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## **The Impact of Information Technology on Supply Chain Management in health sector in Jordan**

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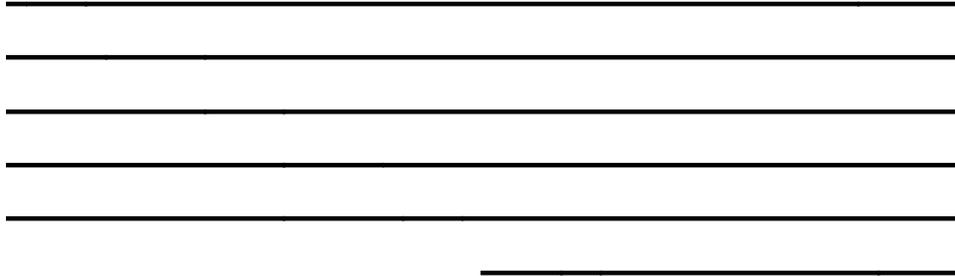
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## **1. Introduction**

The medical industry is still finding its place as other industries begin to adapt to information technology (IT). Many sectors benefit from the common field of IT, which involve digitized supply chains; virtual medicine communication; data sharing and improved diagnostics technology in multimedia. It is enough to inspire developing countries such as Jordan to embrace IT to deal with different impacts in the hospital supply networks and compete for e-health that most of these technologies cost (Matar & Alnabhan, 2013)..

Many sectors benefit from common areas of information technology, including virtual pharmaceutical supply chains, communication with electronic medicines, data sharing and improved interactive diagnostics.

Moreover, hospital services are increasingly planned and integrated health care systems introduced as essential mechanisms for reducing resource consumption and improving the quality of healthcare. Of course the world of health services operations changed significantly not only in practice but also from a theoretical point of view.

Nevertheless, our understanding of the health care sector also tends to be rather limited from a supply chain management perspective. While many healthcare organizations recognize the importance of supply chain management practices, it is often very obviously difficult to apply the strategies, processes and best practices that have been initially developed

in an industrial environment (Karsh, et al., 2004).. The complexities of technology, various stakeholders, a diverse internal and external world and distinct characteristics of health care operations often obstruct the simple application of industrial-oriented supply chain management practices (Karsh, et al., 2004).

The many troublesome initiatives that attempt to incorporate comprehensive planning processes for patient movements and to build relationships between different healthcare service organizations clearly indicate how challenging the concept of supply chain management is to healthcare organizations. In these contexts, the initiative for this special edition and the included articles, chosen after a thorough analysis and revision method, continue with the emerging field of supply chain management in the sense of health services.

It is enough incentive for developed countries like Jordan to implement Information Technology for specific effects within the hospital supply chains to participate in e-health, provided that the price of most of these innovations has plummeted (Matar & Al-Nabhan 2013). This includes "e-health" or electronic health, which has broad significance ranging from technology utilization to diagnostic and prescriptive management activities.

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Nevertheless, various hospital-based Information Technology systems can not only operate for internal, but also remote operations as it needs to work with insurance agencies, state, health services ministries and inventory-management pharmaceutical chains (Ali, et al., 2013).

### 1.1 Research Question

The main research question is: what are the role and importance of Information Technology in healthcare system which includes billing system, supply chain management, and operational change process? The following paragraph dealt with this issue in the objectives of the research.

### 1-2 Aims and Objectives

The Research is aimed to evaluate Sampled Jordanian hospitals and examining their Information Technology role in organizing in addition to promoting patient care and financial performance, the Research main goals are:

- 1- To examine whether Information Technology investment in hospitals in Jordan would rationalize administrative costs.
- 2- To examine whether Jordanian hospitals use Information Technology for their payment and billing systems.

- 3- To examine the role of Information Technology in the management system and processes of organizational change in the Jordanian hospitals.

### **1.3 Research Design**

According to (Mouton and Marais, 1996), the primary objective of a research design is to plan and structure in such a way that the ultimate validity of the research findings is maximized. This section will consider the research design of this research. The research variables, the types of research and the methods used to ensure reliability and validity will be discussed.

