Modified UTAUT Model to Study the Factors Affecting the Adoption of Mobile Banking in Jordan

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Abstract

Mobile banking allows bank customers to conduct bank transactions at anytime from any place. The usage of mobile banking services is still in early stage compared to other services conducted by the banks sector. This study is important for the banking industry since it will provide practical recommendations to the banking industry in Jordan as a developing country. This study achieves three main goals: first; we developed a modified model by adding and removing new factors to the Unified Theory of Acceptance and Use of Technology (UTAUT) model; which is considered as one of the most powerful models in investigating the factors that affect the technology adoption decision of mobile banking services. The modifications on the UTAUT model were in two directions, the first direction was by adding new moderator factor called the influence of education. The second direction was by adding the Reliability, Design Issues, and Security as a three technology related factors to the UTAUT model. Second; we studied and investigated the factors that affect the technology adoption decision of mobile banking services in Jordan. We also explored if those factors are moderated by the proposed moderator factors or not. For this purpose we proposed 21 hypothesis, then we designed a questionnaire that is distributed to figure out the customer believes and intention to adopt mobile banking services. The questionnaire was distributed to 174 persons; from this number we approved 162 questionnaires for the purposes of research and analysis. We tested our proposed hypothesis using PLS Path Modeling. Third; we validated the modified model using the Varimax procedure; in which the loading factor values were more than 0.6, Kaiser-Mayer-Olkin (KMO) values were more than 0.5, and the Eigen values were more than one. The results shows our proposed model is valid, and that the Security factor plays the most significant factor on the intention to adopt m-bank services, and the Facilitating Conditions (FC) has a powerful effects in the actual use of m-bank services.

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In term of education and experience role; the results shows that the Performance Expectancy (PE) factor is the most factor moderated by the education and experience factors. The results also show that the Social Influence (SI) and Design Issues factors are not moderated by the education and experience factor in the intention behavior. But in actual use side the results show that the Facilitating Conditions (FC) is moderated by the education and experience factor.

Keywords: mobile banking; improved UTAUT Model; Factors Affecting the Adoption.

1. Introduction:

Banks seek always to acchive competitive advantage an to be first in market; so they keep looking for new technology which can improve the bank services. Mobile banking is considered one of the newest technologies which can increase the performance of services conducted by the banks. Mobile banking or M-banking concept means that you can use the mobile devices to provide financial information to customers, also providing communication and transactions such as checking account balances, transferring funds between accounts, and accessing other banking products and services from anywhere, at any point of time [1].

By using M-banking customers can coduct any transactions at anytime. M-banking can also improve the quility of services while reducing the operational costs. Another important advantage that makes the investment in m-banking more attarctive to the banks is that the investment cost of m-banking technology is lower than other technologies, this is due the fact that the infrastructure which is needed for mobile banking is already satisfied. The customer also will be familiare with this new technology because they are already familiar with the mobile interface which is very simple aplication.

it is important for the banking industry to understand the factors that affect the technology adoption decision of mobile banking services in Jordan, this will help them to acchive competitive advantage, to be the first in market, and to satesfy their customers. The factors that affect the technology adoption decision of mobile banking services were studied using either the Technology Acceptance Model (TAM) such as [3,4,10,11,12,13,14], or the Unified Theory of Acceptance and Use of Technology (UTAUT) model such as [5,6, 15,16]. This study will use the Unified Theory of Acceptance and Use of Technology (UTAUT) model; because it is considered as one of the most powerful models in investigating the factors that affect the technology adoption decision of mobile banking services [5,6]. So this study used the Unified theory of acceptance and use of technology (UTAUT) [2] to detirmine and examine the factors that influence the intention to adopt m-banking in jordan. This study will also modefiy the UTAUT model based on the available litrature which was studied by the authors of this research, the modefication will be impleminted by adding new moderator factor called the influence of education. Also we added the Reliability, Design Issues, and Security as a three technology related factors to the UTAUT model. The added factors will be tested using PLS path Modeling. Finally; we validated our proposed model using the Varimax procedure.

