Using big data to improve the quality of healthcare in the Jordanian medical sector

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Abstract:

This study aimed here to reveal the extent and extent of using some operating hospitals located in Jordan of modern electronic business technologies from big data with the aim of improving and developing health care in their hospitals. The study was applied to that random sample of operating hospitals in JORDAN, whose size reached (45) hospitals The design has not been determined.
For collecting data, it has been used with descriptive statistics, and those tests aim to analyze the data and make hypothesis testing such as the signal test, Mann-Whitney test and test.
The study finally reached a number of results, the most important of which were: The decrease in the size and level of adoption of these technologies and big data in the Jordanian governmental hospitals affiliated with the Ministry of Health and the private hospitals operating in the Amman region, Whereas, the size of these systems and technologies in the governmental and private hospitals of the Jordanian Ministry of Health was between medium and high.

The study also found here that there is such a relationship between the independent variables (such as type of hospital, hospital size, hospital age, obtaining accreditation).

Keywords: e-business technologies, big data, health care.

1.INTRODUCTION:

Here, this big data represents an important stage of those stages of development of systems and technologies, data and huge information from communications, and it is also here that it expresses that simple concept of that huge amount of complex data, whose size exceeds the capacity of traditional software and computer mechanisms. In terms of storage, processing and distribution, which forced each of the specialists to work on studying that situation and put forward many modern alternative solutions that help institutions and organizations to be able to control and control the flow
In addition to having this technology from big data the ability to analyze data from websites, sensors, and social media data, as the analysis here for this data allows exploration to find out

the size of the correlation between a group of independent data in order to reveal these many aspects, including for example that prediction of trends In addition to the possibility of providing these forecasts to the decision maker of the tools Innovative ones to understand the best of those circumstances and data that help in making the right decisions and from which they can achieve the required goals. (Ackerman and Locate; 2011)

2. STUDY PROBLEM:

Many studies have indicated here that the successful application of these technologies to electronic business in organizations that brings them many advantages, including the improvement of the process of taking For the decision, better management of the facility's information, with the process of improving the relationship with clients in hospitals, with the optimum utilization of resources, while reducing costs and increasing profitability. This benefit from those advantages for hospitals, especially those specified in the study sample, may lead to an increase in the rate of competitive advantages that support it in achieving its strategic objectives, on top of which is survival, growth, and an increase in market share, especially in light of that environment characterized by strong competition and changing consumer tastes continuously, with the presence of The speed with technological development, and on the other hand, this tremendous development has pushed the field of information and communication technology to take advantage of these opportunities in providing modern technical tools in all fields, including that in the medical field, and also towards the follow-up to further progress in this field through employment of these technologies to serve The patient and increasing the facilitation of his transactions and improvement of the services provided to him, as it works to improve by sharing resources between patients and health care staff.

the importance of studying:

The importance of the study is highlighted by the following:
1 - Adopting solutions for electronic and technical business in organizations that provide those competitive advantages that contribute to the achievement of their strategic objectives. Therefore, there must be increased interest in studying this topic in all its different aspects.
2- The Jordanian hospital sector operates in an environment that is distinguished by that because of intense competition in gaining customer satisfaction, and it is similar to a great extent here in those characteristics of the service provided, which reflects the importance of relying on these organizations on electronic solutions in their performance of their work in a manner that works to achieve these standards efficiently and effectively in their management.

3- This study is presented here for a group of areas that may constitute the implications of the effective strategic plan for employing technologies for e-business in hospitals under study.

4- This study - on the limit to the researcher's knowledge - is considered one of the first studies that may address the issue of diagnosis of adopting these technologies in electronic work and their determinants in hospitals operating in JORDAN, which may reflect the importance of the results that the study will reach to help decision-makers in those hospitals as it provides These are indicators of the effective employment of business technologies.

Objectives of the study:

The study aims here to do the following:
1- Diagnosis and evaluation of this current situation with the level of effective adoption of these technologies from e-business by hospitals operating in JORDAN.
2- Disclosure of those variables, those that reflect these disparities in the effective use of electronic technologies from big data by hospitals operating in JORDAN.
3- Disclosing these determinants of adopting the use of electronic technologies and big data by those hospitals operating in JORDAN.

Study questions:
This case study will answer the following questions here:
The first question: What is the level of adoption by hospitals operating in the Jordanian health field in JORDAN of big data from the point of view of managers concerned with information technology in hospitals?
The second question: What are those determinants that may hinder the process of adopting hospitals operating in JORDAN for electronic business technologies and the use of big data in their development for health care?