#### **1.3.1 Research Variables**

The dependent variable in the research is Hospitals Investment and the independent variables are: supply chain management, tracking bills to patients, quality management, supply chain disaster management, supply chain utilization management, and supply chain reimbursement. The aim of the research is to determine whether the independent variables have an influence on Hospitals investment (dependent variable).

#### **1.3.2 Data Processing**

For the purposes of analyzing and controlling, each questionnaire response will be documented in the survey analysis program. The SPSS Statistical Software is used for statistical analysis estimation and conduct,

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and the statistical procedures will include the following: Cronbach’s, coefficient alpha, Pearson’s correlation coefficient, Analysis of variance (ANOVA), T-test, Level of significance, mean, Standard deviation.

**1.4 Research Hypotheses**

The research recognized six areas where it can support and sustain the supply chain of hospitals, so the hypotheses will be:

H<sub>1</sub>: There is no relationship between Hospitals investment in information technology and supply chain management.

H<sub>2</sub>: There is no relationship between Hospitals investment in Information Technology and tracking bills to patients and payment to human resources and materials for suppliers.

H<sub>3</sub>: There is no relationship between Hospitals investment in Information Technology and quality management of change processes.

**2Theoretical framework**

**2.1 Theoretical framework**

In different developing countries there has been a paradigm shift from hospitals to improved patient care with the use of Information Technology. The various functions of hospitals at the organization-and operational level of the supply chain include these activities. Financial

management, hospital care and outpatient care also play a role in the development of the hospital. IT, of course, reduces administrative costs for hospitals, especially expenditure on stationaries and consumables for offices. The consistency of patient care and facilities in different areas, such as data management, billing and insurance claims can be enhanced or sustained.

This research described six areas where Information Technology can support and sustain the supply chains of hospitals.

### **2.1.1 Information Technology in Administrative cost control in hospitals**

Cost overrun problems are common throughout the patient care supply chain in many hospitals in Jordan. This is because the administrative and accounting staff lack electronic medical records (EMRs), where they can comment on the procedures and the best way to streamline expense (Garets & davis 2006). Various cost functions such as budgets, particularly when people do not know or if systems are not supporting such a course, are difficult to monitor in the hospitals (Oracle Corp., 2009).

The IT infrastructure is typically capable of implementing good practice in terms of healthcare, such as the automation of processes and the minimization of waste of resources (FCG, 2007), both at the individual level and inter-departmental staff levels.

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Cost management also ensures that general practitioners and clinicians are able to effectively evaluate clients in order to monitor treatments and progress appropriately (Poissant et al., 2005).

It is therefore beneficial to have a module or system for Information Technology which monitors operational costs through analytics, encourages decision-making, handbooks on affordable references, optimum process costs, and inventory costs for tracks (Wang, 2003).

### **2.1.2 Information Technology for Tracking Bills to Patients, Materials for suppliers and Payment for Human Resources.**

Hospitals typically have many bills for hospital care, regular examinations and unnecessary check-up treatments and lab testing and x-ray, among other issues, from a physician's point of view. All this requires material, equipment and provision to be purchased by hospitals. Information Technology systems are used to track payments from suppliers, patients' receipt and other service charges consultation in hospitals (Faustine and Austine, 2008).

The purpose of these IT modules is to make billing and payment processes more effective and secure. Otherwise in most hospitals cases involving over and under billing and compensation, patients are unhappy with the full-service situation (Garets & Davis, 2006).

This module is especially useful for e-prescriptions when a doctor or consultant needs a digital location to monitor bills and patient

information (Faustine and Austine, 2008). The prescription context is the same, only electronically administered. The consultant can then use the same information after electronic billing to pay medicine from a pharmaceutical company near the location of patients (Lenhart, et al., 2000).

### **2.1.3 Information Technology for Managing Quality of Change Process**

It is essential to ensure no loss in medical data control during routine changes and periodic operational changes in the hospital. In addition, with guidance on available medical records and information, the process of change must be able to support better service recommendations. The process of change must therefore be administratively friendly and every responsible person must be recognizable from his or her place in the hospital chain before and after. Such tasks are assisted by IT systems and can also be used to hold meetings and solve problems in the supply chain of hospitals.

