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Determinants of customer acceptance of e-banking in Iraq using technology acceptance model

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ABSTRACT

Electronic banking (e-banking) is a form of banking in which funds are transferred through an exchange of electronic signals along to the traditional banking process as the exchange of cash, checks, or other types of paper documents. Moreover, the general tendencies of the Iraqi government in line with other countries to adopt e-banking and provide e-services to customers. However, the determinants of e-banking services need to investigate to determine the variables affecting the rate of such adoption. Thus, the main aim of this study is to identify the determinants of e-banking services in Iraq. Hence, this study gives an investigation using the technology acceptance model (TAM) by selecting a sample for many Iraqi banks' customers and staff to determine the determinants of user acceptance of e-banking. A preliminary study was conducted to empirically determine the user acceptance determinants of e-banking. For data collection, a quantitative method was used represented by the questionnaire. The selected sample for the investigation is 200 (customers and staff). Several methods have used for data analysis such as hierarchical regression, one-way ANOVA, descriptive statistics, t-test as well as structural equation modeling (SEM). The obtained outcomes show there are several determinants of e-banking services in Iraq that have determined in this study. Moreover, this study confirms the overcoming of those determinants will give a highly positive impact on e-banking services.

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1. INTRODUCTION

Traditional banks provide several services to their clients whether the clients are individuals or companies, these services include money deposits, deliver various banking services, as well as making loans to their clients [1-3]. Compared with traditional services that had done through physical branches, e-banking uses internet facilities to deliver banking services to their customers, such as opening new accounts, receive/transferring funds, as well as online bill payment [2, 4-6].

Consequently, two core methods exist for e-banking, 1) an existing bank with physical offices can establish an online site and provides e-banking services to its customers in parallel to the regular channel. 2)

there are many e-banks are existing only on the internet, they allowing customers to deal with those e-banks in virtual" manner [7, 8]. The core motivations for the implementation of e-banking services are to enhance the satisfaction level of customers and expand the market. The biggest challenges of the implementation process come from the lack of knowledge and unwillingness of customers as well as the under-developed infrastructure level [7, 9]. Besides, the general tendencies of the Iraqi government in line with other countries to adopt electronic banks and provide e-services to customers. In the same aspect, the manual and conventional processes have still applied to Iraqi banks. Every transaction consumes many documents and sometimes be a complex process.

Therefore, to make their services and products more efficient, there is a need to implement a new e-system in banking. However, some bank customers are still reluctant to apply and use new banking technologies. Furthermore, clear comprehension and empirical guide of customers' intention to adopt e-banking in Iraq are still lacked. The rest of the paper has organized as follows. Section 2 presents the preliminary study. Section 3 describes the proposed model. Section 4 provides the experimental results of the proposed model. Section 5 discusses the analysis of the proposed model based on several factors. Section 6 presents the conclusions and recommendations for future work.

2. PRELIMINARY STUDY

In this section, a preliminary study is conducted to empirically determine the user acceptance determinants of e-banking. This preliminary study involves staff who work in three Iraqi banks as well as their customers- as deduced from the previous relevant studies. In the next sections, the method used, analysis, and the obtained findings have discussed.

2.1. The method used

User acceptance of e-banking is measured by a 10-item survey questionnaire. This developed questionnaire has developed based on the adaptation of items from previous related studies, as well as conclusions made from the literature [10]. The obtained result from this preliminary study assists to extract the determinants that affect the adoption of electronic banks in Iraq. Table 1 presents the items, their codes, and their respective references. The developed questionnaires were spread over to forty-five (45) respondents purposively selected among bank staff. as mentioned early, the aim of conducting the preliminary study is users‟ validation [11]. Data collected was analyzed using Statistical Package for the Social Sciences (SPSS v25). To validate the consistency of the selected items and to ensure that the selected items duly measured, a reliability test was conducted.

