PILOT STUDY OF EHRS ACCEPTANCE MODEL IN IRAQI HOSPITALS

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ABSTRACT: Electronic health records (EHRs) exchange improves hospital quality and reduces health costs. However, few studies address the antecedent factors of healthcare professionals' intentions to use EHR system. We examine the factors that affecting EHRs acceptance by Unified Theory of Acceptance and Use of Technology management model, this is a new methodology for evaluating acceptance of EHRs. We propose a theoretical model to explain the exercise behavior of healthcare professionals' to use an EHR system acceptance. The goal of this study to investigate the factors that affect the acceptance of electronic health records system by healthcare professionals. This study applied in Iraqi hospitals which use EHR system. Our objectives to build a clear vision of the factors that affect the user acceptance of the system by pilot test to be the start of an in-depth study and expanded in the future, based on a preliminary study Methods: We conducted a pilot test survey in Iraq hospitals to collect data from healthcare professionals who had experience using the EHR systems.

Keywords: EHR, Iraq, Model

1. INTRODUCTION

An EHR system is software that enables medical facilities to create, organize, edit, store, and retrieve patient record on a computer. Also, about 30 years ago, the first electronic health records were introduced as a computer-based health record system with limited accessibility to medical care providers by using that single computer [1]. However, within the last three decades, EHRs have developed over time to include very innovative digitalized formats for medical practitioners to record and check health data as well as, in some cases, the accessibility of health information which is stored online. A number of healthcare providers have been prepared to develop and employ their own proprietary EHR systems and are, therefore, ahead of the rest of the healthcare industry; some of these healthcare providers are the Veterans Administration, which has implemented its own system called MyHealtheVet, and Kaiser Permanente with their own EHR system called My Health Manager [1] Quite a few developing countries face difficulties locating resources, tracking chronic diseases, along with decreasing medical errors because of the lack of technologies [2]. Additionally, patient deployment computerized systems is dependent on organizational or local needs [3]. This scenario contains true in developing countries such as Iraq. In 2007, Ms. Jemma, the manager of medical records office, provided the researcher a journey in Port of General Hospital in Spain to realize the current workflow regarding health record system. This visit exposed that the big hospitals inside Port of Spain, as an example Port of General Hospital in Spain do not own an e-Health Records system. Nevertheless, some public and private hospitals, like James Medical Complex and Clair Medical Center are implementing patient information systems with regard to administrative functions for example appointments and billing [4]. Indeed, in Iraq, the adoption and diffusion rate of information systems in the health-related sector is quite poor when compared with other sectors like finance, manufacturing, transportation, and retail industries [5].

2. Limitation of research

The concept of EHR is global in nature, this study population was restricted to the people of Iraq. It's due to the research problem studied as well as the easy accessibility of this target research population to the researcher. However, it is expected the result can be generalized to other climes that share similarities with the people of Iraq. Healthcare providers cuts across various departments; it would be interesting to focus on particular department that may have more need for knowledge management thus need to use EHR systems.

3. The model

The main goal of these theories was to identify, which are the most critical factors that affect EHR adoption in healthcare sector. The fundamental theory applied to the study of EHR adoption at the organization level is the TOE framework. DOI has described the process of diffusion at the organization level as well. Moreover, this study provides strong empirical evidence of the usage of institutional theory to give an understanding of these kinds of organizational adoptions such as EHR. For understanding, explaining, exchanging or predicting how and why individuals accept technology in organizations, Theory of Reason Action (TRA) and Social Exchange Theory are used to support the individual context.

The current study comes within the broad theoretical field of technology adoption. The research model proposes the adoption of EHR as a dependent variable. This can be captured the level of intention that healthcare institutions have to adopt EHR. The intent to adopt is utilized commonly as a dependent variable in the literature organizational IT adoption [6]. Independent variables will be categorized in four contexts 1) Individual 2) Organizational; 2) Technological, and 3) Environment. As mentioned earlier, variables affiliated with these four contexts are identified based on the current review of TOE framework, DOI theory, and Institutional Theory, Theory of Reason Action (TRA), and Social Exchange. After that, these contexts and variables have conceptualized to be studied in this research. Figure 1 shows that the main conceptual model of this study.

The factors have been adopted from researches done in Middle Eastern countries such as Kuwait and Jordan. Each characteristic has numerous influencing factors. The influencing factors of the current research are knowledge and skill, training, attitude toward, privacy and security, cost effectiveness, complexity, compatibility, management, organization size, IT capability, culture, policy and government support. This study also introduces 13 hypotheses. One hypothesis is formulated for every factor. Figure 1 shows the model of this study. The factors that can promote engagement in the willingness to accept EHR have been identified. The pilot study is performed to evaluate the questionnaire items and to determine the appropriate questions for the survey. The questionnaires were distributed among health sector worker. The succeeding section explains the questionnaire design.

