategy (3PL), followed by outsourcing strategy, and then just in time supply strategy (JIT). This part of the results gives a glance about the future trend at AIE. It seems that they will use more effective policies than what they are using in the present. Further research can be conducted in order to investigate the future situation in depth for the LSCM at AIE. Second, from the table, it can be found that the companies are satisfied with the strategies of partnership with suppliers, building a close partnership with customers, using E-procurement strategy and many suppliers strategy. Third, the study found that more than the half of the companies are implementing the use of external consultants' strategy. Finally, from Table 1 it can be found that the companies at AIE claim that there are some strategies that are not appropriate. These strategies are subcontracting, supply chain benchmarking and few suppliers.

Table 1

LSCM Strategies at AIE

	Improve	Start Implementing	Satisfied already	Not appropriate
Partnership with Suppliers	8	4	37	0
Close Partnership with Customers	4	12	32	0
Just In Time (JIT) supply	10	7	7	9
E-procurement	4	12	14	1
Electronic Data Interchange (EDI)	10	4	14	7
Outsourcing	10	6	8	8
Subcontracting	1	10	7	13
Third Party Logistics (3PL)	12	6	5	8
Supply Chain Benchmarking	9	5	5	14
Few suppliers	6	6	5	14
Many suppliers	0	8	16	9
Holding safety stock	10	0	13	9
Use of external consultants	9	20	1	2

Supply Chain and Partnerships at AIE

Table 1 shows the status of partnerships between the companies in the sample with both their suppliers and customers. Regarding the companies' relationship with suppliers, 37 companies (75.51%) believe their partnerships with suppliers are satisfactory already, at the

same time as eight companies (16.33%) claim this partnership needs improvement. None of the companies believes partnerships with suppliers are not an appropriate strategy.

Regarding the companies' relationship with customers, the situation was nearly the same, 32 companies (66.67%) are satisfied with their partnerships with their customers, while at the same time, four companies (8.33%) state that it needs improvement. None of the companies believes partnerships with customers are not an appropriate strategy.

The last finding about their partnership was that twelve of the companies (38.71%) are planning to improve the third party logistics (3PL) partners and six companies (19.35%) classified themselves as starting to implement. Just five companies (16.13%) are satisfied with 3PL strategy. Finally, eight companies (25.81%) believe that 3PL strategy is not appropriate for them.

The Companies' Efforts Regarding LSCM

The study found that more than the half of the companies (55.1%) do not have a separate logistics department, 57.1% of the companies do not have a clear logistics plan and 71.4% of them do not provide training programs to their employees. The following charts Figure 9 , Figure 10 and Figure 11 show these results.

Figure 9: The Companies That Have Separate Logistics Department

Figure 10: The Companies That Have a Clear Logistic Plan

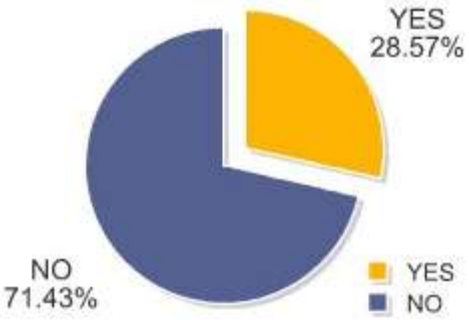

Figure 11: The Companies That Provide Training Programs to Their Employees

The Information Systems that Currently are In Use for LSCM at AIE

Table 2 shows the information systems that are currently in use to improve the LSCM at AIE. The most popular systems were enterprise resource planning systems (ERP) with 87.76%, and then manufacturing resources planning systems (MRPII) with 83.67%. In the same popularity is advanced planning systems (APS) with 83.67%, followed by material requirements planning systems (MRP) with 81.63%. Also, the percentage of the companies that are using the bar coding systems was 77.55%%, followed by supplier relationships management (SRM) with 73.47%, and finally warehouse management systems (WMS) with 71.43%. On the other hand, the unfamiliar systems are radio frequency identification system (RFID) with 22.45%, followed by just in time systems (JIT) with 26.53%, then E-commerce with 38.78%, then E-business with 42.86%, followed by electronic data interchange systems (EDI) with 46.94%. Finally, just 51.02% of the companies are using the decision support or the expert systems.

