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Investigating the Organizational and the Environmental Issues that Influence the Adoption of Healthcare Information Systems in Public Hospitals of Iraq

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Abstract

Healthcare information systems (HIS) are an important part of nowadays hospitals as it provides valuable benefits and functionalities for healthcare provision. However, the implementation and adoption of these complex innovations is a challenging task as documented by the literature; therefore, careful planning and consideration to all important factors that influence the adoption process by healthcare staff is required. Governmental reports stated that the usage of HIS systems within public hospitals of Iraq is still low and problematic; that's why the current study aims at empirically investigating the opinions of healthcare staff regarding the adoption of HIS within public hospitals of Iraq. The current study extended the UTAUT model by integrating additional organizational and environmental factors and for that purpose a questionnaire was developed for obtaining the healthcare staff's opinions. To the best of our knowledge, this is the first empirical study that utilized the UTAUT model to tackle the topic of HIS adoption in Iraq public healthcare sector. The study was able to explain 33% and 46% of the variance within the behavioral intention and the usage of HIS, respectively. The practical findings of this quantitative study can be helpful for healthcare officials to address the actual challenges related to HIS adoption and to set proper strategies for implementing futuristic HIS projects.

Keywords: Healthcare Information Systems(HIS), Adoption, Iraq, Kurdistan Region, UTAUT

1. Introduction and Study Motivations

The employment of new technologies in healthcare practice provides numerous benefits and functionalities such as effective healthcare services, reduced costs, better sickness management, less medical errors and improved managerial functionalities (Buntin, Burke, Hoaglin, & Blumenthal, 2011; Goldzweig, Towfigh, Maglione, & Shekelle, 2009; Herricck, Gorman, & Goodman, 2010). These technologies are collectively called healthcare information systems (HIS) and it can be defined as computerized systems that are designed to carry out different medical, administrative, accounting and communication tasks within healthcare institutions (Rodrigues, Gattini, Almeida, & Gamboa, 1999). The implementation of those innovations into modern hospitals has become inevitable as many countries are trying to digitize their healthcare institutions (Chang, Hwang, Yen, & Lian, 2006). Simultaneously, these HIS systems introduce new work experiences to healthcare staff that did not exist previously, which can create challenges that need to be tackled properly in order to assure the adoption of such systems by healthcare staff and consequently to achieve its success (Cresswell & Sheikh, 2013; McGinn et al., 2011).

Numerous factors catalyze the research in the area of HIS adoption. First of all, these HIS projects are considered expensive technological systems and vast funds are allocated by governments for this purpose; furthermore, increasing initiatives have been started to upgrade the healthcare institutions and equip them with modern HIS systems (Bossen, Jensen, & Udsen, 2013; Dobrev et al., 2010; e-Health ERA Report, 2007; Househ, Al-Tuwaijri, & Al-Dosari, 2010; Infoway, 2009; McHugh et al., 2016; The Department of Health Australian Government, 2010). However, despite the benefits provided by these systems, the literature has documented several examples were HIS faced resistance, low adoption and even failure in some cases (Al Hilfi, Lafta, & Burnham, 2013; Holden & Karsh, 2010; Kaplan & Harris-Salamone, 2009; Kijsanayotin, Pannarunothai, & Speedie, 2009; Kim & Kankanhalli, 2009; Novak, Anders, Gadd, & Lorenzi, 2012; StandishGroup, 2013). As a

result, this low adoption of HIS systems implies the loss of those substantial budgets that probably cannot be reallocated again for the same purpose. Another reason for HIS low adoption is the complexity of those technologies (Avgar, Litwin, & Pronovost, 2012; Cresswell & Sheikh, 2013; Lluch, 2011; Thakur, Hsu, & Fontenot, 2012; Venkatesh, Sykes, & Zhang, 2011), which might discourage the healthcare staff to use it as it will require them to attend training programs and adds time burdens to the staff's already loaded schedule (Boonstra & Broekhuis, 2010; McGinn et al., 2011). The mere availability of HIS systems within the hospital will not guaranty that the staff will use it and commit to it (Avgar et al., 2012). That's why the staff's attitude must not be underestimated as a contributor to the adoption of HIS and should be accounted for, as this adoption of technology is a precondition for its success as asserted by many researchers (Cresswell & Sheikh, 2013; McGinn et al., 2011; Ward, Stevens, Brentnall, & Briddon, 2008). Also, the examination of the factors that drive technology adoption within hospitals is still relatively lagging compared to other industries (Escobar-Rodríguez & Romero-Alonso, 2013; Schnall & Bakken, 2011). Another point that needs to be considered is that the majority of empirical studies addressing the issue of HIS adoption were conducted in western and developed countries (Escobar-Rodríguez & Romero-Alonso, 2013; McGinn et al., 2011; Venkatesh et al., 2011), which encouraged the current study to investigate this issue within the new environment of Iraq as each context and each society has its own specificity and its own circumstances that differs from other contexts (Castillo, Martínez-García, & Pulido, 2010; Holden & Karsh, 2010; Novak et al., 2012; Venkatesh et al., 2011; Venkatesh & Zhang, 2010), and it would be misleading to conclude that there is one suitable solution for all scenarios (Boonstra & Broekhuis, 2010). The previous reasons in addition to the troubled situation of HIS in Iraqi public hospitals (Al Hilfi et al., 2013; Ali, Abdulsalam, & Hasan, 2011) have stimulated this study to empirically investigate this important issue by examining the important factors that influence the healthcare staff's attitude in Iraqi public hospitals.