2. Literature Review

 M-banking was studied by many researchers based on Technology Acceptance Model (TAM) such as [3,4, 10,11,12,13,14]. The authors in [3] applied Technology Acceptance Model to examine the factors that influence the adoption of M-banking in Kenya. The study was about the M-banking softwrae which called M-Kesho. They used the Confirmatory Factor Analysis to analyze the data collectd data. They also used the and Structural Equation Modeling to validate their proposed research model. The results showed that the Perceived Ease of Use, Perceived Self Efficacy, Perceived Usefulness, and Perceived Credibility significantly influenc the customers' attitude towards the usage of M-banking. The authors in [4] studied the factors that influence the adoption of m-banking in Malaysia; they used and extend the well known Technology Acceptance Model (TAM). Their proposed model was able to predict the consumer intention to use m-banking.

In this research we are not going to use the TAM model; TAM have no moderate factors which was found to be useful and handy in studying the factors affecting the intention toward mobile banking services adoption by customers.

In [5]; the Unified Theory of Acceptance and Use of Technology (UTAUT) is used to investigate what are the factors that can impact users to adopt mobile banking. They found that the individual intention to adopt m-banking was influenced by the following factors; the social influence, performance expectancy, perceived financial cost, and perceived credibility. They found that the consumers' behavior was also affected by the facilitating conditions. They also found that the gender moderated the effects of performance expectancy and perceived financial cost on behavioral intention. The authors in [5] also found that the age also moderated the effects of facilitating conditions and perceived self efficacy on the actual adoption. In another study conducted in Jordan, Khraim and his colleagues [6] identify the underlying factors that affect mobile banking adoption in Jordan. In their study, the factors that could affect mobile phone users in Jordan to adopt m-banking services were tested. The research findings proved that all of the following factors: compatibility, complexity, self efficacy, risk, and relative advantage affect the mobile banking adoption. Compared to our study; those studies [5,6] did not cover any technology related factors, also they did not cover the education and Experience as moderator factors.

Finally; and Unlike our study which studied the factors influencing mobile banking adoption by customers, Shammot [7] conducted a study that was concerned with the opinion of commercial bank managers (not the customers) towards the advantages of using m-Banking in Jordan. The research results showed that Amman bank managers feel that using M-Banking will provide a high degree of comfort ability for their customers. The research finds that the managers with less than 8 years of experience feel that using M-Banking can introduce better monitoring & following for the reports related to work more than those managers with more than or equal to15 years of experience.

3. Unified Theory of Acceptance and Use of Technology (UTAUT)

It is a model sugested by Venkatesh [2] which is used to explore the factors affecting the intention to adopt technology.. this model has been used widely in investigating information technology adoption.

UTAUT model sugested that there are a set of factors influenss the intention of the individual user acceptance. Those factors clasified into two kind of variables, the first one called external variable which include those factors that play a significant role in the user acceptance, include Performance Expectancy(PE), Effort Expectancy(EE), Social Influence(SI) and Facilitating Conditions(FC). While the other cattegory represent the moderator variable or control variable which include age, gender, experience and Voluntariness of Use. Figure 1 show UTAUT model.
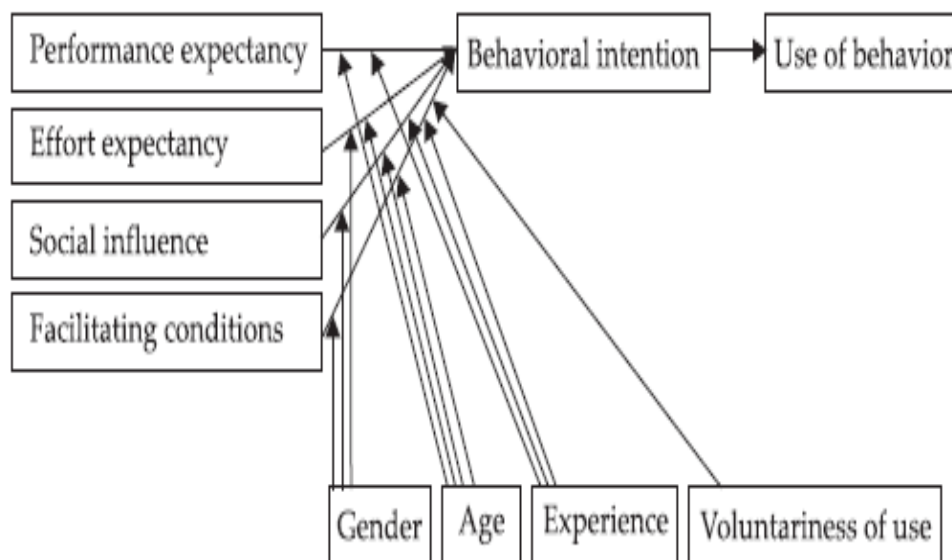

