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# EHRS ACCEPTANCE IN JORDAN HOSPITALS BY UTAUT2 MODEL: PRELIMINARY RESULT

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**ABSTRACT**

Purpose: 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 effecting on EHRs acceptance by Unified Theory of Acceptance and Use of Technology (UTAUT2) model, this is a new methodology for evaluating acceptance of EHRs. We propose a theoretical model to explain the exercise behavior of health care professionals' to use an EHR system acceptance.
Methods: We conducted a pilot test survey in Jordan hospitals to collect data from healthcare professionals who had experience using the EHR systems. A valid sample of 22 responses from 70 questionnaires were collected for data analysis to pilot test

**KEYWORDS:** *Ehrs, Healthcare Professionals, UTAUT1, UTAUT2, Healthcare Professionals,* Acceptance

## 1. INTRODUCTION

The electronic health record (EHR) is taken as the spine associate the consolidation of various information tools (e.g., test system, emergency information, electronic prescription, DSS, telemedicine, and digital imagery) that could better the acceptance of indication into health care professionals' decisions. By such indication in daily hospital, practice could enable a safer and more able healthcare system. Literature review supports numerous benefits of EHR for patients [1]. The main benefits reported is the increased quality of care resulting from patients having their major health data accessible to their different health care provider that can safely improve the coordination of care [2]. Also, boost the efficiency of primary care practice [3]. The EHR support empowered citizens to actively take part in decisions concerning their health, and be used to way the transfer of recommended preventive care through primary care practices [5]. The EHR is furthermore a device that enables knowledge exchange and decision making through healthcare professionals in hospitals by providing them with relevant, up-to-date information ,and timely [1].

The goal from this study to investigate the factors that affect the acceptance of electronic health records system by healthcare professionals. This study applied in Jordanian hospitals that use EHR system. This study aims to build a clear vision of the factors that affect the user acceptance of the system by pilot test to be the start point of conducting in depth study and expand in the future, based on a preliminary study.

## 2. CURRENT KNOWLEDGE OF EHR ACCEPTANCE.

The employment of EHRs is presently supported in many high-income nations [2]. For instance, the USA Institute Medicine has qualified the EHR as ''an important technology'' for eHealth [3]. However, the rate of EHR acceptance by healthcare professionals remains slow in countries such as the US [4][5], United-Kingdom, and Canada [6]. An growing body of knowledge on EHR implementation illustrations that a common of projects are discontinued after the experimentation phase of their assessment [7]. Matters associated with the slow flow of the EHR include: important start-up funds, lack of financial incentives, suboptimal technology, low importance, and resistance of possible users [8]. EHR acceptance by

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healthcare professionals requires significant financial investment and learning effort, however introduces radical change to every single aspect of hospitals work [9]. Also, perceptions towards the use of EHR may vary between health professionals groups, adding to the complexity of acceptance this technology in a pluralist eHealth .[10].

## 3. LITERATURE REVIEW

### Unified Theory of Acceptance and Use of Technology (UTAUT)

Researchers have conducted technology acceptance educations for over two decades now. They have used several theories and models to carry out these studies in different environments with different part of study. Findings from these studies vary. The authors of UTAUT model unified eight theories and models which include Theory of reason Action (TRA) Technology acceptance model (TAM), Motivational model (MM), Theory of planned behavior (TPB) combined TAM and TPB (C-TAM-TPB) Model of PC Utilization MPCU. Innovation Diffusion Theory (IDT) and Social Cognitive.[11]–[18],[19]

Theory (SCT) Bandura (1986). The unification by the scholars sum up all the concepts from the eight models to four determinants, which expects intentions, usage, and 4 moderators of the key relationships [20]. Figure 1 illustrates the relationships that exist in the UTAUT model. The model has four EV, which refers to exogenous variables, EE, which refers to effort expectancy, PE which indicates to performance expectancy, SI which refers to social influence, and FC which mea facilitating conditions. The endogenous variables are the technology intention to use and behavior. There are other four moderators namely age, experience, gender, voluntariness. Performance expectancy is known, as a degree individual believes in the benefit of the system to performance [12], [21].

The amount of ease related with the use of the system is an important indicator towards technology intention to use which calls effort expectancy. The degree of an individual perceives on the important of new system used is also significant indicator towards technology intention to use. The degree of an individual believes on the effective of organizational and technical infrastructure exists that needs to support the use of the system is an important indicator which called facilitating condition.

