

The Effect of Trust, Perceived Risk and Security on the Adoption of Mobile Banking in Morocco

Younes Lafraxo¹, Fadoua Hadri¹, Hamza Amhal² and Amine Rossafi³

¹Faculty of Law, Economics and Social Sciences, Department for Management Science, Daoudiate, B.P. 2380, Marrakech, Morocco

²Moroccan School of Engineering Science, 5 Lotissement Bouizgaren, Marrakech, Morocco

³Ecole des Ponts Business School, 12 boulevard Copernic, cité Descartes, Champs-sur-Marne, Paris, France

Keywords: Mobile Banking Adoption, UTAUT, Perceived Risk, Trust, Security, Morocco.

Abstract: This short paper shows an acceptability model developed based on UTAUT (Unified Theory of Acceptance and Use of Technology) and three additional factors namely “Perceived risk”, “Security” and “Trust”. The model was tested using 460 responses obtained from the almost 720 mobile banking application users from five banks such as CIH, BP, AWB, CM, SGMB in Marrakech, Morocco. The first replies analysis, reveals that Performance expectancy, Effort Expectancy, Social influence and Security in Mobile banking show a significant positive impact on the users’ behavioural intention to accept mobile banking services. However, Trust, facilitating conditions and Perceived risk in the mobile application does not influence positively the behavioural intention. Note also that the resulting model of this study, still in progress, explains almost 62% of users’ intention to use mobile banking.

1 INTRODUCTION

Nowadays, Banks get an opportunity of serving their customers without location and time restrictions. Thanks to internet, emerging innovative and novel technologies allows customers to use their mobile phones to remotely access banking networks. Users can explore anytime and anywhere almost all the banking services; from reaching account information to making payments.

This new era of mobile banking helps traditional banks to improve their service quality and reduce service costs.

In the context of banking services, disruptive and innovative technology development is changing financial services operations. Mobile banking is the latest and fastest raising areas.

It allows bank clients to use a smartphone or portable computing device to perform banking tasks such as monitor account balances, bill payments, money transfer, or find ATM locations. The phenomenon is so important that IS professionals have described it as one of the most promising and important developments in the field of mobile commerce and banking business (Lin, 2011).

Most banks have deployed Internet banking systems in an attempt to reduce costs while improving customer service (Martins, 2014).

Trust is essential for Mobile Banking adoption and usage. MB technology has the potential to improve people's quality of life and to bring efficiency to banks (Malaquias, 2016).

There is a pressing need to understand the main factors affecting mobile banking user acceptance. The increasing number of mobile banking studies and articles published in the last years has made the research process on this important subject more complex (Baptista, 2016).

Increasingly, banks in Morocco seem to be more motivated to integrate the Mobile banking channels in their operational systems. Important financial and technical resources have been devoted in this regard to implement mobile banking applications within their systems and start marketing them.

The developed model is based on UTAUT (Venkatesh, 2003); which three additional factors were integrated: “Trust”, “Perceived Risk” and “Security”. The analysis of the received responses reveals the first results obtained. It shows factors that influence mobile users located in Marrakech

with regard to their acceptability of using mobile banking.

2 THEORETICAL BACKGROUND

The question of the technology adoption has led to research work, particularly in the field of information systems. The Model of Technology Acceptance Model (TAM), developed by Davis in 1986, is one of the major axes of this work. The TAM, which allows to study the sight utility as well as the usability caught by the user, was updated with a second version, the TAM 2 (Venkatesh and Davis, 2000), and a third, the TAM 3 (Venkatesh and Bala, 2008). Venkatesh and his co-authors (2003), including Davis, have drawn inspiration from the TAM and have studied several models to identify recurrent determinants. They considered the findings of several studies conducted for more than ten years and analysed 8 theoretical models as well as the determining factors influencing the intention of use and the individual's actual use of information and communication technologies. These factors and their relationships were grouped into a unified theory of the acceptance and use of these technologies with a model known by the acronym UTAUT (Unified Theory of Acceptance and Use of Technology). The UTAUT model is considered the most robust. So, it has been corroborated by several studies (Venkatesh and al., 2016). Since its inception, this model has proved able to predict the factors that influence the behavioural intentions of users, and so to help them to actually accept technologies (Venkatesh and al., 2003, p. 425 in Bennani and al., 2013). Originally, this model was developed to explain user acceptance of technology. It explains about 62% of the intention to use the technology. Note that these explanatory models were applied in banking areas, in particular to study the question of the acceptability of mobile banking.

