Investigating Factors Affecting Adoption of Mobile Banking

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Abstract—*This paper aims to understand the factors affecting mobile banking adoption in India. The penetration of smart phones is more than the number of bank accounts in India, by June 2013 India has achieved a teledensity of 78.5 which is clearly showing that mobile is going to be the next revolution that's why every business is looking towards mobile commerce and in this race banking sector is not much behind. This paper uses descriptive study and the data of survey has been collected by the students of Delhi School of Management and friends and relatives that are using mobile banking in their daily lives using an online structured questionnaire from over 200 respondents. In this paper UTAUT (Unified theory of Acceptance and Usage of Technology [6]) and TAM model has been used that amounts to extended UTAUT model or UTAUTAM model which is being used in order to identify the factors affecting mobile banking adoption in India as this will give a broader aspect than the other theories or model to have a study on acceptance of technology. This study observes that the performance expectancy, perceived ease of use, perceived usefulness, facilitating conditions, perceived risk are some factors that are affecting mobile banking adoption. This study will help the banking industry, mobile industry, telecom industry and the m-commerce users to give solutions to this problem easily.*

1. INTRODUCTION

Mobile commerce may be defined as the delivery of electronic commerce capabilities directly into the consumer's hand, anywhere, via wireless technology (by Kevin Duffey, 1997). Some estimates indicates that since the 1980's about 50% of all new capital investment in organization has been in IT (Westland & Clark 2000).

Mobile banking is an application of m-commerce which enables customers to access bank accounts through mobile devices to conduct and complete bank-related transactions such as balancing cheques, checking account statuses, transferring money and selling stocks (Kim *et al.* 2009). Luo et.al (2010), defined mobile banking as an innovative method for accessing banking services via a channel whereby the customer interacts with a bank using a mobile device. **.** **Mobile Commerce,** or m-Commerce, is about the explosion of applications and services that are becoming accessible from Internet-enabled mobile devices. It involves new technologies, services and business models. It is quite different from traditional e-Commerce. Mobile phones impose very different constraints than desktop computers. But they also open the door to a slew of new applications and services where we can access any information, can do virtual or internet based activity very easily. From the day internet found its way to our pockets through smart phones people didn't need to remember any mobile numbers, now there device can be used to detect their location booking orders or even taxis is now very easy which is clearly stating the fact that mobile commerce is going to be the next big revolution in the whole world. A recent report by Digi-Capital estimates that VCs invested $4.2 billion in m-commerce from Q3 2013 to Q3 2014, far surpassing the $1.2 billion invested in 2013 and the $829 million invested in the previous two years combined. While much of this capital was poured into a few multibillion dollar juggernauts like Uber and Pinterest, it has also continued to fuel an explosion of m-commerce start-ups, including several in new subcategories. The main purpose behind mobile applications development was to help retrieve information such as email and weather information. However, the rapid demand for more and various apps has led to more verity in mobile application categories including games, GPS, factory automation and dedicated online app-discovery services, e-Government services [8] and online banking. These mobile applications became very popular and mobile users were Addicted to their use and are employed in different sectors including banking sector.

Nationalization of banks have been done in 1969 in India and by now we have 68% people who have access to banking services which is a very huge number and after PM have announced the Dhan Jan Yojna Mr. Arun Jaitley the FM have said that 7.5 crore accounts will be opened by January 26,2015. Banking industry is now focussing more on the mobile apps to provide their services and up to some extent they are successful also. But still there is some gap which is needed to be identified that is acting as an obstruction in the path of mobile banking adoption. If we talk particularly of India then we have a subscriber base of nearly 898.02 million by the end of FY13, India has the second-largest telecom

network in the world, availability of affordable smart phones and lower rates are expected to drive growth in the Indian telecom industry (TRAI, Planning Commission, and ARANCA Research).