In order to initiate, handle and evaluate the whole cycle of hospital transformation, the option of technology is sufficiently robust (Garets & Davis, 2006).

## **3. Literature Review**

IT has been shown to be an important method of handling organizational awareness. The role of IT in building supply chains 'knowledge management capabilities deserves research attention as knowledge management is becoming increasingly important for the supply chains especially in health sector. This chapter, which focuses its

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theoretical advancement on the IT literature, provides the basis for concepts of IT capacities and how business value can be extracted from that capacity to understand the dynamic phenomenon of using IT to manage information in the supply chains, this section is included a literature that covers the five areas of this research.

### **3.1 The role of Information Technology in healthcare**

The healthcare has changed new and emerging technologies in recent years. In large and small medical centers and hospitals, new technologies were applied to adapt and improve overall quality of patient care to a growing regulatory environment. Medical facilities today are state-of - The-art operations that offer state-of - the art technology to skilled professionals. Nonetheless, hospitals and healthcare centers still have crucial opportunities to streamline their deployment and use of new technologies (Kulkarni, 2019).

Health IT helps medical professionals, through safe use and sharing of medical information, to control patient care better. Health IT can improve the quality of the medication, even as it makes health care more economically effective, by developing safe and private electronic health records for most Americans and making health information available electronically when and where needed.

With the IT health, the providers of health care will have (Aceto, 2018):

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- Exact and comprehensive patient health information. Providers can therefore provide the best possible care, whether during a routine visit or during a medical emergency.
  - Ability to manage the treatment given better. This is particularly important if a patient is seriously ill.
  - A way to secure information for patients who choose this comfort with patients and their family members over the Internet. This means patients and their families can more fully take part in decisions about their health care.

### **3.2 Health care operations from a supply chain management perspective**

In the past four decades, the emphasis within industrial firms has gradually shifted from a strong orientation towards a chain orientation on individual processes. Manufacturing companies saw the management and control of individual processes as essential to competitiveness in the 60s and 70s of the previous century. In this period, conventional work on operational management led to many mathematical models and instruments, which contributed strongly to our understanding and understanding of operational planning and control in a manufacturing environment (Vries, 2011).

The increasing potential of ICT has undeniably increased the emphasis on companies' change in the final nineties of the past century. Particularly using software for company resource management (ERP) was the driving force behind the strong focus on more centralized control of the flow of goods by manufacturers. ERP solutions provide software packages for the integration, normalization and automation of processes within enterprises and their value chains (Vries, 2011). A set of modules



connected through a central database is used to access, manage and update the data from all modules. ERP systems have a simple, compelling pledge: better-informed management decision-making decreased contact costs and increased business efficiency and cohesiveness (Dezdar and Sulaiman, 2009). Many studies have been performed on integrated planning systems. Mainstream research in the field of business management in the 1980s and 1990s focused on how to avoid under-optimization in relation to control of goods flows within companies. The collaboration between various planning stages, the execution of the master plan and the implementation of the planning and control systems are examples of research topics that are extensively studied during these periods (Sun, 2014).

**3.3 Supply chain management?**

The supply chain is a series of processes and flows (materials, knowledge and money) that are structured to meet final customer requirements and that are introduced within and between different phases of the supply chain. The supply chain involves not only producers and vendors, but also transporters, distributors, retailers and clients (depending on the logistical flows). This includes new product development, marketing, logistics, delivery, finance and customer service, but is not limited to it (Chopra and Meindl 2001).

The term ‘Supply Chain Management’ is relatively new, it can be defined as the integrated preparation, scheduling, and monitoring of every business process and operation in the supply chain, which provides the supply chain with superior customer value at a lower cost while meeting other supply chain actors’ demands (Van der, 2004).

## 4 Research Methodology

This chapter describes the research methodology employed. It explains and justifies the research approach, research population and sampling, and the ethical considerations. The primary data collection methods, research model, reliability and validity, are described in detail.

It is worth mentioning the purposes of this research; questionnaires were deemed appropriate data gathering instruments. According to Weiers (as cited in Josias, 2005), utilizing questionnaires have the following benefits:

- There are fairly small costs to handle questionnaires.
- The layout of the questionnaire makes analyzing the information provided via the questionnaire fairly simple.
- The survey provides sufficient time for respondents to provide correct answers.