Figure 1: UTAUT model. [source [2]]

As shown in figure 1 the UTAUT model consist of the following factors which all were defind by the authors of [2] as the following:

- Performance Expectancy(PE): "The degree to which an individual believes that using the system will help him or her to attain gains in job performance" [2]**.**
- Effort Expectancy(EE): "The degree of ease associated with the use of the system" [2]**.**
- Social Influence(SI): "The degree to which an individual perceives that important others believe he or she should use the new system" [2]**.**
- Facilitating Conditions(FC): "The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" [2]**.**

- Moderators: which include age, gender, experience and Voluntariness of Use, where Voluntariness of Use is "the extent to which potential adopters perceive the adoption decision to be non-mandatory"[2].

4. The Proposed Model.

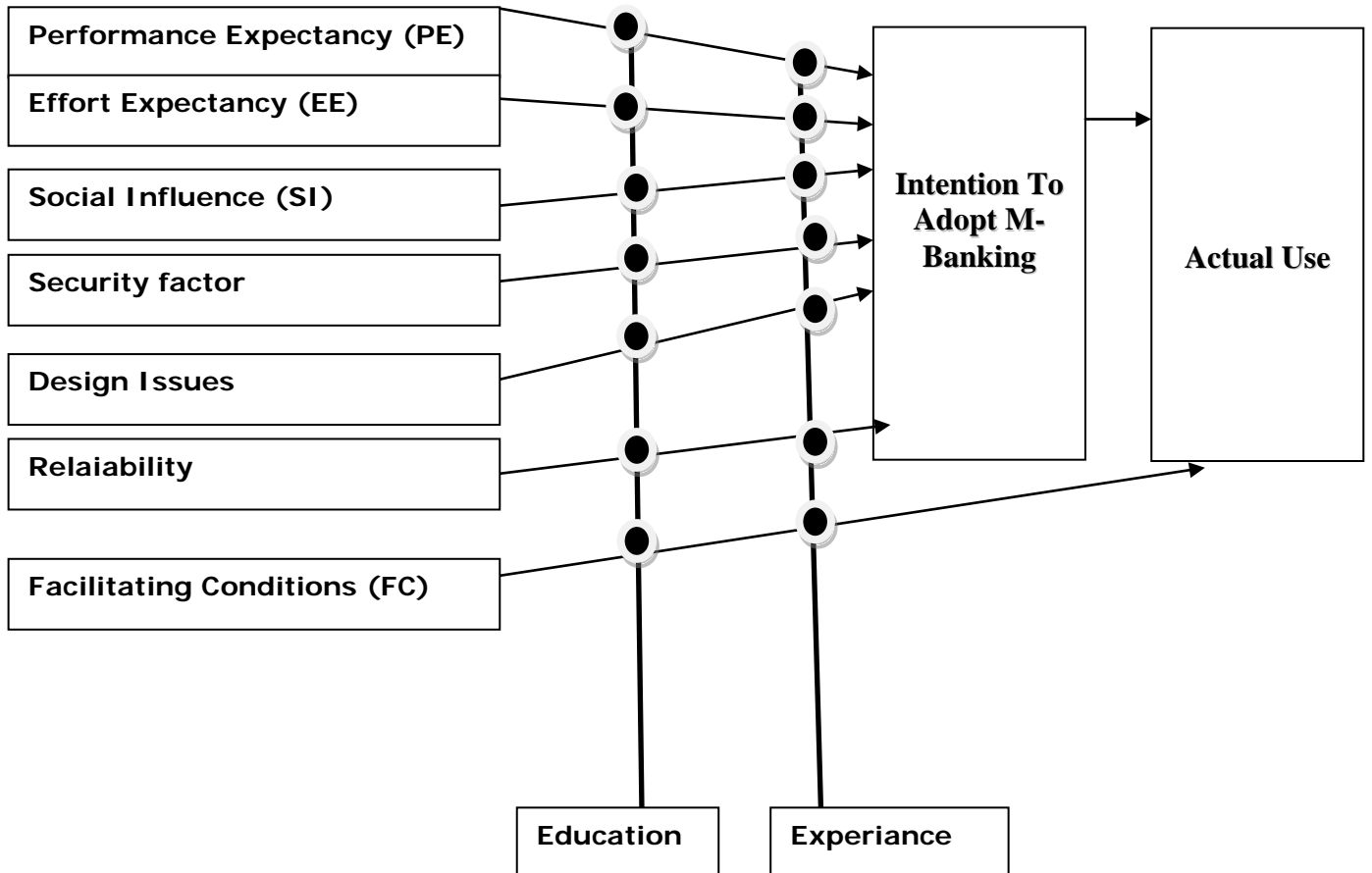Based on UTAUT model and previous studies the following model is proposed:

Figure 2: The Proposed Model (NOTE: Education and Experience are moderator factors that control all external factor.)