4. Research Methods

The survey method is employed in this study because surveys are prevalently used to begin reports and it is a suitable method for examining factors and hypotheses. The questionnaire methodology is used for data collection. Paper shows that the questionnaire design relies on three criteria, namely, the manner by which the questions are written, planning for the classification of variables, and the appearance of the questionnaire .

Table 1	l shows	the operationa	lization of t	the factors	and items	•
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Description	Part	Constructs	
Personal	А	• Gender	
Details		 Age Group 	
		Job title	
		 Educational 	
		level	
		 Working 	
		experience	
		• Format of	
		medical records	
		 Litercy level 	
		 Know about 	
		EHR	
Individual	В	 Knowledge 	• Five
Factors		and Skills	• Seven
		 Training 	• Seven
		 Attitudes 	
		Towards	
Technology	С	 Privacy and 	• Six
Factors		Security	• Six
		• Cost-	• Five
		effectiveness	• Six
		Compatibility	
		 Complexity 	
Organizational	D	• Top	• Eleven
Factors		management support	• Six
		• Size	• Six
		 IT capability 	
Environmental	E	• Culture	• Five
Factors		 Policy 	• Five
		• Government	• Five
		support	
Depending	F	• EHR	• Eight
		Adamtian	1

5. Table 2 demographic characterise

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Variable	Pilot study
Male	
Female	
Less than 30 years	
30 to 39 years	
40 to 49 years	
50 to 59 years	
60 years and older	
Diploma	
Undergraduate	
Postgraduate	
Experience in years	
Less than 5 year	
5 - 10 years	
11 - 15 years	
More than 15 years	
job title	
Physicians	
Nurses	
Pharmacists	
Lab Technicians	
Administration Staff	
Medical Records	
Others	

The questionnaire has six parts: Part A consists of the demographic information for personal details, and Parts B, C, D, E, and F consist of the constructs used to test the hypotheses .

Personal details (A) was placed at the beginning of the questionnaire [7] because of personal questions can encourage respondents to share their personal history, relate to the study, and complete the questionnaire. Participants were asked to provide information Age range, Gender, Job title, Years of working experience and level of education. This information represented the data obtained. Parts B, C, D, E, and F measure the effects of the constructs hypothesized. Parts C, D, E, and F comprise some constructs, each one consisting of various items that was selected after considering the data required in hypothesis testing. Subsequently, these items were modified to suit the current study.

The pilot study is allowed respondents the freedom to criticize the instruments regarding the content, format, and terminology. This is also helped to identify if respondents could very well understand and complete the questionnaire in an easy and fast manner. The feedback identified that respondents had taken about 17 minutes to answer and complete the questionnaire; this particular time is considered within the time range of 10-20 minutes recommended by Chua (2009), as the focus tends to diminish After this period. The collected data was analyzed statistically using SPSS version 21 to determine the reliability of the scales in the questionnaire . Figure 2 illustrate the percentage of How much do they know about Electronic Health Records (EHRs) system, figure 3 illustrate the format of medical records does they primary health care organization, figure 4 illustrate rate them computer literacy level.

RESULT OF DATA ANALYSIS

Reliability relates to the extent some items in provided scales are internally consistent than with each other [9]. The scale's reliability to be utilized in the questionnaire may be verified by determining the coefficient of Cronbach's alpha value of a set of items

Durfee, Shinnar, & Gonzalez, (2006) Point out that the appropriate value of Cronbach's alpha coefficient is usually 0.70 or above regarding instruments to consider reliable. Reliability testing was accomplished for questionnaire items except the demographic parts. The reliability test was constructed separately about each measurement. Based on the results, just about all the scales were considered reliable because they met with the required Cronbach's alpha [10], as shown in Table 3

The data collected from the pilot studies have been analyzed using Statistical Package for the Social Sciences 20 to identify the values of each factor in Cronbach's alpha. Based on the pilot study, no change should be made in the items of the pilot study. These items were rewritten to create a clear and easy-to-understand questionnaire. The items of the factors were also reduced. Thus, all factors have values of more than 0.7, which are acceptable.