### 4.1 Population and Sample Size

All elements or persons participating in a research are part of the population of the studies. A sample, however, is a collection of individuals in the population that basically have the same demographic differences (Kerlinger, 1986). The main objective of the sampling is to pick a certain number of people from a population so that the population from which the sample was taken can be accurately represented. The probability and non-probability sampling of two types of sampling methods can be defined. The probability sampling raises the likelihood that the main objective of the sampling is achieved, according to (Kerlinger, 1986), since each participant is similarly selected. Random sampling is known to be the best way to measure probability. However,

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the selected individuals do not automatically represent the population during non-probability sampling. The sampling approach used will satisfy the objectives of the study.

Based on the operational requirements of the business, it was determined that for duration of one week online questionnaires were accessible to provide all people with an equal opportunity to complete the questionnaire. Based on this, it can be mentioned that in this study a convenience (unlikely) sample method has been used.

The objective of the research is to assess In terms of quality of care and management of financial aspects of the Information Technology integration effect on hospital supply chains in Jordan. Jordanian hospital managers and/or IT managers in public, private, military and universities were the subjects of the research. The first option of the respondents depends on the type of hospital management; and selection of a second group of strata or target samples randomly. The study will include 24 Hospitals (22%) form the total number of hospitals distributed which selected to cover almost all Jordanian districts and cover all types of hospitals in Jordan which are: public, private, military and university hospitals.

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## 4.2 Data Collection

Two key data collection techniques have been developed. First of all, in order to determine their supply chain, maturity and integration of IT, the content analysis examined each of the participating hospitals websites. Consequently, for the 24 hospital websites targeted, content review has been undertaken (Lockyer, et al., 2001) with the goal of determining the percentage of people with IT integration. The above was demonstrated by a basic content analysis and literature review in the hospitals. The expertise and resources in hospitals are lacking in the application and management of IT (Lockyer, et al., 2001).

Second, in collecting data from the hospital managers and administrative heads, a closed ended questionnaire (Saunders et al., 2007), as set out in Appendix A, by the researcher was used. The aim of using hospital managers or IT managers was the assessment of the IT adoption by their organizations and the effect to date. The questionnaires were sent directly to each IT director hospital administrator with a rationale that the study cycle was streamlined and budget allocations rationalized. The other reason for submitting the questionnaire is that the hospital is distributed widely and manual data collection takes time with associated costs.

## 4.3 Reliability and Validity of Data

The reliability of the research method and the findings were dependent on quality of results as shown in the four layers of Jordanian hospitals. This means that content analysis findings in a public hospital must be repeated in private, military and university

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hospitals and repeatable reverse as evidence of information consistency, as the principle of IT is applied in the supply chain of hospitals (Kirk & Miller, 2005). As standard for assessing the accuracy of survey data (Golafshani 2003), the Cronbach's alpha  $\alpha = 0.7$  has been adopted quantitatively and this is being accomplished in all respects.

The data's validity is focused on the factors of content and design and demonstrates the reliability of the work of science, objectivity, scientific perceptions, reality, proof, fact, actuality, purpose, etc. The questionnaire instrument therefore would be checked by selecting four different types of hospitals for face validity (Golafshani, 2002): government, private, military, and university. The questionnaire has therefore been updated to ensure that every component in all hospital strata is transparent and relevant.

In order to determine the relationship between the 6 principal hypotheses in the four types of hospitals with regard to IT effects, the researcher has adopted the correlation metrical of Pearson (Honaker, 2001) for content validity. The data also show that convergence is true because a strong correlation is found (Sekaran & Roger, 2010).

## **5. Analysis and Findings**

18 successful questioners were targeted in all 24 Hospitals, equivalent to 75% of the return rate, 8 public, 6 private, 2 military and 2 University hospitals. The results of the survey showed 18 successful

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questioners, and a percent of 90% of all distributed questionnaires were returned. For analysis of survey data, the SPSS method was used.

