

An Investigation on Mobile Banking Adoption and Usage: A Case Study of Mauritius

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The purpose of this paper is to investigate m-banking adoption and usage in Mauritius; a service relatively new in the island. The aim is to gauge awareness level and to identify those factors that inhibit or motivate m-banking usage in Mauritius. An online survey was carried out using a standard questionnaire. Convenience sampling method was used. Out of the 211 people who responded to the survey, only 169 responses were deemed to be usable. It was found that awareness of local m-banking services is quite high and usage level is reasonable. Convenience, time and effort savings, privacy, ubiquitous access to banking services, compatibility with lifestyle and banking needs were identified as the main factors motivating m-banking adoption. Perceived security risk and reliability were found to be the main obstacles to m-banking usage. It was also found that m-banking usage is not associated with age, gender and salary. There is, however, an association between education and m-banking usage. As to the limitation of the study, the use of convenience sampling limits the generalisation of the findings of the study. The study has practical implications for local banks either offering or planning to launch m-banking services in Mauritius as factors preventing and encouraging usage of m-banking are discussed. The constructs of Technology Acceptance Model (TAM) and Innovation Diffusion Theory (IDT) are integrated and extended with perceived risk and cost to ascertain m-banking usage and adoption. The study, therefore, offers valuable insights on m-banking in Mauritius.

Key Words: Mobile Banking, Mauritius

Field of Research: Technology and Management

1. Introduction

The advent of the mobile phone marked the beginning of a revolution in the ways people communicate and transact. It has redefined communication and has reshaped the way services are provided. The mobile phone has undeniably brought a paradigm shift, affecting both the lives of people and the business environment. It has permeated the lives of billions of people around the world; becoming for many an indispensable device (Laukkanen, 2007a). The mobile phone is also an ever-evolving device becoming increasingly sophisticated, slimmer, and multifunctional. It allows performing several activities such as communicating, connecting to the internet, obtaining services and effecting payments

These distinctive features have made the mobile phone evolve into a channel conducive for the provision of many services. Many firms are increasingly realising that there are indeed huge opportunities to be tapped with the mobile phenomena. The soaring and large mobile phone user base is pushing firms more and more

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Ramdhony & Munien

towards “mobile” strategies. The financial services sector, in particular, has responded quickly to this mobile era with many financial institutions starting to offer mobile services (Laukkanen, 2007b). Many banks around the world have launched mobile banking services in an attempt to provide ubiquitous access to banking services. With mobile banking, customers are able to have anywhere and anytime access to banking services via a mobile device; tablet or mobile phone (Crosman, 2011). Whilst the service is an evolution of internet banking, global m-banking adoption and usage is not as widespread and massive as internet banking (Koenig-Lewis et al, 2010).

Many studies (Barnes and Corbitt, 2003; Brown et al., 2003; Lee et al., 2003; Suoranta, 2003; Luarn and Lin, 2005; Barnes Scornavacca and, 2004; Laukkanen and Lauronen, 2005), in different countries of the world, have been conducted to ascertain why uptake of m-banking is below expectations. There is, nevertheless, confidence that usage will increase given the benefits that the service provides (Wessel and Drennan, 2010). The topic has been thoroughly researched by academics to understand why take-off is slow. Several researches on mobile banking adoption have combined the diffusion of innovation theory of Rogers (1962) and technology acceptance model of Davis (1989) (Riquelme & Rios, 2010).

In Mauritius, however, there is scarcity of studies on m-banking since the service has recently been launched by a few banks; the Mauritius Commercial Bank, the State Bank of Mauritius and the Mauritius Post and Cooperative bank. M-banking usage is therefore still in its introductory stage compared to internet banking which has experienced widespread diffusion throughout the island. This paper therefore aims to investigate factors which encourage and hinder the adoption and use of m-banking in Mauritius.

The study provides insight on m-banking in Mauritius. It will shed light on the possible barriers to m-banking adoption in Mauritius. The potential factors that encourage and/or inhibit Mauritians from using m-banking services will be also identified which altogether should provide a comprehensive picture of m-banking in Mauritius. Local banks will most certainly benefit the most from the findings of the study as an in-depth assessment and analysis of m-banking will be made. Any firm considering launching mobile services in Mauritius can also get meaningful and valuable insights by extrapolating the results of the study. Besides, the study can also be used as a basis to conduct further studies on m-banking and mobile services in general in Mauritius.

The paper is organized as follows: the next part provides an overview of the Mauritian banking sector and literature review, part 3 contains the research methodology followed by analysis and findings. Finally part 5 discusses the managerial implications.

2. Literature Review

Local Banking Sector

The Mauritian banking sector is a very competitive sector with 18 banks offering their services. There are currently 4 offshore banks, 7 local banks and 7 subsidiaries of

Ramdhony & Munien

international banks. Most retail banks in Mauritius provide online banking as add-on services to existing branch activities while mobile banking is in the initial stage of implementation. By the end of July 2012, only 3 banks were providing m-banking services; MCB, SBM and MPCB. Similarly, Internet banking services were initially provided by only the MCB and SBM with the other banks introducing the service much after. In fact, the MCB and SBM pioneer most innovation in the local banking sector.

Mobile Banking in Mauritius

The MCB and SBM started investing heavily in mobile banking services in 2011. The MPCB has, in June 2012, started to provide m-banking services to its customers. The MCB intensively advertised its mobile banking services when it introduced it. Information about m-banking together with its advantages was provided. Besides, information about m-banking is readily available on its website. To be able to use the service customers must subscribe to the service by going to any branch of the MCB or through internet banking. The SBM, on the other hand, partnered with local mobile network operator Orange to broaden its m-banking services. SMS banking and Mobile Internet Banking are the two main categories of m-banking services provided locally.

M-Banking and Its Emergence

M-banking is the latest approach used by financial institutions for the provision of financial services through information and communication technology (ICT). M-banking is a service whereby customers use a mobile phone or mobile device to access banking services and perform financial transactions (Anderson, 2010). Goswami and Raghavendran (2009) argue that the broad aim of m-banking is to fit a financial institution on a mobile phone. Crosman (2011) reinforces this by asserting that m-banking enables users to have a bank branch in their pocket and to be able to bank “anytime and anywhere”. Laukkanen and Kiviniemi (2010) define m-banking as an interaction through which a customer is connected to a bank via a mobile device. The interaction does not necessarily involve performing transactions such as paying bills and transferring money but can, in its simplest form, be the sending of an SMS (Short message system) for account balance inquiry. Steadman (2011) advocates that technology is the enabling factor that allowed m-banking to emerge. The “always-on” connectivity demand by customers coupled with the fact the internet has evolved from fixed wired through wireless to mobile connection, meant that financial institutions had to pursue alternative channels to provide their services in order to meet customers’ expectations (Puschel *et al*, 2010).