2. The Study's Theoretical Foundation

The current study employed the underpinning theory of UTAUT (Venkatesh, Morris, Davis, & Davis, 2003) as the theoretical backbone for the study for examining the adoption of HIS among healthcare staff within Iraqi public hospitals. The UTAUT model proved to be a robust model in studying individuals' adoption of new technologies within different domains (Alshehri, Drew, Alhussain, & Alghamdi, 2012; Duyck et al., 2007; Jianbin & Jiaojiao, 2013; Lian, 2015; Lin, Lu, & Liu, 2013; Oliveira, Faria, Thomas, & Popovič, 2014; Venkatesh et al., 2003; Venkatesh, Thong, & Xu, 2012; Venkatesh & Zhang, 2010; Yu, 2012). In the original UTAUT model, the study explained about 70% and 50% of the variance in regard to both behavioral intention and the usage of technology, respectively.

The empirical studies that were conducted within healthcare context and used the UTAUT model produced fluctuating results regarding the significance of the UTAUT model's constructs (Duyck et al., 2007; Ifinedo, 2012; Liu et al., 2014; Schaper & Pervan, 2007; Venkatesh et al., 2011). Moreover, Venkatesh and his collegues in their study (2011) also suggested that the UTAUT model needs further testing within different healthcare settings in order to enhance our understanding about the adoption of different HIS innovations among healthcare staff. Such findings from the literature motivated this study to reuse the UTAUT to further examine its robustness within the study's new context which is the public hospitals of Iraq and to further develop this underpinning theory by adding more factors that are specifically associated to the healthcare context.

The adoption process of new technology involves different but interrelated dimensions that need to be considered collectively to comprehend and explain the phenomenon of technology adoption in healthcare context (Cresswell & Sheikh, 2013; Jeyaraj, Rottman, & Lacity, 2006; Yusof, Kuljis, Papazafeiropoulou, & Stergioulas, 2008); therefore, to improve the performance of the UTAUT model within healthcare context, other potentially important constructs were integrated to the UTAUT model in order to cover the other aspects of the adoption process.

Boonstra and Broekhuis (2010) stated that organizational factors are considered one of the barriers affecting the adoption of HIS within hospitals, as such factors are directly related to managing the medical practice and the healthcare staff's environment; on the other hand, the organizational role can significantly support the adoption of HIS by promoting the benefits of those technologies, actively involving and providing the required resources for smooth implementation process (Bossen et al., 2013; Escobar-Rodríguez & Romero-Alonso, 2013). Moreover, Cresswell and Sheikh (2013) concluded that organizational factors did not receive the sufficient attention in prior studies regarding its effect and role in the adoption process of technology within healthcare context and it deserve further investigation by researchers. As a result, factors like top management commitment and top management innovativeness were incorporated into the current study's model to cover the organizational dimension.

Moreover, the implementation of HIS systems is a complex task; it is not as easy as installing a set of peripheral devices (Avgar et al., 2012). That's why other environmental factors need to be considered carefully to assert the adoption of the HIS. Environmental factors can be defined as those external factors that exist outside the control of the hospital's management or the staff themselves (Jeyaraj et al., 2006); such as work overload, government support and vendor support.

A more holistic model regarding the HIS adoption is necessary to improve the prediction of users' behavior related to this issue. Therefore, by extending the UTAUT model within the study's new environment and covering the important aspects which are related to the adoption process, the study will fill the gap in this domain and contribute to this important area of research.

3. Conceptual Model and Hypotheses

The current study's conceptual model was established on the UTAUT model as one of the prominent theories in the domain of information systems (Venkatesh et al., 2003, 2011, 2012); furthermore, the target construct of this study is similar to that of the UTAUT model which is examining the usage and adoption of new technologies and the factors influencing this phenomenon in work environments.

The UTAUT model originally had four independent variables (i.e. constructs) which were conceptualized from eight previous information systems theories (Venkatesh et al., 2003); the UTAUT independent variables are Performance Expectance (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC); the UTAUT also have two dependent variables, Behavioral Intention (BI) and Use Behavior (USE).

