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The Impact of Information Technology in Enhancing Supply Chain Performance: An Applied Study on the Textile Companies in Jordan

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Abstract
The study aims to introduce the impact of information technology in enhancing supply chain performance, it is an applied study on the textile companies in Jordan, the study figures out the impact of the information technology in enhancing supply chain performance among Textile industry in Jordan, that would help the organizations to draw the road map for applying and practicing the best information technologies in order to get the best supply chain performance, The importance of the study stems from the two important variables it aims to measure IT, SCM performance. The study concluded the following results : The sample of textile companies found to be aware of information technology, the sample's companies use information technology, results indicate that the sample supply chain affected by information technology development, there is an impact for the information technology in supply chain performance (firm logistic, vendor relationship management procurement, operation, and customer relationship management), information technology is also used by the sample's companies through doing some improvements to reduce the problems in the supply chain performance. The study recommends that the awareness of information technologies very important for manufactories for the purpose of using it and to gain the advantages of information technologies, the manufactories are also using information technologies for saving labors time utilizing the working hours in a better way to support supply chain performance.
Keywords: Information technology; Supply chain; Textile companies; Jordan.

1. Introduction

In the past few decades the world was witnessing a huge revolution in computing and telecommunications, and there
are no predictions that this revolution will stop in a while, this rapid changes motivate leaders among organizations to think of establishing best policies to adopt technology in an efficient and effective way in order to enhance the organizational performance. It is widely recognized that a “information technology” is the most important building block for most organizations to survive and compete with other organizations. Information is life blood of every organization, the current organizations needs accurate and immediate and comprehensive information. For long time it was addressed the importance of getting the right information at the right time in order to improve decision making process at all levels within the organizational context (Beynon-Davies 2009).
Seeking efficiency in supply chain management is combined with choosing the most appropriate and costly effective transportation means and channels, while using IT in supply chain management is considered an important tool to enhance over all organizational performance as it assists the organization to build an accumulative knowledge about customers, suppliers, distributors, and main channels (Fasanghari et al. , 2008). According to Sambamurthy et al.(2003) the creative IT solutions were the main capabilities that enables companies such as Dell, GE and Wal-Mart to create an integrated systems among their organizations that includes upstream and downstream activities. Using IT was recognized to have a high importance in SCM, new concept among SCM pears to be" digitized SCM" which means transforming the traditional supply management activities into an integrated information-based operations that includes upstream and downstream activities (Zhu, 2004).
The provided background implies the importance of IT impact on Supply Chain Management (SCM) and that was encouraging to conduct this study. This study is expected to build a comprehensive understand about the main determinants of IT dimensions that impact SCM in Textile companies in Jordan.

1.1 The Problem of the Study:

Lots of efforts pay a high attention for improving and excelling the supply chain performance because it is one of the main organizational indicators for success, at the same time the tools and systems offered by the technology to the organization are not avoidable, those tools assist the organizations to survive in such a huge competition era.
From here the study decided to figure out the impact of the information technology in enhancing supply chain

performance among Textile industry in Jordan, that would help the organizations to draw the road map for applying and practicing the best information technologies in order to get the best supply chain performance .

The problem of the study resulted from the lack of Arabian studies that highlight the impact of the IT on SCM, as the related literature review revealed that this subject is not yet wholly explained nor deeply verified.

So the main question of the study is "**What Is the Impact of Information Technology in enhancing Supply Chain Performance among the Textile Companies in Jordan**?"

This question is divided into 6 sub-questions:

1. What is the impact of Information Technology (IT) in enhancing the firm's supply chain activities in the textile companies in Jordan?
2. What is the impact of Information Technology (IT) in enhancing logistics performance in the textile companies in Jordan?
3. What is the impact of Information Technology (IT) in enhancing the vendor relationship management in the textile companies in Jordan?
4. What is the impact of Information Technology (IT) in enhancing procurement performance in the textile companies in Jordan?
5. What is the impact of Information Technology (IT) in enhancing operational performance in the textile companies in Jordan?
6. What is the impact of Information Technology (IT) in enhancing customer relationship management in the textile companies in Jordan?

1.2 Study Objectives

The objectives of this study are as follows:

1. Analyzing the relationship between information technology and organizational supply chain performance.
2. Introducing an advanced model to measure the overall supply chain performance.
3. The study will conclude a number of findings and results that will lead researchers for future insights.
4. Provide Jordanian organizations with recommendations related to how to select the best applicable IT with high impacts on the supply chain performance.