There is a convergence of ideas that the main driver of m-banking is the widespread proliferation, availability and acceptance of mobile or smart phones and devices (Halime, 2010). Skeldon (2011) affirms that the general and widespread acceptance of mobile applications, the increasing use of mobile phones as a tool and means for paying bills, and lifestyle are the factors driving the adoption of m-banking. Coelho and Easingwood (2003) assert that the fact that customers nowadays are less willing to visit traditional branches, they are more and more receptive to new electronic channels and demand better service quality.

Ramdhony & Munien

Studies on M-banking have focused on developed countries and generalisation of their findings to developing countries would be dangerous. The paper adds to the literature by investigating M-banking in a developing country. The paper comes at an opportune time as M-banking introduction is quite recent in Mauritius.

M-Banking Users and Factors Favouring Its Adoption

Koenig-Lewis *et al.* (2010) assert that young people are more predisposed to adopt m-banking as it fits their lifestyle, so do Howcroft *et al.* (2002). Toe and Pok (2003, cited Sangle and Awasthi, (2011) purport that people having a busy life and being constantly on move rather than having a sedentary life are more prone to adopt and use mobile banking. Sangle and Awasthi (2011) claim that internet banking users usually take less time to use and adopt m-banking.

Suoranta (2003) ascertains that the convenience, privacy, time and effort savings together with the location-free access that m-banking offers encourage its adoption and use, whereas Lee *et al.* (2003) state that self-prestige is a key factor. Delport (2010) affirms that awareness is a key factor in m-banking adoption and use.

Despite the numerous advantages it offers, m-banking is still in an “infancy stage” (Laukkanen and Kiviniemi, 2010). Kim *et al.* (2009), argue that m-banking subscription has been well below industry expectations

Barriers to M-Banking

Koenig-Lewis *et al.* (2010) affirm that customer adoption remains the major barrier that hinders the development of m-banking. It is unlikely that banks will increase their investment in m-banking if customers do not see any advantages in it and if adoption is not widespread (Koenig-Lewis *et al.*, 2010).

Crosman (2011) claims that “not everyone is interested in having a bank branch in their pocket” and asserts that those people do not know what it means to be able to bank anytime and anywhere. Understanding what prevents customers from using and adopting m-banking is therefore important (Koenig-Lewis *et al.*, 2010).

People refrain from using m-banking because it involves payments (Luarn and Lin, 2005), such as SMS fee (Crosman, 2011), security issues (Brown *et al.*, 2003) and small keyboards and display screen of smart phone (Laukkanen, 2007b).

M-Banking Services

SMS banking, thin-client applications and access to online banking are the main ways through which banks offer m-banking services (Cruz *et al.*, 2010). Suoranta and Matila (2004), argue that m-banking allows users to check account balance, make transaction history inquiries, transfer funds, pay bills, trade stock and manage portfolio of assets. Crosman (2011) argues that downloadable applications such ATM locator which enables customers to find the nearest ATM from where the customer is located, enables bank to provide distinctive and beyond standard services. However, Wilcox (2009) predicts that the range of m-banking services is likely to increase in the future.

Ramdhony & Munien

Cruz *et al.* (2010) assert that m-banking services are either transactional or non-transactional based. “Monitoring recent transactions, access to loan and card statements, alerts on account activity or the passing of set thresholds, the status of cheques among others” are examples of non-transactional based transactions (Cruz *et al.*, 2010). Non-transaction based m-banking services are mostly used for informational purposes but may be essential for conducting transactions (Cruz *et al.*, 2010). For example, checking the balance of an account is important before making transfers. Nevertheless, Skeldon (2010) claims that m-banking is used mostly for viewing account balances and that SMS is the most popular medium for the delivery of m-banking services. Tavan (2011) asserts that use of transactional-based m-banking services is quite low.

Benefits of M-Banking to Customers

Ubiquitous access, convenience and mobility are the main benefits that m-banking confers to customers (Laforet and Li, 2005). Delport (2010) points out that with m-banking customers no longer need to use scarce time and resources to travel to bank branches. Nevertheless, despite the widespread proliferation of mobile phones and the numerous advantages that m-banking offers, m-banking is still not widely adopted (Riquelme and Rios, 2010). Laukkanen (2007b) argues that internet banking remains the leading channel in electronic banking.

Perceived Risk

Aldás-Manzano *et al* (2009a) argue that new products inherently contain risks which increase resistance to adoption. Yousafzai *et al* (2003) affirm that risk in online and mobile banking is perceived to be higher than traditional banking channels as they operate on open technological infrastructure which creates implicit fears that hacking and other malicious attacks that cause financial loss and manipulation of personal data might occur.

Perceived Risk Dimensions:

Security Risk

Akturan and Tezcan (2012) argue that security risk relates to the potential loss of control over transactions and financial information. Koenig-Lewis *et al.* (2010) affirm that in the m-banking context, customers fear that their funds will be transferred to third parties without their knowledge.

Privacy Risk

Privacy risk in banking refers to the degree to which consumers fear that their privacy will be violated and anxiety that banks will divulge personal information to other companies or to cross sell other banking products (Aldás-Manzano *et al.*, 2009a).

Performance Risk

Performance risk is concerned with whether the product/ service performs as per expectations or as anticipated (Aldás-Manzano *et al.*, 2009a). Akturan and Tezcan

Ramdhony & Munien

(2012) affirm that performance risk relates to the probability that the product or service not functioning properly.

Time Risk

Akturan and Tecan (2012) affirm that time risk considers the possibility of losing time to learn how to use a product or services. In the mobile banking context, time risk refers to the amount of time it will take to learn and use mobile banking (Aldás-Manzano *et al.*, 2009a).

Social Risk

Aldás-Manzano *et al* (2009a) affirm that the lack of human interaction is an obstacle to the use of self-service technology based services. M-banking operates in an “impersonal environment” (Koenig-Lewis *et al*, 2010). Suganthi *et al.* (2001) argue that personal interaction between customers and bankers helps to overcome barriers and increases trust.