From the second and the third column in Table 2, it can be found that the companies at AIE are using the standard package systems more than the customized systems. Figure 12 shows the percentage of companies that are using the standard package systems and the customized systems.

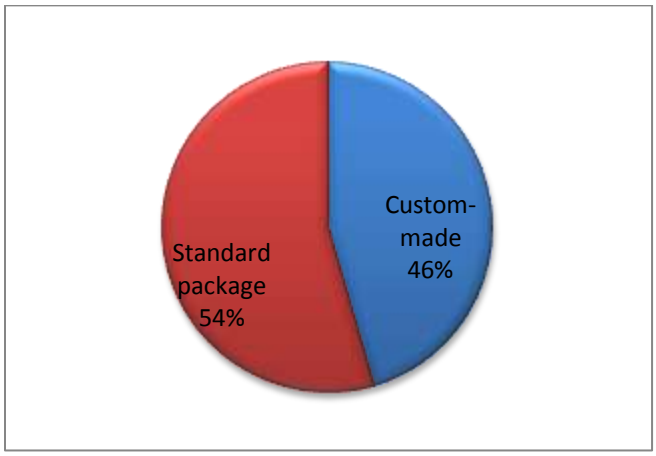

Figure 12: Type of Systems that are Currently in Use

Table 2

Systems that are Currently in Use

	Using custom made systems	Using standard package systems	Using custom made or standard package systems	Using custom made or standard package systems
Material Requirements Planning (MRP)	24	16	40	81.63%
Manufacturing Resources Planning (MRPII)	20	21	41	83.67%
Enterprise Resource Planning (ERP)	16	27	43	87.76%
Warehouse Management System (WMS)	14	21	35	71.43%
Supply Chain Management (SCM)	6	25	31	63.27%
Customer Relationships Management(CRM)	6	27	33	67.35%
Supplier Relationships Management (SRM)	12	24	36	73.47%
Advanced Planning System (APS)	26	15	41	83.67%
Just In Time (JIT)	6	7	13	26.53%
E-commerce	11	8	19	38.78%
E-business	12	9	21	42.86%
Decision support / expert system	6	19	25	51.02%
Radio Frequency Identification (RFID)	4	7	11	22.45%
Electronic Data Interchange (EDI)	17	6	23	46.94%
Bar coding	25	13	38	77.55%

The Benefits of Using the LCSM Systems

The benefits of using the LCSM systems were investigated through a specific question. These results are summarized in Table 3.

Table 3

Benefit from Using the LSCM Systems

	Mean	Std. Deviation
Better quality of information	4.14	1.291
Better quantity of information	4.11	1.172
Flexibility	4.25	1.212
Reduced lead-time in production	4.17	1.078
Cost saving	4.52	1.11
Forecasting	4.45	1.088
Resource planning	4.32	1.29
Better operational efficiency	4.41	1.019
Reduced inventory level	4.16	1.143
More accurate costing	4.3	1.133
Increased coordination between departments	4.35	1.32
Increased coordination with suppliers	4.56	1.319
Increased coordination with customers	4.55	1.174
Increased sales	4.65	1.197

1=Not at all, 2=Little, 3=Average, 4=Greatly, 5=A lot

The companies at AIE claim that the most important benefit of using these systems is increasing sales, which is at the top of the list with an average of 4.65, followed by increasing coordination with suppliers with an average of 4.56, then increasing coordination with customers with an average of 4.55, cost saving benefit with an average of 4.52, and forecasting benefit with an average of 4.45. The following chart shows these results.