1.3 Study Importance

The importance of the study stems from the two important variables it aims to measure (IT, SCM performance), adding the importance of the field of the study (Textile industry) that enjoys a high importance in the Jordanian economy, as one of the leading and advanced source of investments. The study importance will result from contributing in both practical and scientific levels, as follows:

First: the importance of the study on the practical level:

The findings of the study expected to guide the researched organizations towards using (IT) for enhancing their supply chain performance to achieve business success and better strategic position. This study will support the targeted companies to know how to gain a competitive advantage by making the best use of technology to cut cost and provide high quality of products and services. This study will address the extent to which this pattern (IT) affects the supply chain performance, and also it will determine the most influenced dimensions.

Second: the importance of the study at the scientific level:

The proposed study tries to understand the relation between the (IT) and supply chain performance, then conclude results that may assist to suggest a comprehensive model. Also, due to, the lack of Arabic studies that covered this subject, makes this study a source to enrich the Arabic library, as well as starting point towards further studies in other sectors.

1.4 Research Model

As shown in figure (1), the model of the study contains two main variables, the independent variable is Information Technology (IT), and the dependent variable is supply chain performance that is consisting of 6 main dimensions (firm, logistic, vendor relationship management procurement, operation, and customer relationship management) that will be measured using the tool suggested by (Fasanghari et al. , 2008; Dong et al., 2009).

1.5 Hypotheses

The study hypotheses were formulated based on the literature review and the previous research results as follows:

Ho1: There is no statistically significant impact for the information technology in supply chain performance (firm, logistic, vendor relationship management procurement, operation, and customer relationship management) in the textile companies in Jordan.

Ho1.1: There is no statistically significant impact for the information technology in firm's activities related to supply chain performance in the textile companies in Jordan.

Ho1.2: There is no statistically significant impact for the information technology in logistics in the textile companies in Jordan.
Ho1.3: There is no statistically significant impact for the information technology in vendor relationship management among the textile companies in Jordan.
Ho1.4: There is no statistically significant impact for the information technology in supply chain performance operations in the textile companies in Jordan.
Ho1.5: There is no statistically significant impact for the information technology in procurement performance in the textile companies in Jordan.
Ho1.6: There is no statistically significant impact for the information technology in customer relationship management in the textile companies in Jordan.
Ho2: There is no statistically significant differences impact for the information technology in supply chain performance (firm, logistic, vendor relationship management, procurement, operation, and customer relationship management) in the textile companies in Jordan related to age of organization, number of employees.

1.6 Procedural Definitions

1.6.1 Information Technology: according to the study of (Fasanghari et al. , 2008) the term IT means "*the use of inter organizational systems that are used for information sharing and/or processing across organizational boundaries*".
As described by (Sliver et al. , 1995) Information Technology are implemented within an organization for improving the effectiveness and efficiency of that organization. Capabilities of the information Technology and characteristics of the organization, its work systems, its people, and its development and implementation methodologies together determine the extent to which that purpose is achieved. Masrek and Hashim (2009) categorized the Information Technology factors as (IS Facilities, IS Structure, IS Competency, Functional Dimension, and Technical User Support).
1.6.2 Supply Chain Performance: based on the definition of Stevens (1989) supply chain is "a series of interconnected activities which are concerned with planning, coordinating and controlling materials, parts and finished goods from supplier to customer" as cited by (Fasanghari et al. , 2008).

2. The Theoretical Framework

2.1 Why do organizations need information technology?

This Question was posted in many public related to business websites. IT is becoming growing effective in every day live and works. Made the coordinating role of the emerging information technology one of the topics that are sew the fabric of the organization. It is no longer possible to design or modified organizations without acknowledging that it is part of the fabric (Zammuto et al., 2007). In addition information is considered as lifeblood of any organization.

2.2 The Impact of IT on organizations:

It was addressed by Alter (2002), Information systems: Foundations of e-business that the Information systems have had a huge impact on the way that businesses operate.When computers were first introduced; employees had limited access to the data stored within them. As technology has developed, data storage has become more prevalent within organizations. With networked PCs, employees can now access information and information systems with an ease that was just not possible ten years ago, the study highlighted the impact of technology on business on the two main areas:

1) Economic Impact :
   By using appropriate materials and information systems, the organization can save materials and resources, as well as staff time. In addition administrative duties performed less effort, easier and less time-consuming through the introduction of suitable information systems.
2) Organizational Change: the study addressed the following factors to be considered when planning a new information system:
   - The environment in which the organization operates.
   - The structure of the organization.
   - The culture and politics of the organization.
   - The style of management.
   - The people affected by the organization – its employees and other interested parties.
   - The goal of the information system – what is the task, decision, business process ….etc. that this information system is supposed to assist with?.