### 5.1 Demographic Factors Analysis

Approximately 39% of the participants were Male, compared with 61% of Female. Between 25-35 years, 47.5% of participants decreased gradually in the age range from 46 to 55 (44.9%), but in the age range from 56 to 65 years there was a dramatic drop in the number of participants (7.9%). Participants' levels of education ranged from graduates (36.4%), bachelors (53.8%), and the smallest number (9.8%) were among higher education participants. The participants' expert years ranged as following from 3-5 years (22.5%), 6-10 years (29.6%), 11-15 years (21.8%), 16-20 years (13.5%), 21-25 years (7.2%), and over 25 years (5.5%).

In total, this survey shows that most hospitals in all four categories / strata have good patient care experience, with a mean of (3.55) for 11-15 years of service. The year-long survey showed that most of those with age 21 or older were public / government hospitals, while the rest were in service in university / military hospitals with age 16-20. As shown in table Appendix B, most private hospitals clustered between 11-15 years. The majority of hospitals were hospitable by a mean of 1.96, 41.4% as defined in Appendix C. In addition, hospitals were the second highest frequency with a mean of 37.9%, the highest in private hospitals. The military and university hospitals are low-frequency, with limited groups of community members serving 6.9% and 13.8% respectively.

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On the capacity of hospital patients, an average of (3.17) indicates that all hospitals manage an average of five to seven hundred patients per day in combination. The survey showed that the population of approximately 1.001 patients per day was most prevalent for public / government hospitals. This means government hospitals are smaller and more doctors can handle so many patients. There are 1-250 patients in the university and the military hospitals a day, and mostly 251-500 patients a day in private hospitals. In Table Appendix D, frequency groups are shown.

## **5.2 The Evaluation of Information Technology status**

The second part of the survey aimed at assessing the Information Technology modules in the participating hospitals. Multiple data findings are admissible as more than one Information Technology system or unit can be used at the same hospital. In general, the most common Information Technology / unit is 41.6 % for accounting and cost control, while the less common is 9.1 % for insurance schemes, As illustrated in the table E. This means that most insurance claims and reimbursement are carried out manually between Jordanian hospitals.

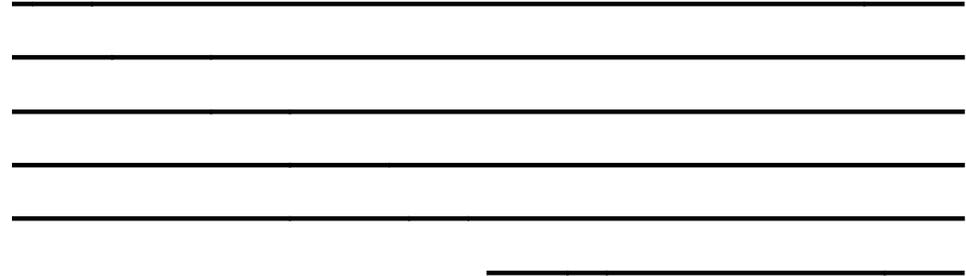
The assessment of the Information Technology infrastructure mean of 2.20 hospitals in table F shows that the impacts of Information Technology systems / modules that already exist in public, private, military and university hospitals are positive for the majority of management and IT administrators. Therefore, the IT process has neither

a good nor a negative effect. 51.7 % of the managers and IT administrators involved in the study feel. This indicates that much room has been highlighted for change about development and building ability to have a positive impact.

Some hospitals have no adequate Information Technology framework to address specific hospital supply chain activities. Many hospitals are underfunded with adequate IT facilities (Karsh, et al., 2004; Oracle Corp., 2009). Additional hospitals in a hospital supply chain have been slow to accept and empower IT (Miller and Sim, 2004). Many hospitals are not in a position to enforce IT policies and processes, and patients lack input on hospital supply chain management (Gill et al. 2001). The results of this research indicate that for the six areas objective here, most of the targeted hospitals have partial IT integration.

