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ANALYZING THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON SUPPLY CHAIN MANAGEMENT AND PERFORMANCE.

Research Proposal

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CHAPTER ONE: INTRODUCTION

1.1 Introduction to the Study

Information is said to be the glue that holds supply chains together in any organization and as a key infrastructure, information technologies continue to have significant impact on supply chain strategies. Focusing on the coordination side, the information technologies provides a virtually free platform for enhancing transparency, eliminating information delays and distortions, and significantly reducing transaction costs (Bozarth, Warsing & Flynn, 2009). Therefor one should acknowledge that, although information flow has speeded considerably, material flow has not gained much speed. This spectacle makes the synchronization of material, information, and cash flows even more crucial for effective supply chain management. Looking on the design side of the supply chain management, the current technology is able to badge a dynamic supply chain design in response to changing business environment (Byrd& Davidson, 2003). Furthermore, owing to the high competition in the business industry, supply chain events have become very information-intensive and IT has been noted as an increasingly important topic to help enterprises improve supply chain performance and management since   information is said to be the glue that holds supply chains together having a substantial impact on supply chain strategies in relation to coordination, enhancing transparency, removing information delays and alterations, and meaningfully minimizing the transaction costs.

1.2 Background of the Study

Effective Supply Chain Management (SCM) has confirmed essential for the competitiveness of organizations, since it guarantees the efficiency of supplies, and the appropriate coordination with traders, intermediaries and market needs. The application of Information and Communication Technology (ICT) in the Supply Chain Management has confirmed to have a positive impact on SCM performance for the companies that have implemented it, particularly in relation to procurement, as this improves collaboration, refining the quality of information shared between suppliers and purchasers (Lee & Whang,1997).

In many organizations, the increasing integration of information and communication technology (ICT) has led to favorable results in terms of goal accomplishment either generally or specifically in the functional areas of businesses. The operationalization of ICT in businesses should be integrated in dynamic areas, such as the management of the supply chain, since this allows for better controls in the management of material resources, avoiding delays in production and thus enhancing compliance with customers (Devaraj, Krajewski & Wei, 2007)

According to Shah (2009), ICT in an organization has various functions and it increases scale efficiencies of the organizations' operations, processes basic business transactions, collects and provides information relevant to managerial decisions and also keep records of status and change in the essential business functions within the organization and maintaining communication channels. Most organizations are always in the race of improving their organizational competitiveness and nowadays they are faced with a lot of trials in their supply chain management.

The situation here is attributed to the increase in construction scale and the cost of purchasing equipment, storage, maintenance and supply as the challenges organizations face (Liu, 2011). Companies in the 21st century view supply chain management as a universal organization strategy for accomplishing organizations competence and in order to improve their flexibility and responsiveness, companies are changing the way they operate by implementing Supply chain management paradigm and Information and Communication Technology strategies (Vickery et al., 2003).

Information and communication Technology aids to assess structure of the supply chain of organisations, the nature and management of supply chain and the environment in which the businesses operate from. Therefor organisations should have the potential to improve their Information Technologies so as to lower the costs associated in the supply chain. Organization's management need to assess the structure, nature and management of the supply chain by using tools and techniques of ICT to measure cost and performance of the company.

The introduction of internet and the advancements in information and communication technology (ICT) overtime has led to efficiency in the provision of real time information, timely access, sharing and exchange of data/information, improvements in coordination and interactions, logistics and other supply chain management (Manochehri, Esmail and Ashrafi, 2012). These advancements have influenced the planning and price of supply chain management, and consequently the connection among supply chain participants like suppliers, vendors, employees, customers. The supply chain management plays various roles in different industries or sectors. A case in point a grocery sector supply chain operation starts from ordering a product, which is then transported by a logistics company then received by the customer which in other words called network of end-to-end (B2B) operations. Accordingly, many have recognized the appliance of ICT