The UTAUT latent variables are defined as the following: performance expectancy is defined as the degree to which an employee believes that using a certain system will be more advantageous for him/her and will improve the task's performance; effort expectancy refers to the degree of ease and simplicity experienced by individuals when they use a certain technological system; social influence refers to the degree to which the opinions of peers have an effect on the individual's behavior regarding the use of new technology while facilitating conditions refers to the degree to which an employee or an individual perceives the tools, technical infrastructure and the support from the organization are existed to encourage the use of technological systems (Venkatesh et al., 2003); furthermore, the UTAUT model has two dependent variables: behavioral intention which refers to the degree to which a person is willing to use a technological system; and use behavior which is defined as the recurrence of using a certain technological system as reported by the user or the individual himself/herself (Davis, 1989). Therefore, the hypotheses for the current study's main constructs are:

H1: Performance Expectancy will significantly influence behavioral intention to use HIS.

H2: Effort Expectancy will significantly influence behavioral intention to use HIS.

H3: Social Influence will significantly influence behavioral intention to use HIS.

H4: Facilitating Conditions will significantly influence HIS usage.

3.1 Organizational Dimension

Organizational dimension encloses factors that exist inside the organization itself and related directly to the organization's policy of managing its resources and running the work environment in order to fullfil the organization's mission and targets (Thong, Yap, & Raman, 1996; Tornatzky, Fleischer, & Chakrabarti, 1990). Top Management Commitment (TMC) is one of the organizational factors and it refers to the level of support, commitment and active engagement the top management shows in regard to the planning and the implementation of technological systems within the organization which assures the adoption of those systems by the staff (Thong et al., 1996). Boonstra and Broekhuis (2010) stated that the management belief in the potentials of HIS and the level of support it shows will certainly influence the adoption of those systems by healthcare staff. Without the management's important role to motivate and convince the individuals within the organization about the potentials of HIS, the adoption and use of those systems might become a challenging issue (Terry et al., 2008; Thakur et al., 2012). Other researchers reported that the management being disoriented and lacking a full strategic plan can cause the selection of an inappropriate HIS system for their organization and consequently unfulfilling the realistic needs and requirements for their staff and the job-tasks (Davidson & Heslinga, 2006; Ludwick & Doucette, 2009). As a result, the following study incorporated the TMC variable into the UTAUT model as part of the organizational dimension and the hypothesis for this construct is:

H5: Top management commitment will significantly influence behavioral intention to use HIS.

In line with this, Top Management Innovativeness (TMV) can be defined as the senior managers' innovativeness and their degree of willingness to embrace innovative ideas and approaches to solve the organization's problems

and to improve its performance (Thong & Yap, 1995). The top manager's character plays an important role in encouraging the adoption of technological systems within healthcare institutions (Cresswell & Sheikh, 2013; Escobar-Rodríguez & Romero-Alonso, 2013; Yusof et al., 2008) and her/his knowledge and familiarity about the HIS can minimize the uncertainty about those innovations and as a result prompting its implementation by the organization and its adoption by the staff (Abdul Hameed & Counsell, 2012; Thong & Yap, 1995; Thong, 1999). The TMV was also added to the UTAUT model and the hypothesis for this construct is:

H6: Top management innovativeness will significantly influence behavioral intention to use HIS.

3.2 Environmental Dimension

Environmental factors can be defined as those external factors that exist outside the control of the hospital's management or the staff themselves (Jeyaraj et al., 2006). For example, Vendor Support (VS) refers to the degree to which the vendor of a technological product provides adequate support and assistance to the product users during and after the implementation phase (Thong et al., 1996). Boonstra and Broekhuis (2010) stated that healthcare practitioners are concerned about the trustworthiness of the vendor to provide the adequate support and training during and after the implementation due to several reasons like vendor immaturity or going out of business. In another study conducted in Denmark (Bossen et al., 2013), healthcare staff found that vendor responsiveness and support was a significant factor during and after the deployment of a comprehensive EHR system in the hospital. Furthermore, Aldosari (2012) in his study about the acceptance of PACS within a healthcare institution in Saudi Arabia suggested that vendor support could influence the acceptance of such technologies since there are multiple suppliers for those HIS systems with each supplier having its own policy; the researcher also suggested to include this factor in future studies. The previous lines have demonstrated the importance of vendor support as a contributor to the adoption of HIS systems; as a result, the hypothesis for this construct is:

H7: Vendor support will significantly influence the usage of HIS.

Another potentially important factor is Government Support (GVS) which refers to the role of the government in promoting and encouraging the implementation and usage of technology within organizations (Tornatzky et al., 1990). Government regulations and policies vary from one country to another and from one industry to another (Tornatzky et al., 1990). These regulations can be a constraining factor within a certain industry which discourages the adoption of new innovations; while in another industry, those regulations and guidelines can stimulate the organization to adopt technological innovations (Tornatzky et al., 1990). This factor was examined by several studies, and the results regarding its significance and its role to technology adoption were inconsistent due to the different studies' environments and settings (Abbasi, Chandio, Soomro, & Shah, 2011; Abdul Hameed & Counsell, 2012; Chang et al., 2006; El-Gohary, 2012; Quaddus & Hofmeyer, 2007). Hence, the current study considered this factor as a predictor to the adoption of new technologies within the Iraqi healthcare context to understand its effect in this new environment and the hypothesis is:

H8: Government support will significantly influence the usage of HIS.

