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The adoption of E-government services in the Iraqi higher education context: An application of the UTAUT model in the university of Baghdad

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Abstract
E-government services are in their infancy in many developing countries, particularly in Iraq. The achievement of e-government services is dependent on government support as well as the users of these services. This study adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explore factors that determine the adoption of e-government services in the Iraqi higher-education context. In the University of Baghdad, 430 academic staffs' were surveyed using a modified version of the UTAUT model. The results shows that there is positive and significant impact of performance expectancy, effort expectancy and social influence on behavioral intention. Moreover there is a positive and significant impact of facilitating conditions and behavioral intention on use behavior. The limitation and future research avenues are also discussed at the end of the article.

Keywords: adoption, e-government, Iraqi higher, UTAUT

Introduction
Nowadays, the applications of e-government services are undertaken worldwide. E-government has been defined as "the application of information and communications technology (ICT) to transform the efficiency, effectiveness, transparency and accountability of informational and transactional exchanges within government, between governments and government agencies at federal, municipal and local levels, citizens and businesses; and to empower citizens through access and use of information" (Tambouris, Gorilas, & Boukis, 2001) [20].

According to Carter and Belanger (2005), the success of e-government services' adoption is dependent on government support and the users of these services as well. Thus far, there has been diminutive research exploring factors that determine the adoption of e-government services among the Arab countries (AlAwadhi & Morris, 2009) [1], particularly in the education environment. The present research intended to address this gap. The study adapted the Unified Theory of Acceptance and Use of Technology (UTAUT) model to investigate factors that establish the adoption of e-government services in the University of Baghdad as a paradigm of a public university where e-government services are still being developed. The results of this study will help decision makers to achieve a better understanding about the factors that determine the university staffs' adoption of e government services.

The e-governance services in the higher education and its establishments have technologically advanced in stages, but the acceptance and adoption of these e-governance initiatives by the facilitators (the university staffs) have been considered. In the current study, an attempt has been made to investigate empirically the factors impacting the acceptance and adoption of e-governance services, which is the government-to-government (G2G) application system in the University of Baghdad.

Literature review
The importance of e-government cannot be ignored in the contemporary higher education system. It is essential for any organization either public or private to be equipped with latest technology so that the administration can be improved and processes can be enhance in terms of quality services. For this Ian *et al.* (2007) highlighted the factors that are important for e-governance adoption are trust, support from the management, reliability of information etc.

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Ali (2013) indicated that the modern requirement of the Iraqi organizations are to be related to the improved and modified organizational structure.

The Iraqi e-governance system has several issues which are to be cope up to establish a proper foundation that can help the country to eliminate the security issues as well as control the corruption (Mohammed *et al*, 2015). Furthermore the mindset need to be changed and the way the public employees behave has be changed and they must realize that they are not the government but the government employees. These all concerns are the best logical explanation for the implementation of a proper e-governance system and there is need of the day to investigate further in this area. Some of the studies regarding the e-governance in higher education system are discussed in the upcoming paragraphs.

Several information systems studies have published on various theories and models that examined the adoption of information technology innovations, especially the adoption of e-government services. These theories include; the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) [10], the Theory of Planned Behavior (TPB) (Ajzen, 1991) [3], the Technology Acceptance Model (TAM) (Davis, 1989) [6], the Diffusion of Innovation (DOI) (Rogers, 1995), Model of the IT Implementation Process (Cooper & Zmud, 1990), Information Systems Success Model (DeLone & Mclean, 1992) [7] and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003) [21]. Each model attempts to predict and explain user behavior using a variety of independent variables. These studies are the most widely used and empirically tested adoption and acceptance models, and provide useful comprehensions and implications for understanding an individual's intention of using e-government services (Korpelainen, 2011; Rana *et al*., 2011; Eneizan *et al*. 2018) [14, 15, 8].