Table 1. The 10-item survey questionnaire

Code	Item	References
1	I can use Internet banking, including conduct many bank transactions.	[12, 13]
2	The bank website is easy to use.	[6]
3	The bank website is secure	[14, 15]
4	I can use ATM to do bank transactions anywhere	[10]
5	There is a lack of knowledge about transferring online	[16]
6	E-banking is reliable	[13, 17]
7	I trust the bank website	[18, 19]
8	ICT background	[20]
9	The bank website is usefulness	[21]
10	Is there an international transformation that exists in Iraqi e-banking?	[7]

2.2. Findings

According to [22], for the preferable case, the calculated value of a Cronbach’s Alpha value should be more than 7, while it was acceptable if it more than 6. Therefore, Cronbach's Alpha value of 0.727 is satisfactory. This indicates that all selected items are suitable for the assessment of user acceptance of e-banking. The descriptive statistics were calculated (the value of the mean was 4.53 and the value of the standard deviation was 1.02) on a 5-point Likert scale (1=Strongly disagree, 2=Disagree, 3=Somehow agree, 4=Agree and 5=Strongly agree). The findings, therefore, showed that selected data is accepted.

2.3. Implications of the preliminary findings

The findings of the conducted a preliminary study point to the same conclusion made from the previous studies on the issues of adopting e-banking. It shows e-banking in Iraq has been experiencing an

increase in the number of their customers generally and the academic customers specifically. In conclusion, the preliminary study provides:

- Empirical evidence that e-banking services in Iraq are experiencing the problem of lack of Information and Communication Technology.
- E-banking infrastructure is essential and needs.
- Enhancing customer confidence to deal with banks electronically is an urgent need.
- Increase e-services for the banks.
- Enhance bank reputation, the relationship between the reputation of the bank and the number of users is a direct relationship, as the more the bank's reputation is excellent the more the number of dealers with this bank and vice versa.
- The usability of the bank website plays a significant role and necessary for customer acceptance and satisfaction.

From the foregoing, this study posits that since e-banking in Iraq is experiencing the three main problems of non-familiarity with ICT, decreasing trust level between the banks and their regular customers, and inadequate infrastructures of E-banking. In view of this, this study decided to select those six constructs named (customer trust (CT), non-ICT, e-banking infrastructure (SI), e-banking service (ES), system interface usability (SIU), bank reputation (BR)). Figure 1 illustrate the determinants of user acceptance of e banking in Iraq, and the interpretation for the determinants are listed in Sections 3.2.3 to 3.2.8.

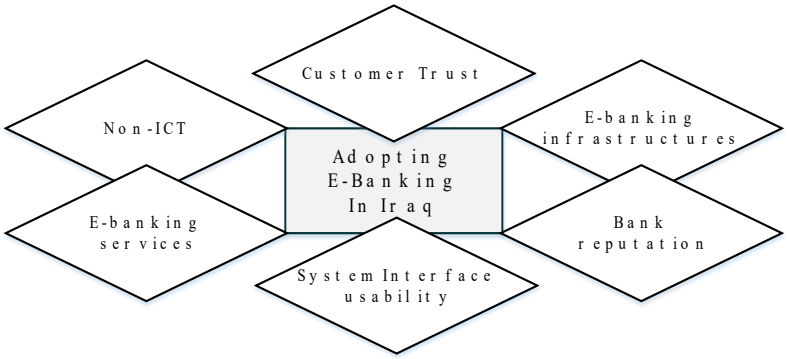

Figure 1. E-banking determinants in Iraq

3. THE PROPOSED MODEL

In this section, an overview of related theories to the study has highlighted. Firstly, the theory of acceptance model (TAM) has utilized as an underpinning theory of this research. Then the definition and the conceptualization of TAM model variables have been described. Furthermore, the overview of the external variables that extended the TAM model.