Academic hypotheses:

The study here will test the following main hypothesis:
1- There are no significant differences: H The main hypothesis: 0 in the effective adoption of the use of statistical big data at the α (0.05) level in hospitals operating in Amman.

2- There are no significant differences: H The main hypothesis: 0 in the effective adoption of the use of electronic technologies statistically at the α (0.05) level in hospitals operating in the Amman region.

Previous studies:

1- The Zaban Study, (2013). This study aimed to identify the impact of electronic business systems applications on intelligence for Jordanian pharmaceutical companies operating in Amman.
The study used the systematic survey to collect those data from the community. The study about the variables addressed by the study by means of the statistical questionnaire, and the

study was applied to employees (13) after testing the hypotheses, and the study reached a number of results, the most important of which are: With regard to providing the software, material and human requirements for these systems, as well as those systems with a positive impact of statistical significance in investigating the intelligence of companies. 2- Abu Shukr study (2012). This study aimed to show the extent of the impact of using information technology in private sector hospitals in Amman on the quality of health, hotel and administrative services. The questionnaire for collecting data, the first questionnaire was applied to a random sample of workers in (5) Jordanian hospitals, where the sample size was (154) individuals, while the second questionnaire was applied to the random sample of patients in those hospitals, where its size reached (310) individuals. After testing the hypotheses, the study reached a number of results, the most important of which was the positive effect of using information technology and big data on the quality of health, hotel and administrative services in the respondent hospitals.

The first topic: -

1-2 big data technologies:
It is an open source program or software platform written in the Java language to store and process that big data in a distributed form, such as storing the big data on several devices and then distributing the processing process on these devices to speed up the processing result.
2 - 2 Sources of Big Data:
There are many sources of big data, including:
Sources arising from program management:
As a governmental or non-governmental program, or as electronic medical records and hospital visits
And insurance records, bank records F and those for food banks.
Commercial or transaction related sources:
It concerns data arising from transactions between two entities, for example card transactions such as credit and transactions that may take place over the Internet by means of mobile devices.
Network sources and sensors:
Such as satellite imaging, road sensors, and air and climate pollution sensors.
GPS Tracker Sources:
For example tracking data from cell phones and the global system
Centering.
Sources of behavioral data:
Such as searching the Internet for a product, service, or other type of information, and the times when the page is displayed on the Internet.
Opinion data sources:
Like comments and reviews on social media such as Facebook and Twitter.

The second topic :

2.2 Uses of Big Data:

The medical field

Wireless biosensors can now collect simple data about body temperature and heart rate, as well as provide more other information.

Complicating an example of the volume and rate of blood oxygen saturation and potassium volume levels

In addition, doctors can remotely monitor medical cases.

Includes sensor data for heart rate, blood pressure, and oxygen saturation volume.

1- Treatment of diseases:

For example, the collaboration allowed Microsoft to obtain a large amount of data from the anonymous records of more than 1.1 million people, and it was given to doctors to find out how certain chronic diseases spread in the country, and this technology helped doctors to ascertain the amount of time a patient needed before they Health condition stabilizes and ends.

2- Diagnosis of diseases

The use of many more computers in the medical examination rooms, to help detect and diagnose diseases, based on the analysis of images, by displaying hundreds of images for X-rays, magnetic resonance, CT scans and other types of medical imaging, and by analyzing that big data, here computers can To start with the definition. The problem is that the doctor then begins to examine it, which saves the doctors time and effort to examine a large number of x-rays.

3- Pharmaceutical industry

Pharmaceutical manufacturers and health insurance companies collect data from poor countries in Africa and Asia, to be used in predicting the emergence of specific diseases, and increasing their sales in those specific regions, as pricing and drug distribution policies that depend on the results to analyze this big data.

The third topic - the study population: The community is represented here to study for some of the government and private hospitals operating in the Amman region, which number (45) hospitals.

Study tool:

In order to collect this information related to the study, a statistical questionnaire was used, which was designed The questionnaire consisted of three sections: 1- The first section: It consists of those data for the organization of hospitals, the research sample.