The previous studies also have identified a number of factors that determine the adoption of e-government services, such as usefulness, ease of use, perceived risk, trustworthiness, compatibility, external influence, internet safety, interpersonal influence, relative advantage, image, hedonic motivation, price value, habit facilitating conditions, and website quality (see, for instance, Alshehri *et al*., 2012; Carter & Belanger, 2005; Hung, Chang, & Yu, 2006; Venkatesh, Thong, & Xu, 2012, Eneizan *et al*. 2018, Shaban, *et al*., 2019) [2, 13, 23, 9, 19].

In the education environment, the use of technology acceptance models in educational technology acceptance conditions would be a valuable tool. This study evaluates the adoption of e-government services in a higher educational setting and examines the UTAUT model as a useful analytical tool in this context.

Research model and hypotheses development
In this study, the research model was based on the Unified Theory of Acceptance and Use of Technology (UTAUT) that was originally proposed by Venkatesh *et al*. (2003) [21]. The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. According to AlAwadhi and Morris (2009) [1], UTAUT model provides a complete picture of the acceptance and use of technology than any previous individual models were able to do. Based on a relevant literature of the user acceptance, Venkatesh *et al*. (2003) [21] reviewed and analyzed empirically eight significant models named: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model, Theory of Planned Behaviour (TPB), a model combining TAM and TPB, Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). Further, Venkatesh *et al* (2003) [21] integrated the above eight models into a new model named UTAUT. The UTAUT model consists of five key constructs, including performance expectancy, effort expectancy, social influence, facilitating conditions and behavioural intention that play a significant role as direct determinants of usage behaviour and user acceptance. These constructs are influenced by gender, age, experience and voluntariness of use, which act as moderator variables (Venkatesh *et al*., 2003; Venkatesh *et al*., 2012) [21, 23]. The UTUAT model has been widely used for the study of adoption of e-governance in different countries around the world. An insight into the established studies shows that the model has been empirically tested through the study of e-government adoption in the domains of Government-to-Citizens (G2C) and Government-to-Business (G2B) mainly. Most of the literature and the publications on e-governance are focused on G2C or G2B (Realini, 2004) [17]. There are very few studies in the government-to-government (G2G) adoption and acceptance of e-governance (Realini, 2004; Barua, 2012) [17, 4]. According to Realini (2004) [17], G2G e-governance can be considered as the implementation of IT solutions between and inside public administration. The UTUAT model was used as the conceptualized model and the results identified the factors which influence e-government adoption by employees. Figure 1 demonstrates the model used in the study.
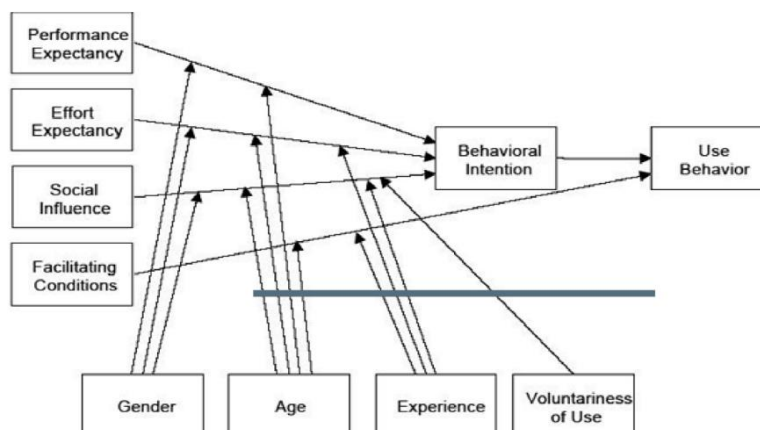

Fig 1: UTAUT model (Venkatesh *et al*., 2003) [21]

In the UTAUT model, performance expectance is driven from perceived usefulness (from TAM/TAM2), relative advantage (from IDT), extrinsic motivates (from MM), job-fit (from MPCU), and outcome expectations (from SCT). In the context of this study, performance expectancy is defined as the degree to which staff believes that use of the technology will help improve his or her job performance (Venkatesh *et al*., 2003) [21].