The choice of this model in this study is justified by its worldwide and integrative attitude, incorporating a wide variety of explanatory variables from the core theoretical models developed to define technology acceptance and use. In particular, [20] carried out an in- depth analysis of literature on this topic and proposed a unified model that integrates the contributions public to the previous theories. Hence, it is reasonable to expect a theory that mixes the most important contributions from other models to be greater to the previous theories description of technology acceptance and use.[19]

### UTAUT2

[14] Spreads the unified theory of acceptance and use of technology (UTAUT) to examine acceptance and use of technology in a consumer context. That the goals of UTAUT2 integrates three concepts into UTAUT: HM, PV, and HT. the demographic characteristics of service users' were used as moderatos variables namely experience, age and gender to control the effect on the BI and the use of technology. The findings have derived from two-channels online survey conducted with user of technology. The data collected took four months from 1,512 of the clients of mobile. As compared to UTAUT, the additions target in UTAUT2 produced a substantial enhancement in the variance described in BI.

**Hedonic Motivation (HM)**

Hedonic motivation (HM) can defined as the intrinsic motivation such as fun, enjoyment or pleasure when using a technology because of technology for its own sake, and it has known an important construct in defining technology acceptance and use. HM is similar to perceived enjoyment or playfulness to TAM as an intrinsic motivation element, [14], [22], [23]

**Price Value (PV)**

In general, people chose the services or products when their benefit gives more than the price value compared with its cost .Therefore, price value can be defined as learners' cognitive tradeoff among the seeming benefits of the applications and the economic cost, [14], [23], [24]

**Habit (HT)**

Habit (HT) is one of a strong predictor of future technology use[24]. Habit actually has been known as the degree to which individuals incline to implement behaviors routinely for of learning [14], [22]

Figure 1 UTAUT2 [14]

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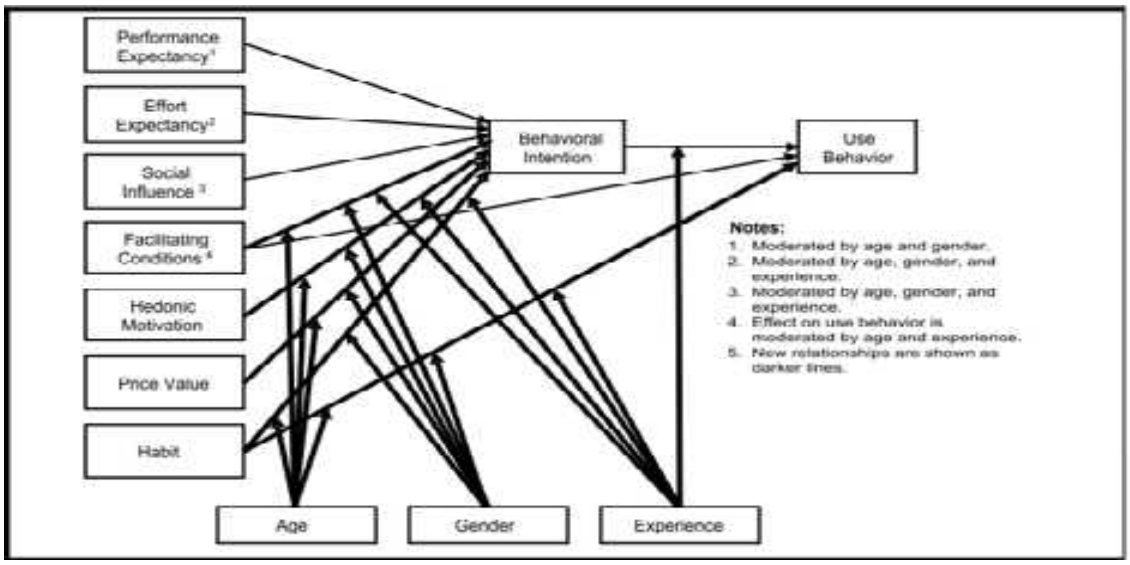