3.1. Technology acceptance model

In 1989, Davis proposed the Technology Acceptance Model (TAM); this model thus is one of the significant models accredited by researchers to measure customer behavior to adopt new technology such as (Internet banking). it is based on the Theory of Reasoned Action (TRA) by [23]. TAM suggests that both perceived ease of use (PEU) and perceived usefulness (PU) can be predicted by user attitude toward using the intended technology. PEU also can influence the PU of the intended technology. Figure 2 illustrates an original version of TAM which adopted from [24].

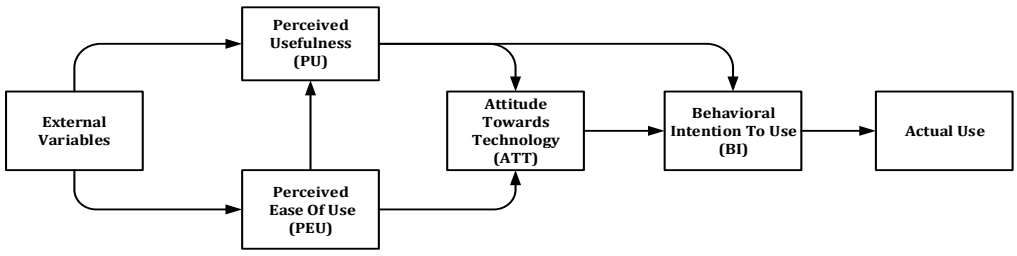

Figure 2. Original version of TAM [22]

As explicitly shown in Figure 2, the core variables of the original version of TAM are the following:
- Perceived usefulness (PU): To what extent, the technology's users can enhance their business performance.
- Perceived ease of use (PEU): Users trying to use new technology to the extent possible to pay the subjective perception.
- Attitude towards (AT): A positive evaluation by technology's users of new technologies or negative.
- Behavioural intention (BI): the technology's users want to use new technologies, the actual operational behaviour of technology users.
- Actual use (AU): Adoption e-banking system.

There are many studies for discovering the determinants in adopt e-banking in developing countries that predict the intention to adopt and use e-banking [25-28]. This study extends the TAM model and therefore identifies the determinants of e-banking services. This study attempts to achieve the following research objectives: 1) to what extent the customer trust (CT) can effect on perceived usefulness. 2) To what extent the customer trust (CT) can effect on perceived as easy to use. 3) To what extent the e-banking infrastructure (EI) can effect on perceived usefulness. 4) To what extent the e-banking infrastructure (EI) can effect on perceived easy to use. 5) To what extent the e-banking services (ES) can effect on perceived usefulness. 6) To what extent the e-banking services (ES) can effect on perceived easy to use. 7) To what extent the non-ICT can effect on perceived usefulness. 8) To what extent the Non-ICT can effect on perceived easy to use. 9) To what extent the customer trust (CT) can effect on behavioral intention. 10) To what extent the e-banking services (ES) can effect on behavioral intention. 11) To what extent the bank reputation (BR) can effect on perceived usefulness. 12) To what extent the bank reputation (BR) can effect on perceived as easy to use. 13) To what extent the system interface usability (SIU) can effect on perceived usefulness. 14) To what extent the system interface usability (SIU) can effect on perceived as easy to use.

3.2. Literature review and research hypotheses

This section describes the literature and theories related to this research, such as TAM and its core components perceived usefulness, perceived easy to use, attitude towards, behavior intention. The proposed external variables as determinants of customer acceptance of e-banking of this study have highlighted. Finally, the research hypotheses have outlined.

3.2.1. Perceived usefulness (PU)

Fred Davis proposed perceived usefulness (PU) in 1989 as "the degree to which a person believes that using a particular system would enhance his or her job performance". It measures whether or not the user perceives the intended technology to be useful for what they want to do. The evidence of the significance of PU is supported by a broad range of related research such as [24, 29-32] but not limited to. Based on these findings, the following hypothesis are proposed:

Hypothesis 1: There was a positive relationship between perceived usefulness and user intention in using e-banking.