Regarding effort expectancy, Venkatesh *et al*. (2003) [21] captured the concept of perceived ease-of-use (from TAM/TAM2), complexity (from MPCU), and easy-of -use (from IDT) to define effort expectation as the degree of ease related with technology use. Venkatesh *et al*. (2003) [21] employed social influence to symbolize subjective norm in (TRA, TAM2, TPB/DTPB), and (C-TAM-TPB), social factors in (MPCU), and image in (IDT). They defined social influence as the degree to which staff perceives that important others believe she/he would use the technology.

Throughout capturing the concepts of perceived behavioural control (TPB/DTPB, C-TAM-TPB), facilitating conditions (MPCU), and compatibility, for instance, work style (IDT), Venkatesh *et al*. (2003) [21] defined facilitating conditions as the degree to which staff believes that an organizational and technical infrastructure exists to support technology use (Venkatesh *et al*., 2003) [21]. There are four factors: gender, age, experience and voluntariness of use, recognized as moderating variables in the original UTAUT model. However, in the interests of briefness for this study, only the main hypotheses will be investigated, while the effect of the moderators (gender, age, experience & voluntariness of use) will not be the focus of this study. Consistent with models drawing from psychological theories, which clearly mentioned that individual behavior was predictable and influenced by individual intention, UTAUT argued and confirmed behavioural intention to have significant influence on technology use (Venkatesh *et al*., 2003; Venkatesh & Zhang, 2010) [21, 22]. Taken the above together, grounded in UTAUT model, this study posits the following hypotheses:

H1: Performance expectance significantly affects academic staff intention to use e-government services.
H2: Effort expectancy significantly affects academic staff intention to use e-government services.
H3: Social influence significantly affects academic staff intention to use e-government services.
H4: Facilitating conditions significantly affect academic staff behavior of using e-government services.
H5: Behavioral intention significantly affects affect academic staff behavior of using e-government services.

Methodology

Quantitative research in the form of a survey questionnaire was undertaken to meet the aim of the research. The questionnaire was divided into two sections. The first section represents the demographic information about each participant. In the second section, the perception of each variable within the model was captured. The study was limited to academic staffs at University of Baghdad. The sample was chosen not only for convenient reasons but because university staffs are mature population for whom the Internet has become part of their daily duties, thus, knowing their attitudes and perceptions will help to improve e-government services. The survey instrument is one of the most common tools of technology adoption as it uses a set of detailed questions to cover the study topic and to target a large number of participants in a practical and efficient way (Reddick 2005; Venkatesh *et al*., 2003) [16, 21]. The instrument is based on the constructs defined in the UTAUT model (Venkatesh *et al*., 2003; Venkatesh & Zhang 2010) [21, 22], which included performance expectancy, effort expectancy, social influence, facilitating conditions and behavioral intention to use e government services. All constructs elicited by using a seven-point Likert scale ranging from 1 "strongly disagree" to 7 "strongly agree". As the requirements for validating the contents of a quantitative research instrument, the items were selected based on an extensive review from the literature and evaluated by several academicians to eliminate fatigue from adversely affecting survey results.

The questionnaire was administered to 600 academic staffs working at University of Baghdad. Between February and April 2018, the researchers distributed the questionnaire to the sample randomly within the university. A total of 430 complete questionnaires were obtained, yielding a response rate of 71.6%. The returned questionnaires considered usable to analyze and fulfil the aim of this study. More details about the instrument used are provided in Appendix A.

Data analysis and results

The analysis section of the study is presented here including the descriptive statistics, reliability tests, correlation and regression.

Reliability
Behavioral intention

Table 1: Reliability statistics

Cronbach's Alpha	N of Items
.899	4

Table 2: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
BI1	11.4372	6.848	.837	.851
BI2	11.5419	6.226	.849	.841
BI3	11.4326	6.111	.789	.868
BI4	11.2651	7.571	.649	.912

Use Behavior

Reliability Statistics	
Cronbach's Alpha	N of Items
.907	4

Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
UB1	11.6512	7.724	.845	.864
UB2	11.7628	6.876	.872	.849
UB3	11.6419	6.627	.816	.875
UB4	11.4651	8.641	.661	.922