### 5.3 Hypothesis Results

In the whole test hypothesis we found the following very strong meaning of alpha. H1  $p=0.663$ , H2  $p=0.397$ , H3  $p=0.875$ . We conclude that investment n IT is significant across the hospital strata in Jordan supply chains for cost control and utilization, useful for bills and suppliers to track payments, necessary for management of trade processes, important in disaster and interruption management, and critical for the reimbursement of insurance cover, thus, For the value of commitment, both hypotheses had alpha  $p > 0.05$ . In general, IT has had a wide range of impacts, including medical education (Lockyer, et al., 2001) and reporting (Gill, et al., 2001). Many positive



effects include increasing patient satisfaction and smooth partnerships with medical partners such as the Ministry of Public Health and Pharmacies. However, IT has increased timeframes for the introduction of quality requirements by various hospitals and in the care of patients.

Many hospitals were aware of the need for an IT module or program in cost administration. Nevertheless, The results from the neutral effect lead to the conclusion that modules may not be effective and workers may need to be replaced by retraining, as shown by the  $\alpha$  value (H1  $p = 0.663$ ).

With a view to the future, supply use management is a recently recommended practice that helps healthcare institutions to expand their supply chain costs to achieve new and even greater supply savings, by the  $\alpha$  value (H1  $p = 0.663$ ).

And, at the  $\alpha$  (H3  $p = 0.875$ ), the majority of hospitals in Jordan have demonstrated their value as a source of day to day communications for the management of change processes by IT systems. We also consider that the process of policy communication and change progress is a challenge, but the management of the Hospitals seek to reassure stakeholders and build consensus. Nonetheless, IT plays a major role in quality control of these activities as changes occur within the supply chain of a hospital in Jordan.

H1: There is no relationship between Hospitals		Sum of Squares	DF	Mean Square	F	Sig.
	Between groups (Combined)	1.009	3	.336	.543	.663

investment in information technology and supply chain management	Unweighted	.839	1	.839	1.331	.259
	Weighted	.936	1	.936	1.486	.234
	deviation	.073	2	.036	.058	.944
	Within groups	15.750	25	.630		
	Total	16.759	28			

**Table (5.1): ANOVA Results for Hypothesis H1.**

We conclude that the decision making process through the hospital supply chain should strengthen such processes as IT systems to enable billing and payments processing and analytics. Because in Jordan the most important need for hospitals is ~ (H2  $p = 0.397$ ), IT systems / module for bill monitoring and payment for staff and supplies are the second most crucial. Hospitals in Jordan also search for forms of billing and group payments. The suppliers of supply and supplies to the hospitals and to their clients also have to pay for these.

H2: There is no relationship between Hospitals investment in Information Technology and tracking bills to patients and payment to human resources and materials for supplier	Between groups (Combined)	3.971	3	1.324	1.029	.397
	Unweighted	.920	1	.920	.715	.406
	Weighted	.276	1	.276	.215	.647
	deviation	3.695	2	1.848	1.436	.257
	Within groups	32.167	25	1.287		
	Total	36.138	28			

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**Table (5.2): ANOVA Results for Hypothesis H2.**

The highest average square among hospital groups was 1,369 by H3, as illustrated in table (5.3). As a result, p was found to be 0,314 for the lowest combined significance alpha among the hospital groups.

H3: There is no relationship between Hospitals investment in Information Technology and quality management of change processes.	Between groups (Combined)	.945	3	0.315	.230	.875
	Unweighted	.204	1	.204	.149	.703
	Weighted	.072	1	.072	.053	.820
	deviation	.873	2	.436	.319	.730
	Within groups	34.227	25	1.369		
	Total	35.172	28			

**Table (5.3): ANOVA Results for Hypothesis H3.**

With an interval of 95% for the means we used ANOVA for evaluating the respective hypothesis, for mean value  $p=0.05$  with a cumulative average of 95% we used H3 for measuring the mean total at 3.4483. H3 for 95% was the lowest average for the mean at 3.4483. When we checked the validity of the data content we found that all but one of these hypotheses met the threshold of alpha significance.

IT increased the frequency of contact between hospitals and patients as they interact, especially during change management, in

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programs such as public or primary health services. IT has strengthened disease out breaking surveillance and reduced insurance reimbursement expenditures, including the study and implementation of alternative medical procedures (Matar & Alnabhan, 2013). In addition, since several hospitals have implemented IT, emergency costs have been reduced as some processes can be managed in disaster management response from hospitals to patients directly (Lockyer et al., 2001).