5. Hypothesis Development

H1a: Performance Expectancy(PE) significantly affects customer intention to adopt m-banking services.

H1b: The influence of Performance Expectancy(PE) on customer intention is moderated by Education.

H1c: The influence of Performance Expectancy(PE) on customer intention is moderated by Experience.

H2a: Effort Expectancy(EE) significantly affects customer intention to adopt m-banking services.

H2b: The influence of Effort Expectancy(EE) on intention is moderated by Education.

H2c: The influence of Effort Expectancy(EE) on customer intention is moderated by Experience.

H3a: Social Influence(SI) significantly affects customer intention to adopt m-banking services.

H3b: The influence of Social Influence(SI) on intention is moderated by Education.

H3c: The influence of Social Influence(SI) on customer intention is moderated by Experience.

H4a: Security factor significantly affects customer intention to adopt m-banking services.

H4b: The influence of Security factor on intention is moderated by Education.

H4c: The influence of Social Influence(SI) on customer intention is moderated by Experience.

H5a: Design Issues factor significantly affects customer intention to adopt m-banking services.

H5b: The influence of Design Issues factor on intention is moderated by Education.

H5c: The influence of Design Issues factor on customer intention is moderated by Experience.

H6a: Relaiability significantly affects customer intention to adopt m-banking services.

H6b: The influence of Relaiability factor on intention is moderated by Education.

H6c: The influence of Relaiability factor on customer intention is moderated by Experience.

H7a: Facilitating conditions significantly affect customer intention to adopt m-banking services.

H7b: The influence of Facilitating conditions on customer behavior is moderated by Education.

H7c: The influence of Facilitating conditions on customer intention is moderated by Experience.

H8: Behavioral intention significantly affects customer behavior of using mobile banking.

6. Questionnaire Design and Sampling

In order to examine the different hypothesis a questionnaire has been designed based on previous studies and evaluated by a number of specialized individuals. The study population is all Jordanian banks customer. The questionnaires were distributed to 174 persons, and the number of questionnaires approved for this research and analysis was 162 questionnaires.

7. Experiment and results:

1) **Study Sample Characteristics:**

By analyzing the answers of the first section of the questionnaire and as shown in table 1 the study sample is appropriately in term of diversity in education and experience level.

Table 1: Respondents Education.

	Answer Alternatives	Frequency
Education	Less than Diploma	37
	Diploma	22
	Bachelor	87
	High Studies	16
Experience	Less than 5 years	78
	5-10 years	**46**
	10-15 years	**25**
	More than 15 years	**13**

2)   Questionnaire reliability using Cranach's Alpha.

For the purpose of testing the questionnaire reliability Cronbash's alpha is performed and As shown in table 2 the values of Cronbach's Alpha for each variable exceed the recommended value 0.7 [8], which shows good internal consistency among scales and good reliability of the questionnaire where the values of Cronbach's Alpha for each variable were higher than 0.7.

Table 2: Cronbach's Alpha.

Variable	Cronbash's alpha
Performance Expectancy(PE)	**0.721**
Effort Expectancy(EE)	**0.815**
Social Influence(SI)	**0.758**
Security factor	**0.814**
Design Issues	**0.706**
Relaiability	**0.743**
Facilitating Conditions(FC)	**0.815**
Actual USE Behavioral	**0.731**

2) Model validity using loading factor and Kaiser-Mayer-Olkin (KMO).

In order to find whether the model is valid or not; the factor Analysis is used applying Varimax procedure, Eigen value should be more than one as recommended by this procedure [9]. As we can see in table 2 the loading factor for all variable are more than 0.6 which is recommended by [9], so we can be sure that the paragraph is valid to measure the variables. Table 3 also shows that KMO values which is used to measure the fitness of using factor analysis for the data is more than the recommended value which is 0.5 [9], and this reflect the fitness factor for this data.