3.2.2. Perceived ease of use (PEU)

Fred Davis proposed PU in 1989 as "the degree to which a person believes that using a particular system would be free from effort". If the technology is easy to use, then the difficulties are conquered. If the intended system is difficult to use and the system has a complicated interface, has a positive attitude towards it. By applying these into e-banking context, we hypothesize:

Hypothesis 2: There was a positive relationship between perceived ease of use and consumer intention in using e-banking.

3.2.3. Non-ICT

Recently, information and communication technology (ICT) are supported the banking sector in dealing and overcomes the economic challenges. Moreover, if e-banking users have a good background and maturity in the ICT this will add more acceptance to users towards e-banking services. By applying these into e-banking context, we hypothesize:

Hypothesis 3: There was a positive relationship between perceived ease of use and non-ICT.

Hypothesis 4: There was a positive relationship between perceived usefulness and non-ICT.

3.2.4. Customer trust

The investigating which done by [33] regard internet trust as a form of e-banking context trust. Besides, [19] investigated the perceptions of the bank's top management and its managers on the one hand and potential users in terms of expectations of e-banking. Consequently, the aim of proposing *customer trust* is to test empirically the influence of trust on e-banking acceptance. Thus, the following hypothesis were proposed.

Hypothesis 5: There was a positive relationship between perceived ease of use and customer trust.
Hypothesis 6: There was a positive relationship between perceived usefulness and customer trust.

3.2.5. E-banking infrastructures

Recently, most developing countries especially in e-banking, tend to an increasing extent to invest in developing and improving their systems' infrastructure [34, 35]. On the other hand, if the e-banking system has a solid infrastructure such as professionalism in the distribution of ATMs certainly will have a positive impact on the acceptance of e-banking [36]. Hence, the following hypothesis was proposed.
Hypothesis 7: There was a positive relationship between perceived ease of use and e-banking Infrastructures.
Hypothesis 8: There was a positive relationship between perceived usefulness and e-banking Infrastructures.

3.2.6. Bank reputation

The Bank's reputation plays a very important role in accepting customers to deal with the Bank [37]. On the other hand, if the e-banking system has an excellent reputation will have a positive impact on the acceptance of e-banking. Hence, the following hypotheses were proposed.
Hypothesis 9: There was a positive relationship between perceived ease of use and bank reputation.
Hypothesis 10: There was a positive relationship between perceived usefulness and bank reputation.

3.2.7. System interface usability

According to [38, 39], the usability of e-banking determines its ease of use and usefulness, later the usability use to determines the degree of user satisfaction. Besides, [40] reports that the usability of e-banking services has a positive impact on the perceived ease of use and perceived usefulness. In this sense, the following hypothesis was proposed:
Hypothesis 11: Usability to the e-banking service has a positive impact in determines the usefulness of the service.
Hypothesis 12: Usability to the e-banking service has a positive impact in determines the ease of use of the service.

3.2.8. The system services

Recognizing the correlation within user Interactions and e-banking services will be useful for e-banks in providing more trustworthy service [41]. In the same aspect, e-banking services also play a very important role in customer interaction with banks. The diversity of services will certainly have a positive impact on increasing user satisfaction. In this sense, the following hypothesis was proposed:
Hypothesis 13: E-banking service has a positive impact on determines the usefulness of the service.
Hypothesis 14: E-banking services have a positive impact on determines the ease of use of the service.
In addition, two extra hypotheses have proposed that are:
Hypothesis 15: There was a positive relationship between CT and consumer intention in using e-banking.
Hypothesis 16: There was a positive relationship between ES and consumer intention in using e-banking.
In line with the above. Figure 3 visualize the extending TAM model and relevant hypothesis.