Performance expectancy

Reliability Statistics	
Cronbach's Alpha	N of Items
.815	5

Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
PE1	16.0512	12.356	.006	.936
PE2	16.2000	8.384	.791	.724
PE3	16.1767	7.708	.799	.713
PE4	16.2558	7.342	.844	.695
PE5	16.2093	8.968	.778	.737

Effort Expectancy

Reliability Statistics	
Cronbach's Alpha	N of Items
.877	5

Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
EE1	13.1186	16.198	.752	.843
EE2	13.1953	15.127	.790	.831
EE3	13.4302	14.330	.747	.841
EE4	13.3558	14.980	.707	.851
EE5	13.4581	16.515	.567	.883

Social Influence

Reliability Statistics	
Cronbach's Alpha	N of Items
.925	4

Item-Total Statistics				
	Scale Mean if Item Deleted	**Scale Variance if Item Deleted**	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
SI1	12.5860	4.989	.829	.901
SI2	12.4698	4.958	.861	.890
SI3	12.4372	5.123	.802	.910
SI4	12.4605	5.088	.810	.907

Facilitating condition

Reliability Statistics	
Cronbach's Alpha	N of Items
.880	5

Item-Total Statistics				
	Scale mean if item deleted	**Scale variance if item deleted**	**Corrected item-total correlation**	**Cronbach's alpha if item deleted**
FC1	15.8047	10.078	.851	.822
FC2	15.9163	9.093	.881	.810
FC3	15.7953	8.946	.800	.834
FC4	15.6186	11.351	.627	.873
FC5	15.5070	12.875	.440	.907

The above results of the reliability analysis shows that the reliability of all constructs is above 0.7 which is satisfactory and further analysis can be performed.

Descriptive Stats

The descriptive statistics such as mean, maximum, minimum and standard deviation are presented in the following section.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
BI	430	1.00	5.00	3.8064	.84793
UB	430	1.00	5.00	3.8767	.89705
PE	430	2.20	5.00	4.0447	.73123
EE	430	1.20	5.00	3.1414	1.03302
SI	430	2.00	5.00	4.1628	.73911
FC	430	1.60	5.00	3.9321	.79699
Valid N (listwise)	430				

The above table of descriptive statistics show that the minimum and maximum values for behavioral intention are 1 and 5 respectively while the mean and standard deviation are 3.8 and 0.84 respectively. The minimum and maximum values for Use behavior are 1 and 5 respectively while the mean is 3.8 and standard deviation is 0.89. Performance expectancy has the minimum value of 2.2 and maximum of 5 with the mean 4.04 and standard deviation 0.73. The minimum value for effort expectancy is 1.2 while the max is 5 with the mean 3.14 and standard deviation 1.03. Social influence has a minimum of 2 and maximum of 5 while the standard deviation is 0.73 and mean is 4.16. The values for facilitating condition are with the 1.6 of minimum and 5 of maximum while the mean and standard deviation are 3.9 and 0.79 respectively.

Correlation

Correlations		BI	UB	PE	EE	SI	FC
BI	Pearson Correlation	1	.896**	.634**	-.023	.533**	.886**
	Sig. (2-tailed)		.000	.000	.629	.000	.000
	N	430	430	430	430	430	430
UB	Pearson Correlation	.896**	1	.669**	-.046	.595**	.985**
	Sig. (2-tailed)	.000		.000	.338	.000	.000
	N	430	430	430	430	430	430
PE	Pearson Correlation	.634**	.669**	1	-.014	.707**	.720**
	Sig. (2-tailed)	.000	.000		.775	.000	.000
	N	430	430	430	430	430	430
EE	Pearson Correlation	-.023	-.046	-.014	1	-.308**	-.038
	Sig. (2-tailed)	.629	.338	.775		.000	.436
	N	430	430	430	430	430	430
SI	Pearson Correlation	.533**	.595**	.707**	-.308**	1	.625**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	430	430	430	430	430	430
FC	Pearson Correlation	.886**	.985**	.720**	-.038	.625**	1
	Sig. (2-tailed)	.000	.000	.000	.436	.000	
	N	430	430	430	430	430	430
**. Correlation is significant at the 0.01 level (2-tailed).							