## 4. ELECTRONIC HEALTH RECORD SYSTEM

Information and communication technologies (ICTs) contain a collection of effective tools to collect, store, and exchange eHealth-related information [1]. In that regard, it is believed that ICT could improve quality, safety, and cost-performance of healthcare services. Through the applications of ICTs for the health care sector, the electronic health record (EHR) is considered as the linchpin. Plumping for the consolidation of various orders (e.g., electronic prescription, emergency info, test ordering, telemedicine, digital imaging) that could better the uptake of evidence inside hospital decisions. Using such evidence in daily clinical practices could enable a solid and more efficient EHR system [38]. Patients, professionals, organizations, and the public in general are thus expected to benefit from EHR system. Literature review supports several benefits of EHRs for patients [1] .One of the main benefits described is the increased quality of care resulting from patients having their essential health data accessible to their different providers [25] . Based on relevant disease management programs [26], EHR could support empowered citizens to actively take part in decisions regarding their health. The EHR is also a tool that facilitates knowledge exchange and decision making among healthcare professionals by providing them with relevant, up-to-date information, timely.

*Table 2 Provides A Snapshot View Of The Studies Conducted On The Employee Adoption Of The Ehrs.*

| Author | Description | origin | Method, simple size | Factors |
|---|---|---|---|---|
| [27] | investigate empirically the impact of organizational culture | Jordan | Questionnaire, 271 employees | organizational culture |
| [28] | Examines EHR acceptance factors in an academic-based eHealth | Us | Questionnaire, 802 faculty | Physician involvement. Adequate training, Physician autonomy. Doctor-patient relationship, Perceived ease of use, Perceived usefulness, attitude about EHR usage |
| [29] | To assess adoption of electronic health records (EHRs) | Us | Survey. 155 children's | Functionalities. |
| [30] | the effect of (EHR) acceptance | | Surveyed, 72 | influence on patient care, interference with other activities, influence on |

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| | | | | |
|---|---|---|---|---|
| | | | | communication and relationships, billing process, |
| [1] | To examine variation in the adoption of electronic health record (EHR) | Us | Survey, 4484 physicians | size availability of EHR functionalities, (functionality use, |
| [31] | to study the role of business case analysis in healthcare organizations' | Us | Case study interviewed 43 organizational | Cost external factors, size and complexity, stage of EHR adoption, structure of health system-physician relationships, geographic location, |
| [32] | implementation usage behavior of Electronic Medic Records system | Jordan | 7 hospitals ,700 questionnaires | Usefulness<br>Ease ,ease of use |
| [33] | Health information using the Medical Evidence Gathering and Analysis through Health IT (MEGAHIT). | US | Case study<br>Interviews with 43 participants | governance dimensions |
| [34] | patient safety from hospitals in six developing countries | Egypt, Jordan Morocco, Sudan Tunisia Yemen | Survey<br>10 group | Standers |
| [35] | to find out the status of electronic private healthcare information protection and safeguards | UAE | Qualitative, quantitative, 115 Chief Security | security of private and personal information |
| [25] | exploring the factors influencing behavior and adoption of USB-based Personal Health Records (PHR) | Taiwan | Questionnaires 1549 | Higher Usage Intentions, Perceived Usefulness |
| [36] | literature review is used to gain knowledge about the medical and information security cultures involved | US | literature review,<br>95 articles | security behavior<br>Behavioral change agents<br>Information security behavior |
| [37] | Previous studies concerning the security and privacy (EHRs) | | Literature review<br>775 articles | Security and privacy |
| [38] | analyze barriers perceived by different healthcare | Saudi Arabian | Case study<br>158 participated | Human , Financial , Laws and Policies, Organizational ,Barriers, Computers and IT Professional |
| [39] | EHR acceptance and utilization by physicians in Jordan | Jordan | Interviews, questionnaire 500 | acceptance and utilization<br>TAM |

Because of the recent issuance of UTAUT2 model in March 2012. The author has conducted a comprehensive review of all the studies that have been used since the establishment of UTAUT2 Model has been published research paper in March 2015 entitled (**Review of Studies with Utaut2 as Conceptual Framework).** The aim of that paper is to variance and integrate results from various paper using the Unified Theory of Acceptance and Use of technology (UTAUT2) with its extensions. To detecting type among studied results, sources of discrepancy among those results, neither other

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present relationships that may come to light in the context of these articles. Studies from which that paper was prepared were derived from Emerald, EBSCOhost databases, Science Direct, Out of 17 studies gleaned 2 were on education, , 2 were on the web, 3 were on Health, 2 on social, 4 were on mobile, 2 were on the consumer,1 were on banking and 1 were on different forms.. The Results from these papers are several. That paper table thematically and chronologically literature where (UTAUT2) have been applied. The review identified the Author, Topic, Sample, Size, Location, and theoretical model used. It moreover contain the Statistical techniques applied, the aims of the article and the outcomes [19]. Gap of study: the study showed that the literature lack to UTAUT2 model used to determine the factors in electronic health records by accepting users. Therefore, this work is focusing on the acceptance of UTAUT2 in EHRs in Jordan hospitals.