Technology Acceptance Model & Innovation Diffusion Theory

Technology Acceptance Model

TAM is a well-known model that helps to explain the adoption and use of technology (Sangle and Awasthi, 2010; Wessels and Drennan, 2010). Brought forward by Davis in 1989, it is based on Fishbein and Ajzen’s theory of reasoned action (Sangle and Awasthi, 2011). Davis argues that the intention to use a particular technology is based on a person’s behavioural intention which in turn is determined by two beliefs; perceived ease of use and perceived usefulness (Liu and Li, 2009; Sangle and Awasthi, 2011).

Perceived Ease of Use & Perceived Usefulness

Perceived ease of use is “the degree to which a user believes that using a particular service would be free of effort” while perceived usefulness refers to “the degree to which an individual perceives that using a particular system would enhance his/her job performance” (Liu and Li, 2009). Aldás-Manzano *et al.* (2012a) assert that perceived usefulness refers to the advantages that mobile banking offers and whether using a mobile phone is useful for performing financial transactions. Perceived ease of use, on the other hand, relates to whether mobile banking is easy to learn and use (Aldás-Manzano *et al*, 2012a). Riquelme and Rios (2010) assert that perceived usefulness plays a significant role in determining the adoption and use of banking services. Nevertheless, Luarn and Lin (2005) argue that TAM does not highlight the barriers to the adoption of a technology. Chong *et al* (2010) assert that using TAM solely does not sufficiently explain people’s decision to adopt a technology and argue that TAM should rather be used as a base model which should be extended with additional variables based on the technology being studied.

Innovation

Quinn, (2000), argues that firms must continually innovate if they do not want to be outshined by competitors. Innovation is what makes organisations successful and ensure their long term survival (Ehigie and McAndrew, 2005). Hivener *et al.* (2003) define innovation as a new or innovative idea that is applied to initiate or improve a product, process or service. Ehigie and McAndrew (2005) affirm that “in the innovation change process, creativity leads to an invention, and the first introduction or implementation of an invention is innovation, which could lead to adoption which in turn results from a diffusion process”.

Innovation Diffusion Theory (IDT)

Bradley and Stewart (2002) affirm that firms engage in the diffusion of innovation in order to gain competitive advantage, reduce costs and protect their strategic positions. The innovation diffusion theory put forward by Rogers in 1962 is a well-known theory that explains how an innovation is diffused among users over time (Liu and Li, 2009). It also helps to understand customers' behaviour in the adoption or non-adoption of an innovation (Vaugh and Schavione, 2010; Lee *et al.*, 2003). The theory depicts that the adopters of any innovation follow a bell-shaped distribution curve which may be divided into five parts to categorise users in terms of innovativeness (Liu and Li, 2009). Rogers classified users as innovators, early adopters, early majority, late majority and laggards (Liu and Li, 2009). As per the research of Rogers (1995), innovators account for 2.5%, early adopters compose of 13.5%, early and late majority made each 34% whilst laggards correspond to 16% of the total consumers of an innovation.

Perceived Characteristics of an Innovation

As per Rogers (1962), there are five perceived characteristics that influence the adoption or non-adoption of an innovation which are:

Relative Advantage

Rogers (1995) defines relative advantage as “the degree to which an innovation is perceived as better than the idea it supersedes”. It refers to whether the innovation is perceived to be superior to the product or service from which it evolves (Laukkanen and Kiviniemi, 2010). Püschel *et al.* (2010) define relative advantage as the degree to which an innovation is perceived as a better alternative to currently available products and services. Liu and Li (2009) argue that relative advantage is a very robust predictor of the intention to adopt and use a particular innovation and corresponds to the “perceived usefulness” component of the Technology Acceptance Model (TAM) put forward by Davis (1989). Ram and Sheth (1989) argue that if the performance of an innovation is not superior to existing alternatives, then customers will not find it meaningful to change their behaviour and adopt the innovation. Conversely, Lee *et al.* (2003) affirm that users are more prone to adopt a new technology when they perceive that it offers a relative advantage over existing one.

Complexity

Rogers (1995) describes complexity as “the degree to which an innovation is perceived as relatively difficult to understand and use”. Complexity is similar to the “perceived ease of use” component of TAM and is a significant predictor of the intention to use and adopt an innovation as the more complex an innovation is the slower its rate of adoption will be (Liu and Li, 2009). Lee *et al.* (2003) affirm that “perceived complexity” negatively affect m-banking usage and adoption. Koenig-Lewis *et al.* (2010) affirm that the perceived complexity of m-banking will be lower for users who are versed with mobile phones and will consequently experience fewer problems in using m-banking.

Compatibility

Rogers (1995) defines compatibility as “the degree to which an innovation is perceived to be consistent with existing values, past experiences and the need of potential users”. Lee and Lee (2010) argue that people tend to more easily adopt technologies that are compatible with the current technologies that they have or had before. Innovations that match with the lifestyle of users usually have a faster adoption rate (Koenig-Lewis *et al.*, 2010). In the context of m-banking, compatibility refers to the extent to which m-banking is consistent with consumers’ lifestyle and current needs (Kleijnen *et al.*, 2004).

Observability

Rogers (1995) argues that observability is the “degree to which the results of an innovation are visible and tangible to others”. Liu and Li (2009) assert that the more it is easy to describe and observe an innovation the more positive impact it will have on people which will eventually encourage usage of the innovation. Cruz *et al.* (2010) affirm that probability of adopting an innovation increases when the benefits and usage of innovation can be easily observed.

Triability

Triability is defined as the “degree to which an innovation can be tried on a limited basis (Rogers and Shoemaker, 1971). As per Rogers, there is faster adoption of new ideas when these can be tried before their full implementation whilst adoption tend be slower where prior trial is not possible (Püscel *et al.*, 2010). For financial services, however, Aldás-Manzano *et al.* (2009a) assert that customers are unable to try them before adoption.

Limitations of the Diffusion of Innovation

Vaugh and Schavione (2010) purport that every research on the diffusion of innovation, such as The Diffusion of Innovation theory (Rogers, 1962) and Technology Acceptance Model (Davis, 1989), have assumed that customers will replace old technology with new ones. Rogers (2003) argues that researches on innovation are “pro-innovation bias” as they assumed that all innovation are “good’ and that customers would automatically adopt them by replacing previous innovations. However, it is not always that new technology automatically or completely replaces old ones (Vaugh and Schavione, 2010). Selwyn (2003) argues

Ramdhony & Munien

that non-adoption is “one of the least understood areas of innovation diffusion”. Ram (1987), on the other hand, asserts that resistance to innovation is a normal customer response. Cruz *et al.* (2010) claim that functional and psychological barriers are created by people to resist from using innovative product and services.

