An empirical examination of behavioral intention to mobile Internet banking: The case of Egypt

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Mobile Internet banking has changed the business of retail banks significantly in terms of cost reduction and increased convenience for the customers. However, most of the existing literature focused on developed countries, while the worldwide growth of mobile commerce has shown the need to extend the research to other unstudied developing countries with different cultures and from different perspectives. Thus, the current paper is one more attempt to fill these gaps in the current body of literature, specifically in the developing countries context, by empirically examining and validating factors that affect customer’s behavioral intention to use mobile Internet banking. This study developed an empirically-based model including factors, which have never been integrated into one framework, to examination simultaneously. A richer research methodology is used in our empirical study combining quantitative and qualitative methods to validate the research model. Based on our findings the study has made a number of important managerial and academic implications.

Field of Research: Marketing

1. Introduction:

Banking services sector nowadays is increasingly relying on the Internet as an electronic distribution channel, for delivering services directly to customers through bank websites, where customer use web browser to access their accounts, which is known as Internet banking, Net banking or web-banking. These terms are often used interchangeably (e.g. Dimitriadis et al., 2011; Malhotra & Singh, 2010; Oliveira &Hippel, 2011, Shah et al., 2009; Callaway, 2011; Lee et al., 2011).

The latest generation of Internet banking is the current mobile Internet banking (m-banking), based on the convergence of Internet, wireless technology and mobile devices, in which customers can access bank websites via their mobile devices and perform a wider range of banking transactions anywhere and anytime, , without visiting banks in person, limited only by coverage provided by the mobile networks, including, account balance checking, account movement statement, transferring between accounts, and electronic payment of bills (Lin, 2011; Luo et al., 2010; Peevers et al., 2011).

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However, the empirical evidence from past research tends to support the view that mobile Internet banking reduces service costs for banks and adds value to customers by supporting their mobile lifestyle and it is believed to have the potential to expand significantly in the future despite its relatively slow usage rate compared with Internet banking users (e.g. Chung & Kwon, 2009; Cruz et al., 2009). Others, as Gu et al. (2009) argued that the trend of mobile banking indicates a remarkable potential to banking industry and banks have the opportunity to convert cell phone users into banking users. In summary, m-banking has changed the business of retail banks significantly in terms of cost reduction and increased convenience for the customers, despite its international adoption rates are still low and many banks try to market it to mobile users. Therefore, identifying and examining the factors contribute to customer’s intention to use m-banking considered a fundamental requisite for developing this type of service (e. g. Lin, 2011; Zhou et al., 2010; Luo et al., 2010; Yu & Fang, 2009; Petrova & Ya, 2010).

2. Research Problem, Objectives and Plan:

Despite the progress of research in e-commerce Literature most of the existing previous works about Internet banking in general and mobile Internet banking particularly have focused on developed countries, with a greater predisposition toward the Internet, and mainly examined customers’ intention from trust perspective, while the worldwide growth of mobile commerce has shown the need to extend this research to other unstudied developing countries with different cultures and from different perspectives (e.g. Hernandez et al., 2010; Petrova & Yu, 2010; Lee & Chang, 2009; Krauter & Faullant, 2010; Zhou et al., 2010). In addition, our preliminary study revealed that the mobile Internet banking remains largely unnoticed by a retail banking customers of Egypt. This relatively inadequate coverage poses problems for developing countries because limitations in this area mean difficulties for their banks to properly plan and successfully deliver mobile banking service. Thus, the current paper is one more attempt to fill these gaps in the current body of literature, specifically in the developing countries context, by examining and validating empirically the critical factors that affect customer’s behavioral intention to use mobile Internet banking. Specifically, the present investigation adds to literature through achieving the following objectives: (1) identify the potential critical factors that have the most significant influence on customer’s intention to use mobile Internet banking, for enhancing banking B2C mobile commerce applications, (2) determine the relative importance of each of these factors for retaining and attracting mobile users, (3) develop and validate a mathematical model, that can systematically predict the probability of mobile Internet banking usage in the B2C e-commerce market of Egypt as an example of developing country based on empirical evidences.
With these objectives in view, the current paper has been organized as follows: the literature and relevant studies were reviewed and analyzed. Then a research model was proposed and hypotheses were formulated to be tested in the study. This was followed by an explanation of the procedures used to obtain data, measurement, and validation processes, as well as the testing of the hypotheses stated. Finally, based on our findings a series of conclusions with managerial implications and final thoughts that emphasize the great interest in the topic under analysis were presented; and then certain limitations and future lines of research with regard to this issue were highlighted.