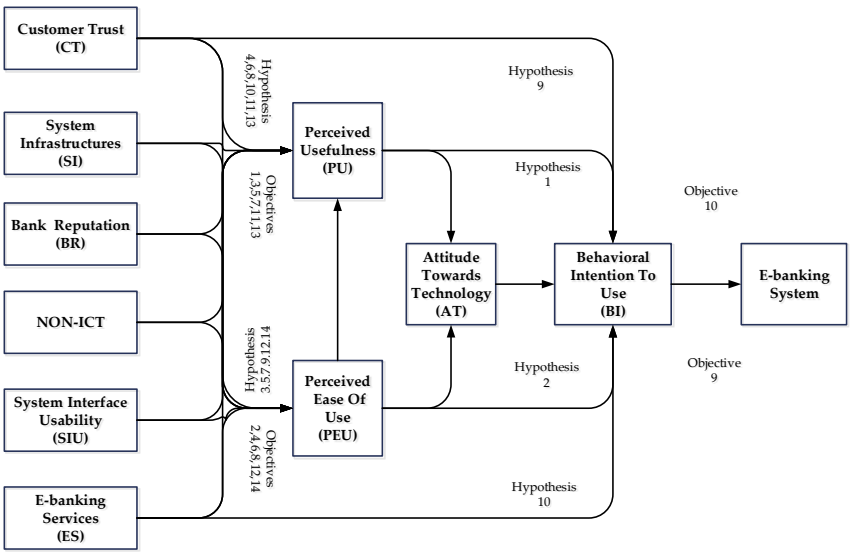

Figure 3. The extending TAM model and relevant hypothesis

4. RESEARCH METHODOLOGY

This section comprises a systematic process from the beginning to end on how the research objectives have achieved. It describes the methodological phases and the research design used in this study. It discusses the research processes in holistic, and presents all the methods used in achieving the stated objectives. The corresponding steps taken to accomplish each of the phases in the research methodology, as adapted, are also explained.

4.1. Overview of the proposed model

As mentioned above, the extended model in this study is based on the TAM model to demonstrate the intention to use e-banking in Iraq. Consequently, the external variables was proposed and tested. The instrument used in this study was developed; then, validity and reliability of the developed instrument test were conducted. Finally, the hypothesis was proposed and tested.

4.2. Instrument development and procedure

The main technique utilized in this study is a questionnaire. It is a broadly agreeable and useful instrument in collecting survey data, providing structured numerical data, and can be directed without the presence of the researcher [42, 43]. The developed instrument (questionnaire) contained six dimensions and 36 items spread on those dimensions. Close-ended questions that were tested and translated into the Arabic language as the participants are from Iraq. Besides, it has divided into two sub-sections. The first section measures six-core constructs using a five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. While the second section covers the demographic profile of the participants. Table 2 presents the variables, items, and the respective references.

Table 2. The Model variables, items, and supporting references

TAM External Variables	Relevant Items Numbers	Supporting References
Customer Trust (CT)	6 Items	[1], [10]
E-banking Services (ES)	6 Items	[2-5]
System Interface Usability (SIU)	6 Items	[8],[18],[20]
Non-ICT	6 Items	[5-6]
System Infrastructure (SI)	6 Items	[11]
Bank Reputation (RP)	6 Items	[18]

4.3. Sample selection

In the context of this study, two types of the selected sample: the first one was bank customers especially (academic staff); who have a bank account at any bank that provides e-banking services in Iraq. While the second type was the bank staff, also at any bank that provides e-banking services. The instrument has spread over 100 participants (bank customers) and 100 participants (bank staff). Incomplete and /or duplicated surveys have discarded. Accordingly, 196 usable questionnaires, a 98 % response. SPSS v.25 has used as an analysis software to analyze the collected data. Table 3 visualize the demographic information of the participants.