2.1 Mobile Banking

First of all, we need to understand that mobile banking, as an instance of a mobile commerce application by which financial institutions enable their customers to carry out banking activities via mobile devices (Oliveira, 2014). Thus, mobile banking, users can access banking services such as account management, information inquiry, money transfer, and bill payment (Luarn and Lin, 2005). In

IT business value literature, mobile banking has received considerable attention by both academia and practice (Gu, Lee, and Suh, 2009; Kim et al., 2009; Luarn and Lin, 2005; Medhi, Ratan, and Toyama, 2009; Zhou, Lu, and Wang, 2010). This has led to diverse studies and complex research related to adopt Mobile banking that have been conducted to a better understanding adopting determinants.

Mobile Banking includes mobile accounting (e.g. check book requests, blocking lost cards, money transfers or insurance policies subscription), mobile brokerage (selling and purchasing financial instruments), and mobile financial information services (balance inquiries, statement requests, credit card information, branches and ATM locations, foreign exchange rates or commodity prices) (Tiwari, 2007).

2.2 Mobile Banking in Relation with UTAUT Modified

Several studies have been done about adopting mobile banking using UTAUT like in Taipei Taiwan downtown a street questionnaire was conducted to investigate what makes an individual adopt mobile banking using the UTAUT, as a result usage is positively affect by facilitating conditions ($\beta = 0.56$) and behaviour intention ($\beta = 0.72$). The model explains 65.1% of variation in usage, so it is suggested to use Social influence, performance expectancy for the mobile banking adoption (Yu, 2012). Thail and Bhatiasevi (2015) examined an extended framework of UTAUT on mobile banking adoption. The study integrated perceived cost perceived convenience and perceived credibility in the existing framework of UTAUT (Afshan, 2016).

There was a study done in Iran for 361 bank customers agree on usefulness, perceived risk and trust are some of various factors influencing the adoption of mobile banking in that country (Hanafizadeh and al, 2014).

Since mobile banking is rather new to m-Commerce, user experience is residual. Moreover, not every customer may consider its adoption. Hence two UTAUT moderators, voluntariness and experience, are not considered in this study. However, the two other moderators, gender and age, are taken into account to remain as close as possible to UTAUT.

Luo and al. (2010) and Riffai, Grant, and Edgar (2012) concluded that performance expectancy is a key factor for a user to accept the mobile banking technology. Performance expectancy implies that the

user realizes gains from the use of mobile banking. It bears resemblance to the perceived usefulness construct from TAM (Kim et al., 2009; Martins, Oliveira and Popovic, 2014; Miltgen, Popovic and Oliveira, 2013). The value to customers from mobile banking can be more than those available from Internet based or brick-and-mortar based services.

All the researchers agree on three main factors that effects the adoption of mobile banking; such as Perceived risk, Security and Trust.

By integrating the unified theory of acceptance and usage of technology (UTAUT), this research proposes a mobile banking user adoption model. We found that performance expectancy, social influence, and other moderators have significant effects on user adoption. In addition, we also found a significant effect of trust.

2.2.1 Perceived Risk

According to Bauer (1960) and Ostlund (1974), the negative consequences that may arise from consumers' actions lead to an important well-established concept in consumer behaviour: perceived risk. Many authors have studied the impact of risk on the adoption of Mobile banking and some of them will be discussed. Many authors have studied the impact of risk on the adoption of Mobile banking, building upon the premise that purchasing Internet banking services is perceived to be riskier than purchasing traditional banking services (Cunningham and al., 2005). The resistance to Internet banking and their connections to values of individuals and concluded that both functional and psychological barriers arise from service, channel, consumer, and communication. ATM services are still preferred by customers, because of their old routine and the Internet's insecurity, inefficiency, and inconvenience. Besides the fear of possible misuse of changeable passwords and the lack of proof provided by an official receipt. Additionally, non-users also complain about the lack of social dimension, that is, the absence of a face-to-face encounter, as at a branch.

