AN ELECTRONIC HEALTH RECORD MANAGEMENT MODEL FOR HEALTHCARE ORGANIZATIONS IN IRAQ

ALI FAHEM NEAMAH

DOCTOR OF PHILOSOPHY

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Faculty of Information and Communication Technology

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ALI FAHEM NEAMAH

A thesis submitted
in fulfilment of the requirements for the degree of Doctor of Philosophy

Faculty of Information and Communication Technology

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DECLARATION

I declare that this thesis entitled “An Electronic Health Record Management Model for Healthcare Organizations in Iraq” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

Signature : ……

Name : Ali Fahem Neamah

Date : ……

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APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

Signature :…….…….

Supervisor Name : Prof. Dr. Mohd Khanapi Abd Ghani

Date :……...……..……..

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DEDICATION

I dedicate my project work to the sake of Allah, my Creator and my Master, my great teacher and messenger, Mohammed (May Allah bless and grant him), who taught us the purpose of life, my country Iraq, my family and my friends. Many thanks to my supervisor Professor Dr. Mohd Khanapi Abd Ghani who give me support and help, thanks from the heart to him.

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ABSTRACT

The electronic health record (EHR) is an important system of information and communication technologies to the healthcare sector. EHR implementation is expected to produce benefits for patients, professionals, organizations, and the population as a whole. These benefits cannot be achieved without the adoption of EHR by healthcare organizations. Despite the extensive literature, there is still limited research related to the factors which impact on healthcare organizations adoption of this new innovation in the developing countries. In addition, the adoption rate of such systems is still low and meets resistance from the users. This because of the gap between the developers of electronic health and the assumptions of the users. The literature argues that the adoption of electronic health technology is dependent of the acceptance of this technology by the users. Therefore, many theories such as technology acceptance theory, institutional theory, DOI, TOE and TRA, were all developed to provide an effective model that explains how to adopt an optimal health electronic that meets users' needs. Yet, each theory discussed electronic adoption from different view of points such as individual factors, external environmental factors, technological feature, organizational roles and etc., leaving a wide body of knowledge vary from one study to another and from one country to another. This contradictory finding leaves a gap and raises a questions what is the appropriate model for electronic health adoption, especially in developing countries were the electronic health records still in the infant stage. Therefore, this research aims to come out with a model of EHR adoption from developing countries. For example, in Iraq, EHR is still in its nascent stage, thus the current research provides valuable guidance for IT managers for making solid decisions to transform their information system toward adopting EHR among Iraqi healthcare organizations. To meet the research objectives of this study, the researcher adopts quantitative approach. A self-administered survey using questionnaire was conducted on 388 clinical staff selected from selected hospitals in Iraq. The research analyse tools are SPSS and structure equation modelling (SEM) in AMOS. The main factors that were identified as playing a significant positive role in healthcare organizations adoption of EHR system were: knowledge and skills, training, attitudes towards, privacy and security, complexity, compatibility, top management support, organization size, IT capabilities, culture, policy, government support. While cost-effectiveness is playing a significant negative effect on EHR adoption. These findings have important implications and great value to the academic researchers and health sector practitioners. The outcomes of this study can be applied by both healthcare organizations and the government. In addition, the new model developed in this study was proven to be more effective for EHR adoption in Iraqi healthcare organizations.