The above table of correlation shows the significant correlation of Performance expectancy, effort expectancy and social influence with behavioral intention. While the significant correlation of facilitating conditions and behavioral intention with use behavior. Moreover no correlation of independent variables exceed the value of 0.9 which shows there is no issue of multicollinearity.

Regression

To examine the relationship found in the conceptual framework of the study there are two models presented to performance regression analysis. The model 1 has the dependent variable of behavioral intention while the independent variables are performance expectancy, effort expectancy and social influence while in model 2 the use behavior is the dependent variable and behavioral intention and facilitating condition are the independent variables. The results of the both models are presented in the following.

Model 1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.676ª	.457	.453	.62692
a. Predictors: (Constant), SI, EE, PE				

The model summary shows that the R^2 value is 0.457 which means around 46% of the variation in behavioral intention is defined by performance expectancy, effort expectancy and social influence.

ANOVAª					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	141.015	3	47.005	119.597	.000[b]
Residual	167.430	426	.393		
Total	308.445	429			
a. Dependent Variable: BI					
b. Predictors: (Constant), SI, EE, PE					

The above table of annova shows that the p-value is 0.00 which less than 0.05 showing that the model is fit.

Coefficientsª					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.011	.213		-.054	.957
PE	.489	.062	.421	7.945	.000
EE	.187	.033	.214	5.671	.000
SI	.292	.060	.255	4.840	.000
a. Dependent Variable: BI					

The above table of coefficient shows that all three variables say performance expectancy, effort expectancy and social influence have significant impact on behavioral intention as their p-values are less than 0.05. Moreover the beta value of 0.421, 0.214 and 0.255 are all positive. Hence it can be said that performance expectancy, effort expectancy and social influence significantly and positively impact on behavioral intention.

Model 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986ª	.973	.973	.14848
a. Predictors: (Constant), FC, BI				

The model summary shows that the R^2 value is 0.973 which means around 97% of the variation in use behavior is explained by behavior intention and facilitating conditions.

ANOVAª					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	335.803	2	167.902	7615.454	.000[b]
Residual	9.414	427	.022		
Total	345.217	429			
a. Dependent Variable: UB					
b. Predictors: (Constant), FC, BI					

The above annova table shows that the model is fit as the p-value is less than 0.05 in the model.

Coefficientsª					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.494	.036		-13.678	.000
BI	.115	.018	.109	6.326	.000
FC	1.000	.019	.889	51.643	.000
a. Dependent Variable: UB					

The results of the coefficients is presented in the above table. The p-values for both behavioral intention and facilitating condition are less than 0.05 which shows the significant role in use behavior. The beta values of 0.109 and 0.889 are both positive and shows that the impact of behavioral intention and facilitating condition is significant and positive on use behavior.

Hypotheses	P-value	Results
H1: Performance expectance significantly affects academic staff intention to use e-government services.	0.000	Supported
H2: Effort expectancy significantly affects academic staff intention to use e-government services.	0.000	Supported
H3: Social influence significantly affects academic staff intention to use e-government services.	0.000	Supported
H4: Facilitating conditions significantly affect academic staff behavior of using e-government services.	0.000	Supported
H5: Behavioral intention significantly affects affect academic staff behavior of using e-government services.	0.000	Supported

The above table regarding the summary of hypotheses show that all the hypotheses found to be supported as their p-values are all less than 0.05.

Appendix A: Measurement Scale and Items (adapted from Venkatesh *et al.*, 2003)

Performance Expectancy (PE) Scale

PE1	I would find the e-government services system useful in my work job.	1 2 3 4 5 6 7
PE2	Using e-government services enables me to accomplish tasks more quickly.	1 2 3 4 5 6 7
PE3	Using e-government services enables me to accomplish tasks more efficiently.	1 2 3 4 5 6 7
PE4	I use e-government services, I will spend less time on routine job tasks.	1 2 3 4 5 6 7
PE5	Using e-government services increases the quality of academic services	1 2 3 4 5 6 7