Hypothesis Development

Koenig-Lewis *et al.* (2010) assert that young people are more predisposed to adopt m-banking as it fits their lifestyle. Several studies (Darian, 1987; Dickerson and Gentry, 1983; Labay and Kinnear, 1981; Sim and Koi, 2002; Venkatraman, 1991) found that adopters of new technologies to be generally male, younger, more educated and have higher income than non-adopters (Cruz *et al.*, 2009). A research conducted by Howcroft *et al.* (2002) found that younger consumers value the convenience or time saving potential of online and mobile banking more than older consumers. Moreover, lack of face-to-face contact by younger consumers was deemed to be less important compared to older consumers. Their research also revealed that educational levels of respondents did not affect the use of telephone or online banking. Conversely, Karjaluoto *et al.* (2002) identified the profile of a typical Finnish online banking user as being highly educated, relatively young and wealthy person with good knowledge of computers and, especially, the internet. Rogers (2003) argues that “the adoption of one new idea may trigger the adoption of several others in a cluster which consists of one or more distinguishable elements of technology that are perceived as being interrelated”. Internet banking and M-banking both use technological innovations making use of computers and mobile phones respectively. In the same vein, Sangle and Awasthi (2011) assert that internet banking users usually take less time to use and adopt m-banking. We therefore hypothesize that:

1. There is no association between age and m-banking usage.
2. There is no association between income and m-banking usage.
3. There is no association between education level and m-banking usage.
4. There is no association between gender and m-banking usage.
5. There is no relationship between internet banking usage and m-banking usage.

3. Research Methodology

Data Collection Method

The quantitative approach was used to collect data. A standard questionnaire was used and uniform filed procedures were used where the questionnaire was administered by all respondents in the same way.

Since mobile banking is quite new in Mauritius, data on m-banking in Mauritius is therefore scarce. In order to attain the objectives of the research, primary data has been collected in the form of an online mail survey. An e-mail invitation was sent to potential respondents describing the purpose of the study. The e-mail contained a hyperlink which directed the respondents to a self-administered online questionnaire.

Ramdhony & Munien

The Questionnaire

The questionnaire has been designed in such a way that the relevant data is collected from the respondents. Significant efforts were made to devise questions that are easy to understand and which means the same thing to everyone. Besides, the questionnaire was kept concise and precise so as not to burden respondents to fill a too long questionnaire. For most questions, a five point Likert-scale was used with values with 1 meaning given to strongly disagree and 5 to strongly agree.

For ease of administration and fluidity of the questionnaire, the latter was divided into 5 sections: Section A contained questions about awareness and usage, Section B dealt with the relative advantages of M-banking, Section C was about the perceived cost and risk, Section D provided information about internet banking and Section E aimed at collecting general information on the respondents.

Population and Sample Size

The population for this study consists of people who own a mobile phone and who are customers of local banks that provide m-banking services. By the end of July 2012, only 3 banks were offering m-banking services in Mauritius: The Mauritius Commercial Bank Ltd (MCB), State Bank Mauritius Ltd (SBM) and Mauritius Post and Cooperative Bank Ltd (MPCB). Therefore, to qualify for inclusion in the sample, the respondents required to be a customer of the MCB or SBM or MPCB and should own a mobile phone or device.

There is no readily available information on the size of the target population but it is estimated that the population is greater than 100,000. As per Saunders *et al* (2005), a sample size of 384 is considered adequate for a population size greater than 10,000 to achieve a confidence interval of 95%.

Devising a sampling frame for this study was difficult as it required local banks that provide m-banking services to make available information about their customers. Due to confidentiality reasons banks were unable to provide such information. In the absence of a sampling frame, non-probability sampling was used. Snowball sampling method whereby an e-mail invitation containing a hyperlink leading to the online questionnaire was sent to a group of people who were identified as being members of the target population. These people were also asked to forward the e-mail invitation to other people they thought might be eligible to participate in the survey.

The questionnaire was pre-tested using on a sample of 10 respondents and modifications were consequently made based on their feedback.

Response Rate

This study was carried out in an ethical manner where confidentiality was given significant importance. Anonymity of respondents was respected and respondents were not forced in any way to participate in the survey. Moreover, the study was carried out with the aim of having an insight on m-banking in Mauritius and not to criticise the m-banking service provided by local banks

Ramdhony & Munien

211 people responded to the survey. However, only 169 questionnaires were deemed to be usable. A response rate of 44.01% was therefore obtained reflecting the disadvantages of using mail survey.

Justification for Model Used

Many researches on the acceptance of electronic-banking services have used Davis's (1989) technology acceptance model (TAM) (Aldás-Manzano *et al.* 2009b). It has been suggested that Technology acceptance model (TAM) and Innovation Diffusion theory complement each other as perceived usefulness is similar to relative advantage and perceived ease of use is closely linked with complexity (Koenig-Lewis *et al.*, 2010). It is argued that using TAM solely is insufficient to explain the adoption or non-adoption of technologies (Chong *et al.*, 2010). Several researches on mobile banking adoption have combined the diffusion of innovation theory and technology acceptance model (Riquelme & Rios, 2010). Püschel *et al.* (2010) affirm that taken individually the models have limited predictive power but integrating the two into a single framework results into more predictability. In their investigation on m-banking, Püschel *et al.* (2010) have integrated elements of the Technology acceptance model (TAM) of Davis with Rogers' innovation diffusion theory. Chong *et al.* (2010) affirm that it is better to use TAM as a base model and extend it by including additional variables based on the study that is being carried out. Aldás-Manzano *et al.* (2009b) have, in their study on online banking, extended TAM by adding perceived risk as another variable. Akturan and Tezcan (2012) have integrated TAM, perceived benefits and perceived risks to investigate mobile banking adoption. Wessels and Drennan (2010) extended TAM by adding cost, compatibility and perceived risk as constructs for their investigation on customers' acceptance of m-banking. The study will therefore combine TAM and IDT together with perceived risk and cost construct to investigate perception of m-banking in Mauritius.

4. Analysis & Findings

Demographics

Out of the 169 respondents, 60.4% were males and 39.6% were females. More men than women have therefore participated in the survey. 49.1% of those who participated in the survey were aged between 25-35 years, 30.8% were less than 25 years and 20.1% were between 35-50 years. Half of the respondents were therefore in the age group 25-35 years whilst none of them had more than 50 years of age.