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ABSTRAK

Rekod kesihatan elektronik (EHR) merupakan sistem maklumat dan komunikasi yang penting kepada sektor penjagaan kesihatan. Pelaksanaan EHR diharapkan dapat menghasilkan manfaat kepada pesakit, golongaan profesional, organisasi, dan populasi secara keseluruhan. Faedah ini tidak dapat dicapai tanpa penggunaan EHR oleh organisasi penjagaan kesihatan. Walaupun terdapat kesusasteraan yang luas, masih ada penyelidikan terbatas yang berkaitan dengan faktor-faktor yang memberi kesan kepada organisasi penjagaan kesihatan yang menerima inovasi baru terutama bagi negara membangun. Di samping itu, kadar penggunaan sistem ini juga masih rendah dan mendapat tentangan daripada pengguna. Ini kerana, terdapat jurang di antara pemaju kesihatan elektronik dan andaian pengguna. Penulisan kesusasteraan lampau berpendapat bahawa penggunaan teknologi kesihatan elektronik bergantung kepada penerimaan teknologi ini oleh para pengguna. Oleh itu, banyak teori di bangunkan seperti teori penerimaan teknologi, teori institusi, konteks teknologi, konteks alam sekitar dan sebagainya, semuanya dibangunkan untuk menyediakan model yang berkesan yang menerangkan cara mengguna pakai elektronik kesihatan secara optimum bagi memenuhi keperluan pengguna. Namun, setiap teori membincangkan penggunaan elektronik dari sudut pandangan yang berbeza seperti tingkah laku pengguna (TAM), faktor persekitaran luaran (EC), ciri-ciri teknologi (TC), peranan organisasi (OC) dan lain-lain, berbeza dari satu kajian ke kajian lain dan dari satu negara ke negara lain. Penemuan yang bercanggah ini meninggalkan jurang dan menimbulkan persoalan apakah model yang sesuai untuk penerimaan kesihatan elektronik, terutama di negara-negara membangun adalah rekod kesihatan elektronik masih di peringkat bayi. Oleh itu, kajian ini bertujuan untuk menghasilkan model penerapan EHR dari negara membangun. Sebagai contoh, di Iraq, EHR masih berada di peringkat awal, oleh itu penyelidikan menyediakan panduan bagi pengurus IT untuk membuat keputusan kukuh mengubah sistem maklumat mereka ke arah mengadaptasi EHR di kalangan organisasi penjagaan kesihatan Iraq. Untuk memenuhi matlamat penyelidikan kajian ini, penyelidik menggunakan pendekatan kuantitatif. Tinjauan kendiri menggunakan soal selidik telah dijalankan ke atas 388 kakitangan klinikal terdiri dari hospital terpilih di Iraq. Alat analisis penyelidikan adalah SPSS dan pemodelan persamaan struktur (SEM) dalam AMOS. Faktor utama yang dikenal pasti memainkan peranan positif dalam organisasi penjagaan kesihatan sistem EHR adalah: pengetahuan dan kemahiran, latihan, sikap terhadap privasi dan keselamatan, kerumitan, keserasian, sokongan pengurusan atas, saiz organisasi, keupayaan IT, budaya, dasar, sokongan kerajaan. Walaubagaimanapun, keberkesanan kos memainkan kesan negatif yang signifikan terhadap penggunaan EHR. Penemuan ini mempunyai implikasi yang penting dan berharga kepada para penyelidik akademik dan pengamal sektor kesihatan. Hasil kajian ini boleh digunakan oleh kedua-dua organisasi penjagaan kesihatan dan kerajaan. Di samping itu, model baru yang dibangunkan dalam kajian ini terbukti lebih berkesan untuk penggunaan EHR dalam organisasi penjagaan kesihatan di Iraq.

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LIST OF ABBREVIATIONS

DOI	-	Diffusion of Innovation Theory
e-Health	-	Electronic Health
EHR	-	Electronic Health Records
EMR	-	Electronic Medical Records
HIS	-	Health Information System
ICT	-	Information Communication Technology
IT	-	Information Technology
MOH	-	Ministry of Health
SMEs	-	Small Medium Entrepreneurs
SPSS	-	Statistical Package for Social Science
TAM	-	Technology Acceptance Model
TOE	-	Technology, Organization, Environment
TRA	-	Theory of Reasoned Action
WHO	-	World Health Organization

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CHAPTER 1

INTRODUCTION

1.1 Overview

The field of information and communications technologies (ICTs) has seen the adoption of powerful tools for processing, storing, collecting, and exchanging health-related information (Gagnon et. al., 2010a) that enhance the safety, quality, and cost-effectiveness of healthcare services. A key ICT programme in the health-related sectors is the electronic health record (EHR), which is considered to be critical for the promotion and integration of various tools, such as emergency information, EHR prescription, tests ordering, and digital imaging, telemedicine, and decision-support systems. These work to expand customer bases of evidence that support informed healthcare decisions. Through the integration of these inputs in everyday clinical procedures, it is possible to bring about more efficient and safer healthcare (Alvarez, 2004).

Specialists, patients, and care providers are anticipated to benefit from the embrace of EHR practices. International medical literature expounds the various advantages of EHR patient methods (Earnest et. al., 2004; Chaudhry et. al., 2006; Shekelle et. al., 2006). Among the key advantages is the enhanced quality of care effected by providing patients access to crucial healthcare records from healthcare providers (Wilson and Lankton, 2004; Staroselsky et. al., 2006). With linked applications for disease management (Urowitz et. al., 2008), EHR can motivate people to participate in decisions regarding their own health. EMRs and EHRs are basically synonymous in the health-related field (Boonstra and Broekhuis, 2010a). As well, e-Health record systems are new tools that enable better

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knowledge exchanges as well as decision-making among healthcare professionals, through the provision of material, timely, and updated information (Ben-Assuli, 2015).