3. Literature Review:

Relevant literature and past research were extensively reviewed and integrated sequentially, including a wide range of recently published works, in order to develop more effectively the study's hypotheses and the research model. This extensive revision, which provided the conceptual foundation for our study, revealed some critical factors that have a significant impact on customers’ behavioral Intention to use m-banking. In order to expand the research scope, the current paper has operationalized to major dimensions, to be simultaneously examined.

The first dimension included the perceptual factors that relatively under a bank's control and may affect either positively or negatively the customers’ intention to use m-banking such as the customer's perceived trust of the bank as an e-service vendor, perceived usefulness of mobile Internet applications and perceived ease of use, as positive factors, and perceived security risk of m-commerce transactions as a negative factor (see Gu et al., 2009; Chung & Kwon, 2009; Yu & Fang, 2009; Shah et al., 2009; Luo et al., 2010). In e-commerce context, perceived trust is defined as a belief the vendors are willing to behave based on an individual’s expectation (e.g. Gu et al., 2009).

The second dimension included the personal factors that are not under the control of the bank, so they are viewed by many bank practitioners as potential barriers to m-banking usage by customers. These factors have been described in previous studies as the educational level, income; age and mobile Internet experience (e.g. Proenca & Rodrigues, 2011; Luo et al., 2010; Winley, 2011).

In contrast to previous works, the current study extended the research scope by combining the most critical factors identified in literature and developed an empirically-based model including these factors, which have never been integrated into one framework, to examination simultaneously for validation and relationship.
4. Developing the research model and Hypotheses:

The preceding discussion of literature as well as the feedback obtained from our preliminary study formed the theoretical foundation of the research model illustrated in Figure 1, which incorporated many of the relevant features of m-banking identified in the literature and applied these to our local context.

**Fig.1. The research model**

As seen from the figure, the proposed model, contained 8 structural paths, representing the hypothesized relationships embedded within two dimensions between independent variables as predictors (perceptual and personal factors) and the dependent variable customer’s intention to use m-banking as a criterion. In order to validate this model a number of validity tests have been applied and relationships among its variables have been empirically examined. Based on the structural paths of the research model the following hypotheses were formulated to be simultaneously tested.

**H₁:** Customers’ intention to use mobile Internet banking is positively influenced by certain perceptual factors such as:
- H₁ₐ: Perceived trust of bank as an e-services vendor (P₁)
- H₁₉: Perceived usefulness of mobile banking application (P₂)
- H₁₉: Perceived ease of use of mobile banking application (P₃)

**H₂:** Customers’ intention to use mobile Internet banking is negatively influenced by their perceived security risk of m-commerce transactions (P₄)

**H₃:** Customers’ intention to use mobile Internet banking is positively influenced by certain personal factors such as:
- H₃₈: Customer experience with mobile Internet (P₅)
- H₃₉: Customer educational level (P₆)
- H₃₉: Customer income (P₇)

**H₄:** Customers’ age negatively affects their intention to use mobile Internet banking (P₈)

Symbolically, the initial multiple regression equation (EQ1) can be presented as follows to predict the probability of customer’s intention to use m-banking.