In fact, the non-emergency operations have increased IT management treatment at a lower administrative cost in hospitals. Many patients in hospitals have acknowledged that the use of IT in some procedures decreases the time to wait for hospitals.

Different hospitals are using IT to have positive effects on farmers who face personnel, finance and logistics problems in their communications. In addition, IT allows the public to access such critical health information useful for management of emergencies and disasters (Gill, et al., 2001).

Of example, the lists of implications for different hospitals that IT has affected are lengthy. Nonetheless, most of these studies focus on specific health system benefits. There are reports of the financial impact of IT on hospitals supply chains. The size of transition achieved through IT integration in hospitals is currently under review, and innovative designers and clinicians are threatened by sudden change in technology (Miller & Sim, 2004).

Eventually, at the  $\alpha$  ( $H3$   $p = 0.875$ ), the majority of hospitals in Jordan have demonstrated their value as a source of day to day

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communications for the management of change processes by IT systems. We also consider that the process of policy communication and change progress is a challenge, but the management of the Hospitals seeks to reassure stakeholders and build consensus. Nonetheless, IT plays a major role in quality control of these activities as changes occur within the supply chain of a hospital in Jordan.

## **6 .Conclusion and Recommendations**

This research aimed to evaluate the healthcare impact of information technology in Jordan on patient care and financial management. The analysis shows that the standards and information technology specifications for Jordan's hospitals differ in their supply chains.

The researcher developed a survey method for gathering information from public, private, military and university hospitals in Jordan to investigate several IT effect hypotheses. Researchers have shown an improved alpha value by using an ANOVA system, in all the experiments involving pain and financial management, where implementation has been successful, as opposed to slandered  $\alpha = 0.05$  IT levels. The study showed how the IT effect in the fields of implementation and potential plans defined for Jordanian hospitals can be improved. And recognized three areas where it can support and sustain the supply chain of hospitals and investigated 3 hypotheses,

It's recommended the following guidelines should be taken into account and applied if IT is to benefit Jordanian hospitals and supply chains. The management of hospitals must first understand and endorse the value of IT to include analytical data on supply chains and methods to

save costs. Essential to explain the value of investing in appropriate IT is the awareness of the strengths, limitations, opportunities and risks of hospital supply chains (Al-Nassar, et al., 2011a).

Second, the processes should be reviewed by hospitals, and payment practices explained. The IT to help supply chains in hospitals is the best way to achieve this. The management of hospitals can then monitors charge and receive payments while improving the quality of patients ' care (Stempniak 2013).

Third, many Jordanian hospitals are under continuous change management, be it safe or departmental. Therefore, it is advised to invest in appropriate IT as it will also ensure that the stakeholders have minimal resistance to change and full engagement (Al-Nassar, et al. 2011b).

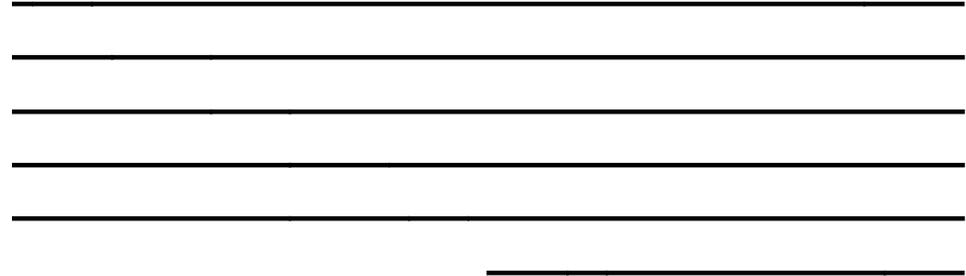
Many organizations view confidential IT data as privately owned, also as proprietary, and this analysis was thus based not on secondary data but on individual self-reported data. Although the analysis was structured through a positive context, it relied on self-reporting data given by individuals to validate the proposed model. The self-reference criterion can be included in the analysis and tainted with partiality. The two significant limitations influencing the conduct of this analysis were resources and time constraints.

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