2. LITERATURE REVIEW

In comparison to the whole banking transactions, the market of mobile banking still remains very small [1]. Internet banking and mobile banking are both electronic banking [2], however they differ in the channels to be used to deliver services to the customers [3]. The literature on adoption is primarily organized around themes such as adoption models (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Venkatesh and Davis, 2000; Davis, 1989; Rogers, 1995; Habib, 2005; Lie and Sorensen, 1996). The Theory of Reasoned Action (TRA), developed by (Fishbein and Ajzen, 1975) and (Ajzen and Fishbein, 1980) [4] consists of three variables: behavioural intention (BI), attitude (A) and subjective norm (SN). The theory has been revised and extended by Ajzen himself into the Theory of Planned Behaviour (TPB). This extension involves the addition of a major predictor, perceived behavioural control, to the model. TPB is further extended to Decomposed TPB (DTPB) by incorporating innovation diffusion factors such as relative advantage, compatibility, risk and significant influence of others. Davis (1989) expanded the Theory of Reasoned Action (TRA) to the Technology Acceptance Model (TAM) by incorporating factors like perceived usefulness (PU) and perceived ease-of-use (PEOU). The Unified Theory of Acceptance and Use of Technology (UTAUT) is a technology acceptance model formulated by Venkatesh et al. (2003) based on a review of the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behaviour, the combined theory of planned behaviour /technology acceptance model, the model of personal computer utilization, the diffusion of innovations theory, and the social cognitive theory. The UTAUT theory holds that four key constructs—namely, performance expectancy, effort expectancy, social influence and facilitating conditions— are direct determinants of usage intention and behaviour. Gender, age, experience and voluntariness of use are related to mediate the impact of the four key constructs on usage intention and behaviour. The theory has been tested for the adoption of information and communication technologies and mobile commerce. Compared to other theories, the UTAUT theory was found to be more relevant for studying the adoption of mobile commerce. Cheng et al. (2008) studied the adoption of Internet banking using the UTAUT model, the DeLone & McLean (D&M) model, and the concept of trust. A comprehensive model was developed and empirically examined by them in China [5]. A sample of 313 intended users of Internet banking was used to test UTAUT for adoption of technology, information and service quality. Trust, risk, locus of control and uncertainty were studied towards intention. Except effort expectancy and information quality,

the rest of the parameters were significant towards intention. Jun et al. (2008) identified the facilitating and moderating factors in the adoption of on-line and mobile banking in Korea. They argue that usefulness, ease of use, innovativeness, social influence, quality and cost were significantly related to the adoption of on-line and mobile banking; whereas on-line banking service type, social influence and cost were found to be moderators for the adoption of Internet banking and mobile banking. Dewan, Low and Land (2009) studied previous adoption models and proposed their own model wherein reasoning, referencing and contextual factors affecting choice were suggested for the adoption of mobile banking. Cheah et.al (2011) argue that Factors such as perceived usefulness (PU), perceived ease of use (PEOU), relative advantages (RA) and personal innovativeness (PI) were found positively related with the intention to adopt mobile banking services. However, social norms (SN) were the only factor found insignificant. Pedersen (2005) carried out a study in North America and Europe on the adoption of mobile Internet services [7]. He found that TAM, Decomposed TPB and the domestication model are important from the social and technical perspectives. Further, usefulness and subjective norm were significant towards the attitude to use m-commerce. Facilitating conditions were restricted to the resources used. Self-efficacy and operator influence on facilitating conditions were not tested in his research. Rao and Troshani (2007) established user predisposition (i.e., knowledge, compatibility and perceived enjoyment), behavioural control and innovativeness, image, perceived usefulness, perceived ease of use, internal and external social influence, facilitating conditions (i.e., promotion, security and privacy) as important drivers for m-commerce service adoption.
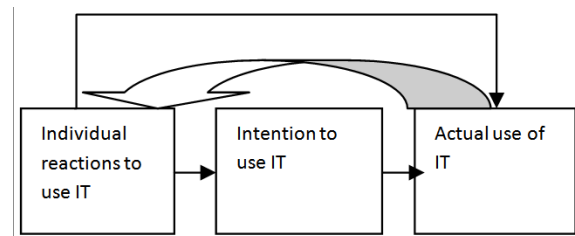

Figure 1: Basic concept underlying acceptance models.