Moreover, the literature mentioned factors like Work Overload (WOL) that could affect the phenomenon of technology adoption as it refers to the employees' perceptions regarding the work environment being compacted with many tasks, close deadlines and having exhausting working hours (Moore, 2000). Several studies concluded that time-insufficiency and heavy workload in healthcare sector were considered important factors negatively affecting the adoption of HIS (Boonstra & Broekhuis, 2010; McGinn et al., 2011). On the other hand, other researchers did not find a significant effect of workload as a job stressor (Calisir, Gumussoy, & Iskin, 2011; Dagnone et al., 2006). This controversy in the literature requires empirical investigation of this factor to study its effect within different settings; that's why the hypothesis for this construct is:

H9: Work overload will have a significant negative influence on the usage of HIS.

Last but not least, Behavioral Intention (BI) which refers to the individual's willingness to use technological innovations (Davis, 1989; Venkatesh et al., 2003) was hypothesized like the following:

H10: Behavioral Intention will significantly influence HIS usage.

Figure 1. presents the study's conceptual model along with all its constructs and hypotheses.

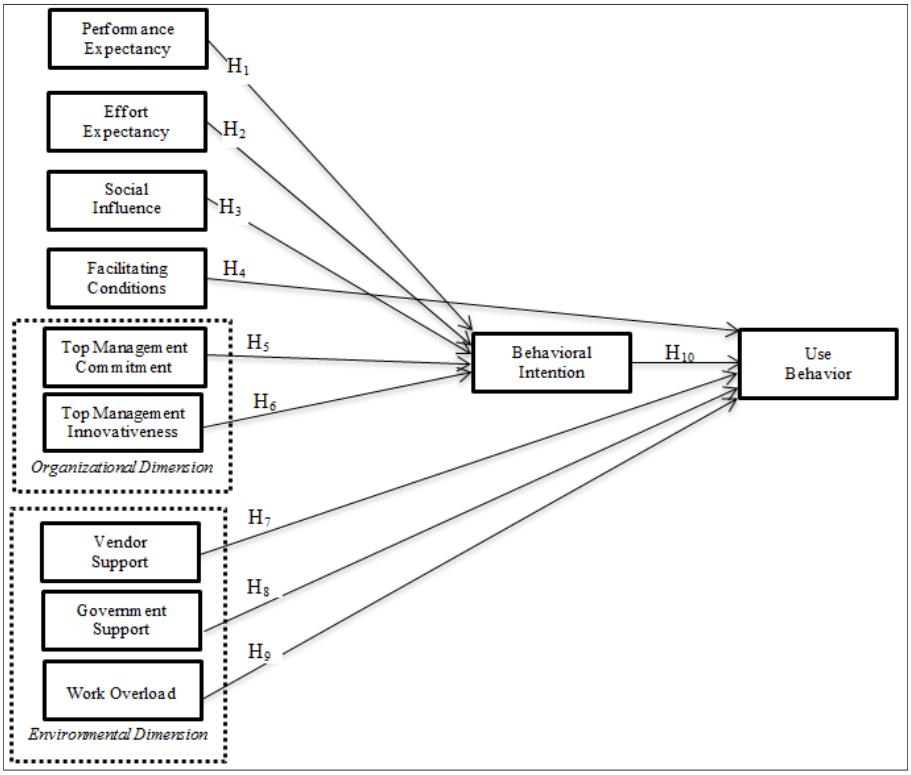

Figure 1. The study's conceptual model

4. Research Methods

4.1 Instrument Development

Previous related studies were reviewed for constructing the instrument (i.e. selecting the questionnaire items) for the current study. All constructs' items were selected and included from validated and tested measures from previous studies; those measures were adapted to fit the healthcare context. The independent variables (i.e. constructs) PE, EE, SI, FC and the dependent variable behavioral intention (BI) were adapted from the original UTAUT model (Venkatesh et al., 2003); the second dependent variable which is use behavior (USE) was adapted from (Ifinedo, 2012). The organizational dimension was represented by two constructs: top management commitment (TMC) and top management innovativeness (TMV); TMC items were adapted from (Lewis, Agarwal, & Sambamurthy, 2003), while TMV items were adapted from (Thong & Yap, 1995).

On the other hand, the environmental dimension was represented by three constructs: vendor support (VS), government support (GVS) and work overload (WOL); the items for those constructs were adapted from (Alia, Rahman, & Ismail, 2012), (Abbasi et al., 2011), and (Moore, 2000), respectively. All the items within the questionnaire were measured using seven-likert scale, ranging from one-to-seven, with one indicating "strongly disagree" and seven indicating "strongly agree".

As part of the pretesting procedure, the questionnaire layout was evaluated independently by three university professors to get their opinions and feedback regarding the items' wording being understandable and free of ambiguity for the purpose of increasing the content validity (Sekaran & Bougie, 2010); the experts' feedback was considered to help shape the final form of the questionnaire.