Table 3. Demographic information of participants

	Category	Relevant Items Numbers	Supporting References	Percentage %
1	Gender	Female	127	63.5 %
		Male	73	36.5 %
		Total	**200**	**100 %**
2	Qualification level	PhD	75	37.5 %
		MSc	75	37.5 %
		BSc	50	25 %
		Total	**200**	**100 %**

4.4. Validity and reliability of the instrument

In terms of instrument validity, content validity was conducted via expert reviews; where seven expert reviewers from both local and international have asked to validate the developed instrument in terms of relevancy and understanding of the terminology used. Based on the positive response by the experts, the instrument validation was fulfilling. In terms of reliability, Cronbach's Alphas (α) test was conducted to test the reliability of the developed instrument and set ($\alpha >= 0.7$) to be significant as suggested in [44]. Besides, the factor analysis test was conducted to ensure that the degree of importance of each item in the designed

instrument as suggested by [45, 46]. Thus, the factor analysis test was run and guided for accepting each item based on utilizing Kaiser-Meyer-Olkin (KMO) [47]. The outcome shows the level of reliability is above 0.7 for all measures as shown in Table 4.

Table 4. The reliability analysis result

	External Variables	Cronbach's Alpha Test	KMO
1	Customer Trust (CT)	0.860	0.710
2	E-banking Services (ES)	0.740	0.780
3	System Interface Usability (SIU)	0.790	0.730
4	Non-ICT	0.790	0.650
5	System Infrastructure (SI)	0.830	0.820
6	Bank Reputation (RP)	0.826	0.744
	Overall Average	0.805	0.739

Moreover, in understanding data and present it in a meaningful manner the descriptive statistics have conducted. For secure accuracy and consistency, the test of the reliability has conducted. The main tests have carried out are the composite reliability (α) and the variance-extracted measure (ρ). The majority of questionnaire items are valid and can used to test the corresponding variables. As stated earlier, factor loadings ≥ 0.70 are considered practically significant and well-defined structures [48, 49]. Hence, this study used scale loading value > =0.7. To examine the simple bivariate relationships among variables in the model, the general structural model has utilized as well as all hypotheses have examined within the context of the structural model. The justification of this is to obtain the interpretation of the outcomes due to a relationship between two variables that be examined while keeping the other variables in the model. Furthermore, the one-way ANOVA test was conducted between the participant's age and their influences on the use of e-banking. Thus, the selected sample was classified into several sets based on the participants' age. Next, the descriptive statistic has conducted as well as P-value was calculated. As clearly visualized in Table 5.

Table 5. One-Way ANOVA Test 1

	Age Group (Years)	No. of Participants	**Mean**	**STD. Deviation**
1	30 or below	30	6.8791	0.7721
2	31-35	45	6.6587	0.9722
3	36-40	60	6.3214	0.8904
4	41-45	35	6.5312	0.9712
5	46 and Above	30	6.1724	1.8741
	Total	200	6.4505	0.9045
	P-value			0.9020

The findings in Table 6 show that there is no influence between the participant's age and their acceptance to adopt e-banking. Since the P-value of 0.9020 is greater than the pretest level of significance (P=0.825>0.05). Besides, a new classification of participants sample was conducted based on their work experience with e-banking. (No work experience L0, new in e-banking L1, less than five years in e-banking L2, and less than 10 years in e-banking L3. then the descriptive statistic (calculate mean and std. deviation) was conducted as well as P-value was calculated. As clearly shown in Table 6.

The consequences in Table 6 show that there is no influence between work experience participants and adopt an e-banking system. Since the p-value of 0.9021 is greater than the pretest level of significance (p =0.825 > 0.05). The discriminant validity of the model variables has evaluated as suggested by [44]. He proposed an approach that conducts a comparison among the square root of the average variance extracted (AVE) for the model variables with its corresponding correlation values. As indicated in Table 7, the diagonal values mean the square roots of AVE, which are high compared to the values in their corresponding rows and columns that reflect the satisfactory level of discriminant validity.