Table 3 Cronbach's alpha and number of items

Construct No.	Scale Name	Cronbach's Alpha	No. of Items	
1	Knowledge and Skills	0.843	5	
2	Training	0.726	7	
3	Attitudes Towards	0.876	7	
4	Privacy and Security	0.784	6	
5	Cost- Effectiveness	0.774	6	

6	Compatibility	0.833	5
7	Complexity	0.812	6
8	Top Management Support	0.728	11
9	Organization size	0.739	6
10	IT Capabilities	0.701	6
11	Cultural	0.822	5
12	Policy	0.816	5
13	Government Support	0.757	5
14	EHR Adoption	0.787	8

CONCLUSION AND FUTURE WORK

This study was proposed to examine the influencing factors in the willingness to adopt EHR in Iraq. This study was prompted by a real need to examine the requirements, challenges, and gaps in adopting this new technology. A set of items of questionnaires was designed based on previous studies on the adoption of EHR in the Middle Eastern countries, such as Kuwait, Saudi Arabia, Jordan, and Turkey. The pilot studies were conducted to examine each influencing factor in the hypotheses and to test the reliability of the questionnaire. The pilot study was required to verify the items. Cronbach's alpha test in the pilot study reveals that the factors have values more than 0.7, which are acceptable. The pilot study was conducted using questionnaires that were disseminated to physicians in Iraq. A research paper will follow this study to illustrate the results of the data analysis of the survey. Future research will then test the hypotheses and validate the framework. The results of the tests are expected to contribute to furthering the understanding and grasp of The pilot study is allowed respondents the freedom to criticize the instruments regarding the content, format, and terminology. This is also helped to identify if respondents could very well understand

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Figure 1 the model to adoption EHR in Iraq



Figure 2 frequency of knowledge and skill



Figure 3 frequency of medical record format



Figure 4 frequency of computer literacy level

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INDIVIDUAL

Index	Knowledge and Skills	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
KaS.1	I have enough knowledge on how to use EHR system in my job	210ug100				
KaS.2	I can use the computer for straightforward activities.					
KaS.3	I know where I can find a variety of IT resources to enhance the healthcare process.					
KaS.4	I have good EHR knowledge and skills					
KaS.5	I am confident that I can develop new skills when using EHR system.					
Index	Training	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Tr.1	The training I will receive on the EHR will be adequate.					
Tr.2	I will receive the training that I need to be able to					
Tr.3	The EHR training will make it more useful to me.					
Tr.4	The EHR training will make it easier for me to use this					
	technology.					
Tr.5	Training process will not take a lot of time and effort					
Tr.6	Management concerns to provide the staff with the needed					
Tr.7	EHR training is essential for all staff that will be using the					
	HER.					
Index	Attitudes Towards	Strongly	Disagree	Neutral	Agree	Strongly
		Disagree				Agree
AT.1	The development and implementation of the EHR					
	technology will support me in providing better patient care.					
AT.2	I will encourage the use of EHR among my colleagues.					
AT.3 AT 4	I need the EHR technology to provide effective patient care.					
AT.4	in my job.					
A1.5 AT 6	All staff should learn to use the EHR effectively.					
AT.7	Coherent and Comprehensive patient records will be easy					
	accessible.					
	TEC	CHNOLOGY				
Index	Privacy and Security	Strongly	Disagree	Neutral	Agree	Strongly
		Disagree				Agree
PaS.1	Being concerned about patient privacy is important.					
PaS.2	We have to keep the privacy of patients.					
PaS.3	EHR system need to be private and confidential					
PaS.4	Security concern is very essential in order to adopt EHR system within your organization					
PaS.5	You trust the EHR system and believe that it is a well-reliable system.					
PaS.6	Degree of healthcare organization's concern with data security in EHR systems.					
Index	Cost- effectiveness	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

I feel the	potential	costs	of	using	the	EHR	systems	would
outweigh	the benefi	its.						

- **CE.2** High cost of equipment might be the cause of not adopting EHR systems.
- **CE.3** EHR system is less costly than the traditional healthcare delivery.
- **CE.4** All our clinical staff need to be trained in order to use EHR system.
- **CE.5** EHR system has low training costs
- **CE.6** The overall cost of using EHR system is less than the cost of traditional systems.