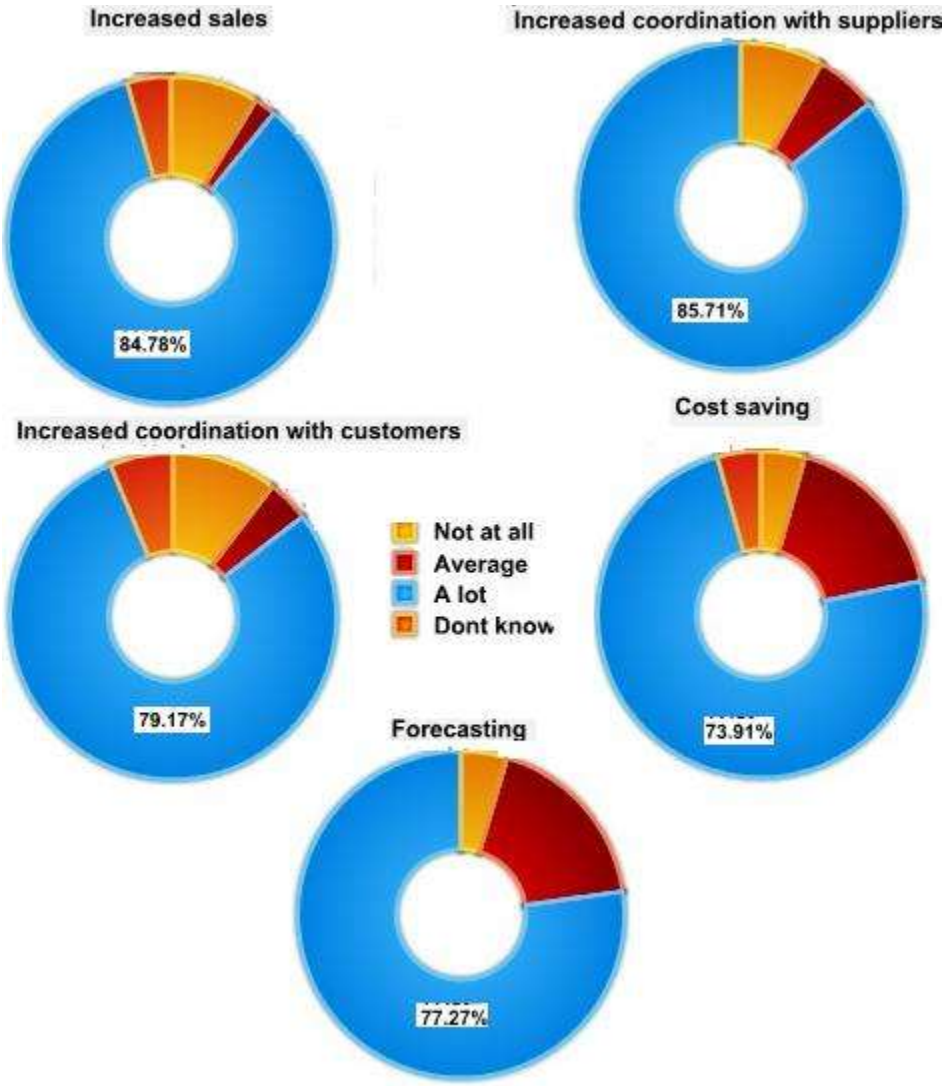

Figure 13: The Most Important Benefits of Using the LSCM Systems

The Problems of Using the LSCM Information Systems

By using the LSCM information systems, some problems will be faced by the AIE companies. The research extracts these problems through a specific question. These problems are summarized in Table 4. From the table, it can be found that the problems for these systems are skills shortages, integration with the supplier's system and integration with the customer's system.