**EQ1:**

\[
Y_{INT} = a + b_{PTR}PTR + b_{PUS}PUS + b_{PES}PES - b_{PSR}PSR + b_{MIE}MIE + b_{EDU}EDU + b_{INC}INC - b_{AGE}AGE
\]
5. Research Methodology:

A richer research methodology is used in our empirical study combining quantitative and qualitative methods to validate the research model. Thus, the research process involved multi-stage procedures as follows:

5.1 Preliminary qualitative study: In this stage, a series of in-depth interviews were carried out to enhance our understanding of the nature and essence of the phenomenon under investigation, the issues arising from this stage, were used as a basis for the next quantitative study.

5.2. Quantitative study and sampling: The quantitative stage in the form of questionnaire survey was conducted to collect empirical data from retail banking customers of banks operating in Egypt. The list of banks registered with the Central Bank of Egypt at 30 August 2010 (http://www.cbe.org.eg/links.htm) served as the sampling frame for this study. Simple random sampling was carried out in order to gain as many representative samples as possible.

5.3. Instrument development and Validity: To develop our instrument a number of prior relevant studies and corresponding scales were reviewed to ensure that a comprehensive list of measures were included. Multi-items measures were generated for each construct and assessed for the reliability and content validity. The questionnaire consisted of two parts including a portion for respondent’s personal data and another dealt with the perceptual variables. Each questionnaire items of perceptual constructs were measured on 7-point Likert scales, in which 1 indicates “completely disagree” and 7 “completely agree”. Prior to the conduct of a formal survey, a pre-test was carried out to validate the initial version of the survey questionnaire. The results from the pre-test study led to the final version of the questionnaire, and the instrument has confirmed content validity.

5.4. Research design and Reliability: The research design for this study involved a cross-sectional survey methodology, which was conducted between November, 2010 and Jan, 2011. The questionnaire was originally developed in English, and subsequently translated into Arabic language. Among a total of 700 questionnaires that were personally distributed, 328 valid responses were received and used in data analysis, after discarding some erroneous responses, achieving a 46 percent usable response rate for the overall survey. Despite the relatively low response rate, which thought to be expected for the local context, the fact that the respondents were as representative of the population as possible, led to their contribution being regarded as providing information applicable to the larger population. The reliability and internal consistency of instruments was assessed using Cronbach’s alpha coefficient. All alpha values exhibited an acceptable degree of reliability (alpha > 0.7).
6. Data Analysis and model testing:

The empirical data obtained were processed using statistical software packages (SPSS). Multiple regression analysis with its associated statistical inference tests (F test and t-test on b) was performed, to investigate the strength and direction of the hypothesized relationships among the model’s constructs. Eight independent variables were used as regressors, while the dependent variable was served as regress.

6.1. Multicollinearity: To determine whether any multicollinearity effects existed, total correlation matrix of the research model was reviewed in-depth, and the results showed that there was no evidence detected of severe multicollinearity problem among regressors. The results of testing each of the four hypotheses are given below.

6.2. The results of hypotheses testing: As shown in Table 1, the results of multiple regression analysis provide strong support for the hypotheses; also the significant testing findings presented in table 2 provided further evidence for this acceptance.

<table>
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<tr>
<th>Table 1: Summary output of the multiple regression analysis</th>
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<tbody>
<tr>
<td>Coefficients *</td>
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<td>Regression Statistics</td>
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<tr>
<td>Multiple correlation coefficient</td>
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<td>Coefficient of multiple determination</td>
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<td>Adjusted R Square</td>
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<td>Standard Error</td>
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<td>Observations</td>
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<td>ANOVA b</td>
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<td>Residual</td>
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<td>Total</td>
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<td>F-test overall model</td>
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<td>Degrees of freedom</td>
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* Criterion variable: Y_EPI
b. Predictors: (constant), PTR, PUS, PES, PSR, MIE, EDU, INC, AGE
*Significant at (p < 0.0000 level)

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<th>Table 2. Variables included in the research model equation</th>
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<tr>
<td>Factors</td>
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<td>PTR</td>
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Intercept a 0.66889313 df n-k-1 319

Notes: n=sample size, k= No. of independent v
A strong significant meaningful correlation is found between customers’ intention to use m-banking and the above mentioned independent variables (Multiple correlation coefficient: Multiple $R= 0.94723367$). The $F$ statistic value ($F=348.209028766214$ at $p < 0.0000$ level) is statistically significant indicating that the results of the model could hardly have occurred by chance. The coefficient of determination, multiple $R$-square showed that these predictor factors explained the major proportion (89.72 %) of the variability observed ($R^2 =0.901606115$), which reinforce our confidence in the hypotheses testing results and provides support for the above mentioned association.

