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An Investigation into the Adoption of Mobile Banking Application in Jordan

Research Article

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Abstract. The future direction of Internet banking focuses on mobile banking which enables client-based banking applications on mobile devices. This shift will enhance productivity, reduce cost, increase profit, and enables customization. The main aim of this research is to develop a demographical adoption model based on the Technology Acceptance Model (TAM) and Information Systems Success (IS SUCCESS) model. The demographic factors and IS SUCCESS Factors are investigated to assess their influence on intention to use of mobile banking applications via descriptive and inferential statistical analysis. The total sample comprising of 395 respondents from Jordanian bank clients in bank branch offices within five major cities in Jordan is used for analysis. Results of the analysis revealed evidence that the young generation with high level of education and income are the most adopters of mobile banking application. The findings of this research are expected to lead to an understanding of how demographic factors and IS SUCCESS Factors the adoption of mobile banking applications in developing countries, which will in turn play an important role in increasing the level of adoption of mobile banking in such countries.

Keywords. Mobile Banking; TAM; IS success model; Adoption; Demographic factors

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1. Introduction

User acceptance is a customer's decision to use a product/service, while technology acceptance is a major topic in the field of IS research (Davis 1986; AbuShanab and Pearson 2007). Many models and theories have been developed to evaluate or measure the influence of a specific factor, such as a specific technology or application, on innovation. These models or theories are used "to predict an individual's intention to adopt a specific technology" (AbuShanab et al. 2010).

2. Theoretical Backgrounds

Technology Acceptance Model

TAM [1] is widely used by researchers to gain a better understanding about the intention to use or adoption of ISs. The main goals of the TAM are to (1) know the major motivational variables that mediate between system characteristics and actual use of computer-based systems, (2) understand the relationship between different variables and system characteristics and user behaviour, and (3) measure user motivation prior to organizational implementation in order to evaluate the relative likelihood of user acceptance for proposed new systems [1].

According to Chew (2006), "This model is a customized version of the TRA model, designed specifically for the study of user acceptance of ISs and technology" [2, 5]. In addition, Davis (1986) uses behavioural intention (BI) and attitudes (A) as constructs, but adds another two constructs, namely, perceived usefulness and perceived ease of use. So the elements of the TAM are as follows:

1. *Behavioural intention*: the individual intention to perform a specified behaviour. "Behavioural intention to use a new technology is determined by the individual's attitude towards using this technology" [2, 3].
2. *Attitudes*: "positive or negative feelings a person has towards performing a target behaviour [2].
3. *Perceived usefulness*: the belief of individuals that using a technique or system will improve their job performance [1, 2].
4. *Perceived ease of use*: the belief of individuals that using a particular system will be free of physical effort [1, 2].
5. *External variables*: system characteristics, development process, training for example, are variables that also impact intention to use, which are mediated by perceived usefulness and perceived ease of use [4].

DeLone and McLean's Model

This research depends on the DeLone and McLean [6] IS success model. It examines the issues of interface design quality and technology acceptance, Figure 1 illustrates the DeLone-McLean

model for IS success. It contains six factors: (1) system quality, (2) information quality, (3) IS use, (4) user satisfaction, (5) individual impact and (6) organizational impact. Iivari [7] states that this Model assumes that system quality and information quality, individually and jointly, affect user satisfaction and use.

DeLone and McLean (1992) state that an information system's quality affects the extent of its utilization and its users' satisfaction, ultimately influencing the behaviours of individuals and the organizations to which they belong [8]. As the quality of an IS influences the behaviours of individuals, this research study links the IS success model and the TAM.

In 2003, the original IS success model was further enhanced by adding the service quality measure [10]. The research in this study, however, follows the same method used by Lee and Chung [8]. Information quality or system quality may be the most important quality component by which to measure the success of a single system (individual system). Moreover, for measuring the overall success of the IS department, as opposed to an individual system, service quality may become the most important variable. However, although service quality is important for mobile banking, it is excluded from this study's model because this study is focuses on individuals and individual mobile phone banking systems.

3. Methodology

This research study employs quantitative research due to the nature of the research problem. The research questions are designed to address the problem while the review of the relevant literature establishes the importance of the problem.