4.2 Study Sample and Setting

The current study used a quantitative approach in order to achieve the required generalizability of the findings; and to keep the results free of bias, the researchers kept a neutral role throughout the study and relied on rigorous statistical methods for analyzing the data and interpreting the final results (Creswell, 2013). The empirical study was conducted in the northern part of Iraq which is referred to as Kurdistan Region of Iraq (KRI) as it is the most secure and developed part of the country (Khayyat & Heshmati, 2013), which enabled the study to examine and evaluate the most recent developments in the field of public healthcare in Iraq. Nine public hospitals were selected randomly in Kurdistan Region to carry out the study.

Moreover, the current study took a general perspective by covering all types of HIS systems operating within healthcare institutions and without specifying a particular technology by itself. The target subjects of this study were the current users of HIS systems including both medical and administrative staff and this general approach was followed by several researchers in the literature (Aldosari, 2014; Chen & Hsiao, 2012; Kijsanayotin et al., 2009).

In total, 1250 questionnaires were distributed on the target respondents; 551 valid questionnaires were returned with a response rate of (44.08%) and those observations were used for the data analysis step in order to test the proposed hypotheses for the current study. Table 1 presents the demographic attributes of the participants.

Table 1. Demographic attributes of the participants

Characteristics		Percentage
Gender	Males	49.7%
	Females	50.3%
Age	21-30	49.9%
	31-40	31.9%
	41-50	13.4%
	51-60	3.8%
	above 60	0.9%
Job-Position	Medical Staff	75.3%
	Administrative Staff	24.7%

4.3 Data Analysis Method

Partial Least Squares Structural Equation Modeling (PLS-SEM) was selected as the suitable analysis technique for this study becauses one of the objectives of the study was the prediction of target variables (i.e. dependent variables) and the identification of main driver variables (i.e. independent variables); moreover, the study is extending an existing theory which is the UTAUT (Chin, 2010; Hair, Hult, Ringle, & Sarstedt, 2014). That's why the partial least squares software SmartPLS 2.0 (Ringle, Wende, & Will, 2005) was employed to carry out the assessment for the measurement and the structural models for this study (Chin, 2010; Hair et al., 2014).

4.3.1 The Measurement Model Assessment

Evaluating the reliability and the validity of the measurement model is an essential requirement in order to ensure the quality and the eligibility of the final results (Chin, 2010; Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). The assessment of the measurement model was carried out by examining four criterions: internal consistency reliability (CR), individual indicator reliability, convergent validity and discriminant validity.

In the current study, the CR values for the model's constructs ranged from (0.839) to (0.946), which exceeded the required threshold of 0.7; therefore, it was considered acceptable (Hair et al., 2014). Table 2 presents these results for all the constructs. Moreover, the Cronbach's Alpha values were also satisfied and were above the critical value of 0.7 for all the constructs. On the other hand, the indicator's reliability is considered acceptable if the outer loading for that indicator is above the value of (0.7) (Chin, 2010; Hair, Ringle, & Sarstedt, 2011); the loadings of the items within the current study's model were all above the 0.7 threshold except for two indicators, the third indicator of the construct FC with outer loading (0.650) and the forth indicator of the construct WOL with outer loading (0.667). However, indicators with loadings of (0.5) and (0.6) can still be retained if the construct's CR value was above the critical threshold (i.e. 0.7) and if there exist other indicators within the same construct with values (i.e. loadings) above (0.7) for comparison purposes (Chin, 2010; Hair et al., 2011); therefore, the indicators with loadings below (0.7) in the current study's model were preserved. The loadings and cross-loadings for all the study items can be found in Appendix A.

Regarding the validity of the constructs, the value of the Average Variance Extracted (AVE) is used to assess the level of convergent validity; an AVE value of (0.5) and above is considered acceptable for a construct (Chin, 2010; Hair et al., 2014). All the constructs within the study's model have satisfied this criterion and the minimum AVE value for a construct was (0.565); Table 2 displays the AVE values for all the model's constructs.

Table 2. Measurement Model Assessment

Construct	CR	AVE	Cronbach's Alpha	R^2
Performance Expectancy (PE)	0.877	0.641	0.814	
Effort Expectancy (EE)	0.915	0.730	0.877	
Social Influence (SI)	0.839	0.565	0.744	
Facilitating Conditions (FC)	0.859	0.605	0.781	
Top Management Commitment (TMC)	0.923	0.708	0.894	
Top Management Innovativeness (TMV)	0.917	0.787	0.865	
Vendor Support (VS)	0.931	0.817	0.888	
Government Support (GVS)	0.942	0.766	0.923	
Work Overload (WOL)	0.840	0.570	0.758	
Behavioral Intention (BI)	0.926	0.806	0.879	0.326
Use Behavior (USE)	0.946	0.815	0.924	0.455

On the other hand, discriminant validity can be evaluated using the Fornell-Larcker criterion (Fornell & Larcker, 1981). If the construct's square root of the AVE value is greater than the construct's correlations with other latent variables (i.e. constructs) within the same model, then discriminant validity is satisfied (Chin, 2010; Hair et al., 2014). Discriminant validity condition was met for the current study and Table 3 presents the results of the Fornell-Larcker method with more detail.