2- The second section: here it means the identification process to know the size and extent of the hospitals 'adoption of technologies and electronic works in order to serve their tasks. A

number   of   these   following   technologies   are   included   here:
1- The communication infrastructure, data exchange and file sharing, and it includes the following technologies (Internet access, a website that provides those interactive services to employees, patients, or any of the hospital's clients through that web, e-mail, transaction processing systems, the base of computerized big data. , Local network, knowledge management   systems.
2- The second category, which is represented in the electronic business systems, which includes

SCM, the following technologies; Management System for Supply Chain Management, ERP   management   and   planning   system   for   hospital   resources.

3- The third category: CRM, customer relationship management, and includes:
(HIS)   They   are   Health   Informatics   Systems
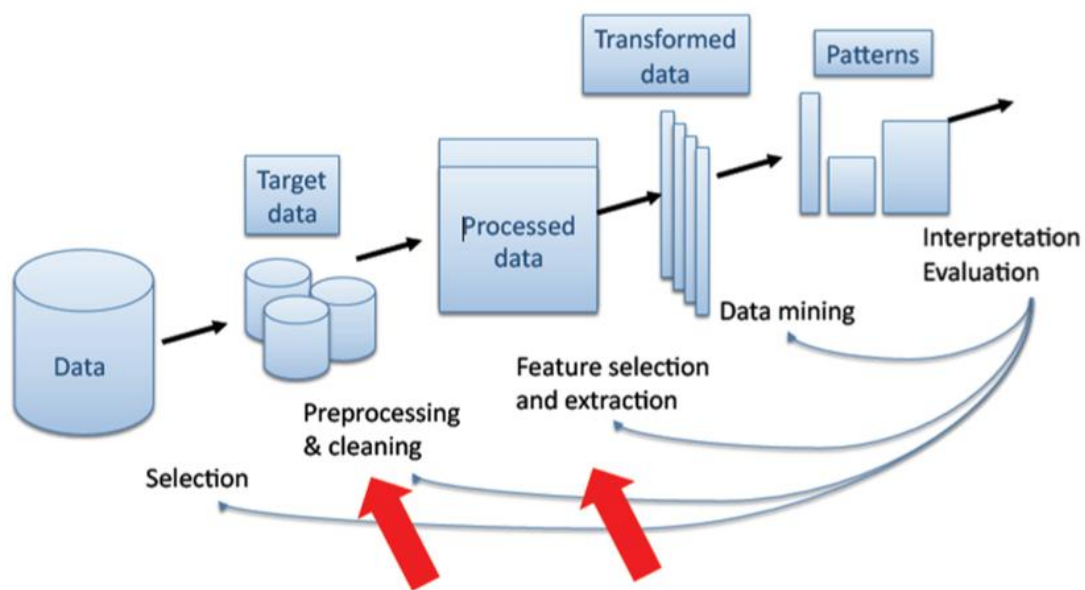EMR   the   following   technologies;   The   system   manages   medical   records.

Table (1)
Data responding hospitals:

The ratio	Repetition	Categories	variable	T
0.34	14	Governmental Ministry of Health	The sector to which it belongs	1
0.08	6	The investment sectors		
0.54	25	private sector Community sector		
0.48	23	Year	Type of hospital	2
0.51	22	Specialist		
0.22	8	From 8 to 10 years	Chronological age of the hospital	3
0.54	20	10-15 years old		
0.34	12	Older than 15 years old		

Honesty, resolution and consistency: Validity means searching through the tool used (Wilson, 2003), as one of the most important of these conditions is the scale or tool that is used in the study sample, and the researcher conducted validity of the content of the questionnaire in order to ascertain the extent of the suitability of the tool for the phenomenon that is intended Measuring and verifying through that the technical judgment of a group of experts about that extent of the suitability of the scale, and the researcher has done the following: 1- Preparing a first questionnaire to provide the necessary data to answer these study questions and test research hypotheses 2- Presentation of the questionnaire to that group of experts (a number of these refereed professors) in addition to presenting the academic problem, the study model and hypotheses for it, to express their opinion on it, and their opinions that were agreed upon were taken and the necessary amendments to the questionnaire were implemented.

Table No. 2 Questionnaire:

strongly disagree	agree disagree	agree somewhat	ok	ok Strongly	Rating
5	4	3	2	1	Weight

Table 3

Krum Bach-Alpha E-Business Results and Big Data Adoption Dimensions:

Krum Bach Alpha	Number of paragraphs	variable
0.65	7	Communication infrastructure And file sharing
0.54	9	Electronic business systems
0.86	7	Health informatics systems
0.88		The whole questionnaire

From the previous table, the normal distribution of big data in hospitals was tested, the study sample:

To verify that the sample big data that the study relies on follows the normal distribution for his   data

Here the nature determines the appropriate statistical tests to analyze the study data and test hypotheses; the procedure was carried out for the (Colegrove) test, which shows the test results for each dimension to adopt electronic technologies and big data in hospitals.