The majority of respondents (87%) have completed tertiary studies and 13% have completed only secondary education. The high educational level of the respondents is explained by the fact that literacy rate is quite high in Mauritius. As anticipated from their educational background, a high proportion (82.2%) of the respondents was professionals, 15.4% were students, 1.8% were self-employed and 0.6% were manual workers.

Ramdhony & Munien

Table 4.1

	%		%
Gender		Occupation	
Male	60.4	Professional	82.2
Female	39.6	Manual worker	0.6
Education		Self-employed	1.8
Tertiary	87%	Student	15.4
Secondary	13%	AGE	
Salary		<25	30.8
0-10,000	19.5	25-35	49.1
10,000-20,000	22.5	35-50	20.1
20,000-30,000	18.9	>50	0
30,000-50,000	19.5		
>50,000	19.5		

The distribution of respondents in income groups was more or less equally spread with 19.5% of the respondents the MUR 0-10,000 salary range, 22.5% earn a monthly salary of MUR 10,000-20,000, 18.9% obtained a salary in the range MUR 20,000-30,000, 19.5% received between MUR 30,000-50,000 as salary and 19.5% earn a salary of more than MUR 50,000.

Section-Awareness

A significant majority (94.7%) of the respondents have heard about m-banking. It can be therefore argued that the informative advertising campaigns of local banks offering the service have been successful in informing people about the existence of m-banking in Mauritius. A lower proportion (26%) of the respondents affirm that they are fully aware of local m-banking services, 42.6% claim that they are aware to some extent, 28.4% have little awareness and only 3% are not aware at all of m-banking services provided locally. In line with Delpont (2010) who claims that awareness is a key factor that negatively affects m-banking adoption, it can be concluded that awareness is not a major barrier to m-banking adoption in Mauritius as the degree of awareness of the m-banking services is quite high.

Section-Usage

Half of the respondents (51.5%) are users of mobile banking services. Koenig-Lewis *et al* (2010) affirm that customer adoption remains the major barrier that hinders the development of m-banking and that it is unlikely that banks will increase their investment in m-banking if it is not widely adopted by customers. Being a relatively new service, actual usage (51.5%) can be considered to be fair in Mauritius. Moreover, Tavan (2011) affirms that m-banking adoption is slow because customers are on the learning curve. A high proportion (71%) of the respondents affirm that they will either use or continue using m-banking in the future (41.4% very likely and 29.6% likely); which is indeed a high percentage. Only around 7% of the respondents affirm that they will not use m-banking in the future whilst 20.7% are uncertain about whether to use the service or not. Given the high percentage of potential users, it can be assumed that m-banking adoption will increase further in

Ramdhony & Munien

the future as it is quite new in Mauritius and customers are still learning about the service.

Section Relative Advantage

Table 4.2: Relative Advantage

Compared to other banking channels, using a mobile phone to obtain banking services:		
	Mean	Std Deviation
is more convenient	3.98	0.922
enables more time and effort savings	4.19	0.794
offers more privacy	3.53	1.024
Increase self-prestige	3.8	1.058

Respondents highly value the time and efforts savings in using m-banking services. The hectic lifestyle of most Mauritians could be a possible explanation for such a choice. A person does not have to go through the hassle of finding an ATM or even to put on his computer when he has a mobile phone. The second most important motivating factor was found to be the convenience to access banking services rather than through other channels. Thus, m-banking is perceived as being convenient to access banking services. The results corroborate the findings of other studies on m-banking adoption (Cruz et al., 2010, Laukkanen, 2007b). Contrary to the findings of Laukkanen (2007a) who argues that studies on m-banking have identified privacy as one of the main factors encouraging m-banking adoption, Mauritians value the privacy factor to a lesser degree. Possibly respondents view other banking channels as offering the same level of privacy as m-banking. Lee et al. (2003) claim that using m-banking services increases users' self-prestige which consequently favours m-banking adoption and usage. However, the mean of 3.8 shows that it is one of the least motivating factors. Furthermore, the high standard deviation (1.058) shows that views of respondents diverge as to whether m-banking increases self-prestige.

Compatibility, Complexity and Observability

Lee and Lee (2010) advocate that technologies that are compatible with the needs of users are usually more easily adopted. The results (means greater than 3) lend support to the arguments of Lee and Lee (2010) and Koenig-Lewis et al (2010) who assert that innovations that match the lifestyle of users have a faster adoption rate

Ramdhony & Munien

Table 4.3

	Mean	Std. Dev
Compatibility		
m-banking is appropriate for my banking needs	3.62	0.970
m-banking is consistent with my values	3.35	0.894
m-banking fits my lifestyle	3.59	0.954
Complexity		
m-banking is difficult to understand	2.41	0.991
m-banking is not easy to use	2.30	0.942
Observability		
Anytime and anywhere banking	4.39	0.674

Rogers (1962) defines complexity as “the degree to which an innovation is perceived as relatively difficult to understand and use”. As depicted in the above table, difficult to understand/ learn has a mean of 2.41 which shows that the respondents do not find m-banking to be difficult to understand and learn. ‘Not easy to use’ has, on the other hand, a mean of 2.30. Thus, Complexity is not an obstacle to m-banking usage in Mauritius as m-banking is perceived to be easy to understand, learn and use.

The highest mean of 4.39 shows that a large majority of respondents agree that the major advantage of m-banking over existing banking channel is the ability to access banking services at any place and any time. The ubiquity that m-banking provides is therefore valued by the respondents. This validates the argument of Laukkanen (2007a) who asserts that the ability to access banking services whenever and wherever wanted is the major advantage that m-banking provides.

Barriers to M-banking Adoption

Table 4.4

m-banking:	Mean	Std. Deviation
is not reliable- transactions might not get executed	3.28	.946
threatens Privacy	3.56	.918
can lead to financial loss	3.67	.956
is not secure	3.10	.943
Is riskier than existing banking channels	3.18	.968
is costly	2.78	.968

The most important barrier affecting the adoption of m-banking is the fear of financial loss. Respondents are concerned about the risk of losing money through m-banking. It is common for banks to secure themselves when providing this type of service

Ramdhony & Munien

whereby the bank disclaims any liability in case of system breakdown or misuse. This could be a possibility in explaining such behavior. The majority of the respondents are neutral on their perception of the security level of m-banking which is reflected in the mean of 3.10. Respondents behaved similarly regarding the argument that m-banking is riskier than other banking channels. The results conflict the findings of Riquelme and Rios (2010) who argue that perceived risks in m-banking tend to be higher because there is a possibility that the mobile phone may be lost or get stolen. The low mean of 2.78 indicates that the cost factor is not a barrier to m-banking adoption. This finding is in contrast with Crosman (2011) who affirms that people refrain from using m-banking as they do not want to pay fees, such as SMS fees. As part of a strategy to induce more customers to use m-banking, banks might charge low fees or even no fees initially. The cost of sending an SMS is also negligible in Mauritius. These could explain why m-banking is not perceived as being costly.