As table 4 displays, the value of R^2 is 0.641 for the behavioral intention and 0.692 for the actual behavior and this indicates the applicability of the proposed model to predict the customer intentions and behaviors to adopt m-bank services.

As shown in table 4 the Performance Expectancy (PE), Social Influence (SI), Security and Reliability factors are significant in the intention to adopt m-bank services where the Security factor plays the most significant effect on the intention to adopt m-bank services. Table 4 also shows that the Effort Expectancy (EE) and Design Issues factors are not considered as significant factors on the intention to adopt m-bank services. In term of actual use of m-bank services the result shows that the Facilitating Conditions (FC) has a powerful effect in the actual use of m-bank services.

In term of education role table 4 shows that Performance Expectancy(PE) , Effort Expectancy(EE), Security and Reliability factors moderated by education factor in the intention behavior, the results show that the Performance Expectancy(PE) factor is the most factor moderated by the education factor. We found that the Social Influence (SI) and Design Issues factors are not moderated by the education factor in the intention behavior. In the actual use side the Facilitating Conditions (FC) is moderated by the education factor.

In term of experience role table 4 shows that Performance Expectancy (PE), Effort Expectancy (EE), Design Issues, Security and Reliability factors are moderated by experience factor in the intention behavior. The results also show that the Performance Expectancy (PE) is the most factor moderated by the experience factor, and in the other hand the Social Influence (SI) is not moderated by the experience factor in the intention behavior. Finally; and in the actual use side the Facilitating Conditions (FC) are moderated by the experience factor.

Table 3: Loading Factor and KMO

Variable	Loading Factor	KMO	Eigen value
Performance Expectancy(PE)	0.821 0.681 0.748 0.749 0.815	0.654	1.874
Effort Expectancy(EE)	0.851 0.794 0.778 0.715 0.779	0.678	2.018
Social Influence(SI)	0.634 0.813 0.785 0.827	0.577	2.344
Security factor	0.765 0.737 0.847 0.811	0.701	2.574
Design Issues	0.754 0.773 0.804 0.727	0.567	2.257
Relaiability	0.848 0.771 0.759 0.642	0.652	2.775
Facilitating Conditions(FC)	0.712 0.732 0.725 0.850	0.646	2.564
USE Behavioral	0.824 0.712 0.719	0.581	2.497

Table 4: The PLS Results

Variable	PLS
R^2 of intention	0.641
R^2 of actual use.	0.692
Performance Expectancy(PE) on intention.	0.218
Performance Expectancy(PE) moderated by education on intention.	0.416
Performance Expectancy(PE) moderated by experience on intention.	0.293
Effort Expectancy(EE) on intention.	0.031
Effort Expectancy(EE) moderated by education on intention.	0.372
Effort Expectancy(EE) moderated by experience on intention.	0.210
Social Influence(SI) on intention.	0.549
Social Influence(SI) moderated by education on intention.	0.042
Social Influence(SI) moderated by experience on intention.	0.032
Security factor on intention.	0.621
Security factor moderated by education on intention.	0.263
Security factor moderated by experience on intention.	0.175
Design Issues on intention.	0.052
Design Issues moderated by education on intention.	0.033
Design Issues moderated by experience on intention.	0.217
Reliability on intention.	0.317
Reliability moderated by education on intention.	0.145
Reliability moderated by experience on intention.	0.172
Facilitating Conditions(FC) on actual us.	0.438
Facilitating Conditions(FC) moderated by education) on actual us.	0.374
Facilitating Conditions(FC) moderated by experience on actual use.	0.194
Behavioral Intention on actual use.	0.538

7. Conclusions

The purpose of this research is to explore the factors that affect the intention to adopt mobile banking. For this purpose a modified model based on UTAUT model is designed, measured, and validated.

Our results show that the proposed model is valid. We also found that the most significant factor on the intention to adopt m-bank services is Security. While in actual use side; the results show that the Facilitating Conditions (FC) has a powerful effect in the actual use of m-bank services.

In term of education and experience role; the results shows that the Performance Expectancy (PE) factor is the most factor moderated by the education and experience factors. Also we found that the Social Influence (SI) and Design Issues factors are not moderated by the education and experience factor in the intention behavior. While in actual use side the results shows that the Facilitating Conditions (FC) is moderated by the education and experience factors.

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