2.2.2 Security

Compared with Internet banking that builds on wired networks, mobile banking that builds on wireless networks will be more vulnerable to security attacks and interceptions (Crabbe and al., 2009; Kim and al., 2009). This may result in users' anxiety about mobile banking security and severely influence their effort expectancy. Mobile banking can use wireless encryption technologies to enhance its security and

provide reliable, secure, and real-time services to users.

2.2.3 Trust

Trust has been widely examined and proven to be a crucial factor predicting customer's perception and intention toward Mobile banking.

In his study to examine the factors predicting customers' initial trust in Mobile banking, Zhou (2011) confirmed trust as key factor determining the likelihood of customers using Mobile banking.

In addition, Viruses and Trojan horses may exist in mobile terminals; so, these problems increase users' concern about payment security, and decrease their trust in mobile banking, which, in turn, can affect their usage intention and behaviour (Zhou, 2012).

Also, the initial trust model (ITM) shows the relationship between initial trust in mobile banking and usage intentions of it (Kim and al., 2009).

Examining the role of initial trust in the adoption of Technology and how it is crucial, ITM has gained separate attention in electronic commerce literature due to the presence of high uncertainty and risks associated with the domain (Afshan, 2016).

3 HYPOTHESIS AND RESEARCH MODEL

Based on the UTAUT modified, considering 'Perceived risk', 'Security' and 'Trust', the additional hypothesis and the research model are as follows:

- Performance Expectancy (**PE**) influences positively Intention to reuse(**ITR**);
- Effort Expectancy (**EE**) influences positively Intention to reuse;
- Social influence (**SI**) influences positively Behavioural Intention;
- Facilitating conditions(**FC**) influences positively Intention to reuse;
- Trust (**ET**) in ITM influences positively Intention to reuse;
- Security (**PS**) influences positively Intention to reuse;
- Perceived risk (**PR**) influences negatively Intention to reuse.

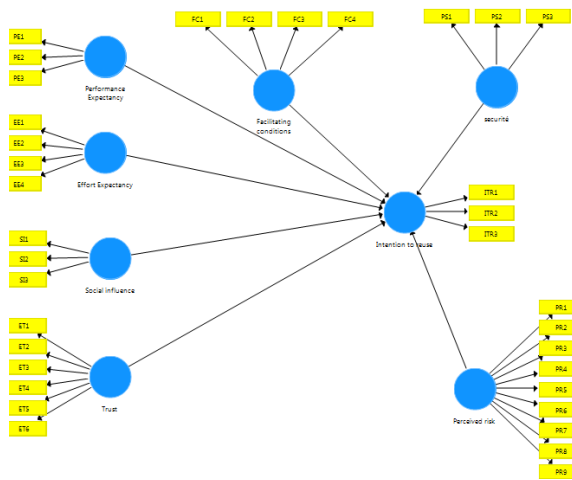


Figure 1: Research model.

4 METHODOLOGIES

4.1 Data Collection

Our target population was a group of Mobile banking application users form Marrakech (a representative panel of Moroccan users). Almost 720 individuals were requested to respond to a structured questionnaire. We were able to collect data from 460 participants from which we received full responses retained for analysis, representing 63,8% of initial panel target. The data collection process took place in May 2016.

4.2 Data Analysis and Results

Thanks to the Partial Least Squares (PLS), appropriate to validate predictive models using purposeful latent, with minimal theoretical foundation, using Smart PLS software for the purpose to produce measurement model, the structural model and their respective values.

4.3 Measurement Model and Structural Model

Assessment of the measurement model is performed by both of convergent and discriminant validities. The first one indicates the degree to which theoretically similar constructs are highly correlated with each other. As for the discriminant validity, it indicates the degree to which a given construct is different from other constructs. Convergent validity includes reliability of construct measurement. This reliability was assessed by the composite reliability

and internal consistency. This later was assessed by the Cronbach’s Alpha coefficient. It is verified when the alpha is above 0,7.