Table 4

Problems of Using the Systems

	Mean	Std. Deviation
Resistance to change from employees	2.29	1.384
Resources shortages	2.05	1.447
Skills shortages	2.43	1.107
Insufficient vendor support	1.6	0.929
Hidden cost	1.42	1.18
Integration with existing system	2.02	1.52
Integration with supplier's system	2.89	1.588
Integration with customer's system	2.61	1.498

1=No problem at all, 2=Little problem, 3=Some problem, 4=Significant problem, 5=Serious problem

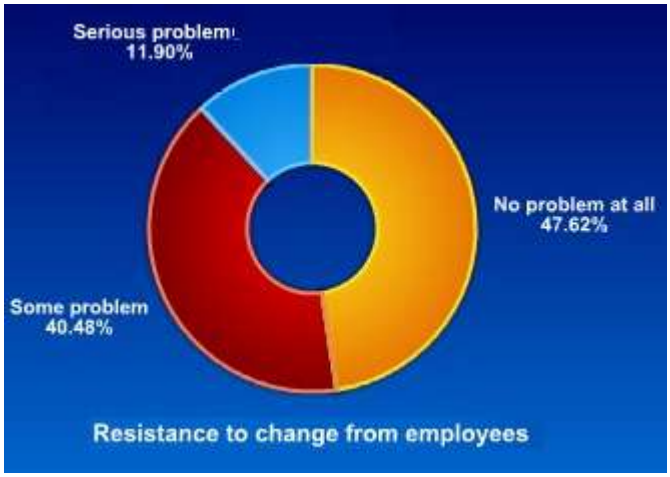

Figure 14: Resistance to Change from Employee Problem

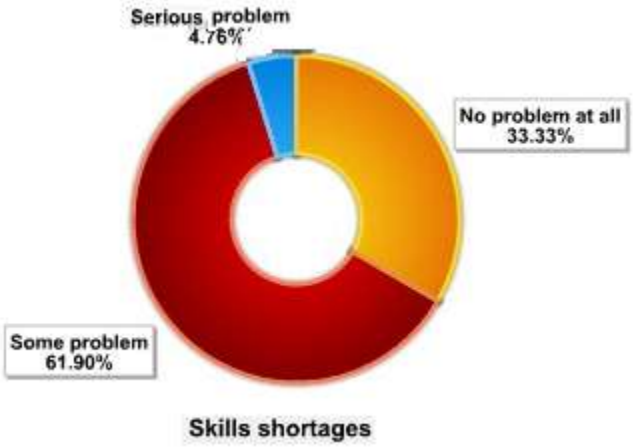

Figure 15: Skills Shortages Problem

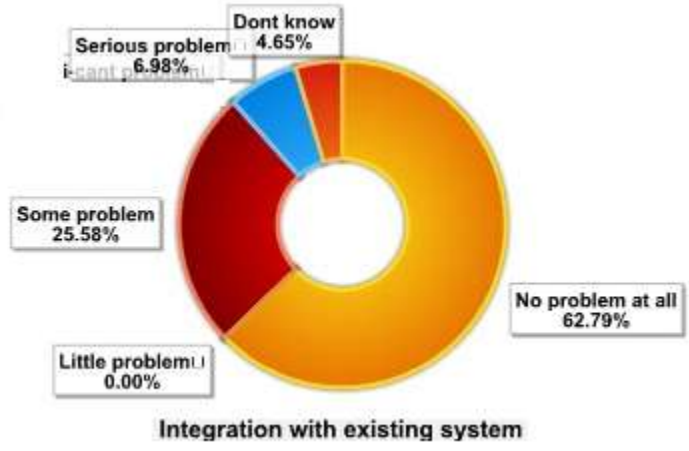

Figure 16: Integration with Existing Systems Problem

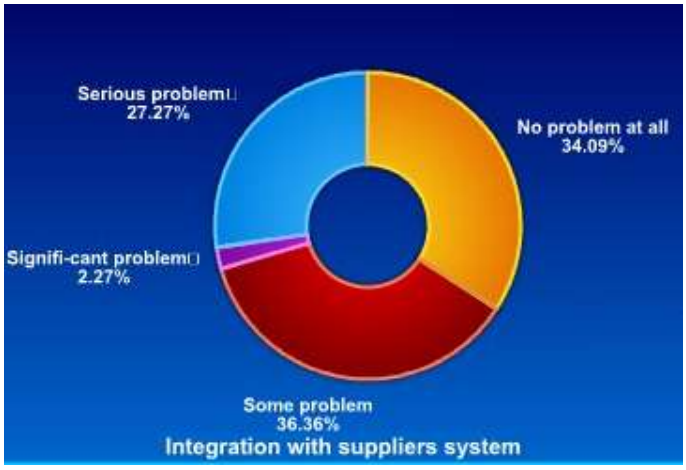

Figure 17: Integration with Suppliers' Systems Problem

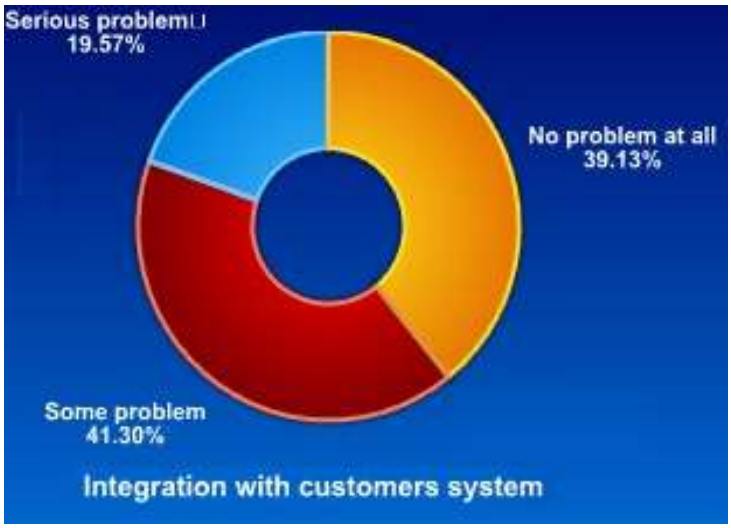

Figure 18: Integration with Customers' Systems Problem

Policies Regarding LSCM

Policies Satisfactions

In a specific question the companies at AIE were asked whether they are satisfied with current policies regarding LSCM. Table 5 summarizes the results for this question. From the table, it can be found about 20% of the companies are not satisfied at all with the LSCM policies. About 35% of the companies are somewhat satisfied. Also, the percentage of the companies that are satisfied with policies was 17.4 % of the companies; 28.3% of them are quite satisfied and

none of these companies are very satisfied. Finally, none of the companies is very satisfied with the current policy.

Table 5

Policies' Satisfactions Regarding LSCM and IS

Satisfaction Level	Percentage
Not at all	19.6
Somewhat	34.8