2.3 Drivers for IT use in SCM

According to the study (Auramo et al., 2005; Magalhães, 2000) the main following reasons are the essential reasons to use IT in SCM:

1) Reduction of the costs of operational processes (manual work).
2) Improvement of information quality by eliminating human errors.
3) Speeding up the transfer of information between organizations

2.4 Previous Studies

The Study of Mishra, (2012) focused on the role of Information technology (IT) in supply chain management. It also highlights the contribution of IT in helping to restructure the entire distribution set up to achieve higher service levels and lower inventory and lower supply chain costs. The broad strategic directions which need to be supported by the IT strategy are increasing of frequency of receipts/dispatch, holding materials further up the supply chain and crashing the various lead times. Critical IT contributions and implementations are discussed. Fundamental changes have occurred in today's economy. These changes alter the relationship we have with our customers, our suppliers, our business partners and our colleagues. It also describes how IT developments have presented companies with unprecedented opportunities to gain competitive advantage. So IT investment is the pre-requisite thing for each firm in order to sustain in the market.

The Study of (Dong et al., 2009) in this study, the researchers aimed to better understand the value of information technology (IT) in supply chain contexts. Grounded in the resource-based theory in conjunction with transaction cost economics, they developed a conceptual model that links three IT-related resources (backend integration, managerial skills, and partner support) to firm performance improvement. The model differs from previous studies by proposing a moderating effect of competition on the resource-performance relationships. Using data of 743 manufacturing firms, their analysis indicates significant contribution of IT to supply chains, which is generated through development of the digitally enabled integration capability and manifested at the process level along the supply chain. The technological resource alone, however, does not hold the answer to IT value creation. In fact, managerial skills, which enable adaptations on supply chain processes and corporate strategy to accommodate the use of IT, are shown to play the strongest role in IT value creation. Furthermore, backend integration and managerial skills are found to be more valuable in more competitive environments. While commodity-like resources have diminishing value under competition, integrational and managerial resources become even stronger. Overall, their results shed light on the key drivers of IT-enabled supply chains, and provide insights into how competition shapes IT value.

Fasanghari et al. (2008) indicated that companies attempt to companies are attempting to find ways to improve their flexibility and responsiveness and in turn competitiveness by changing their operations strategy, methods and technologies that include the implementation of supply chain management (SCM) paradigm. Hence, information technology (IT) can enhance the ability of SCM. The aspects, however, which IT impact on SCM are not equal. In this paper, the researchers specify the areas that IT affects on supply chain, and evaluate it. Since the judgments of Iranians automobile industry are qualitative, the evaluation has been done by fuzzy ranking method, the main dimentions of SCM were (firm, logistic, vendor relationship management procurement, operation, and customer relationship management), the results of the study were IT enhanced teamwork and customer relationship management. To evaluate the impact of IT on SCM of automobile industry of Iran, it was tested by 8 experts of Iranians automobile industry supply chains which 90% were pleased with the obtained results.

The research of (Olugbode et al., 2008) aimed to study the effect of information systems on firm performance and profitability using a case-study approach on Beale and Cole Company that was experiencing significant levels of growth in its business. The researches realized that its existing operational practices and ICT infrastructure were incapable of efficiently sustaining their level of growth. A thorough analysis of the operational systems was carried out covering both the manual systems and those supported by its computerized accounting system. A number of beneficial changes were made, including the implementation of a major new business system replacing the old accounting system. In all these developments, the work of a teaching company associate, now known as knowledge transfer partnerships associate supported the analysis, but the full participation and support of all key personnel within the company was essential. Although there were problems during the implementation, these have being resolved and Beale and Cole now has a fully supported and integrated IT system which will maintain their competitive advantage and facilitate their continued growth and profitability.

The study of (David et al., 2004) indicated that the supply chain management is critical since firms always confront the competition on their supply chain efficiency. This article discusses the trend in supply chain management by examining Web technologies that transform and streamline the supply chain management.

2.5 Relevance of the Study

The proposed study is significant of the following reasons:

1. This study will provide clear evidence with or against the studies that indicated a positive impact of IT on supply chain performance.
2. The study helps to identify determinants of organizational SCM dimensions that impact over all

organizational performance.

3. an understanding of the IT impact on SCM will help the top management and decision makers within the commercial banks in Jordan to focus on achieving these conditions and desired effects.
4. Finally, the proposed study will provide insights for future researchers to apply the research findings to different areas.

3. Methodology

3.1 Population and Sample :

The population of the study consists of all textile companies based in Amman –Jordan, A probability sample will be employed to collect the data from top and middle managers, the sample consisted of (197) managers and head of departments in the selected companies. We received (150) responses, which correspond to a response rate of approximately 76%.