Table 6. One-Way ANOVA Test 2

	Age Group (Years)	No. of Participants	Mean	STD. Deviation
1.	L0	20	6.2491	0.9122
2.	L1	80	6.6687	0.8221
3.	L2	30	6.9514	0.9303
4.	L3	70	5.9810	0.9714
	Total	200	6.2702	0.9042
	p-value			0.8921

Table 7. Discriminant validity for extended variables

Model Variable	CT	ES	SUI	SI	BR	Non-ICT
CT	**0.851**					
ES	0.284	**0.866**				
SUI	0.345	0.451	**0.878**			
SI	0.494	0.326	0.324	**0.866**		
BR	0.292	0.443	0.655	0.435	**0.862**	
Non-ICT	0.395	0.215	0.437	0.325	0.423	**0.892**

4.5. The findings of hypothesis testing

BU has a positive influence on BI in using e banking, the standard path coefficients (β=0.489), therefore, hypothesis H1 is accepted. The influence of PEU on BI in using e-banking was found significant at $p<0.05$ (β=0.455), therefore H2 was accepted. A positive influence of CT is observed on PU (β=0.423), therefore, hypothesis H6 is accepted. Besides, A positive influence of CT is observed on PEU (β=0.471), therefore, hypothesis H5 is accepted. A positive influence of ES is observed on PU (β=0.462), therefore, hypothesis H13 is accepted. Besides, A positive influence of ES is observed on PEU (β=0.474), therefore, hypothesis H14 is accepted. A positive influence of SUI is observed on PU (β=0.415), therefore, hypothesis H11 is accepted.

Besides, A positive influence of SUI is observed on PEU (β=0.399), therefore, hypothesis H12 is accepted. A positive influence of SI is observed on PU (β=0.404), therefore, hypothesis H8 is accepted. Besides, A positive influence of SI is observed on PEU (β=0.429), therefore, hypothesis H7 is accepted. A positive influence of BR is observed on PU (β=0.462), therefore, hypothesis H10 is accepted. Besides, A positive influence of BR is observed on PEU (β=0.482), therefore, hypothesis H9 is accepted. A positive influence of Non-ICT is observed on PU (β=0.413), therefore, hypothesis H4 is accepted. Besides, A positive influence of Non-ICT is observed on PEU (β=0.474), therefore, hypothesis H3 is accepted. A positive influence of CT is observed on PU (β=0.423), therefore, hypothesis H15 is accepted. Besides, A positive influence of ES is observed on PEU (β=0.499), therefore, hypothesis H16 is accepted.

4.6. Discussion of the results

The core aim of this paper has investigated and identified the determinants of the adoption of e-banking in Iraq by proposing the influencing factors and to expose the relationship between those factors. An extension of TAM has used with six external variables (customer trust, e-banking services, system interface usability, non-ICT, system infrastructure, and bank reputation). The results indicate that the proposed determinants to adopt e-banking is highly influenced by their PU and PEU as well as highly influenced by BI. Consequently, it can be indicated from the results above, by overcoming the determinants have facing e-banking in Iraq will have a positive impact on user satisfaction on adopting e-banking.

5. CONCLUSION AND FUTURE DIRECTION

Electronic banking (e-banking) is a form of banking in which funds are transferred as along to the traditional banking process as the exchange of cash, checks, or other types of paper documents. However, the determinants of e-banking services need to investigate in order to determine and understand the variables affecting the rate of such adoption. Consequently, the main aim of this study is to identify the determinants of e-banking services in Iraq. The model, which tackle out those determinants, was proposed and evaluated.

The measuring of the proposed model variables via technology acceptance model (TAM) due to it is an information systems theory that models how users come to accept and use a technology. Sixteen hypotheses was proposed and tested. Finally, this study was achieved research objective and the authors confirmed the successfully adoption e-banking in Iraq can be done by avoiding and control the all of the proposed model variables. The future direction of this research is to continue measuring the user acceptance of e-banking in different perspectives (customer perspective and bank perspective by combining two or more theories such as technology organization environment TOE and TAM.

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