This research study adopts the correlational and survey research methods for the following purposes. Furthermore, this research adopts the hypothetico-deductive method. According to Sekaran et al. (2009), the best method for this type of study is the hypothetico-deductive method, which is one of the mainstays of scientific research, it comprises a seven-step process as follows: identify a broad problem, define the problem statement, develop hypotheses, determine measures, perform data collection, undertake data analysis, and interpret the data.

For the purposes of this study, approximately 500 questionnaires were prepared and circulated. A total of 412 responses were received. Of these, 17 responses were discarded due to invalid or incomplete data entries. Thus, the total sample comprising 395 respondents is used in the analysis.

4. Research Model and Hypotheses

According to Liu et al. [14] the integration between TAM and IS Success model will provide a more complete understanding of the way in which application or site features ultimately influence online banking usage. Based on that this study has been integrate the TAM and the IS success model to understand the influence of interface design quality on adoption level.

In the original formulation of the D&M model, the dual dimensions of system and information quality seemed sufficient to capture the essential characteristics of information systems being delivered to users. In the intervening decade, however, a third dimension was needed, service quality [6].

This need has become even more apparent with the advent of e-commerce and the demand of customers for support from their Web providers. Thus, the D&M model was updated in 2003 to add the new construct of service quality. System quality, in the Internet environment, measures the functionality of a web site. Information quality captures the e-commerce content issues. Service quality measures the overall support delivered by the service providers [10].

A fundamental problem with IS success research is its limited ability to predict system usage [14]. It is the system behavioural beliefs that directly influence attitudes toward use and, ultimately, usage. But in the IS success literature, the mediating behavioural beliefs and attitudes are absent.

In this study, we integrate the TAM and the updated version of the IS success model developed by (Lee and Chung 2009). So that, together, they can provide a more complete understanding of the way in which mobile banking interface influences mobile banking adoption.

The model proposed in this research study includes those three factors, which are system quality, information quality and interface design quality, derived from Lee and Chung (2009) model, in an attempt to measure their influence on perceived usefulness and perceived ease of use. Figure 1 illustrates the proposed research model.

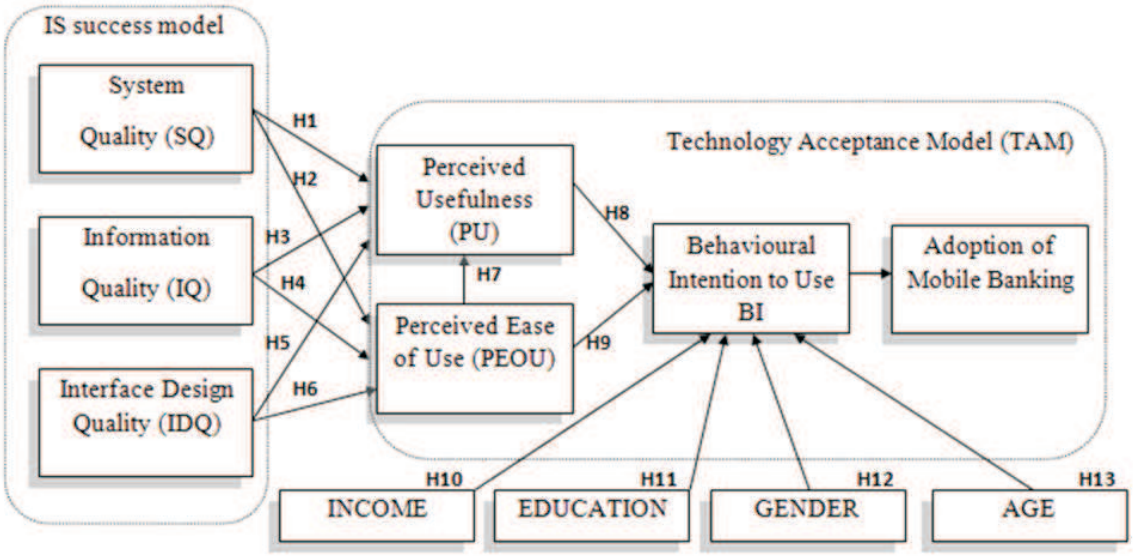

Figure 1. A demographical adoption model for mobile banking applications

5. Results and Discussion

Factor Analysis (Validity Assessment): In this research, factor analysis was conducted to assess validity. According to Coakes and Steed [15], the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) test and Bartlett's test can be used to explore whether the items are tapping into the same construct.