Moreover, internal consistency of the scales is verified, because their Cronbach’s Alpha exceeded threshold value and confirmed a satisfactory reliability. Furthermore, convergent validity is measured by the factor loadings of the items on the model’s constructs. An observed principle for convergent validity is to retain items with loadings of 0.70 or more. (Barclay and al., 1995). Discriminant validity is assured when the AVE value is above the threshold value of 0,5 and square root of the AVE is larger than all other cross correlations (Gefen and Straub, 2005). All constructs items loadings should be greater than 0,7 (Fornell and Larcker, 1981). Composite reliability greater than 0,8 and AVE greater than 0,5. The research model (Figure 1) considered in this work has sufficient discriminant validity. All constructs had a composite reliability greater than 0,8 and Cronbach’s alpha greater than 0,7 indicating acceptable level of reliability. In this study, all constructs had item loadings greater than 0,7. Composite reliability values greater than 0,8 and AVE values greater than 0,5. Concerning the discriminant validity, all of the constructs had AVE scores greater than 0,5 indicating that the proposed model has sufficient discriminant validity (Fornell and al., 1981). All constructs had a composite reliability greater than 0,8 and Cronbach’s alpha greater than 0,7 indicating that nearly all constructs had an acceptable level of reliability (Fornell and al., 1981).

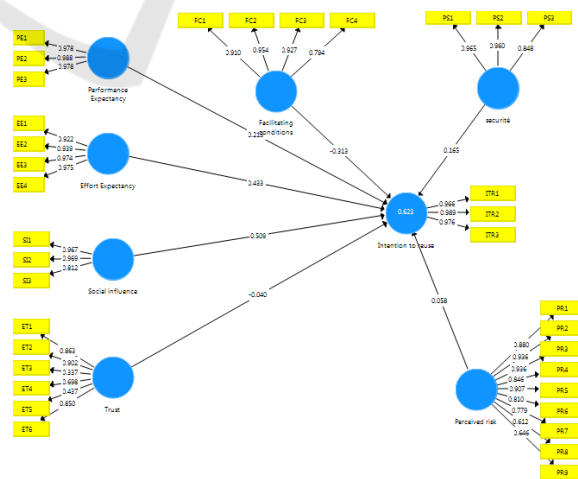


Figure 2: Measurement model.

The structural model provides information about the model’s predictive power given by R² values and

information about path significance. We use bootstrapping to determine the significance levels for loadings weights and path coefficients. Results show that the proposed model explained almost 62% of total users' intention to use mobile banking. They reveal all the β are greater than 2 with $\beta = 1,775$, described in the figure below.

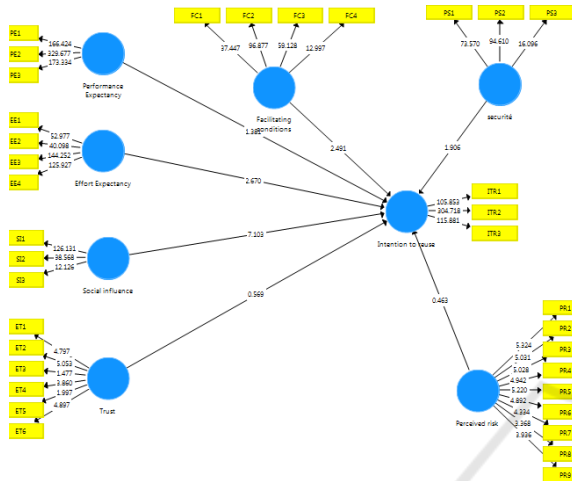


Figure 3: Structural model.

Figure 3 above reproduces the relationships existing between the latent constructs, to draw attention to the importance of the significance (T-values) of the structural relationships obtained after adjustment of the structural model. The significance of the coefficients was estimated by bootstrapping.

In Moroccan Mobile Banking application, the result obtained shows that They reveal that β between 'Intention to reuse' and constructs 'Social influence' (7.103); 'Effort Expectancy' (2.670); 'Facilitating conditions' (2.491); 'Security' (1.906) are greater than 1.7.