3.2 Measures

All constructs were measured using existing scales. All items were measured on a five point Likert - type scale where 1= strongly disagree and 5= strongly agree. Mean scale scores were calculated for all measures. We used the Cronbach's Alpha to estimate reliability for scales.

3.3 Statistical Methods

To achieve the objectives of the study used statistical software packages for Social Sciences (SPSS 22) for the analysis of the study questionnaires. The study analyzed the primary data by using several descriptive and statistical methods such as :

1. Descriptive statistics: frequencies, mean and standard deviations.
2. One Sample-Test and Multiple Regression: to test the hypotheses of the study.
3. Cronbach's alpha coefficient of reliability and consistency for the tool of study.

3.4 Type of Research

The study build a descriptive - quantitative -applied research type which involved collecting and converting data into numerical form so that statistical calculations can be made and conclusions drawn.

4. Hypotheses test

4.1 Main Hypothesis

Ho1.1: There is no statistically significant impact for the information technology on firm's activities related to supply chain performance in the textile companies in Jordan. (With a significance level equals or less than .05)

Table 1 T- Test Result for Hypothesis 0-1-1 (firm's activities)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
13.577	2.64	.000	0.403	0.171	Reject

Multi regression analysis was used to test this hypothesis .Table (1) as shown indicated that there is an impact of the information technology in firm's activities related to supply chain performance in the textile companies in Jordan. This relation is statistically significant upon (α=0.05) since calculated (t) is more than tabulated (t). Therefore the null hypothesis is rejected and the alternative one is accepted. This means that there is an impact of the information technology in in firm's activities related to supply chain performance in the textile companies in Jordan.

Ho1.2: There is no impact of the information technology on logistics related to supply chain performance in the textile companies in Jordan. (With a significance level equals or less than .05)

Table 2 T- Test Result for Sub Hypothesis 0-1-2 (logistics)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
3.019	2.0181	.004	0.426	0.162	Reject

Multi regression analysis was used to test this hypothesis .Table (2) as shown indicated that there is an impact of the information technology on logistics in the textile companies in Jordan. This impact is statistically significant upon (α=0.05) since calculated (t) is more than, tabulated (t). Therefore the null hypothesis is rejected and the alternative one is accepted. This means that there is a there is an impact of the information technology on logistics related to supply chain performance in the textile companies in Jordan.

Ho1.3: There is no impact of the information technology on vendor relationship management related to supply chain performance among the textile companies in Jordan. (With a significance level equals or less than .05)

Table 3 T- Test Result for Sub Hypothesis 0-2-3 (vendor relationship management)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
4.982	2.0181	.000	0.614	0.377	Reject

Multi regression analysis was used to test this hypothesis .Table (3) as shown indicated that there is an impact of the information technology on vendor relationship management among the textile companies in Jordan. This impact is statistically significant upon (α=0.05) since calculated (t) is more than, tabulated (t). Therefore the null

hypothesis is rejected and the alternative one is accepted. This means that that there is an impact of the information technology on vendor relationship management among the textile companies in Jordan.

Ho1.4: There is no impact of the information technology on operations related to supply chain performance in the textile companies in Jordan. (With a significance level equals or less than .05)

Table 4 T- Test Result for Sub Hypothesis 0-1-4 (operations)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
2.908	2.0181	.006	0.403	0.171	Reject

Multi regression analysis was used to test this hypothesis .Table (4) as shown indicated that there is an impact of the information technology on operations among the textile companies in Jordan. This impact is statistically significant upon (α=0.05) since calculated (t) is more than, tabulated (t). Therefore the null hypothesis is rejected and the alternative one is accepted. This means that there is an impact of the information technology on operations related to supply chain performance in the textile companies in Jordan.

Ho1.5: There is no impact of the information technology on procurement related to supply chain performance in the textile companies in Jordan. (With a significance level equals or less than .05)

Table 5 T- Test Result for Sub Hypothesis 0-1-5 (procurement)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
7.222	2.0181	.000	0.118	0.56	Reject

Multi regression analysis was used to test this hypothesis .Table (5) as shown indicated that there is an impact of the information technology on procurement performance in the textile companies in Jordan. This impact is statistically significant upon (α=0.05) since calculated (t) is more than, tabulated (t). Therefore the null hypothesis is rejected and the alternative one is accepted. This means there is an impact of the information technology on procurement related to supply chain performance in the textile companies in Jordan.