Table 3. Discriminant Validity Assessment

	BI	EE	FC	GVS	PE	SI	TMC	TMV	USE	VS	WOL
BI	**0.898**										
EE	0.456	**0.855**									
FC	0.424	0.460	**0.778**								
GVS	0.389	0.273	0.479	**0.875**							
PE	0.364	0.610	0.322	0.185	**0.801**						
SI	0.460	0.610	0.497	0.424	0.507	**0.752**					
TMC	0.447	0.377	0.526	0.622	0.342	0.507	**0.841**				
TMV	0.385	0.264	0.478	0.573	0.253	0.378	0.628	**0.887**			
USE	0.590	0.400	0.478	0.432	0.343	0.458	0.492	0.388	**0.903**		
VS	0.372	0.342	0.442	0.536	0.372	0.390	0.490	0.535	0.429	**0.904**	
WOL	-0.228	-0.235	-0.307	-0.395	-0.216	-0.311	-0.345	-0.306	-0.344	-0.286	**0.755**

Note:(PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence, FC=Facilitating Condition, TMC=Top Management Commitment, TMV=Top Management Innovativeness, GVS=Government Support, VS=Vendor Support, WOL=Work Overload, BI=Behavioral Intention, USE= Use Behavior).

4.3.2 The Structural Model Assessment

PLS-SEM was used to evaluate the structural model; the analysis step reported the values of the coefficient of determination (R^2), path coefficients and the empirical t-values to evaluate the significance of the relationships (Chin, 2010; Hair et al., 2014). The extended UTAUT model presented by this study was able to explain (0.326) of the variance in BI and (0.455) of the variance in HIS usage.

The bootstrapping tool was used to produce the empirical t-values from the original dataset which includes 551 observations. Thus, all the proposed hypotheses were supported within the structural model except for H1 (i.e. from PE to BI) that was not supported as the path coefficient from PE to BI was ($\beta = 0.052$, t-value = 0.992); another hypothesis which is H8 (i.e. from GVS to USE) was also negated as the path coefficient from GVS to USE was ($\beta = 0.070$, t-value = 1.486), further details regarding the study path coefficients and their associated t-values can be found in Table 4.

Table 4. The structural model assessment

Paths	Path Coefficients	t-value	Hypothesis supported/not
BI → USE	0.413	9.029***	supported
EE → BI	0.228	3.959***	supported
FC → USE	0.174	4.378***	supported
GVS → USE	0.070	1.486	n.s.
PE → BI	0.052	0.992	n.s.
SI → BI	0.151	2.903***	supported
TMC → BI	0.177	3.276***	supported
TMV → BI	0.143	2.879***	supported
VS → USE	0.123	2.584***	supported
WOL → USE	-0.133	3.190***	supported

Note:(PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence, FC=Facilitating Condition, TMC=Top Management Commitment, TMV=Top Management Innovativeness, GVS=Government Support, VS=Vendor Support, WOL=Work Overload, BI=Behavioral Intention, USE= Use Behavior).
n.s. = not significant.
*p < 0.10, **p < 0.05, ***p < 0.01.

5. Discussion

The current study extended the UTAUT model by covering other important dimensions (i.e. the organizational and the environmental) that are directly related to HIS adoption within healthcare context. Our model was able to explain 33% and 46% of the variance within the model's two dependent variables (i.e. BI and USE).

The theoretical implication for this study was reexamining the UTAUT model into the study's new environment represented by the Iraqi public healthcare context and the issue of HIS adoption by healthcare staff. The examination of the factors that drive technology adoption within hospitals is still relatively lagging compared to other industries (Escobar-Rodríguez & Romero-Alonso, 2013) and since the empirical testing of the UTAUT model within healthcare setting is still relatively limited as stated by (Venkatesh et al., 2011); and adding to what have been mentioned that the majority of technology adoption studies were conducted in western communities (Gagnon et al., 2012; Venkatesh & Zhang, 2010), the current study affirmed the UTAUT generalizability and applicability and filled the gap by empirically testing it within this new environment. Moreover, taking into consideration that the technology adoption domain in general and the healthcare context in specific is a multidimensional process (Jeyaraj et al., 2006; Yusof et al., 2008), the current study conceptualized two additional organizational factors (i.e. top management commitment and top management innovativeness) and both of them were found to be salient predictors to the adoption of HIS. The findings of the current study regarding the significance of the organizational factors supported the results obtained from prior studies (Abdul Hameed & Counsell, 2012; Bossen et al., 2013; Chen & Hsiao, 2012; Escobar-Rodríguez & Romero-Alonso, 2013).