Although UTAUT has outperformed the previous acceptance models [6] still factors of TAM model has been used to conduct this study to have a structured and well defined questionnaire that will be easy for the respondents also to understand the topic so that the responses given by them will be more useful that will result in better study.

2.1. TAM Model

TAM is tailored to IS contexts and was designed to predict information technology acceptance and usage on the job. Unlike TRA, the final conceptualization of TAM excludes the

attitude construction in order to better explain intention parsimoniously. TAM2 extended TAM by including subjective norm as an additional predictor of intention in the case of mandatory settings (Venkatesh and Davis, 2000). TAM has been widely applied to a diverse set of technology and users. TAM model consists of two factors which are

PU- Defined by Fred and Davis as degree to which a person believes that using a particular system would enhance his/her job.

PEOU- Davis defines this as degree to which a person believes that using a particular system would be free from effort.

The major upgrades of this model were TAM2 (Venkatesh and Davis 2000 & Venkatesh 2000) and TAM3 (Venkatesh and Bala 2008) that was proposed in context of e-commerce with an inclusion of the efforts of trust and perceived risk in system.
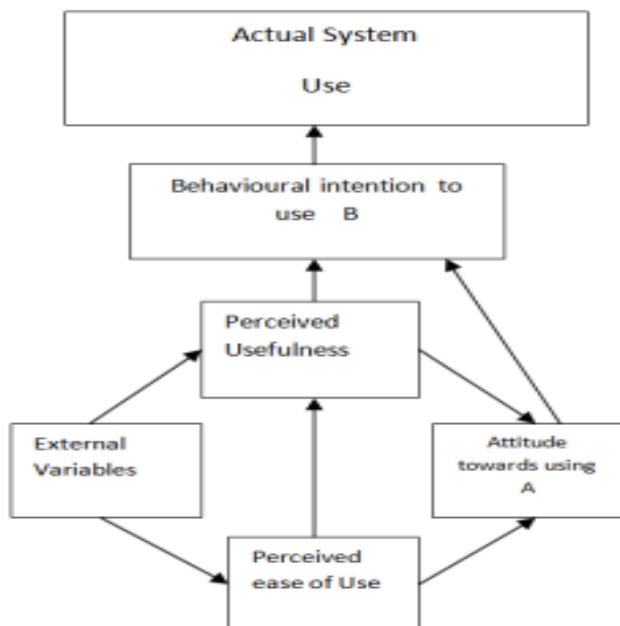

Fig. 2: TAM Model Version 1 (Davis 1989)

2.2. UTAUT Model

This model was an extended version of previous 8 models of usage and acceptance of technology which were TAM, TRA, Motivational model, TPB, Combined theory of planned behaviour and TAM, Model of personal computer use, Diffusion of innovations theory, Social cognitive theory [6]. This model consists of following 4 factors:-

1. Performance Expectancy- Degree to which an individual believes that using the system will help him or her to attain gains in job performance.
2. Effort Expectancy- Degree of ease associated with the use of the system.

3. Social Influence- Degree to which an individual perceives that important which others believe he or she should use in the system.

These 3 factors are the direct determinants of usage intention and behaviour.

4. Facilitating Condition- Degree to which an individual believes that an organisational & technical infrastructure exists to support use of system. It doesn't have significant influence on behavioural intention.

This factor is a direct determinant of user behaviour gender, age, experience and voluntariness.

3. RESEARCH METHODOLOGY

Firstly UTAUT and TAM model has been used to conduct the study which can be termed as UTAUTAM model of usage and acceptance of technology.

3.1. Research Instrument and sample

The factors PEOU, PU, Perceived risk, Performance expectancy, Facilitating Conditions & Social influence has been used to develop the questionnaire for the study that contains 19 questions was formed and for this study users of mobile banking and well educated people has been approached to fill the questionnaire. The first part of the questionnaire contains the subject's demographic information such as gender, age, educational qualification and family monthly income. The next section consists of the questions that are being considered to validate the factors being selected in which the respondents were asked to mark their level of agreement or disagreement using a 5 point Likert scale.