Furthermore, the adjusted $R^2$ of the model, which is a more conservative estimate of variance by considering error variance, is 0.89467487. Thus, the overall explanatory power of the research model is considered high and quite capable of explaining the variance of customers' intention. Using the values of the regression coefficients, shown in table 2, the future intention of using m-banking can be predicted, in this study, by the following equations (EQ2):

$$EQ2: \quad Y_{INT} = 0.67 + 0.54 \text{PTR} + 0.35 \text{PUS} + 0.19 \text{PES} - 0.09 \text{PSR} + 0.16 \text{MIE} + 0.03 \text{EDU} + 0.03 \text{INC} - 0.05 \text{AGE}$$

Based on the standardized $Beta$ coefficients of each predictor variables and t-tests in Table 2 it can be stated that that within 8 independent variables, included in $EQ2$, only 4 variables considered critical highly significant predictors positively affecting the criterion variable $Y_{INT}$. Those variables are perceived trust ($Beta_{PTR} = 0.521, p < 0.0000$), perceived usefulness ($Beta_{PUS} = 0.192, p < 0.0000$), mobile Internet experience ($Beta_{MIE} = 0.180, p < 0.0000$) and perceived ease of use ($Beta_{PES} = 0.149, p < 0.0000$). While perceived security has a significant negative impact ($Beta_{PSR} = 0.087, p< 0.0000$). More specifically perceived trust was found to be the most important determinant of customers’ intention to use m-banking (highest beta value and t-value). This implies that if customers trust the bank as an e-service provider, they become more willing to use m-banking offered by this bank.

7. Conclusion and Implications:

As stated previously, the main objective of this paper was to contribute to both theory and practice of m-banking applications and to help address some gaps in the current body of literature, through expanding the research in this area by developing a comprehensive empirical model that can predict and indentify the critical factors that have the most influence on the customers’ behavioral intention to use mobile Internet banking, which have never been integrated before into one framework, to examination simultaneously for validation and relationship. More specifically, this study has made a number of important managerial and academic implications
In terms of managerial implications, our empirical results suggested that in order to obtain higher m-banking usage rate, specifically in developing m-commerce market, practitioners must continuously work to improve the perceived trust level of their toward the bank as an e-service provider and special attention should be paid to secure mobile banking transactions.

From an academic and research standpoint, this study provides empirical evidences and validation for the existing specialized literature concerning m-commerce. Our findings supported the research model that has a high overall explanatory power, and reinforced its robustness in predicting customers’ behavioral intention. Our research attempted to integrate and encompass the most frequently cited factors in the literature, and applied them in the local context in order to best examine the phenomenon. Therefore, the proposed model contained variables with different dimensions that have not been tested simultaneously in previous works.

8. Limitation and Future research:

Although this paper is differentiated from other previous work and expanded the research scope, as in any study, there are a few limitations that should be considered when interpreting the results and implications. First, the research model was validated using sample data gathered from Egypt and therefore the findings may be specific to the culture in this developing country. Since the study is cross-sectional in design, a further examination of our argument using a longitudinal study is recommended in the future to investigate our model in different time periods. Finally, we must point out that although the majority of the hypothesized relationships were validated, and significant, and the proposed model yielded a relatively high level of coefficient of multiple determination; the obtained value of $R^2$ indicated that there is still need to find additional variables, to improve our model’s ability to predict the future customers’ behavioral intention to use m-banking. Nevertheless, further researches could examine the current proposed model in other countries with different cultures, and make comparisons, to see whether it can be applied, also future studies can use different methodologies and samples to test whether it makes sense.

9. References:


