Factors Affecting the Adoption of Mobile Banking in Klang Valley, Malaysia

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Abstract:

In the 2000s, mobile banking (m-banking) services became an important aspect of the banking industry. The adoption of m-banking has been increasing in many countries around the world. However, the adoption is still low in Malaysia. The aim of this research is to determine the factors affecting the adoption of m-banking in Klang Valley, Malaysia. This study is based on the Diffusion of Innovation (DOI) theory of Rogers and takes into consideration factors, like relative advantage, compatibility, observability, trialability, complexity and perceived risk. The sample respondents of this study are the customers of retail banks. Initially, a pre-test and a pilot test were conducted. Out of the 136 questionnaires distributed, 81 questionnaires were usable. SPSS has been utilised to analyse the data

collected. Reliability, Pearson correlation and regression tests have been utilised in this study. Subsequently, it has been found that relative advantage, compatibility and observability are the significant determinants of m-banking in Klang Valley. However, trialability, complexity and perceived risks were found to be insignificant factors.

Key words: mobile banking, Klang Valley, Malaysia

1. INTRODUCTION

Technology has redefined the financial services industry over the past few years. Nowadays, banks are using electronic channels, like internet banking, SMS banking, ATM and Mobile banking (m-banking) to provide better services to customers. M-banking has become an important aspect of the banking industry such that banks might fail to retain some customers if m-banking services are not provided. M-banking has a bright future and carries many benefits for banks and customers.

According to Maroofi and Nazaripour (2013), m-banking is "a channel whereby the consumer interacts with a bank via a mobile plan, such as a mobile phone or personal digital assistant. In that sense it can be seen as a subset of electronic banking with its own unique characteristics". Nowadays, people are using m-banking to transfer money, make instantaneous payments, make inquiries concerning the balance, perform requests (cheque book), update phone credit and to perform m-commerce (Saini, 2014).

M-banking is very advantageous for both banks and their customers. High adoption of m-banking can significantly reduce queues and waiting time at banks. It is interesting to note that in South Africa, m-banking has improved people's access to banking services and as such many "unbanked" people are now able to use banking facilities. M-banking is also beneficial for banks. If this service would be accepted by everyone, the number of bricks and mortar banks would

decrease significantly and all banking transactions would be done virtually using mobile phones. This would reduce the banks' costs of operations (Sharma, 2015).

This research will focus on m-banking situation in Malaysia. M-banking was introduced in 2006 in Malaysia and as such it is still in its infant phase (Muhammad, 2012). This research will provide an insight about the factors affecting the adoption of m-banking in Klang Valley, Malaysia. The Diffusion of Innovation (DOI) theory of Rogers will be applied in this study. The DOI theory takes six factors into consideration, namely, relative advantage, complexity, trialability, compatibility, observability and perceived risks.

2. PROBLEM STATEMENT

M-banking adoption is still low in Malaysia and it is growing gradually compared to other countries, like Kenya and China. In 2014, the central bank of Malaysia, Bank Negara Malaysia, conducted a study which revealed that only 13 banks were providing m-banking services while 31 banks in Malaysia were providing internet banking services. It was also found that 63.70% of the population are using internet banking while 23.50% of the population are using m-banking in 2015 (Bank Negara Malaysia, 2015). Therefore, although banks are investing massively to provide m-banking services, the local people seem to be reluctant to adopt them. Asian Banks were spending approximately $66.5 billion in 2014 to enhance the information technologies to provide better services to their customers (Bannister, 2014). If banks are spending so much on m-banking technology to enhance services and to get closer to their customers and the latter are unwilling to use m-banking, banks would make huge losses and inefficient use of their resources.

3. LITERATURE REVIEW

3.1. Relative advantage

According to Cheah *et. al.* (2011), relative advantage is the extent to which a new innovation is found to be more beneficial and productive compared to the previous one. Similarly, Sharma (2015), has also concluded that there is a significant positive relationship between relative advantage and m-banking adoption. M-banking has many advantages over the traditional banking. For instance, it is easily accessible, flexible, saves time, involves lower costs, easy to use and it reduces queues. In short, it is more convenient to use. Therefore, these attributes encourage people to use m-banking services. However, the findings of Dash et al. (2014) have shown that relative advantage has a very weak impact on the adoption of m-banking in India. This might be because customers fail to notice that m-banking provides more advantages than internet and branch banking. As such it is "meaningless" for them to adopt m-banking.

3.2. Compatibility

Compatibility refers to the extent to which an invention is perceived to be in-line with the with the users' morals, habits, principles, lifestyle and experiences. A study conducted by Siddik *et. al.* (2014) reflected that compatibility has a strong influence on the adoption of m-banking. Since m-banking services are compatible with the way people manage their funds and suit their way of living, it would be adopted quickly. Thus, compatibility strongly influences the adoption of m-banking. Moreover, Wessels and Drennan (2010) also concluded that compatibility is a significant determinant of m-banking. The researchers explained that the customers feel that m-banking can be easily incorporated in their daily life activities to perform banking transactions. Subsequently, the researchers have suggested that when banks conduct marketing and

educational activities, they should convince the potential customers about the advantages of m-banking, that m-banking is easy to use and is compatible with their lifestyle. Kahandawa and Wijayanayake (2014) have suggested that since compatibility strongly influences the adoption of m-banking, banks have to personalise the m-banking services according to the needs and lifestyle of the customers. However, a research by Mazhar *et. al.* (2014), has shown that compatibility has an insignificant impact on the adoption of m-banking in Pakistan. Cultural and technology differences between the different countries contribute to explain the difference in findings.

3.3. Observability

According to Al-Jabri and Sohail (2012), observability refers to the extent to which the valuable uses of m-banking services can be perceived and communicated. If users can see the impact of m-banking transactions instantly, the latter will communicate the benefits to other people. This will improve people's knowledge concerning m-banking services and will encourage the adoption of m-banking services. Chen (2013) and Chung (2014) have also found that there is a positive relationship between the adoption of m-banking and observability. According to Chen (2013), the views of friends affect people's decision to adopt m-banking services. Chung (2014) has suggested that banks need to improve the observability of m-banking by partnering with mobile banking service providers to encourage retailers and companies to conduct banking transactions using smartphones. This will enhance the visibility and observability of the service. Additionally, trial periods would also allow customers to recognise and acknowledge the benefits of m-banking. This will also contribute to increase the observability of m-banking. On the other hand, Awwad and Ghadi (2010) and Kapoor, Dwivedi and Williams (2015) have found that observbility does not affect the adoption of m-banking. According to Awwad and Ghadi (2010),

this is so because it is difficult for people to see the transactions' results of m-banking users, who are reluctant to disclose the results of their financial transactions to other people. Kapoor, Dwivedi and Williams (2015) have explained that active users do not discuss the use and benefits of m-banking. In this case, observability will have a non-significant impact on the adoption of m-banking.

3.4. Trialability

Trialability is the ability to test the new invention before it is adopted (Dr Jain, 2013). If given the chance to try m-banking services, the potential customers will be more at ease to accept it and will be more knowledgeable about how to use it. Therefore, the researcher, Dr Jain (2013), concluded that trialability has a significant influence on the adoption of m-banking. This can be explained by the fact that m-banking involves certain risks for customers and thus, the latter need to be aware about how to use m-banking services. After the trial, customers will be more comfortable with the m-banking services. Dash et al. (2014) and Kapoor, Dwivedi and Williams (2015) have also concluded that trialability positively impacts the adoption of m-banking. On the other hand, Al-Jabri and Sohail (2012) have found that trialability does not influence m-banking adoption. According to these researchers potential customers are less likely to be persuaded to adopt m-banking services and fail to perceive its advantages in the experimental period. Additionally, people believe m-banking services are helpful and involve lower risks. Subsequently, they do not see the need for the trial.

3.5. Complexity

Muluk and Abale (2014) explained that complexity refers to the extent to which people believe that an invention is difficult to utilize and understand. Subsequently, if it is difficult to use m-banking, the adoption will be lower. The study has revealed

that complexity has a strong negative impact on the adoption of m-banking as people find that it is difficult to use the new service and are hesitating to adopt it. Additionally, Cruz et. al. (2010) found that complexity is a major barrier in the adoption of m-banking and as such "its use is complicated" and "requires knowledge and learning". The researchers have suggested that banks need to educate and train people, especially elder ones, about how to use m-banking. Furthermore, Cheng, Lee and Lee (2014) have also reported that complexity is a barrier to the adoption of m-banking in China. According to the researchers, the authentication process of security is complex. Besides, according to Matthew (2014), customers have a negative image about the adoption of m-banking in their mind. They believe that m-banking is complex to operate and that it is difficult to setup the application. On the other hand, the researches of Al-Jabri and Sohail (2012), Ramdhony and Munien (2013) and Suoranta (2003) have reflected that complexity does not influence m-banking adoption. According to Ramdhony and Munien (2013), this is because users who are proficient in using mobile phones do not find it complex to use m-banking.

3.6. Perceived risk

Perceived risk includes risks and losses associated with m-banking. There are various types of risks that are related to this service, like, financial risks, performance risks, psychology risks and time risks. Kazi and Mannan (2013), Ndumba and Dr Mutari (2014) and Wessels and Drennan (2010) have found that there is a negative relationship between the adoption of m-banking and perceived risk. According to Kazi and Mannan (2013), customers believe that m-banking involves higher risks than traditional banking. For instance, there is the risk that PIN code would be lost and personal banking information would be hacked. As such people are discouraged to adopt m-banking. Ndumba and Dr Mutari (2014) have recommended that banks should increase the security of m-banking to prevent hacking,

reduce system failures and assure the customers that m-banking system is secured and is operating efficiently. Additionally, Wessels and Drennan (2010) have proposed that banks have to improve the m-banking system and provide instructions and security guidelines to improve customers' perception about the risks. Banks have to inform the public about their initiatives to reduce the perception of risk. Additionally, the m-banking system should include "customisable security settings". However, the study of Karma, Dr Ibrahim and Dr Ali (2014) and Suoranta (2003) contradicts the above findings. Suoranta (2003) has explained that the customers trust the m-banking services and they believe that m-banking is safe to use. This helps to explain the insignificant relationship between the adoption of m-banking and perceived risk.

4. HYPOTHESIS FORMULATION

From the above literature review, the following hypotheses can be generated.

H_1: There is a positive relationship between relative advantage and adoption of m-banking.

H_2: There is a positive relationship between compatibility and adoption of m-banking.

H_3: There is a positive relationship between observability and adoption of m-banking.

H_4: There is a positive relationship between trialability and adoption of m-banking.

H_5: There is a negative relationship between complexity and adoption of m-banking.

H_6: There is a negative relationship between perceived risk and adoption of m-banking.

5. METHODOLOGY

This is a deductive research and the research design of Uma Sekaran is used. In this study, the DOI model of Rogers will be used as a theoretical framework to determine the adoption of m-banking among the customers in Klang Valley. Therefore, the independent variables will be relative advantage, complexity, trialability, compatibility, observability and perceived risk while the dependent variable will be the adoption of m-banking. This is a quantitative research whereby 136 questionnaires will be distributed in Klang Valley. The questionnaires consist of 27 close ended questions and the 5 point likert scale is utilised to answer the questions. Initially, a pre-test and pilot test will be conducted before the full distribution of the questionnaires. The sample respondents are chosen randomly. The SPSS software version 20 will be used to analyse the data collected. Reliability test, correlation and multi-regression will be performed.

6. DATA ANALYSIS

Initially, a pre-test was conducted whereby 10 questionnaires were distributed to academicians, students and working people. It was found that the questions for the adoption of m-banking services were wrongly structured and the instructions were inappropriate. After the restructuration of the m-banking adoption questions, a pilot test was carried out before the full distribution of the questionnaires. 30 questionnaires were distributed to random people. All the 30 questionnaires were collected for the pilot test. From the data from the pilot test, the reliability test was conducted and the reliability is measures by the cronbach alpha coefficient (α). According to Kapoor, Dwivedi and Williams (2015), the reliability is low if $α ≤ 0.5$, the reliability is moderate/fair when $0.5 < α ≤ 0.7$, the reliability is high if $0.7 < α ≤ 0.9$ and the reliability is excellent if $α > 0.9$.

It was found that the reliability coefficients for relative advantage, compatibility, oberservability, complexity, trialability and perceived risk are 0.909, 0.894, 0.502, 0.893, 0.904 and 0.876, respectively. It is interesting to note that adoption of m-banking has the highest reliability coefficient of 0.970. On the other hand, observaility has the lowest reliability coefficient of 0.502. Finally, the reliability coefficient for all the 21 items was found to be 0.797. Therefore, overall the questionnaire is reliable.

7. DEMOGRAPHIC ANALYSIS

Out of the 136 questionnaires distributed, 81 questionnaires were usable. The table below reflects the demographic analysis of the respondents.

Table 1: Demographic analysis

		Frequency	Percentage
Gender	Male	38	46.9%
	Female	43	53.1%
Marital status	Single	61	75.3%
	Married	18	22.2%
	Divorced	2	2.5%
Age Group	19-24	49	60.5%
	25-35	19	23.5%
	36-45	9	11.1%
	Above 45	4	4.9%
Education	Below O level	7	8.6%
	A level	12	14.8%
	Professional certificate	3	3.7%
	Undergraduate Degree	46	56.8%
	Masters Degree	11	13.6%
	Doctorate	2	2.5%
Occupation	Employed	27	33.3%
	Self-employed	4	4.9%
	Student	50	61.7%
Using M-banking	Yes	39	48.1%
	No	42	51.9%

8. PEARSON CORRELATION ANALYSIS

In this study Pearson correlation is used to measure the association and direction of the relationship between the dependent and independent variables. The table below shows the correlation

Table 2: Pearson Correlation analysis

	Mean	Standard deviation	Correlation coefficient (r)	Coefficient of determination (R^2)	Strength of relationship
Relative advantage	16.9506	2.88488	0.581	0.3376	moderate positive relationship
Compatibility	15.7901	3.11735	0.655	0.4290	strong positive relationship
Observability	7.8148	1.50093	0.393	0.1544	weak positive relationship
Trialability	8.3086	3.41556	0.323	0.1043	weak positive relationship
Complexity	7.4815	1.57410	-0.367	0.1347	Weak negative relationship
Perceived risk	10.6173	3.19597	-0.366	0.1340	Weak negative relationship

9. MULTI-REGRESSION ANALYSIS

Multiple regression analysis is used to determine whether there is a significant relationship between the dependent and independent variables. In this study the significance level of 5% is used to test the hypotheses.

In this study, R is 0.772. This infers that there is a strong relationship between the dependent and independent variables. R^2 is 0.596. This means 59.60% of the variability in the adoption of m-banking can be explained by the independent variables. In the ANOVA table, the p-value (Significance) is 0.000 which is less than 0.05. This implies that the model is "statistically significant".

Table 3: Multi-regression analysis

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	p-value
	Beta	Std. Error	Beta			
(Constant)	1.92	1.86		1.032	.305	
Relative Advantage (X_1)	.224	.084	.257	2.656	.010	<0.05 (significant)
Compatibility (X_2)	.284	.081	.351	3.504	.001	<0.05 (significant)
Observability (X_3)	.321	.132	.191	2.427	.018	<0.05 (significant)
Trialability (X_4)	.192	.128	.120	1.498	.138	>0.05 (insignificant)
Complexity (X_5)	-.091	.059	-.124	-1.543	.127	>0.05 (insignificant)
Perceived Risk (X_6)	-.125	.066	-.158	-1.902	.061	>0.05 (insignificant)

From the above table, it can be seen that the coefficient (beta) for relative advantage, compatibility, observability, complexity, trialability and perceived risk are 0.224, 0.284, 0.321, -0.091, 0.192 and -0.125, respectively. It is interesting to note that observability has the highest beta value of 0.321. It can be said that observability is the most significant factor affecting the adoption of m-banking compared to the other independent variables.

In this research, the regression equation is:

$$Y = 1.92 + 0.224\ X_1 + 0.284\ X_2 + 0.321\ X_3 + 0.192\ X_4 - .091\ X_5 - 0.125\ X_6 + e$$

Since the p-value of relative advantage, compatibility and observability is less than 0.05, it implies that relative advantage, compatibility and observability are significant determinants of m-banking. On the other hand, trialability, complexity and perceived risks were found to be insignificant factors as the p-value is more than 0.05.

10. DISCUSSION OF FINDINGS

From the data analysis, it has been found that relative advantage, compatibility and observability are significant determinants of m-banking.

The most significant determinant of m-banking in this study is observability. This finding can be explained by the fact that banks are taking a lot of measures to improve the security of m-banking transactions and they are also informing the public about the measures that are being taken. Additionally, it is also possible that the current users are communicating the benefits of m-banking to their peers who are not using m-banking services. All this improves the visibility of m-banking in the eyes of the non-users and improves the adoption of m-banking. This finding is supported by Al-jabri & Sohail (2012) and Suoranta (2003).

The second significant factor is compatibility. Muluk and Abale (2014), Domeher, Frimpong and Appiah (2014), Mian and Rizwan (2013) and Hanafizadeh et al. (2012) have also concluded that compatibility has a significant influence over the adoption of m-banking. This can be explained by the fact that the usage of smartphones is very high in Malaysia. As per the survey of On Device Research in 2014, the penetration rate of smartphones in Malaysia is 140% and World Bank has said that Malaysia has the highest mobile penetration rate in the world (Business Circle, 2014). This suggests that people are comfortable with the use of smartphones and it is easier to incorporate the use of m-banking services in their daily life. However, the findings of Mazhar et al. (2014) contradict the above findings.

The third significant determinant of m-banking is relative advantage. M-banking is rapid, ubiquitous, convenient, less costly and efficient. Additionally, m-banking services reduce the waiting queues at ATMs and in front of the banks. All this contributes to improve the convenience, effectiveness and efficiency of m-banking. Ayodele et al. (2013), Tanakinjal et al. (2010), Sharma (2015), Dr Khraim, Shoubaki and Khraim (2011) and Ndumba & Dr Mutari (2014) have concluded that relative advantage is a significant determinant of m-banking. These previous studies have found that m-banking is more

rapid, simplifies banking transactions, enhances the service performance and improves the service efficiency.

On the other hand, it has been found that trialability, complexity and perceived risk do not influence the adoption of m-banking.

In this research, it has been found that trialability does not have a positive impact on the adoption of m-banking. This might be because the usage of smartphone is high in Malaysia and that the sample respondents find that it is not complex to use m-banking services. Subsequently, the respondents feel that they do not require a trial. This result is consistent with that of Al-Jabri & Sohail (2012) but contradicts the findings of Chen (2013), Audi (2016), Muluk and Abale (2014), Odumeru (2013), Echchabi and Hassanuddeen (2013), Yunus (2010) and Kapoor, Dwivedi and Williams (2015). According to Chen (2013), since m-banking is risky, the customers have to try using m-banking on a trial basis to better understand how to use this service. Additionally, Kapoor, Dwivedi and Williams (2015), explained that since the trial period is free of charge and there is no binding contracts between the banks and the customers for the trial, customers are willing to try the new facility and can easily perceive the benefits of using this service.

Moreover, it has also been concluded that there is an insignificant relationship between complexity and the adoption of m-banking. This can be justified by the fact that the usage rate of smartphone in Malaysia is high. Subsequently, since people are well used to smartphones, they do not find that conducting banking services using phones is frustrating and requires mental effort and technical skills. This result is consistent with that of Al-Jabri & Sohail (2012) and Luarn and Lin (2005). According to Luarn and Lin (2005), this might be because the majority of the respondents are early adopters and innovators who like to try to new technologies and they are already used to the m-banking technology. Subsequently, such users do not find that it is complex to use m-banking. The above

findings are consistent with that of Awwad and Ghadi (2010), Muluk and Abale (2014), Kumari (2015) and Dr Khraim, Shoubaki and Khraim (2011)

The last insignificant determinant of m-banking is perceived risk, which is line in with the results of Makongoro (2014), AlSoufi and Ali (2014), Karma, Dr Ibrahim and Dr Ali (2014), Belousova and Chichkanov (2015) and Ismail and Masinge (2011). This might be due to the fact that the local banks are taking new initiatives to improve the security of m-banking. For instance, Maybank is the first bank in Malaysia to introduce biometric identification measures to secure the m-banking transactions and it is providing customers with regular advices (Maybank, 2016). This finding is different from the conclusions of Malhotra (2011), Oluoch et al. (2012), Wessels & Drennan (2010), Cheah *et al.* (2011), Chen (2013), Kahandawa & Wijayanayake (2014), Ndumba and Dr Mutari (2014) and Siddik *et al.* (2014).

11. IMPLICATIONS

This study will have various implications for the local banks and for the government. Besides, there are also theoretical implications.

11.1. Implications for banks.

Banks should take additional measures to increase the adoption of m-banking. Nowadays, fintech firms are making use of new technologies to offer banking and financial services and banks are losing their customers to the fintech firms. By improving the m-banking services provided, banks will be able to retain some of their customers and this will allow them to better compete with the fintech firms. Besides, when the adoption of m-banking is high, the banks can reduce their operating expenses on traditional branch banking and provide better services to the customers. There are various measures

that the banks can take to enhance the adoption of m-banking. In the first place, since relative advantage is a significant determinant, banks have to conduct marketing activities to reflect how the full use of this facility will enhance their daily life and their banking experience. The banks should conduct educational and marketing activities on the social media to attract youngsters like Facebook and Twitter. Banks can also conduct educational campaigns at the universities to inform the young generation about the new services and features of m-banking. In the second place, banks should try to customise the m-banking services according to the preferences, lifestyle, working styles and needs of the customers and offer those m-banking services that are most suitable to the customers to improve compatibility.

11.2. Implications for the central bank, government and regulators.

Besides the local banks, the central bank also have an important role to play in encouraging the adoption of m-banking. For the successful adoption of m-banking and a successful cashless economy, proper and sufficient infrastructure, regulations, collaboration among the banks and with the government and support from the government are very important. The government must motivate the private sector to invest in the m-banking services and encourage them to build the necessary infrastructure, like strong internet/WIFI connection. The regulatory bodies should also implement laws and regulations to secure the services and to punish the wrong-doers. At the same time, banks should be encouraged to develop new and creative innovations. The central bank has to make sure that the system of protection are being implemented effectively and that the payment systems are effective. The government has to encourage the customers to conduct international remittances using m-banking services. After the stage has been set and the foundation has been built, big data

can be used to further improve the m-banking services. This will allow banks and regulators to better understand the needs and preferences of customers and to develop better services.

12. CONCLUSION

It has been found that relative advantage, observability and compatibility are significant determinants of m-banking in Klang, Valley. On the other hand, the study has shown that trialability, complexity and perceived risks are insignificant factors. This study has certain limitations. The sample size of this study is small. Future researchers have to conduct future studies on a larger scale. Besides, a limited number of factors have been considered in this study. Subsequently, future researchers have consider more factors like perceived ease of use, perceived costs, trust, personal innovativeness and perceived credibility among other factors.

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