3.2. UTAUTAM Model

The factors chosen are such that amounts to extended TAM and UTAUT model being termed as UTAUTAM model with some hypothesis that can be explained as under:-
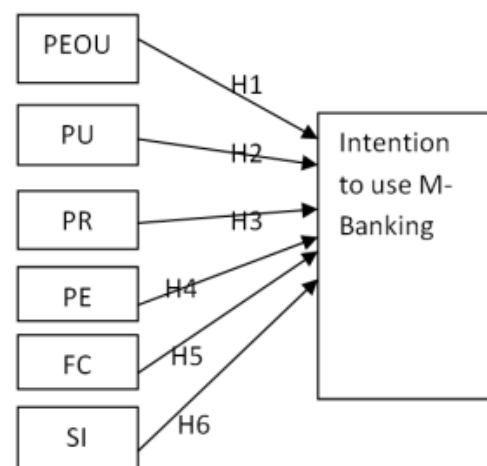

Fig. 3: UTAUTAM Model

The hypotheses that were taken are:-

H1: Between PEOU & Intention to use mobile banking which states that more perceived ease of use leads to more intention to use mobile banking.

H2: Between PU & PE which states that more the perceived usefulness more will be intention to use mobile banking.

H3: Between PR & PE which states that lower the perceived risk the more is the intention to use mobile banking.

H4: Between PE & PU which states that higher the performance expectancy higher is the intention to use mobile banking.

H5: Between FC & PR which states that more the facilitating conditions more is the intention to use mobile banking.

H6: Between SI & Intention to use mobile banking i.e. more the social influence more is the intention to use mobile banking.

3.3. Definitions of terms in model

PEOU- Perceived ease of use (2.1)

PU- Perceived usefulness (2.1)

PR- Perceived Risk i.e. the degree to which person believes using a particular system will leads to risk of privacy and usage.

PE- Performance Expectancy (2.2)

FC- Facilitating Conditions (2.2)

SI- Social Influence (2.2)

3.4. Questionnaire

On the basis of literature and the model a structured questionnaire have been developed that covers all the factors on a 5 point likert scale. The questionnaire consists of 5 points ranking which are 1 for strongly disagree, 2 for agree, 3 for neutral, 4 for agree and 5 for strongly agree to determine the factors effectively. All the variables are also being discussed in the model.

3.5. Validity and Reliability

In this research we attempted to examine the factors that affect consumers' adoption of Mobile banking by employing a modified TAM model. The TAM model is developed in order to verify the relations between the dependent variables and independent variables and test the hypotheses. SPSS analysis technique was used to assess the validity and reliability for each factor that affect the intention to use mobile banking services.

The reliability is referring to the consistency of a measure, and a test is considered reliable if the tester gets the same result repeated trails [9]. There are many types of reliability including inter-ratter reliability, Test-retest reliability, parallel-forms Reliability and internal consistency reliability. On the other hand, [9] defines the validity as the extent to which a test measures what it claims to measure. The validity and reliability of the model have been checked using SPSS analysis for each factor that is affecting mobile banking adoption. Internal consistency reliability test has been used in this paper and the values of cronbach's alpha for various factors are shown in the Table 1.

Table 1: Internal Consistency Reliability Test Values

Factors	Cronbach's Alpha
PEOU	.855
PU	.914
PR	.841
PE	.817
FC	.750
SI	.755

All the alpha values of the factors are above 7 which is clearly indicating that these factors are contributing factors as per the questionnaire and as per [9] this value above or equal to .7 is acceptable hence it gives a good internal reliability test values.

3.6. Respondents Profile

The respondents who filled the questionnaire are more in mail respondent's number. Females were 38.7% while male were 61.3%. The education qualification is at least bachelor degree and higher. The monthly income of 45 respondents was less than 60000, 63 have monthly income of 60-150000 and rest 47 have a monthly income of more than 150000.