technologies in supply chain management. Information and Communication Technology field has also contributed within the internationalization of production and distribution networks in various industrial units. As many organisations are participating in additional than one supply chain within the dynamic business environment, ICT tools are recognized to steer global supply chains to develop comparative advantage for market competitiveness. In relation to Kable (2014), a survey at global level revealed that there has been a 40 percent increase in ICT costs (on hardware, software, communication and IT services) in year 2013 according to 168 retailers. ICT tools are majorly getting used in supply chain areas like order placement, inventory management, shipment tracking, exchange of information/transactions with vendors, e-payment information exchange with suppliers, mobile connectivity and cloud - based services (De Marchi, Di Maria and Gereffi, 2017). In particular, manufacturers and retailers in many developing nations are using ICT tools in supply chain to reinforce their operational promptness, efficiency and economic performance. From all the research findings there was a gap in the study in the impact of ICT in manufacturing industries in the KSA. On the other hand, there also develops inefficiencies in managing multiple supply chains as the business grow and expand and in terms of collaboration and communication with supply chain partners which affects the business performances and profit margins. The effective solution towards this has been recognized with the use of information and communication technologies. Information plays a crucial role in enabling transactions in supply chains. Creating an adequate information infrastructure to interface the members of a supply network has always been challenging. Such an infrastructure must be able to satisfy simultaneously the following requirements (Upton and McAfee 1996): First, it must be able to accommodate members with varying degrees of IT sophistication. Second, it must provide a wide range of functionality ranging from simple data transmission to access to remote applications. Finally, it must be able to

accommodate a constantly changing pool of suppliers and customers within varying stages of relationships. The Internet has emerged as an infrastructure technology that may simultaneously satisfy these three requirements. Johnson and Wang (2002) define e-business as "the marriage between the Internet and supply chain integration.Lee and Whang (2002) divide e-business applications into three categories: E Commerce, e-procurement, and e-collaboration, enables a network of supply chain partners to identify and quickly respond to changing customer demand captured over the Internet, e-Procurement enables companies to use the Internet for procuring direct or indirect materials as well as for handling value-added services. e-Collaboration facilitates coordination of various decisions and activities beyond transactions among the supply chain partners over the Internet. ERP systems have played a crucial role in e-enabling companies. In a natural experiment conducted at a U.S. high-tech manufacturer, McAfee (2002) found evidence that the implementation of an ERP system has led to significant improvements in operational performance a case in point (lead times and on-time deliveries) after an initial performance dip. In a recent survey, however, supply chain professionals highlighted four shortcomings in current ERP systems (Akkermans et al. 2003)

1.3 Statement of the problem;

Companies are striving to maintain relationships with global suppliers. IT is being used to address the information needs of supply chain is by companies (Lan & Unkhelkar, 2006) and the customer's demands have increased. Organizations are reexamining how to conduct business due to new technologies and the increasing intensity of competition and thus, companies are reinventing their supply chains in order to succeed and meet the new customer driven challenges. This is to sustain the competitive edge by attracting more customers and defending against the competitive forces (Graham et.al, 2013). Minimizing the inventory cost is a main advantage and

companies are seeking ways to please customer demand for fast and efficient service. Companies are seeking ways of managing the entire supply chain from raw materials to delivery of finished products to the customer.

Information Technology has a very big impact on the supply chain for example E-commerce is one of the Information Technology that has contributed a lot to improvement of the supply chain management and performance. It is an important aspect of cutting costs and a great enabler of the supply chain. Small and medium firms that have manual systems in their supply chain activities incur a lot of costs than those that have embraced the use of ICT. The biggest issue of a manual system is that more time is spent in search records, data redundancy, insufficient security backups and no updated records. This hinders the performance of the organisations in their supply chain activities. Implementation of ICT in organisations will save the firms in reducing these problems and they will be able to focus on getting new markets for their products, sourcing new suppliers, responding faster to customer demands and gain a competitive edge in the market. Few organisations that have computerized supply chain systems. There exists a gap between companies that are using a manual supply chain and the ones that use Information Technologies in their supply chain activities (Austin & Nolan, 1999). There is limited research regarding the use of Information Technology in supply chain activities among organizations. ICT does a critical function in an organizational supply chain because of the information that streams along the supply chain therefor, for companies to achieve a competitive advantage, they must maximize the use of Information and communication Technology since this enables organizations to come up with ways of reducing inventory cost, improving the lead time for products and integrate supply chain with the various functions of an organization

This study is therefore essential, particularly for organizations and companies which, in spite of being the most dynamic subsector in the industry it's still having the most challenging problems in terms of how they are prearranged, how they link with other sectors and in terms of general efficiency.

1.4 Research Questions

1. How has ICT contributed to efficiency and effectiveness of a supply chain management in manufacturing industries.

2. What are the benefits of ICT in the manufacturing industries?

3. What are the various ICT applications used in the organization and how they have been implemented in the company for it to maintain its competitive position?

4. What are the implications of the information technology on the overall improvement of manufacturing industries?

5. What are the factors that influence information and communication technologies (ICT) in the manufacturing industries?

6. What are the some of the recommendable approaches in managing ICT contribution to improve supply chain management in the manufacturing industries?