Index	Compatibility	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CB.1	Our healthcare organization will be able to use existing systems processes with EHR systems.					
CB.2	EHR systems will work with our existing information systems set up					
CB.3	Using EHR system is compatible with all aspects of our work					
CB.4	The IT infrastructures in our organization are adequate for the adoption of a new technology					
CB.5	Our healthcare organization's employees are capable of responding adequately to the adoption of EHR systems.					
Index	Complexity	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
CX.1	The introduction and implementation of EHR system should					
	be easy to use and not complicated					
CX.2	The use of EHR system will further compound our information systems processes					

CX.3 My interaction with the EHR will be clear, understandable, and "user-friendly"

- CX.4 Learning to operate the EHR system will be easy for me
- CX.5 The integration of new technology with the existing systems
- in our organization depends on its complexity
- CX.6 Overall, I expect the EHR will be easy for me to use.

ORGANIZATION

	Index	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TMS.1	The EHR project is important to top management.					
TMS.2	The EHR project will be introduced to me effectively by top management.					
TMS.3	Top management will do an effective job during the implementation of the EHR.					
TMS.4	Top management will involve me in the implementation of the EHR.					
TMS.5	Top management will provide me with the training that I need in order to use the EHR effectively					
TMS 6	I will have easy eccase to recourses to help me in					

TMS.6 I will have easy access to resources to help me in understanding and using the EHR.

TMS.7 Top management expects me to use the EHR.

TMS.8 Top management has plans to get rid of obstacles that hinder the use of any new technology at the healthcare organization such as EHR systems.

TMS.9 Top management develops plans which are flexible enough to accommodate any changes required by the adoption of EHR systems.

TMS.10 Top management seeks to maintain competitive advantage

CE.1

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through the adoption of new technologies, and its uses in its

operations

TMS.11 The adoption of EHR systems is included in Strategic Plan for IT Center

Index	Organization's Size	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
OS.1	Our healthcare organization's size determines our adoption					8
OS.2	The size and scope of the EHR services to be implemented and adopted by an organization depends on its size and					
OS.3	patients base The adoption of EHR system is based on our organization's projected growth in health market size and services offered					
OS.4	The number of clinical staff in our organization is a determinant issue in the adoption decision for EHR system.					
OS.5	The size of our healthcare organization's IT resources plays a good role in our adoption decision					
OS.6	You think the size of the organization influences the adoption of EHR system.					
Index	IT CAPABILITIES	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ITC.1	Our healthcare requires sufficient and adequate information system applications. We have the necessary technical managerial and other					
ITC.2	skills to adopt EHR system.					
ITC.3 ITC.4	Our healthcare requires good ICT infrastructure. EHR system requires basic IT skills					
ITC.5	Our business values and norms would not prevent us from adopting EHR system in our operations.					
ITC.6	The size of our healthcare organization's IT resources plays a good role in our adoption decision					
	ENV	IRONMENT				
Index	Culture "encompasses values and behaviors that contribute to the unique social environment of an organization"	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Cul.1 Cul 2	Your organization culture helps to adopt the EHR system.					
Cul.2 Cul.3	Religion has a potential impact on applying EHR system.					
Cul.4	Your healthcare organization faces some obstacles in terms of organization culture.					
Cul.5	Our culture norms effect on willing of using EHR system					
Index	Policy	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Pol.1	Our healthcare organization need to legislation and policies to apply EHR system.	U				0
Pol.2	Management shifts policy in all or some of the IT operations towards EHR system.					
Pol.3	legislation and policies build good relationship and trust among our staff.					
Pol.4 Pol.5	The rules in our healthcare organization that exist are sufficient to protect the use of EHR system.					
Index	Government Support	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
GS.1	Your healthcare organization needs the government support in order to adopt the EHR system.	J				5
GS.2	You think the government support is enough to encourage your organization to adopt the EHR system.					
GS.3	The government support will be an important factor that would effect on your decision of adopting the EHR system.					

GS.4 The cost of using information technology can be reduced by government regulations.

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GS.5 The laws that exist nowadays are sufficient to protect the use of EHR system.

EHR ADOPTION

Index	EHR Adoption	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
EHR.1	EHR system is an attractive technological option to the healthcare organizations.					
EHR.2	EHR system is an attractive health option to the healthcare organizations.					
EHR.3	healthcare organization's focuses on new IT system projects, which aim to increase the efficiency and quality of services provided for the beneficiaries.					
EHR.4	The healthcare organization's focuses on new IT system projects, which aim to maintain competitive advantage.					
EHR.5	The healthcare organization's focuses on new IT system projects, which aim to increase clinical staff satisfaction.					
EHR.6	The healthcare organization's focuses on new IT system projects, which aim to increase patient's satisfaction.					
EHR.7	The healthcare organization's focuses on new IT system projects, which aim to increase information security and privacy.					
EHR.8	The adoption of EHR system in IT operations will support the health services process.					