4. HYPOTHESES TESTING

In this research, hypothesis testing was performed on the basis of linear regression analyses. Linear regression is a method to find a relationship between one dependent variable and an independent variables [10].The independent variables and the dependent variable are integrated and tabulated in SPSS for hypothesis testing.

As per the model the variables can be categorised for hypotheses testing as:-

1. Independent Variables – Perceived usefulness, Facilitating conditions, Perceived risk, Performance expectancy, Social Influence, Perceived ease of use.
2. Dependent Variables – Intention to use mobile banking.

Accordingly, the following results are obtained:

Perceived ease of use and Intention to use mobile banking: Hypotheses 1 that is more is ease of use the more is intention

to use mobile banking stands accepted according to [13] which states that the standardization coefficient if greater than .1 and significance value is lower than .05 will be accepted as excepted hypotheses.

Perceived usefulness and Intention to use mobile banking: Hypotheses 2 also stands accepted as it is following the principles under [13] and this is the most significant factor than the other ones.

Perceived risk and Intention to use mobile banking: Hypotheses 3 also stands accepted under the principles stated in [13].

Performance expectancy and Intention to use mobile banking: Hypotheses 4 also stands accepted as per [13].

Facilitating Conditions and Intention to use mobile banking: Hypotheses 5 also stands accepted as per [13].

Social Influence and Intention to use Mobile banking: Hypotheses 6 have standardization coefficient lower than .1 and also the significance value is more than .05 which doesn't sit fit under the values given in [13] which leads to rejection of this hypotheses and this factors is not contributing as a factor leading to mobile banking adoption intention.

So out of all the hypotheses 5 stands accepted and the remaining one didn't get accepted so it can be said that respondents doesn't take social influence as factor leading towards their adoption intention of mobile banking.

Table 2: Hypotheses Testing Result

Hypotheses	Standardization coefficient	Significant	Acceptance/ Rejection
H1	.23	.017	Accepted
H2	.34	.009	Accepted
H3	.24	.012	Accepted
H4	.19	.026	Accepted
H5	.16	.031	Accepted
H6	.09	.06	Rejected

5. CONCLUSION AND FUTURE SCOPE

This research paper presented the extended version of UTAUT and TAM model which is UTAUTAM model and also this paper aims to enlighten the factors affecting mobile banking adoption. This study majorly aims to provide the insight view of the various factors which are acting as hindrance in mobile banking adoption and to let the users of m-commerce platform to give solutions relating to these factors.

This paper is written as per research in [12] and the results of internal reliability test and hypotheses testing have been done by using SPSS software and it is clear from the results that the factors Perceived ease of use, perceived usefulness, perceived risk, performance expectancy, facilitating conditions and social influence have cronbach's alpha values above .70 as per [9] and it can be inferred that these factors are the contributing

factors in mobile banking adoption problem as per the research.

Out of the 6 hypotheses 5 hypotheses gets accepted as per [13] and therefore these factors should be kept in mind while providing the mobile banking services to the customers by any bank in order to have a sufficient customer base. Banking industry can also this paper as the base while taking any decision in the field of providing mobile banking services.

As per the findings following things can be concluded that:-

1. In order to promote mobile banking bank needs to provide higher security measures in order to remove the risk factor associated with transaction using mobile banking.
2. Mobile banking is clearly going to be next revolution and it will reach every home of country at least the educated families.
3. The technical members associated with mobile banking applications needs to introduce more interesting and familiar options to increase the usefulness of the mobile banking.
4. If more people will use the mobile banking platform then they will definitely influence others also to use the mobile banking.
5. The ease associated with mobile banking is much higher that leads to its growing popularity in the society.
6. People need to use this platform at least for once to get familiar with this system.

For the future scope this paper can be expanded in terms of the respondents and higher scale likert scale sampling can be done in order to get a more precise result. Furthermore, this kind or this way of study can be applied to different m-commerce facilities and services in order to determine factors affecting those services. Open ended conditions may also be added in the questionnaire and focussed group interviews can also be conducted in order to find more relative information regarding factors affecting the technology acceptance.

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