Furthermore, the current study incorporated three environmental factors into the UTAUT model (i.e. vendor support, government support and work overload). As hypothesized, WOL was found to have a significant negative effect on the use of HIS inside the hospital and its effect was the largest among the environmental factors in this study. Other studies also concluded that heavy workload can cause staff to develop negative attitudes towards the adoption of new technologies (Boonstra & Broekhuis, 2010; Kale & Goh, 2014; McGinn et al., 2011). Vendor support and post-deployment services was also found to be a significant contributor to foster the adoption of HIS systems as those systems are normally complex systems and involve a high degree of technicality that requires the presence of the vendors or the developers after the system installation to train the staff at the starting stage and help them to overcome any possible problems. The vendor's important role was also supported by the literature (Bossen et al., 2013; Quaddus & Hofmeyer, 2007).

On the other hand, the role of the government support was found to be insignificant in regard to the adoption process. This finding was inconsistent with the hypothesized relationship (i.e. H8) and previous studies (Chang et al., 2006; El-Gohary, 2012), where GVS role was important in adopting new technologies. The reason for this finding might be the current economic situation in Iraq and the war against terrorism which led the government to impose austerity measures that left its shadow on the financial support for many sectors including the healthcare sector. As the available budgets were decreased, it probably interrupted the application of HIS projects;

this situation might have minimized the role of the governmental support as a contributor to the adoption issue from the healthcare professionals' point of view. However, within the literature other researchers found an insignificant or weak role of the GVS as a predictor to the adoption of new technological systems (Abbasi et al., 2011; Abdul Hameed & Counsell, 2012; Quaddus & Hofmeyer, 2007).

In regard to the original UTAUT model's constructs, all the independent variables had a significant influence on the model's two dependent variables (i.e. BI and USE) except for the performance expectancy which had insignificant effect on BI. This finding was not in-line with the study's hypothesis H1 and the results from previous studies. The explanation for this finding might be that healthcare staff and according to their experience with HIS systems in Iraq public hospitals have found those HIS projects were below their expectations and did not meet their actual needs that are required to execute their daily tasks within the hospital; this comes in line with a governmental report (Ali et al., 2011) which evaluated the HIS in Iraq hospitals and concluded weak and disappointing results on several levels in that regard. Moreover, other researchers also found that PE had insignificant effect on the adoption behavior within their studies in healthcare context (Ifinedo, 2012; Schaper & Pervan, 2007); this finding emphasizes the important impact of each context and the type of participants being studied on the study results.

The practical implication of this study enlighten healthcare officials to pay attention to several aspects of the HIS adoption issue such as the important role of management to embrace new approaches and methods to perform the hospital tasks, to establish an awareness about the HIS benefits among the staff to reduce their resistance and to provide the necessary support and resources to encourage the adoption of HIS; in-line with the previous point, the selection of the appropriate and the qualified personals to occupy the important positions is a fundamental issue that should not be underestimated by healthcare officials as those personals (i.e. managers) will lead the change process, create the positive atmosphere and encourage the adoption of those HIS systems. Likewise, establishing partnerships with reputable vendors is another critical issue to ensure the continuous support during and after the deployment of HIS. Simultaneously, the vendors should pay attention to the simplicity of the technological products' design without compromising its efficiency and functionality. Additionally, managers should pay attention to the issue of work overload within public hospitals as a barrier to the adoption of new HIS. The healthcare staff heavy schedule can be an obstacle discouraging them to use the HIS systems as doctors and nurses may perceive the use of those systems as an additional burden to their already hectic environment. Hence, the combination of these factors needs to be accounted for collectively in order to achieve the goal of adopting the HIS systems and consequently assuring the success of such projects.

6. Conclusion

This research presented an extended version of the UTAUT model within a new context (i.e. Iraqi public healthcare) to examine the factors that facilitate the adoption of HIS by healthcare staff. Affirming the generalizability of this underpinning theory was one of the study's objectives; furthermore, additional factors have been conceptualized and were incorporated to the UTAUT model to fulfill the needs of the study's ergonomics. Future studies can conduct more in-depth research using qualitative approaches to provide deeper comprehension about this issue. Moreover, examining the issue of HIS adoption within private sector can be another target for future researchers in order to compare the results and see the differences between the private and the public sectors. This research can serve as a foundation for improving the situation of HIS adoption in particular and the healthcare provision within Iraq in general, and encourages other researchers to examine other potential factors that might contribute to the adoption of HIS within the Arabic healthcare context.

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Appendix A

Table A1. Items cross loadings

	BI	EE	FC	GVS	PE	SI	TMC	TMV	USE	VS	WOL
BI1	**0.892**	0.434	0.406	0.355	0.383	0.433	0.391	0.335	0.525	0.357	-0.222
BI2	**0.913**	0.408	0.368	0.342	0.315	0.420	0.376	0.348	0.522	0.347	-0.200
BI3	**0.888**	0.385	0.369	0.350	0.282	0.386	0.436	0.352	0.542	0.299	-0.192
EE1	0.375	**0.835**	0.409	0.228	0.578	0.505	0.328	0.256	0.323	0.340	-0.184
EE2	0.377	**0.843**	0.364	0.250	0.551	0.532	0.322	0.233	0.315	0.298	-0.218
EE3	0.410	**0.876**	0.385	0.212	0.495	0.526	0.316	0.201	0.337	0.276	-0.204