Satisfied	17.4
Quite satisfied	28.3
Very satisfied	0.0

Policies will Help in Developing the IT and LSCM

The companies at AIE need from the government and the lawmakers to improve the cooperation between companies and governments (4.15). They rank this factor as the most important factor that will affect the future of the IT and LSCM, followed by increasing regional cooperation between institutions (3.97), then signing more inter-country regional agreements (3.86), then improving information provision (3.77), and then finally, easier access to vocational training (3.7). Table 6 will show these results.

Table 6

Policies will Help in Developing the IT and LSCM

	Mean	Std. Deviation
More education, e.g. formal qualification	3.22	1.209
Easier access to vocational training	3.7	1.28
More funding and financial support	3.34	1.203
More inter-country regional agreements	3.86	1.7
Better infrastructure e.g. telecommunications, road, etc	3.56	1.625
Improved information provision	3.77	1.117
Increased regional cooperation between institutions, e.g. chamber of commerce	3.97	1.014
Closer cooperation between companies and governments	4.15	1.306

1=Not at all, 2=Somewhat important, 3=Important, 4=Quite important, 5=Very important

Summary:

This chapter has presented the finding of the current status of the use of information systems for LSCM at AIE. These findings can be summarized in the following points:

- The companies at AIE are focusing on dealing with suppliers more than customers.
- The companies at AIE do not spend enough effort to develop the LSCM policies.
- The companies at AIE are using the standard package systems more than customized systems.

- Most of the companies benefit more than average by using LSCM systems. These benefits are increasing the sales followed by increasing coordination with suppliers, then increasing coordination with customers, cost saving, and forecasting.
- The companies at AIE are facing problems by using LSCM systems. These problems are skills shortages, integration with the supplier's system and integration with the customer's system.
- The majority of these companies are not satisfied with the current polices.

The result of this study was able to answer the research questions. The researcher was not able to reject the null hypothesis that the enterprises at AIE are not aware of effective strategies and systems regarding the LSCM. Hence, the researcher failed to prove the alternative hypothesis. The alternative hypothesis was that the enterprises at AIE are aware of effective strategies and systems regarding the LSCM. The most important factors that are needed to develop the LSCM at AIE are help from the lawmakers by developing contemporary policies regarding LSCM and the companies need to spend more effort for developing the LSCM planning such as providing their employee training courses about LSCM.

CHAPTER 5

SUMMARY AND DISCUSSION

Introduction

In the preceding chapter, the analytic techniques were described and the results of the study were presented. In this chapter, the summaries of the research problem, method, and procedures will be presented.

Summary of Research Problem

The research purpose is investigating the current status at AIE and to review the current enterprises' policies for LSCM.

The study aimed to answer the following questions: What are the major challenges and developments with the use of information systems for LSCM? What is the actual level of satisfaction of current AIE enterprises' policies regarding LSCM? Finally, what is the actual need of enterprises at AIE for the effective use of information systems for LSCM?

Summary of Method

The questionnaire helped in gathering data from enterprises on issues related to challenges, benefits, and development on the use of information systems for LSCM in AIE. The researcher used all of the 49 companies as the study population at Al-Hassan Industrial Estate in Jordan. The researcher sent the survey to IT managers of those companies to partake in the exercise. Also, the researcher got the subject names from the Jordanian yellow book.

After collecting data, the analysis process started. The SPSS program helped in the analysis of the collected data. The descriptive analysis was used to represent the results. This technique is the best technique for the small sample size. The descriptive analysis was presented in tables and charts which gave a better understanding of the results. One of the descriptive statistics methods that had been used in this research is measuring the central tendency which enables the researcher to determine the average number of the companies that are participating in a specific behavior regarding LSCM. Another descriptive statistics method that had been used in this research is measuring the variability by using variance and standard deviation. The variance indicates the degree of variability among the companies for a given variable. The standard deviation is the square root of variance providing an index of variability in the distribution of scores.

Summary of Findings

The data analysis showed interesting results in six significant issues related to the aim and objectives of this study. These issues are the need for improvement in the LSCM strategic planning, the current situation and the type of the systems, benefits that were gained from LSCM systems, problems that were faced while using LSCM systems, satisfaction with current policy and the factors that will help in developing the LSCM. Also, the result of this study helped the researcher to answer the research questions.

From Table 1, it can be found that companies at AIE are focusing their partnerships on dealing with suppliers more than customers. Thus, it can be said that building strong relationships with suppliers has been more important in their supply chain than building strong relationships with customers. Also, like this relationship means that the companies are focusing on the production more than the market orientation.

The 3PL strategy is one of the most important strategies that are used in both local and international supply networks around the world (Ketikidis, 2008). By that, the study indicates that about 75% of the companies are even planning to implement or start implementing or they are satisfied with 3PL companies. This result gives a glance about the future of the 3PL partnership. The companies are aware of the importance of the advantages of 3PL strategy.

The study found that the companies at AIE are facing problems regarding LSCM planning. This study found out some of these problems and it will be discussed in the problem section but some of these problems need further research to find them out. Finally, it can be indicating that the companies at AIE need to spend more effort in the future in strategies planning by using activities such as providing training to their employees or building separate departments for LSCM.

The results in Table 2 harmonize with previous findings in Table 1 that the companies at AIE are focusing on the production more than the market orientation. Also, they are not satisfied with the electronic systems such as E-commerce, E-business or electronic data interchange. From the result about the electronic systems, further research can be conducted to find out the reasons for unpopularity of the electronic systems. Finally, from the second and the third column in Table 2, it can be found that the companies at AIE are using the standard package systems more than the customized systems. Figure 12 shows the percentage of companies that are using the standard package systems and the customized systems.

Regarding the benefits of the LCSM systems, the study found that most of the companies benefit more than average by using these systems. That was not a surprise at all because the IT solutions are beneficial to management in general and for LSCM in specific. This confirms the

benefits of integration technology and management that was mentioned in the literature review chapter.

From Table 4, it can be found that the companies at AIE can be described as overall satisfied with IT systems. In addition, the companies at AIE are satisfied with their suppliers and this satisfaction comes from their strategies of focusing on suppliers. Finally, they are using the standard package systems more than the custom made system as found in Table 2. Because of that they are facing integration problems with the systems of suppliers and customers.

Regarding the Policies satisfactions, the study indicated that the majority of these companies are not satisfied with the policy satisfaction. That means there are problems in the policies regarding the LSCM and these problems affect the development of LSCM at AIE.

These results in Table 6 harmonize with the result in the Table 5 that help is needed from the policy maker to develop contemporary policies that are able to develop the future of LSCM at AIE.

The result of this study was able to answer the research questions. The first question was: What are the major challenges and developments on the use of information systems for LSCM? The answer for this question is that the companies at AIE are focusing their partnerships on dealing with suppliers more than customers. Also, they are facing problems regarding LSCM planning. In addition, they are not satisfied with the electronic systems such as E-commerce, E-business or electronic data interchange. Finally, they are using the standard package systems more than the customized systems.

The second question was: What is the actual level of satisfaction of current enterprises' policies regarding LSCM? The answer for this question is that the majority of these companies are not satisfied with the policy satisfaction.

The last question of this study was: What is the actual need of enterprises at AIE on the effective use of information systems for LSCM? The companies need from the government to improve the cooperation between companies and governments. Also, they need to increase regional cooperation between institutions. In addition, signing more inter-country regional agreements will be helpful to improve the LSCM at AIE. Finally, the companies have to improve information provision and to build easier access to vocational training.

Hence, the researcher was not able to reject the null hypothesis that the enterprises at AIE are not aware of effective strategies and systems regarding the LSCM. Also, the researcher failed to prove the alternative hypothesis. The alternative hypothesis was that the enterprises at AIE are aware of effective strategies and systems regarding the LSCM. The most important factors that are needed to develop the LSCM at AIE are help from the lawmakers by developing contemporary policies regarding LSCM and the companies need to spend more effort for developing the LSCM planning, such as providing their employee training courses about LSCM.

Conclusion

This study provides a first overview of the Jordanian companies regarding the LSCM. This study aimed to explore the state of logistics and supply chain management and the use of information system to support LSCM at AIE in Jordan.

Current companies' policies are focusing on suppliers more than customers. Also, the companies have to spend more effort to develop their LSCM planning by using techniques such as employee training. In addition, they are using the standard package systems more than customized systems. Also, most of the companies benefit more than average by using LSCM systems. Finally, the majority of these companies are below the average with the policy satisfactions.

Implications

Given the success of this study, an expansion for this study can be made in the future by including a sample from all the cities in Jordan. If the time and money are available, the expansion can be real. By this, the conclusion can be for the entire country. Also, further study can be conducted regarding the future prospective of LSCM at AIE. In addition, another future study can be conducted regarding the reasons behind using the standard package systems more than the customized ones. Another study can answer the question why the companies at AIE are not satisfied with the electronic systems such as E-commerce, E-business or electronic data interchange. Finally, another possible study can be a comparison between the situations of LSCM in Jordan and the situation of LSCM in United States of America.

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APPENDIX A: SUPPLY CHAIN MANAGEMENT AT AIE QUESTIONNAIRE

1) Sector Types

Manufacturing

Service

Both

2) Industry

Food, Plastics and rubbers, Chemicals, Wood, Construction, Packaging,

Minerals, Textile, Engineering, IT or Other (Please Specify)

3) How do you manage your supply chain? *select all that apply*

Close partnership with suppliers, Close partnership with customers, Just In Time

(JIT) supply, E-procurement, Electronic Data Interchange (EDI), Outsourcing,

Subcontracting, Third Party Logistics (3PL), Supply Chain Benchmarking,

Few suppliers, Many suppliers, Holding safety stock, Use of external consultants,

Other (Please Specify)

4) How successful do you think is your company in managing its supply chain in general?

Not successful at all, Not successful, Somewhat successful, Somewhat successful ,

Successful or Very successful

5) Which of the following you think that your company needs to do in order to manage its supply chain better?

	Improve	Start Implementing	Satisfied already	Not appropriate
Partnership with suppliers				
Close partnership with customers				
Just In Time (JIT) supply				
E-procurement				
Electronic Data Interchange (EDI)				
Outsourcing				
Subcontracting				
Third Party Logistics (3PL)				
Supply Chain Benchmarking				
Few suppliers				
Many suppliers				
Holding safety stock				
Use of external consultants				

6) What types of systems are currently in use in your company to support Supply Chain Management?

	Custom-made	Standard package	Not in use
Material Requirements Planning (MRP)			
Manufacturing Resources Planning (MRPII)			
Enterprise Resource Planning (ERP)			
Warehouse Management System (WMS)			
Supply Chain Management (SCM)			
Customer Relationships Management (CRM)			
Supplier Relationships Management (SRM)			
Advanced Planning System (APS)			
Just In Time (JIT)			
E-commerce			
E-business			
Decision support / expert system			
Radio Frequency Identification (RFID)			
Electronic Data Interchange (EDI)			
Bar coding			

7) How much did you actually benefit from using these systems?

	Not at all	Average	A lot	Don't know
Better quality of information				
Better quantity of information				
Flexibility				
Reduced lead-time in production				
Cost saving				
Forecasting				
Resource planning				
Better operational efficiency				
Reduced inventory level				
More accurate costing				
Increased coordination between departments				
Increased coordination with suppliers				
Increased coordination with customers				
Increased sales				

8) In what level your company is facing the problems below when using these systems?

	No problem	Some problem	Serious problem	Don't know
Resistance to change from employees				
Resources shortages e.g. no maintenance and update				
Skills shortages e.g. Computer illiteracy within the company				
Insufficient vendor support				
Hidden cost				
Integration with existing system				
Integration with supplier's system				
Integration with customer's system				

9) How satisfied are you with the current public policy regarding SCM and IT?

Not at all, Somewhat, Satisfied, Quite satisfied or Very satisfied

10) How important are the following future measures for supporting your company effort in SCM and IT?

	Not At All	Important	Very Important
More education, e.g. formal qualification			
Easier access to vocational training			
More funding and financial support			
More inter-country regional agreements			
Better infrastructure e.g. telecommunications, road, etc			
Improved information provision			
Increased regional cooperation between institutions			
Closer cooperation between companies and governments			

11) Does your company have a separate logistics department?

Yes/ No

12) Does your company have a clear logistics strategic plan?

Yes/ No

13) Does your company provide SCM courses or training programs to the employees?

Yes/ No