## 5. RESEARCH HYPOTHESIS

### Ehrs And Utaut2

The UTAUT model has been widely used in the EHR adoption and acceptance which is shown in Table 1. The employees will find the EHR system (in this case Jordan) useful if it helps them to perform the functions of the Directorate efficiently and effectively. Performance expectancy, effort expectancy and social influence, hedonic, price value, habit will directly affect the intention to use of the EHRs by the officers and staff. Thus, a high level of intention to use is likely to increase employee adoption of EHRs. H1. Performance expectancy is positively related to intention to use EHR system. H2. Effort expectancy is positively related to intention to use EHR system. H3. Social influence is positively related to the intention to use EHR system. H4. Facilitating conditions are positively related to the intention to use an EHR system. H5.Hedonic motivation is positively related to intention to use EHR system.H6. Price value is positively related to intention to use EHR system.H7. Habit is positively related to intention to use EHR system.

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## 6. RESEARCH METHODS AND RESULTS

### Pilot Study Of Utaut2

This study will be conducted primarily through the use of quantitative methods, to understand and to provide background and contextual information with regard to the acceptance of EHRs in Jordan hospitals. A correlational study design will be used to determine the existence of relationships between the dependent and independent variables in the conceptual model. A detailed description of the study phases is provided below.

A total of 32 items were used to measure the 9 constructs in the proposed extended technology acceptance model based on the Unified Theory of Acceptance and Use of technology UTAUT2 And demographics Necessary demographics were also collected for the Purpose of valid comparisons to be made within the context.

The phenomenon of information technology has widely embedded with the activities of business and service sectors. The massive global and local market competition forced the corporations to re-structure their systems and their methodologies that are important for consolidating their competitive and help them to survive in the economic market. The conflict between quality insurance and cost reduction was a main challenge for many corporations and finding a bridge to fill the gap between them was at the heart of those corporations' goals. Information technology has been considered as a crucial vehicle for driving the achievement of the organization's goals effectively and efficiently. It does so through minimizing the cost of manually services and enhancing the quality of time responsiveness and other criteria. The health sector was not absent of using this great innovation especially in documentation and knowledge exchange between the hospitals themselves and the hospitals with patients. However, technology selection and acceptance is not an easy mission and it always associated with many challenges such as the goal of the hospital, the behavior of users, the characteristics of the technology and the users, the potential benefits of this technology and others. A large number of studies from various disciplines have conducted to describe and examine the critical success factors that influence the acceptance of technology users and among of those studies is studies by [14], [20]. The focus of those studies was to examine the critical success factors on the Acceptance and Use of Technology (UTAUT). The findings of this study nominated eight critical success factors for Acceptance and Use of Technology (UTAUT). Those factors are Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic

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Motivation, Price Value, and Habit, Behavior. In the vein with this model, this study aims to examine the Acceptance and Use of Technology (UTAUT2) through examining [14], [20] theory in the health sector in Jordon. The main aim of selecting this theory is owed to the comprehensive knowledge that contained which can be used in any context. While the main aim of selecting, health sector in Jordon is owed to the fact that this sector is a vital sector that contributes positively to the country economy.

**Demographic Characteristics**

A survey was distributed to over than 70 user in tow hospital who using EHRs and the collected number of respondents is 22 respondents. As shown in the table (1), the majority of respondents were women with 54.5% compared to 45.5 male. The majority participants was those whose age upper than 41 and lower than 51 with percentage of 45.5%, while those whose age upper than 51 were the lowest at 9.10%. The employers whose experience above 10 years were the majority of participants in this survey with approximately 59.10%, followed by those whose experience less than 2 years with percentage of 18.20%.

**Result Of Pilot Test**

**Demographic Characteristics** Table (3)

| Variable | Description | Frequency | Percentage |
|---|---|---|---|
| Gender | male | 10 | 45.50% |
| | Female | 12 | 54.50% |
| Age | 21-30 | 3 | 13.65 |
| | 31-40 | 7 | 31.80% |
| | 41-50 | 10 | 45.50% |
| | 51-60 | 2 | 9.10% |
| Experience | 1-2 Years | 4 | 18.20% |
| | 3-5 Years | 2 | 9.10% |
| | 5-10 Years | 3 | 13.65% |
| | Above 10 | 13 | 59.10% |

Table (4)

| Variable Group | No. Items | Item | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| Performance expectancy | 4 | I would find EHRS useful in my job | 2.00 | 5.00 | 4.0455 | .89853 |
| | | Using EHRS increases my chances of achieving things that are important to me | 1.00 | 5.00 | 3.5455 | 1.22386 |
| | | Using EHR St helps me accomplish things more quickly. | 2.00 | 5.00 | 3.9091 | .97145 |
| | | Using EHRS in my job would increase my productivity | 1.00 | 5.00 | 3.6818 | 1.39340 |
| Effort Expectancy | 4 | Learning to operate EHRS would be easy for me | 1.00 | 5.00 | 3.9091 | 1.30600 |
| | | My interaction with EHRS is clear and understandable | 1.00 | 5.00 | 3.6818 | 1.42716 |
| | | I find EHRS easy to use | 1.00 | 5.00 | 3.5455 | 1.40500 |
| | | It is easy for me to become skillful at using EHRS | 1.00 | 5.00 | 3.8182 | 1.46828 |
| Social Influence | 3 | People who are important to me think that I should use EHRS | 1.00 | 5.00 | 3.3182 | 1.21052 |
| | | People who influence my behavior think that I should use EHRs | 1.00 | 5.00 | 3.2727 | 1.27920 |
| | | People whose opinions that I value prefer that I use EHRS | 1.00 | 5.00 | 3.7273 | 1.16217 |
| Facilitating condition | 4 | I have the resources necessary to use EHRS | 1.00 | 5.00 | 3.5909 | 1.05375 |
| | | I have the knowledge necessary to use EHRS | 2.00 | 5.00 | 3.9545 | .89853 |
| | | EHRS is compatible with other technologies I use | 1.00 | 5.00 | 3.4091 | 1.00755 |
| | | I can get help from others when I have difficulties using EHRS | 1.00 | 5.00 | 3.5909 | 1.29685 |
| Hedonic Motivation | 3 | Using EHRs is fun. | 1.00 | 5.00 | 3.1364 | 1.42413 |
| | | Using EHRs is enjoyable | 1.00 | 5.00 | 3.2727 | 1.31590 |
| | | Using EHRs is very entertaining. | 1.00 | 5.00 | 2.9545 | 1.46311 |
| Price Value | 3 | EHRS is reasonably priced | 1.00 | 4.00 | 2.6364 | 1.21677 |
| | | EHRS is a good value for the money | 1.00 | 5.00 | 2.6818 | 1.46015 |
| | | At the current price, EHRs provides a good value | 1.00 | 5.00 | 2.7273 | 1.54863 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | The use of EHRS has become a habit for me | 1.00 | 5.00 | 3.5909 | 1.09801 |
| | | I am addicted to using EHRs | 1.00 | 5.00 | 3.9545 | 1.13294 |
| | | I must use EHRs | 1.00 | 5.00 | 3.3182 | 1.21052 |
| Habit | 4 | Using EHRs has become natural to me | 2.00 | 5.00 | 4.0000 | 1.15470 |
| | | I intend to continue using EHRs in the future | 1.00 | 5.00 | 3.9545 | 1.17422 |
| | | I will always try to use EHRs in my daily life | 1.00 | 5.00 | 3.7727 | 1.34277 |
| Behavior | 3 | I plan to continue to use EHRs frequently | 1.00 | 5.00 | 3.6818 | 1.24924 |
| | | I frequently used EHR to understand health problem | 1.00 | 5.00 | 3.3182 | 1.24924 |
| | | I often use EHR to serve patient | 2.00 | 5.00 | 3.6364 | 1.21677 |
| Intention to use | 3 | I frequently use EHR to found information about health problem | 2.00 | 5.00 | 3.9524 | 1.20317 |

## 7. RELIABILITY TEST

The goodness of measures was gauged in this study by using reliability test. The reliability or internal consistency of measures was tested using Cronbach's alpha test. The analysis starts with evaluating the appropriateness of the data which must be over than 0.7 according to Uma Sekaran (2003). As shown in table (3), the overall results of Cronbach Alpha indicate that all factors are reliable and the internal consistency of the item's measurements of those factors is also reliable and can be used in this study.

First, the performance expectancy refers to the expected performance of using EHRs technology which is measured by four items as shown in the table (2). According to the results shown in table (3), the Cronbach Alpha of this factor is 0.9, which considered as a very reliable because it is higher than the minimum reliability at 0.7.

**Second**, effort expectancy variable, which indicates to the degree of ease associated with the use of the system. This variable consists of four items as shown in table (2). The Cronbach Alpha of this variable as shown in table (3), is reliable at 0.909 and the items consistency are reliable to answer research questions.

**Third**, Social Influence refers to the degree to which an individual perceives that important others believe he or she should use the new system. This variable consists of three items as shown in table (2), while the Cronbach Alpha is shown to be reliable at 0.876.

**Fourth**, Facilitating condition defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system. This factor contains four items which are shown in table (3). The Cronbach Alpha of this factor is reliable at 0.876.

**Fifth**, Hedonic Motivation is defined as the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use. This indicator contains three items which shown in table (3), while the Cronbach Alpha is reliable at 0.952.

**Sixth**, Price Value which refers to the cost of the technology and the differences between organizations and customer. The price value measured by three items as shown in the table (2). while the Cronbach Alpha is reliable at 0.883. Price value is not in the content of the study because the study is talking about electronic health records applied by the electronic government in the Ministry of Health. The study target health care professionals as employees, not as customers , The other reason is, as noted in the table (2) that answers the mean is 3 and the means to measure the questionnaire is I (do not know). (2.7727, 2.7273, 2.5455) For these reasons, we exclude this factor.

**Seventh**, Experience and Habit which reflect the opportunity to use a target technology and is typically operationalized as the passage of time from the initial use of a technology by an individual.

**Eighth**, behavior always motivated by the experience of using the technology where the high experience motivates the behavior of uses EHRS technology. The behavior measured through three items which shown in table (2), while the Cronbach Alpha test indicates to reliability in 0.941 as shown in table (3).

**Finally**, the intention to use is the dependent variable which indicates to the use of EHRS and measured through three items shown in the table (2). The Cronbach Alpha of this factor is reliable at 0.917. To sum up, all results are shown to have a high reliability test, which reflect to the consistency of the internal items. In addition, the validity of using them in this study. The finding from this study shows that the UTUAT2 factors are related to EHRs.

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**Cronbach Alpha Table (6)**

| Variable | Number of Item | Number of delete item | Cronbach Alpha |
|---|---|---|---|
| Performance expectancy | 4 | 0 | 0.9 |
| Effort Expectancy | 4 | 0 | 0.909 |
| Social Influence | 3 | 0 | 0.876 |
| Facilitating condition | 4 | 0 | 0.876 |
| Hedonic Motivation | 3 | 0 | 0.952 |
| Price Value | 3 | 3 | 0.883 |
| Habit | 4 | 0 | 0.874 |
| Behavior | 3 | 0 | 0.941 |
| Intention to use | 3 | 0 | 0.917 |

## 8. LIMITATIONS AND FUTURE RESEARCH

This study is in its first hypothetical idea, in which a beginner model is proposed based on the literature review and conceptual thought. One of the limitations in this paper is the lack to a large size of respondents because the collected data came from only two hospitals. The following step is the application and validation of the model to an arrangement of healthcare professionals, in order to test the and directly assess its explanatory and predictive power. Future studies may evaluate other relationships that were not foreseen in this model and that will improve the ability to explain the dependent variables. Therefore, this paper opens up other selections for future research Refinement of the constructs and measures is one of the possibilities. An additional option is the examination of more complex relationships between the Independent and dependent variables of the model. Testing this model with other e-health technologies, and in other countries that may be more or less developed than Jordan in e-health use are options that can also bring benefits.

## 9. CONCLUSIONS

Understanding the acceptance and use of EHR system of health care professionals should bring strong benefits for the future sustainability of the Healthcare System, which will enjoy more efficient use of resources. Thus, the goal of this study is to identify a set of determinants of adoption of EHRs by healthcare professionals. To realize this goal, we suggest a research model based on UTAUT2, adding trust factors. We examine all factors that affect EHRs acceptance to know which factors appropriate with this field. We also expect this study to provide a theoretical framework that is a foundation and a starting point for future research on the adoption of EHRs by healthcare professionals .[40].

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