KMO test indicates that the KMO measure for all items in all factors showed a 'meritorious' adequacy except for perceived usefulness which is middling (0.789) but it is still appropriate to undertake factor analysis [19]. The observed values of Bartlett sphericity are also very large and its associated significance level is very low (0.000) for all factors. Both the KMO test and the Bartlett test of sphericity results demonstrate that the items used in all the factors obviously meet the conditions for factor analysis. This means that factor analysis can be applied for all of the factors.

Factor loading is the correlation between an item and the given factor. The result show that all the items for the different factors have a factor loading of more than 0.50. This means that the items correlate very significantly to the factor itself with factor loadings ranging from 0.712 to 0.927. Thus the analysis confirms that every set of items measures one thing.

The results showed that all the relationships between the IS success model and the TAM are significant. The study included empirical evidence to support a significant positive linear relationship between the IS success factors and the TAM factors in the adoption of mobile banking applications.

Moreover, this study conducted multiple regression analysis to discover the influence of IS success factors on TAM factors. The results revealed that the clients of banking institutions in developing countries will adopt mobile banking when it is perceived to be easy to use and it is perceived as useful. Based on the results of the analysis, it was concluded that system quality, information quality and interface design quality are important factors that play a significant role in influencing the decision of clients to adopt mobile banking applications in developing countries.

To investigate the influence of demographic factors on behavioural intention, ANOVAs were conducted. The results showed that gender has a significant influence on behavioural intention, where the effect size for behavioural intention is equal to 0.05, moderate effects. This indicates that men have a higher intention to use mobile banking applications as compared to women. This result is consistent with the research assumptions and previous research studies [20, 21].

In the case of income, this research proved that the income level of clients in developing countries has a significant influence on the level of adoption of mobile banking applications, where the effect size was large for behavioural intention ($\eta^2 = 0.08$). The results indicate that clients who have income of more than JD300 have a higher intention to use mobile banking applications as compared to those with no income. This result is consistent with the research assumptions and previous research studies [22–24].

In the case of education, the ANOVA results showed that the education level of clients in developing countries also has a significant influence on the mobile banking adoption level, where the effect size was $\eta^2 = 0.08$ for behavioural intention. The results indicate that clients with a good education (more than high school) have a higher intention to use mobile banking applications, as compared to clients who have elementary school level education. This result is consistent with the research assumptions and previous research studies [3, 24–27].

The age of clients in developing countries also has a significant influence on the level of adoption of mobile banking applications, where the effect size was $\eta^2 = 0.04$ for behavioural intention and $\eta^2 = 0.03$ for user interface. The results indicate that younger customers are more likely to adopt mobile banking; clients less than 49 years old have a higher intention to use mobile banking applications as compared to clients aged 49 or above. This result is consistent with the research assumptions and previous research studies, where the situation in the Middle East is different; age is important in influencing differences in IT adoption, because the population is relatively young. The percentage of the population aged less than 45 years old is very high, and also the percentage of those aged 65 or above is just under 3% [20, 28, 29].

6. Conclusion

The first contribution of this research is related to understanding how demographic factors affect the level of adoption of mobile banking applications in Jordan. Moreover, this study highlights the importance of the design of the user interface in mobile banking applications. This in turn plays an important role in increasing the level of adoption of mobile banking in developing countries.

The second contribution lies in the development of a demographical adoption model, which is the main contribution of this research. This model is considered to be more appropriate for developing countries, as it has been developed after thorough investigation of the situation in the developing countries.

These contributions offer important guidance to mobile banking application providers, based on the adoption model. Moreover, this research help managers in banking institutions to: (1) understand clients' demands; (2) understand the influence of demographic factors on the adoption of mobile banking applications, especially in developing countries; and (3) provide high-quality mobile banking applications, which will help them to acquire new clients and retain current clients, and which will ultimately enable them to increase profits and decrease costs.

The results of this research have highlighted that there is low level of mobile banking adoption among Jordanian bank clients. Unfortunately, only about 6.1% of the respondents are currently using mobile banking in Jordan. However, the good news is that even though 43% of respondents do not use mobile banking, they are interested in finding out more about or using mobile banking applications. This is a great marketing opportunity for banking institutions to

reach people on low incomes with a broad range of financial services. The results have shown that around 65% of the respondents have an income of less than US$420 per month, hence it is critical for service providers to understand the behaviour patterns of low-income markets.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

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