Further Analysis-Hypothesis Testing

Hypothesis 1

H1a: There is no association between age and m-banking usage

H1b: There is an association between age and m-banking usage

After cross tabulation, 56.6% of those aged between 25 and 35 years were found to use m-banking but most importantly 54% of all current users of m-banking are found in this particular age group. Slightly more than half of the current users of m-banking are therefore found in this age group. A chi square test was performed between age and m-banking usage. The results were as follows:

$X^2=1.737$, $df=2$, $p=0.420$. Since $p=0.420$ which is greater than 0.05, H1a is accepted. It can be concluded that at 5% level of significance, there is no association between age and m-banking usage.

Age, therefore, does not influence m-banking adoption in Mauritius. The finding differs from that of Koenig-Lewis et al. (2010) and Cruz et al. (2010) who found that m-banking users are generally young.

Hypothesis 2

H2a: There is no association between salary and m-banking usage

H2b: There is an association between salary and m-banking usage

Of those earning a monthly salary between MUR 20,000-30,000 62.5% use m-banking. Out of all current users of m-banking, 23% are from the MUR 20,000-30,000 salary range.

Chi square test results between salary and m-banking usage shows: $X^2=2.915$, $df=2$, $p=0.572$. Since $p=0.572$ which is greater than 0.05, H2a is accepted. It can be concluded that at 5% level of significance, there is no association between salary and m-banking usage. This indicates that salary does not influence m-banking usage and adoption in Mauritius as those who use m-banking are from different income thresholds. This is explained by the fact that m-banking is not as service that is restricted only to those having much wealth. Any customer of the bank can use m-banking services irrespective of the amount of money in his or her bank account or his or her salary.

Hypothesis 3

H3a: There is no association between education and m-banking usage

H3b: There is an association between education and m-banking usage

54.4% of those who have tertiary education qualifications use m-banking. 92% of all current users of m-banking have tertiary education certificate. It should be noted, however, that 87% of the respondents have completed tertiary studies.

The results of the Chi square test between education and m-banking usage are: $X^2=3.914$, $df=2$, $p=0.048$. Since $p=0.048$ which is less than 5%, H3a is therefore rejected. It can be concluded that at 5% level of significance, there is an association between education and m-banking usage. The fact that a large majority of respondents were tertiary educated could have contributed to the result. Educational level consequently affects m-banking usage in Mauritius which is in line with the findings of Cruz et al. (2010). Those having high education are, therefore, more inclined to use m-banking in Mauritius. This may be because education shaped their perception on new innovations and technologies making them more disposed to use m-banking.

Hypothesis 4

H4a: There is no association between gender and m-banking usage

H4b: There is an association between gender and m-banking usage

52% of male respondents use m-banking and 60.9% of all current users of m-banking are males according to a cross tabulation between the two variables.

Chi square test results between gender and m-banking usage shows: $X^2=0.024$, $df=1$, $p=0.877$. Since $p=0.877$ which is greater than 5%, H4a is accepted. It can be concluded that at 5% level of significance, there is no association gender and m-banking usage. This indicates that m-banking usage and adoption in Mauritius is not restricted to a particular gender but used by both men and women.

Hypothesis 5

Is there a relationship between internet banking and M-Banking?

The correlation between internet banking usage and m-banking usage is $+0.488$, $r=169$, $p=0.000$ which indicates a positive correlation between the two variables. The correlation is significant indicating that those who use internet banking also use m-banking. Since, m-banking it quite new in Mauritius, it can be deduced that internet banking users have taken less time to adopt m-banking which is in line with the findings of Sangle and Awasthi (2011).

5. Managerial Implications

We consider the results to be highly relevant to banks offering m-banking services. The research builds the profile of the typical M-banking user as someone in the age bracket 25-35, earning in the range MUR 20,000-30,000 and having received tertiary education. Banks can craft their strategy by targeting these people to increase the number of m-banking users. Results indicate that m-banking has a bright future in

Ramdhony & Munien

Mauritius. Actual usage of the service is around 52% but the encouraging sign is that around 71% of them intend to either use or continue using the service in the future. Further information about the service and its potential benefits can persuade those who intend to use m-banking to join the club of users. Tavan (2011) argues that adoption is slow because customers are on the learning curve, it can be argued that subscription to m-banking in Mauritius will increase in the future as customers become more knowledgeable about the service. Koenig-Lewis et al. (2010) purport that banks will not increase their m-banking investment if m-banking adoption is not widespread: customer adoption has been found to be not an impediment as customers intend to use the service. Local banks can therefore leverage their investment on m-banking.

Three banks only are offering m-banking services in Mauritius; MCB, SBM and MPCB. Since, the service is quite popular in Mauritius, other retail banks should consider introducing m-banking services since as Goswami and Raghavendran (2009) point out, it will enable them to not only increase fee-based income but also enable significant cost savings, improve service quality and provide cross-selling opportunities.

The degree of awareness of the local m-banking services is reasonable but banks should, nevertheless, endeavour to improve further the level of awareness of their m-banking services if they want to broaden their m-banking customer base. Delpont (2010) argues that awareness is a key factor impacting negatively m-banking. Banks providing m-banking services should engage into promotional activities to bolster m-banking subscription and usage. Persuasive advertising campaigns can therefore be undertaken to show potential customers how m-banking facilitates access to banking services.

Sangle and Awasthi (2011) assert that internet banking users usually take less time to use and adopt m-banking. This study shows that there is a significant correlation between internet banking usage and m-banking usage. Local banks should therefore approach cross selling m-banking services to current internet banking users.

A high percentage of respondents also do not trust the security level of m-banking services. Security aspects have been identified as an obstacle to m-banking adoption in Mauritius in accordance with Brown *et al.* (2003), who argue that perceived security issues hinder m-banking usage. Banks should develop informational programmes that focus on creating a positive attitude towards the security aspects of m-banking. It is noted that advertising on m-banking was made by local banks only when they initially launched their m-banking services. The broad aim of the advertising was to create awareness and inform customers of the availability of a new service. It is now necessary for banks to shift to persuasive advertising of m-banking services in order to increase adoption.

Mauritian banks should develop applications which clients can download on their mobile phones to effect their banking transactions. This would no doubt boost up the number of transactions and number of people using m-banking services. Bank clients would no longer have to access the website of the bank to transact with the bank.

Ramdhony & Munien

The study is limited by the fact that snowball and convenience sampling methods were used because of the non-availability of a sampling frame. Since the survey was carried online, only those having internet access could participate. These two factors limit the possibility to generalise the results to the whole population

References

- Akturan, U & Tezcan, N 2012, 'Mobile banking adoption of the youth market: perceptions and intentions', *Marketing Intelligence & Planning*, vol. 30, Iss: 4, pp. 444-459.
- Aldas-Manzano, J, Lassala-Navarre, C, Ruiz-Mafe, C & Sanz-Blas, S 2012, 'The role of consumer innovativeness and perceived risk in online banking usage', *International Journal of Bank Marketing*, vol. 27, no. 1, pp. 53-75.
- Aldas-Manzano, J, Lassala-Navarre, C, Ruiz-Mafe, C & Sanz-Blas, S 2012, 'Key drivers of internet banking services use', *Online Information Review*, vol. 33, no. 4, pp. 672-695.
- Anderson, J, 2010, 'M-banking in developing markets: competitive and regulatory implications', *info*, vol. 12 Iss: 1, pp. 18-25.
- Barnes, SJ & Corbitt, B 2003, 'Mobile banking: Concept and potential', *International Journal of Mobile Communications*, vol.1, no. 3, pp. 273-288.
- Barnes, SJ & Scornavacca, E 2004, 'Mobile marketing: the role of permission and acceptance', *International Journal of Mobile Communications*, vol. 2, no. 2, pp. 128-139.
- Bradley, L & Stewart, K 2002, 'A Delphi study of the drivers and inhibitors of internet banking', *International Journal of bank marketing*, vol. 20, no. 6, pp. 250-260.
- Brown, I, Cajee, Z, Davies, D & Stroebel, S 2003, "Cell phone banking: predictors of adoption in South Africa – an exploratory study", *International Journal of Information Management*, vol. 23 No. 5, pp. 381-94.
- Chong, A, Ooi, KB, Lin, B & Tan, BI, 2010, 'Online banking adoption: an empirical analysis', *International Journal of bank marketing*, vol. 28, no. 4, pp. 267-287.
- Coelho, F, Easingwood, C & Coelho, A 2003, 'Exploratory Evidence of Channel Performance in Single Vs. Multiple Channel Strategies', *International Journal of Retail and Distribution Management*, vol. 31 no. 11, pp. 561–73.
- Crosman, P. 2011, 'Banks Have Yet to Create the Killer App for Mobile Banking - Bank Systems & Technology', <http://www.banktech.com/channels/banks-have-yet-to-create-the-killer-app/229201117>.
- Cruz, P, Neto, LB, Laukkanen, T & Munoz-Gallego, P 2010, 'Mobile banking rollout in emerging markets: evidence from Brazil', *The International Journal of Bank Marketing*, vol. 28, no.10, pp. 342-371.
- Darian, JC 1987, 'In-Home Shopping: Are There Consumer Segments?', *Journal of Retailing*, vol. 63, no. 2, pp. 163–186.
- Davis, FD, 1989, 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, vol. 13 No. 3, pp. 318-39.
- Dcdm Research, 2012, *The Top 100 companies*, 2012 edn, Baie-du-Tombeau: Business Magazine.
- Delpont, A, 2010, 'Bridging the great divide', ITweb Brainstorm magazine, http://www.brainstormmag.co.za/index.php?option=com_content&view=article&id=3915%3Abridging-the-great-divide&Itemid=108

Ramdhony & Munien

- Dickerson, MD & Gentry, JW 1983, 'Characteristics of Adopters and Non Adopters of Home Computers', *Journal of Consumer Research*, 10 September, pp. 225–235.
- Ehigie, BO & McAndrew, EB 2005, 'Innovation, diffusion and adoption of total quality management (TQM)', *Management decision*, vol. 43, no.6, pp. 925-940.
- Goswami, D & Raghavendran, S 2009, 'Mobile banking: Can elephants and hippos tango', *Journal of Business Strategy*, vol. 30 no.1, pp. 14-20.
- Halime, F 2010, 'M-banking set to become the fifth channel, Retail Banker International, <http://www.vrl-financial-news.com/retail-banking/retail-banker-intl/issues/rbi-2010/rbi-628/m-banking-set-to-become-fifth.aspx>.
- Quinn, JB 2000, 'outsourcing innovation: the new engine of growth', *Sloan Management Review*, pp. 13-28.
- Hivner, W, Hopkins, SA & Hopkins, WE 2003, 'Facilitating, accelerating and sustaining the innovation diffusion process: an epidemic modeling approach', *European journal of innovation management*, vol. 6 no.2, pp. 80-89.
- Howcroft, B, Hamilton, R & Hewer, P 2002, 'Consumer attitude and the usage and adoption of home-based Banking in the United Kingdom', *International journal of bank marketing*, vol.20, no. 3, pp. 111-121.
- Karjaluoto, H, Mattila, M & Pentto, T 2002, 'Factors underlying attitude formation towards online banking in Finland', *International Journal of Bank Marketing*, vol. 20, no.6, pp. 261–272.
- Kim, G, Shin, B & Lee, HG 2009, 'Understanding dynamics between initial trust and usage intentions of mobile banking', *Information Systems Journal*, vol. 19 no. 3, pp. 283-311.
- Kleijnen, M, de Ruyter, K & Wetzels, M 2004, 'Consumer adoption of wireless services: discovering the rules, while playing the game', *Journal of Interactive Marketing*, vol. 18 no. 2, pp. 51-61.
- Koenig-Lewis, N, Palmer, A & Moll, A 2010, 'Predicting young consumers take up of mobile banking services', *International Journal of bank marketing*, vol. 28, no. 5, pp. 410-432.
- Labay, DG & Kinnear, T 1981, 'Exploring the consumer decision Process in the adoption of solar energy systems', *Journal of Consumer Research*, vol. 8, pp. 271–278.
- Laforet, S & Li, X 2005, 'Consumer attitudes towards Online and Mobile Banking in China', *International Journal of Bank Marketing*, vol. 23, no. 5, pp. 362-380.
- Laukkanen, T. & Lauronen, J 2005, 'Consumer value creation in mobile banking services', *International Journal of Mobile Communications*, vol. 3, no. 4, pp. 325-38.
- Laukkanen, T 2007a, 'Customer preferred channel attributes in multi-channel electronic banking', *International Journal of Retail and Distribution Management*, vol. 35, no. 5, pp. 393-412.
- Laukkanen, T 2007b, 'Internet v/s mobile banking: comparing customer value perceptions', *Business Process Management*, vol. 13, no. 6, pp. 788-797.
- Laukkanen, T & Kiviniemi, V 2010, 'The role of information in Mobile Banking Resistance', *International Journal of Bank Marketing*, vol. 28, no. 5, pp. 372-388.
- Luarn, P & Lin, HH 2005, 'Toward an understanding of the behavioral intention to use mobile banking', *Computers in Human Behaviour*, vol. 21, no. 6, pp. 873-91.

Ramdhony & Munien

- Lee, HH & lee, SE 2010, 'Internet vs mobile services: comparisons of gender and ethnicity', *Journal of research and interactive marketing*, vol. 4, no. 4, pp. 346-375.
- Lee, M, McGoldrick, P, Keeling, K & Doherty, J 2003, 'Using ZMET to explore barriers to the adoption of 3G mobile banking services', *International Journal of Retail and Distribution Management*, vol.31, no. 6, pp.340-348.
- Liu, Y & Li, H 2010, 'Mobile internet diffusion in China: an empirical study', *Industrial management and data systems*, vol. 110, no. 3, pp. 309-324.
- Macvaugh, J & Schiavone, F 2010, 'Limits to the diffusion of innovation- A literature review and integrative model', *European Journal of Innovation Management*, vol.13, no. 2, pp. 197-221.
- Puschel, J, Mazzon, J & Hernandez, J 2010, 'Mobile banking: proposition of an integrated adoption intention framework', *International Journal of bank marketing*, vol. 28 no. 5, pp. 389-409.
- Ram, S 1987, 'A model of innovation resistance', *Advances in Consumer Research*, vol. 14 no. 1, pp. 208-12.
- Ram, S & Sheth, JN 1989, 'Consumer resistance to innovations: the marketing problem and its solutions', *Journal of Consumer Marketing*, vol. 6 no. 2, pp. 5-14.
- Rogers, EM 1962, *The Diffusion of Innovations*, The Free Press, New York, NY.
- Rogers, EM 1995, *The Diffusion of Innovations*, 4th edn, Free Press New York, NY.
- Rogers, EM & Shoemaker, FF 1971, *Communication of Innovations: A Cross-cultural Approach*, The Free Press, New York, NY
- Rogers, E 2003, *Diffusion of Innovations*, 5th edn, Free Press, New York, NY.
- Riquelme, H & Rios, R 2010, 'The moderating effect of gender in the adoption of mobile-banking', *International Journal of bank marketing*, vol. 28, no.5, pp. 328-341.
- Sangle, PS & Awasthi, P 2011, 'Consumers expectations from mobile CRM services: a banking context'. *Business Process Management Journal*, vol. 17 no. 6, pp.898-918.
- Saunders, M, Lewis, P & Thornhill LA 2005, *Research methods for business students*. 3rd edn, Delhi: Pearson Education (Singapore) Pte Ltd.
- Selwyn, N 2003, 'Apart from technology: understanding people's non-use of information and communication technologies in everyday life', *Technology in Society*, vol. 25, pp. 99-116.
- Sheth, JN 1981, 'Psychology of innovation resistance: the less developed concept (LDC) in diffusion research', *Research in Marketing*, vol. 4 no. 3, pp. 273-82.
- Sim, LL & Koi, SM 2002, 'Singapore's Internet Shoppers and Their Impact on Traditional Shopping Patterns', *Journal of Retailing and Consumer Services*, vol. 9, no.2, pp. 115-124.
- Skeldon, P 2011, 'Growing consumer demand for mobile prompts massive investment in new multichannel platforms as retailers look to integrate everything' <http://www.internetretailing.net/2011/06/growing-consumer-demand-for-mobile-prompts-massive-investment-in-new-multichannel-platforms-as-retailers-look-to-integrate-everything/>.
- Steadman, A 2011, 'Mobile banking nirvana: myth to reality'. *Retail Banker International* <http://www.vrl-financial-news.com/retail-banking/retail-banker-intl/issues/rbi-2011/rbi-647-648/mobile-banking-nirvana-myth-t.aspx>.
- Suganthi, Balachandher & Balachandran 2001, 'Internet banking patronage: an empirical investigation of Malaysia', www.arraydev.com/commerce/JIBC/0103_01.html

Ramdhony & Munien

- Suoranta, M 2003, 'Adoption of mobile banking in Finland', *Jyva Skyla Studies in Business and Economics* 28, Doctoral thesis, University of Jyva Skyla,
- Suoranta, M & Mattila, M 2004, 'Mobile banking and consumer behaviour: new insights into the diffusion pattern', *Journal of Financial Services Marketing*, vol. 8 no. 4, pp. 354-66.
- Tavan, D 2011, 'M-banking: bridging the gap on value propositions', *Retail Banker International*, www.retailbankerinternational.com.
- Teo, TSH & Pok, SH 2003, 'Adoption of WAP-enabled mobile phones among internet users', *Omega*, vol. 31, no. 6, pp. 483-98.
- MacVaugh J & Schiavone F 2010, 'Limits to the diffusion of innovation: A literature review and integrative model', *European Journal of Innovation Management*, vol. 13 Iss: 2, pp.197 – 221.
- Venkatraman, MP 1991, 'The Impact of Innovativeness and Innovation Type on Adoption', *Journal of Retailing*, vol. 67, no.1, pp. 51–67.
- Wan, WN, Luk, CH & Chow, C 2005, 'Customers adoption of banking channels in Hong Kong', *International Journal of bank marketing*, vol. 23, no. 5, pp. 255-272.
- Wilcox, H 2009a, 'Banking on the mobile, white paper', Juniper Research, Basingstoke, www.juniperresearch.com.
- Wessels, L & Drennan, J 2010, 'An investigation of customer acceptance of m-banking', *International Journal of bank marketing*, vol. 28, no. 7, pp. 547-568.
- Yousafzai, SY, Pallister, JG & Foxall, GR 2003, 'A proposed model of e-trust for electronic banking', *Technovation*, vol. 23, no. 11, pp. 847-6.