5 CONCLUSION

This short paper is result of research work, which is still in progress. Its objective is to share with researchers the primary results already obtained. Thus, it reveals the factors that influence the mobile banking adoption by mobile users in Morocco, also their intention toward the acceptability to use mobile banking and the effect of perceived risk, trust and security. The research work shows several factors such as Performance expectancy, effort expectancy, social influence and security have a significant positive impact on the users' behavioural intention to use mobile banking services. However, Trust,

facilitating conditions and Perceived risk in the mobile application does not influence positively this behavioural intention. Knowing that UTAUT is considered as a strong model because it explains about 62% of the mobile users' intention to use the technology and thanks to the current significant results of this ongoing study, this model can be considered as another strong contribution to enrich research of factors influencing mobile banking adoption.

These outcomes would definitely help Moroccan banks to invest in mobile banking.

REFERENCES

Al-Jabri, I. M., and Sohail, M. S. 2012. *Mobile banking adoption: application of diffusion of innovation theory*. Journal of Electronic Commerce Research.

Barclay D., Chan Y., Huff S., and Copeland D. 1997. *Business Strategic Orientation, Information Strategic Orientation and strategic alignment*. Information Systems Research.

Bennani A, Sidmou ML, Lafraxo Y, Oumlil R 2013. *L'acceptation des systèmes d'Information dans l'enseignement supérieur: Quel modèle pour le contexte marocain ?* IBIMA 22th,

Bhatiasevi, V. 2015. *An extended UTAUT model to explain the adoption of mobile banking*. Information Development.

Carolina Martinsa, Tiago Oliveiraa, AlešPopovič 2014. *Understanding the Internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application*. International Journal of Information Management.

Chen, C. 2013. *Perceived risk, usage frequency of mobile banking services*. Managing Service Quality.

Crabbe M, Standing C, Standing S and Karjaluoto, H 2009. *An adoption model for mobile banking in Ghana*. International Journal of Mobile Communications, 7(5), 515–543.

Cruz, P., FilgueirasNeto, L. B., Munoz-Gallego, P., and Laukkanen, T. 2010. *Mobile banking rollout in emerging markets: evidence from Brazil*. International Journal of Bank Marketing.

Cunningham, L. F., Gerlach, J. H., Harper, M. D., Young, C. E. 2005. *Perceived risk and the consumer buying process: Internet airline reservations*. International Journal of Service Industry Management.

Featherman, M. S., and Pavlou, P. A. 2003. *Predicting e-services adoption: A perceived risk facets perspective*. International Journal of Human-Computer Studies.

Fettke, P. 2006. *State-of-the-Art des State-of-the-Art eineUntersuchung der for schungsmethode "Review" innerhalbder Wirtschaftsinformatik from the UTAUT model*. Journal of Electronic Commerce Research.

Fornell, C., and Larcker, D. F. 1981. *Evaluating Structural Equation Models with Unobservable Variables and*