EE4	0.395	**0.863**	0.415	0.243	0.467	0.525	0.322	0.217	0.392	0.258	-0.199
FC1	0.369	0.397	**0.829**	0.392	0.310	0.415	0.445	0.408	0.379	0.331	-0.250
FC2	0.384	0.442	**0.846**	0.395	0.320	0.438	0.435	0.401	0.444	0.355	-0.276
FC3	0.200	0.272	**0.650**	0.283	0.140	0.335	0.334	0.267	0.279	0.279	-0.203
FC4	0.338	0.297	**0.772**	0.409	0.199	0.350	0.416	0.393	0.363	0.407	-0.220
GVS1	0.349	0.276	0.431	**0.885**	0.169	0.392	0.546	0.533	0.393	0.480	-0.377
GVS2	0.349	0.218	0.391	**0.902**	0.146	0.359	0.570	0.508	0.357	0.493	-0.343
GVS3	0.336	0.233	0.420	**0.903**	0.160	0.375	0.568	0.507	0.394	0.464	-0.338
GVS4	0.326	0.197	0.421	**0.886**	0.113	0.354	0.528	0.502	0.372	0.475	-0.341
GVS5	0.341	0.267	0.430	**0.797**	0.219	0.372	0.511	0.454	0.371	0.435	-0.327
PE1	0.249	0.455	0.196	0.099	**0.768**	0.348	0.252	0.134	0.234	0.292	-0.173
PE2	0.262	0.494	0.300	0.146	**0.840**	0.417	0.273	0.188	0.314	0.317	-0.169
PE3	0.299	0.527	0.263	0.151	**0.853**	0.424	0.239	0.193	0.263	0.282	-0.184
PE4	0.335	0.467	0.263	0.182	**0.736**	0.418	0.319	0.268	0.280	0.298	-0.164
SI1	0.333	0.485	0.248	0.237	0.424	**0.748**	0.286	0.207	0.242	0.280	-0.199
SI2	0.385	0.561	0.269	0.182	0.474	**0.786**	0.304	0.174	0.340	0.249	-0.198
SI3	0.354	0.386	0.488	0.458	0.291	**0.766**	0.490	0.404	0.428	0.352	-0.269
SI4	0.306	0.391	0.514	0.423	0.327	**0.705**	0.460	0.373	0.369	0.296	-0.280
TMC1	0.355	0.298	0.458	0.516	0.286	0.441	**0.861**	0.540	0.413	0.447	-0.270
TMC2	0.395	0.350	0.507	0.569	0.256	0.433	**0.897**	0.574	0.419	0.410	-0.291
TMC3	0.374	0.311	0.490	0.564	0.264	0.444	**0.888**	0.585	0.437	0.413	-0.267
TMC4	0.380	0.280	0.416	0.534	0.274	0.407	**0.843**	0.561	0.420	0.424	-0.318
TMC5	0.368	0.339	0.331	0.423	0.360	0.400	**0.702**	0.369	0.375	0.364	-0.301
TMV1	0.356	0.272	0.436	0.519	0.234	0.359	0.614	**0.896**	0.369	0.507	-0.217
TMV2	0.360	0.203	0.440	0.550	0.219	0.361	0.571	**0.922**	0.353	0.501	-0.291
TMV3	0.304	0.229	0.393	0.451	0.220	0.280	0.478	**0.842**	0.308	0.411	-0.313
USB1	0.538	0.336	0.433	0.385	0.331	0.429	0.462	0.391	**0.880**	0.391	-0.299
USB2	0.547	0.390	0.444	0.416	0.312	0.434	0.445	0.325	**0.925**	0.392	-0.335
USB3	0.513	0.352	0.415	0.368	0.302	0.393	0.437	0.336	**0.911**	0.398	-0.300
USB4	0.530	0.364	0.433	0.389	0.293	0.397	0.434	0.350	**0.894**	0.368	-0.305
VS1	0.366	0.329	0.432	0.468	0.359	0.403	0.488	0.482	0.419	**0.910**	-0.227
VS2	0.302	0.307	0.409	0.514	0.323	0.328	0.423	0.503	0.371	**0.905**	-0.262
VS3	0.338	0.288	0.353	0.474	0.324	0.319	0.414	0.468	0.369	**0.896**	-0.292
WOL1	-0.235	-0.289	-0.281	-0.362	-0.224	-0.368	-0.314	-0.250	-0.325	-0.266	**0.812**
WOL2	-0.212	-0.183	-0.300	-0.340	-0.212	-0.238	-0.373	-0.291	-0.283	-0.271	**0.784**
WOL3	-0.142	-0.126	-0.195	-0.247	-0.123	-0.165	-0.164	-0.188	-0.220	-0.158	**0.748**
WOL4	-0.034	-0.032	-0.086	-0.193	-0.025	-0.076	-0.113	-0.166	-0.161	-0.120	**0.667**