Jamoom and Hing (2015) see e-Health record systems as software packages that enable medical institutions to create, store, organise, revise, and retrieve digital patient records. Almost three decades have passed since EHRs were first introduced as basic computer-based recording systems, with limited access to healthcare suppliers via individual computers (Strudwick and Eyasu, 2015). Since then, EHR technology suppliers have evolved highly innovative, digitalised formats that are used by healthcare professionals to record and review health status data and, in certain cases, access online healthcare data. Certain healthcare institutions have developed and implemented proprietary electronic health record systems that have progressed beyond that of others in the health-related sector. Among these pioneering US healthcare institutions are the Veterans Administration, which developed an EHR system known as MyHealtheVet, and Kaiser Permanente, which has their own scheme known as the My Health Manager (Strudwick and Eyasu, 2015).

EHRs are basic ICT applications used in health-related sectors. Their implementation offers many benefits for healthcare specialists, organizations, patients, as well as the general populace. Such advantages are not attainable without the acceptance of EHRs by healthcare specialists. Nonetheless, the impact of organizational and individual aspects regarding acceptance of e-health record systems remains unclear.

Previous research has recognised the benefits of these practices (Neil, 2012; Sundwall and Lenert, 2012). These include improved clinical practices and strategies, fewer medication errors such as writing mistakes, wrong drug prescriptions, and unfavourable drug interactions. The improvements tend to enhance distribution of preventative healthcare services (Patel et. al., 2014).

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Enhanced quality of care, patient safety, fewer duplicated tests, as well as promotional tools are among the benefits that healthcare professionals can avail of, once EHR is implemented in their primary care workflows (Lapsley et. al., 2015). EHR implementations have led to appreciable time and cost savings for healthcare suppliers (Patel et. al., 2015). Nonetheless, EHR integration present many potential barriers to primary care professionals (Pliskin et. al., 2014). To attain interoperability and understanding of EHR aspects at a national level, its adoption among medical professionals should be encouraged. Nonetheless, proper implementation is critical for achieving project completion and protecting the safety of patients. It is a fact that some 75 percent of all large healthcare information technologies (HIT) projects will fail, as well as 30 percent of all EHR installations. An understanding of these aspects that relates to physician practices should enable institutions to assess system readiness and will also facilitate implementations more effectively.

Globally, modern healthcare bodies face numerous challenges and must resort to various solutions in order to overcome hurdles. Among these is the adoption of EHR methods. Healthcare Information and Management System Society (2010) defines electronic health record systems as secure and patient-focused information resources for use in real time by clinicians at all points of care. Specifically, electronic health records are sets of data that comprise all patient information in an organization that may be accessed at all times.

Numerous developing nations face challenges in the location of resources, tracking of chronic diseases, and reduction of medical errors that stem from inadequate technology (Biondich et. al., 2005). Furthermore, the pace of deployment of computerised methods is usually subject to local as well as organizational requirements (OpenClinical, 2006). This situation is prevalent in underdeveloped nations like Iraq. The manager of the medical

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records office, Ms. Jemma, assisted this researcher in visiting the Port of Spain General Hospital in 2007, for the purpose of assessing and upgrading present workflows in Iraqi healthcare records system. The visit showed that large institutions in the area do not have electronic health records systems. Nonetheless, certain private and public hospitals, such as the Clair Medical Centre and the James Medical Complex, are implementing healthcare information systems in terms of administrative roles, as in their appointment and billing processes (Mohamud, 2014). Iraqi adoption as well as diffusion rates for healthcare information systems remains rather low in comparison to those of other sectors, such as in manufacturing, transport, retail, and finance (DeGannes Scott, 2006).

1.2 Background

EHR acceptance has been on-going for more than three decades and is supported by numerous medical organizations, national leaders, privacy advocates, and legislative programmes. Previous studies present a historical timeline regarding the difficulties that arise from EHR acceptance and healthcare provider-user dynamics. Past data are asset to describe progress in EHR adoption processes and the numerous difficulties involved in adopting advanced healthcare information systems.

This study has the advantage of recording user information for easier access. This can enable healthcare managers to develop community service, communication plan, and user training programmes that make consumers more aware of the benefits of EHR. Improvements in the recording of patient information boost the acceptance of e-Health record systems and also promote better ways to store and revise patient information. Further strengths include the recognition of understanding consumer views on such communications, via the surveys of users' satisfaction with provisioned care and information.

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