- Measurement Error. *Journal of Marketing Research*.
- Gefen, D and Straub, D. 2005. A practical guide to factorial validity using PLS-graph: Tutorial and annotated example. *Communications of the Association for Information Systems*.
- Gonçalo Baptista, Tiago Oliveira 2016. *A weight and a meta-analysis on mobile banking acceptance research*. *Computers in Human Behavior*.
- Gu, J.-C., Lee, S.-C., and Suh, Y.-H. 2009. *Determinants of behavioral intention to mobile banking*. *Expert Systems with Applications*.
- Ha, K.-H., Canedoli, A., Baur, A. W., and Bick, M. 2012. *Mobile banking e insights on its increasing relevance and most common drivers of adoption*. *Electronic Markets*.
- Hanafizadeh, P., Behboudi, M., Koshksaray, A. A., and Tabar, M. J. S. 2014. *Mobile-banking initial acceptance of Mobile Banking in Pakistan*. *International Journal of Scientific and Engineering Research*.
- Kim, G., Shin, B., and Lee, H. G. 2009. *Understanding dynamics between initial trust and usage intentions of mobile banking*. *Information Systems Journal*, 19(3), 283-311
- Kim, S., Lee, K. H., Hwang, H., Yoo, S., 2016. *Analysis of the factors influencing professionals' adoption of mobile electronic medical record (EMR) using the unified theory of acceptance and use of technology (UTAUT) in a tertiary hospital*, *BMC Medical Informatics and Decision Making*.
- Koenig-Lewis, N., Palmer, A., and Moll, A. 2010. *Predicting young consumers' take up of*
- Koufaris, M., and Hampton-Sosa, W. 2004. *The development of initial trust in an online company by new customers*. *Information and Management*.
- Laforet, S., and Li, X. 2005. *Consumers' attitudes towards online and mobile banking in China*. *International Journal of Bank Marketing*.
- Lee, M.-C. 2009. *Factors influencing the adoption of internet banking: an integration of TAM and TPB with perceived risk and perceived benefit*. *Electronic Commerce Research and Applications*.
- Lin, H. F. 2011. *An empirical investigation of mobile banking adoption: The effect of innovation attributes and knowledge-based trust*. *International Journal of Information Management*.
- Luarn, P., and Lin, H. H. 2005. *Toward an understanding of the behavioral intention to use*
- Luo, X., Li, H., Zhang, J., and Shim, J. P. 2010. *Examining multi-dimensional trust and multi-faceted risk in initial acceptance of emerging technologies: An empirical study of mobile banking services*. *Decision Support Systems*.
- Mishra, V., and Bisht, S. S. 2013. *Mobile banking in a developing economy: a customer-centric model for policy formulation*. *Telecommunications Policy*.
- mobile banking services*. *International Journal of Bank Marketing*.
- Rodrigo F. Malaquias, YujongHwang 2016. *An empirical study on trust in mobile banking: A developing country perspective*. *Computers in Human Behavior*.
- SaharAfshan, Arshian Sharif 2016. *Acceptance of Mobile Banking Framework in Pakistan*. *Telematics and Informatics*
- Tiago Oliveira, Miguel Faria, Manoj Abraham Thomas, Ale's Popovi'c 2014. *Extending the understanding of mobile banking adoption: When UTAUT meets TTF and ITM*. *International Journal of Information Management*
- Tiwari, R. 2007. In S. Buse (Ed.), *The mobile commerce prospects: A strategic analysis of oportunities in the banking sector*. *Hamburg, Deutschland: Hamburg University Press*.
- Venkatesh, V., Bala, H., 2008. *Technology Acceptance Model 3 and a Research Agenda on Interventions*. *Decision Sciences*.
- Venkatesh, V., Davis, F. D., 2000. *A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies*. *Management Science*.
- Venkatesh, V., James Y. L. Thong, and Xin Xu. 2012. *"Consumer acceptance and use of information technology: Extending the Unified Theory of Acceptance and Use of Technology."* *MIS Quarterly* 36, no. 1: 157-178. *Business Source Complete*.
- Venkatesh, V., James Y. L. Thong, and Xu Xin. 2016. *"Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead."* *Journal of The Association for Information Systems* 17, no. 5: 328-376. *Business Source Complete*.
- Venkatesh, V., Michael G. Morris, Gordon B. Davis and Fred D. Davis. 2003. *User Acceptance of Information Technology: Toward a Unified View*. *MIS Quarterly*
- Xue, M., Hitt, L. M., and Chen, P. 2011. *Determinants and outcomes of Internet banking adoption*. *Management Science*.
- Yu, C. S. 2012. *Factors affecting individuals to adopt mobile banking: Empirical evidence*
- Yu, C.-S. 2012. *Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model*. *Journal of Electronic Commerce Research*.
- Zhou, T. 2011a. *An empirical examination of initial trust in mobile banking*. *Internet Research*.
- Zhou, T. 2011b. *Understanding mobile Internet continuance usage from the perspectives of UTAUT and flow*. *Information Development*.
- Zhou, T. 2012. *Examining mobile banking user adoption from the perspectives of trust and flow experience*. *Information Technology and Management*.
- Zhou, T. 2012. *Understanding users' initial trust in mobile banking: An elaboration likelihood perspective*. *Computers in Human Behavior*.
- Zhou, T. 2013. *An empirical examination of continuance intention of mobile payment services*. *Decision Support Systems*, 54, 1085–1091.
- Zhou, T., Lu, Y., and Wang, B. 2010. *Integrating TTF and UTAUT to explain mobile banking user adoption*. *Computers in Human Behavior*.