1.5 Objectives of the study

1.5.1 Broad Objective

The main objective of this study is to determine the impacts of Information Technology on supply chain management and performance in the manufacturing industries.

1.5.2 Specific Objectives

1. To determine how ICT has contributed to efficiency and effectiveness of a supply chain management in the manufacturing industries.
2. To determine the benefits of IT in the manufacturing industries.
3. To establish the various IT applications used in the organization and how they have been implemented in the company for it to maintain its competitive position.
4. To determine the implications of the information technology on the overall improvement of KSA manufacturing industries.
5. To explore factors that influence information and communication technologies (ICT) in the manufacturing industries.
6. To recommend approaches in managing ICT contribution to improve supply chain management in the manufacturing industries.

1.6 Significance of the study

The study will be of importance to the professionals in the supply chain management practices since they will be able to appreciate the value that Information Technology has on the Supply Chain. This helps them to know how they can improve their services in the supply chain management in order to attain a competitive ceiling. Manufacturing firms that practice supply chain in their daily activities will also have to benefit from the findings of this study. It is noted that most of these manufacturing industries do not have developed Information Technology systems that help them improve the activities. It will also be beneficial to retail supermarkets as it will assist them in giving more attention to information technology on their supply chain so as to improve efficiency and effectiveness in their operations.

Academicians will also benefit from the study. They need to put more emphasis on the importance of Information Technology in the supply chain field. These manufacturing industries are heading

towards green supply chain where they are reducing waste generated by the supply chain. So they need to train on how IT can reduce paperwork and encourage paperless transactions.

This study will be essential in revealing the impacts of using technological advancement in the manufacturing sector. The implications that are investigated in this study will be both negative and positive effects. The study of both positive and negative effects is also seen essential in ensuring that the industry is informed on the state of the technological innovations concerning quality management. Therefor the firm will be able to strike a balance in enforcing the benefits while diminishing the adverse effects related to the use of technological innovations. Previous studies reveal that the use of information and communication technologies in the public sector was embraced recently, and the forces that are associated with the use of innovative technologies in quality management has not been studied significantly. Therefore, this study holds a crucial role in carrying out the investigations to realize the impacts associated with the novel innovations in managing the quality of services offered to the public by the public sector.

1.7 Scope of the Study

The study will be conducted at among the manufacturing industries. The choice of the area will be purposive because the there are many manufacturing companies in the study area for easy access. Since the main aim of this study is to assess the impact of ICT on the performance and management of supply chain in the manufacturing industries and the impacts associated with embracing the new technologies in the in the performance of the firms.

 The effect of different changes in the supply chain performance in the industry will be studied while comparing their current SCP and the previous SCP. The respondents   to in this study includes the production managers, the suppliers and the venders but also the customers.

Questionnaires will be presented to these different respondent's categories to answer questions related to the impact of ICT on the supply chain performance.

1.8 Limitations of the Study

Availability of data

Since the study is sensitive on assessing the financial performance of the industry, data needed for this research depends much on the flexibility and understanding capacity of the respondents to provide quality and quantitative data which has got truth on it. Some of respondents are likely to give wrong information which is a very bad in research. But sometimes they fail to provide data because of their confidentiality and management reasons which hampers the whole process of accessing data but these can be only reduced by the researcher talking to them frankly and explaining to them the aim of conducting research.

Confidentiality

In any production firms there are some information and sources of information that are not allowed to be accessed by anyone who is not part of management team and the researcher may be wanting to use questionnaire and interview guides as the means of getting the required information rather than documentary sources. This research involves the collection of data from the administration, which is very sensitive and these might retreat because they might view the investigation as very sensitive in revealing their financial turnover thus, this will present a significant challenge for this study

Lack of cooperation

 In most cases it happens that some respondents refuse to give information or show out any

kind of relationship or cooperation in general which later impacts on the researcher to come out with inaccurate and inadequate data but the solution to this could be s that, the researcher shows a good impression at initial point and to pinpoint some important reasons for conducting research so that respondents could understand how imperative the researcher is.

Time constraint and resources

Data collection will be challenging as most of the company workers are too busy, and the collection of data from the workers will not be appealing to them as it will be viewed as a disruption to the activities of the departments.

1.8 Operational Definitions

1.8.1 Supply chain

Lyson and Farrington, (2006) define supply chain as the network of organizations that are involved, through upstream and downstream linkages, in various processes and activities that produce value in the form of products and services in the hands of the ultimate customer or consumer. A supply chain is arrangement of organisation, people, activities, information, and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials, and components into a finished product that is delivered to the end customer. The objective of supply chain is to maximize the profitability of the industry and therefor the value a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request.

1.8.2 Information technology

This defined as the study, design, development, implementation, support or management of computer-based information system, particularly software applicants and computer hardware (Anderson ,1990) IT includes all matters concerned with the furtherance of computer science and technology and with design, development, installation, and implementation of information system and applications. Information technology architecture is an integrated framework for acquiring and evolving IT to achieve strategic goals. It has both logical and technical components. Logical component include mission, functional, and information requirements, system configurations, and information flows. Technical components include IT standards and rules that will be used to implement the logical architecture, (McAfee, 2002)
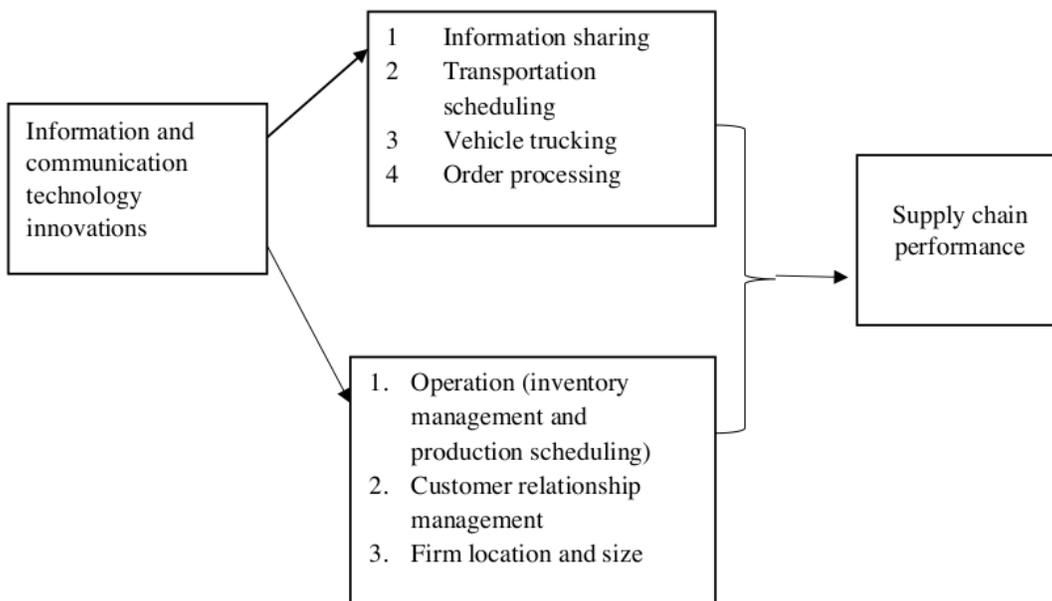
1.9 Organization of the thesis

This study will be divided into five chapters, as follows: Chapter one comprises the introduction of the research, which provides the picture of the study. It includes an introduction, background information of the study, problem statement, scope of the study, research questions, objectives, operational definitions, limitation of the study and conceptual framework.

Chapter two consists of the literature review about the impact of information and communication technology on supply chain performance. The literature review will provide the studies that have been done related to the topic and their findings, which will be important when generating conclusions of the study as compared with the past researches. The research will analyze the impacts of technological concepts. Chapter three will include the plan of the research, which will justify the thesis, data, objectives, and research questions. The section will describe the methodology of the study comprises of research design, the geographical location of the research, population, calculation of sample, the procedure used in sampling, and the tools that

will be used. The chapter will also have other elements such as analysis of data, the process of data collection, reliability, validity, and translation process.

Chapter four will have the presentation of the results after data analysis is done. The data presented will be presented as descriptive data, which will help to conclude the findings and to test the hypothesis and the research questions. Lastly chapter five will include a discussion of the results and conclusions. This chapter will also answer the research questions.

1.10 Conceptual Framework


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┌──────────────────┐      ┌────────────────────────────┐
│ Information and   │ ───▶ │ 1   Information sharing     │
│ communication     │      │ 2   Transportation         │
│ technology        │      │     scheduling             │
│ innovations       │      │ 3   Vehicle trucking       │──┐   ┌──────────────┐
└──────────────────┘       │ 4   Order processing       │  │   │ Supply chain │
            │              └────────────────────────────┘  ├─▶│ performance  │
            │                                               │   └──────────────┘
            │              ┌────────────────────────────┐  │
            └───────────▶  │ 1. Operation (inventory    │  │
                           │    management and          │──┘
                           │    production scheduling)  │
                           │ 2. Customer relationship   │
                           │    management              │
                           │ 3. Firm location and size  │
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Source; *developed by the researcher*.

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