Effort Expectancy (EE) Scale

EE1	Learning to operate e-government system is easy.	1 2 3 4 5 6 7
EE2	Using e-government services system is easy for me	1 2 3 4 5 6 7
EE3	I find the e-government system flexible to interact with.	1 2 3 4 5 6 7
EE4	It would be easy for me to become skill full at using e-government system,	1 2 3 4 5 6 7
EE5	Overall, I believe that the e-government system is easy to use.	1 2 3 4 5 6 7

Social Influence (SI) Scale

SI 1	People who are imperative to me think that I should use e-government services.	1 2 3 4 5 6 7
SI 2	I would use e-government services if my colleagues used them.	1 2 3 4 5 6 7
SI 3	I would use e-government services if my colleagues used them.	1 2 3 4 5 6 7
SI 4	The government encourages using the e-government services system.	1 2 3 4 5 6 7

Facilitating Conditions (FC) Scale

FC 1	I have the resources necessary to use e-government services.	1 2 3 4 5 6 7
FC 2	Using e-government system fits into my work style.	1 2 3 4 5 6 7
FC 3	I have the knowledge necessary to use e-government services.	1 2 3 4 5 6 7
FC 4	Using the e-government system will fit well with the way I work	1 2 3 4 5 6 7
FC 5	Resources required to use the e-government system is available to me.	1 2 3 4 5 6 7

Behavioural Intention (BI) Scale

BI 1	I intend to use the e-government services system.	1 2 3 4 5 6 7
BI 2	I expect to use the e-government services system in the future	1 2 3 4 5 6 7
BI 3	I plan to use the e-government services system.	1 2 3 4 5 6 7
BI 4	I encourage my colleagues to use e-government services system.	1 2 3 4 5 6 7

Use Behaviour (UB) Scale

UB 1	I frequently use e-government services system.	1 2 3 4 5 6 7
UB 2	I really want to use e-government services system.	1 2 3 4 5 6 7
UB 3	Most of my governmental requests are done via e-government services.	1 2 3 4 5 6 7
UB 4	I use e-government services on a regular basis.	1 2 3 4 5 6 7

Discussion

The model for the current study is based on the UTAUT model and the same was tested to provide the empirical evidence of the model testing in Iraqi context. To understand the relationships in the mode a quantitative technique was used for this purpose a questionnaire was developed and the data was collected in five-point likert scale. The model had total six constructs including performance expectancy, effort expectancy, social influence, facilitating conditions, use behavior and behavioral intention. The data analysis found a supportive outcome for the model. The results are in line with the relationships identified in the literature review in the earlier section. The UTAUT model is found to be a successful model that can best predict the influence on behavioral intention and use behavior regarding e-governance in Iraqi context. Moreover the variance explained in behavioral intention by performance expectancy, effort expectancy and social behavior was 46% while the variance explained in use behavior by facilitating conditions and behavioral intention was 97%. Furthermore the hypothetical relationships presented in the conceptual model were found to be significant as all the p-values were below the value of 0.05. hence the model was found to be a good predictor for adoption of e-governance in Iraq.

Conclusion

The study was targeted to analyze the application of UTAUT in Iraqi higher education system. This study is theoretically and practically important as it contributes significantly in the current body of research. There are interesting finding that can be mentioned as PE, EE and SI all significantly and positively explains behavioral intention and in the same was BI and FC significantly influences use behavior. The study was performed in a university in Baghdad hence it is the reflection of the academic staffs perception. Moreover the study will be proved as an important step towards understanding the perception of people regarding their behavior towards the e-governance services in Iraqi context. The study is a motivation for the enhancement of e governance system in Iraq and shows the practical importance of the issue. The findings of the study

provides an empirical evidence of e-government adoption in Iraq.

Limitations
The study is limited to the determination of the factors that influence behavioral intention and use behavior however as per the full model it does not test the moderating effects. The study is limited to only one university in Baghdad. The context of this study does not include the general public's adoption of e-governance hence it is one more limitation of our research.

Future research
The future researcher can conduct the analysis using modern tools of structural equation modeling. The sample should be collected from several organizations in the difference cities. Moreover the future researcher can also add the moderating variables. The model can be tested using structural equation model to increase the value the upcoming studies in this area of study.

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