Ho1.6: There is no impact of the information technology on customer relationship management related to supply chain performance in the textile companies in Jordan. (With a significance level equals or less than .05)

Table 6 T- Test Result for Sub Hypothesis 0-1-6 (customer relationship management)

T Calculated	T tabulated	SIG T	R	R2	Result of H0 test
4.982	2.0181	.000	0.614	0.377	Reject

Multi regression analysis was used to test this hypothesis .Table (6) as shown indicated that there is an impact of the information technology on customer relationship management in the textile companies in Jordan. This impact is statistically significant upon (α=0.05) since calculated (t) is more than, tabulated (t). Therefore the null hypothesis is rejected and the alternative one is accepted. This means that that there is an impact of the information technology on customer relationship management related to supply chain performance in the textile companies in Jordan.

Test of the Main Hypothesis

Ho2: There is no statistically significant differences impact for the information technology in supply chain performance (firm, logistic, vendor relationship management, procurement, operation, and customer relationship management) in the textile companies in Jordan related to age of organization, number of employees.

Table 7 Two – way ANOVA Test Result for Sub Hypothesis 0-1

F Calculated	F tabulated	SIG F	Result of H0 test
1.511	2.55	.221	Accept

Two – way ANOVA was used to test this hypothesis .Table (7) as shown indicated that there is no differences for the information technology on supply chain performance (firm, logistic, vendor relationship management procurement, operation, and customer relationship management) in the textile companies in Jordan related to age of organization, number of employees. This impact is not statistically significant upon (α=0.05) since calculated (f) is less than, tabulated (f). Therefore the null hypothesis is accepted.

5. Results

Based on the analysis made, the study concluded the following results:

a. The sample of textile companies based in Amman –Jordan found to be aware of information technology, due to their interest in such production strategy and the advantages of information technology that support supply chain performance.
   As the sample's companies use information technology, results indicate that the sample supply chain affected by information technology development.
b. There is an impact for the information technology in supply chain performance (firm logistic, vendor relationship management procurement, operation, and customer relationship management) in the textile companies in Jordan.
c. Information technology is also used by the sample's companies through doing some improvements to reduce

the problems in the supply chain performance

6. Conclusion

The study concluded various findings regarding the impact of information technology on supply chain performance.

a. Awareness of information technologies very important for manufactories for the purpose of using it and to gain the advantages of SCM.
b. The manufactories are also using information technologies for saving labors time utilizing the working hours in a better way to supply chain performance.

c. It used for total productive maintenance, also used by the manufactories to avoids any loss or damage in the productive machines.

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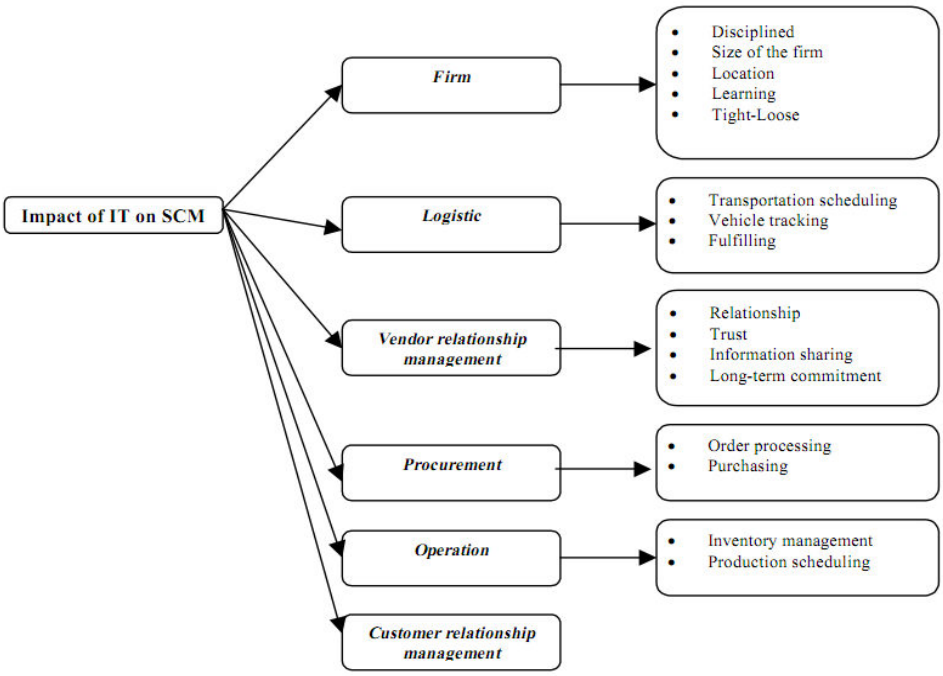

Figure (1): adopted from, Fasanghari, R. and Kamal, C. (2008). Assessing the impact of information technology on supply chain management .world applied sciences journal 4(1): 87-93.