Table (4)

Results for the first-dimension analysis: Infrastructure for communication, data exchange and file sharing:

the level	The percentage of disapproval	Approval percentage	standard deviation	Arithmetic mean	Paragraphs of the first dimension: infrastructure for communication, data exchange and file sharing	The sequence
Low	.78	.23	1.008	2.09	Providing Internet access service in a way that helps them accomplish their work tasks.	1

Average	.76	.32	.98	2.54	plementing many of these administrative tasks related to work through the website For the hospital (such as asking for purchase bids, Affiliate services ... etc.)	2
Low	.77	.23	1.09	3.008	Carrying out many technical and medical tasks through the hospitals' website (such as booking appointments For patients, inquire about test results Laboratory, and others)	3
Low	.77	.28	1.87	2.65	Conducting many transactions electronically inside and outside the hospital	4
Average	.72	.54	1.97	2.007	The hospital employs a local network that provides access to files for all employees Huge database and share the data they need to get their job done.	5
Low	.87	.43	.55	2.05	The hospital employs technologies that help to discover	6

					knowledge from its huge databases Possessed like data mining techniques and expert systems	
Average	.76	.26	.99	3.01	The hospital employs technologies that help to retain and share knowledge between Doctors and share experiences among them like expert systems.	7
	.79	.34	1.98	3.008	Dimension as a whole	

The researcher used this dimension to judge the adoption rate for the hospitals' use of the research sample for those technologies related to the provision of communication infrastructure, the exchange of big data between them, and the sharing of files inside and outside   them.

Where the results indicated in Table No. (4) that (77%) of hospitals in the academic field are in   agreement
On the content in the paragraphs related to the extent to which hospitals adopt electronic technologies   and   use   this   big   data
The   arithmetic   mean   of   this   dimension   was(3.008)
It is at the medium level and the estimate was statistically significant based on the level of significance. Also, the results indicated here that those techniques related to big data are the least used and used techniques with a standard deviation (1.98).

3. DISCUSS FINDINGS AND RECOMMENDATIONS

Results of the research:

1- The study here showed that the level of adoption of e-business technologies is effectively low in that overall form, and that only (25%) of those hospitals identified in the sample are on the way to benefit from these solutions for these technologies, while the rest of the hospitals are still outside the scope of adopting these technologies.

2- The results also showed that employment in the infrastructure for a process of communication, data exchange and file sharing was the most among the techniques that the hospitals identified in the previous sample had adopted, and this is a positive indication of the hospitals' tendency towards that adoption. For e-business applications.

3- The study also showed the existence of these challenges from the use and adoption of electronic business techniques in hospitals in the aforementioned sample, on top of which were those financial, administrative, technical, and human challenges, in addition to the presence here of other external challenges

4- The study also showed that government hospitals affiliated with the Ministry of Health are adopting the employment of e-business

techniques effectively, as the answers to these hospitals were to everyone for the paragraphs of the questionnaire within the high approval and were the most among those technologies that were employed by these hospitals, which are systems for e-business In particular the systems to manage the relationship with customers and the systems for the established resource planning.

5. RECOMMENDATIONS AND RESULTS OF RESEARCH:

Based on the above, the study presents here a set of the following recommendations:
1- Hospitals of all kinds must develop a successful strategy to stimulate that adoption of electronic applications, by linking theory to that application, so that they rely on these strategies and also the results of previous studies related to that topic.
2- The private sector is following up on the successful experience of the sector in the government sector in the Jordanian Ministry of Health, taking into account some international experiences, must here follow the example of government hospitals in this field and benefit from experiences in employment for e-business technologies and the use of this big data.
3- The level of synergy for efforts and coordination between all parties (the government, the private sector, the providers of those services for information technology, the medical technology providers, the research centers) must be increased by contracting for many conferences, meetings and workshops with the aim of reaching those solutions and exploring the opportunities that work on Overcoming those obstacles that prevent and prevent employment of e-business technologies and big data in the Jordanian health sector and

hospitals.

4- Conducting more of those studies to reveal those factors affecting the motivation and adoption of the use of e-business by organizations in the Jordanian health sector.

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