International Journal of Advanced Research and Development
ISSN: 2455-4030
Impact Factor: RJIF 5.24
www.advancedjournal.com
Volume 3; Issue 1; January 2018; Page No. 109-113

A study of tam model in the usage of mobile banking services

[1] Dr. Ashoka ML, [2] Ramaprabha D

[1] Faculty & Research Supervisor, PG Department of Studies & Research in Commerce, University of Mysore, Manasagangotri, Mysore, Karnataka, India

[2] Research Scholar, University of Mysore, Manasagangotri, Mysore & Assistant Professor, PES Degree College, Bangalore, Karnataka, India

Abstract
India is attaining a high rate of mobile banking adoption contributing towards the growth in the economy. Low cost driven Mobile banking channel will bring huge cost saving for the banking activities. Today, Banks and non-banks started to render financial services through mobile. This would in turn towards branchless mode of financial service leading to a greener society. However there is a risk of fraud and privacy issues which need a regulatory concern and also huge requirement of investment in the banking infrastructure. Trust is the most important concern in digital/mobile banking. Hence a study is made in Karnataka with sample size of 300 with a response rate of 40%. Descriptive study was made to understand the relevance of various factors that influence or hinder the banking business through mobile. In this context, similar studies are reviewed to know the important variables of mobile banking adoption. TAM model is the most popular one in the study of technology based banking with perceived use and perceived ease of use variables. In the present study, TAM model was further extended with variables such as perceived cost, perceived risk, security and trust to get a better insight about the various influences in the usage of mobile banking. Reliability of the study was also measured. Perceived risk has shown negative influence in the usage of mobile banking. All other factors influence in the adoption of m-banking. It is implicated to adopt the cost effective channel with increased level of protection to users of mobile banking. Region do not have a significant influence on various factors in the adoption of m-banking.

Keywords: m-banking, TAM model, perceived factors, reliability, actual usage

Introduction
Indian wireless subscribers touch 250 million mark next to China. However China is adding 6-7 million new subscribers per month, India is forecasted to attain 8-9 million and US about 2-3 million (CITA). The mobile phone is used as a technology for poverty elevation because of affordability and choice for even low-income customers via SIM sharing and Micro-prepayment for rapid adoption, in an inexpensive way to serve large and remote rural areas compared to fixed line of telephone. Mobiles can be used for text, voice and a two way communication, and most easily available and ubiquitous communication device over a large area. The increase in mobile transaction in India by volume and value shows a transition in the way banking is done today. India is leading in the adoption of mobile banking mostly the youths with average age of mobile banking users being 30 (TNN, 2015). The recent note-ban effect has shown a change in the adoption behavior of the users in the banking system. Consumers involving adults has shown switch over to the usage pattern in basic wallet like paytm.

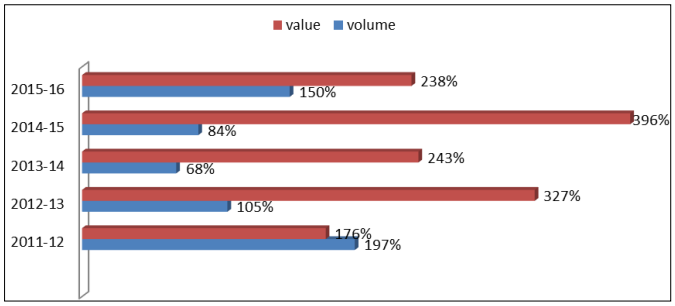

Fig 1: Mobile banking transactions in India

The direct benefits of Mobile phones boost the GDP growth of the economy. Vodofone (2005) reported that in a developing country the increase in 10 mobile phones per 100 people has boosted 6% growth in GDP. Apart from GDP benefit contribution, it creates job opportunities in this sector as well as productivity increase to meet the demand for mobile banking. GDP also leads to direct taxation revenue and many value added benefits from the service providers. Indirect

benefits such as information symmetry, transport substitution, market efficiencies can also be attained. Intangible benefits such as education and health and social network in reference to rural community can also be measured (Asheeta *et al*. 2008) [5]. M-banking also contributes towards cashless society by curbing black-money, corruption and loss due to theft of cash. However there is also the risk of e-fraud and illiteracy (Bihari, 2013) [5]. The Biometric authentication via smart card however ensures the penetration of cashless banking to rural areas by BCs in a more secured manner (Prasad, Swathi, 2012) [16]. Minimizing the cash mode of banking transactions will lead to greener society (Ashish, 2010) [6] M-commerce services launched in India by banks and service providers play a role of virtual banking for the rural needs too. Micro-finance facility by non-banks are not scalable and reliable. However such a technology plays instrumental role in national priority projects like NREGA (Amar, 2010) [3]. Mobile penetration is more than bank access which need to be improved. It was suggested that whoever make early adoption banks or telephone to render finance services can generate revenue through mobile money. Low cost feature, security of cash, convenient payment, promoting savings and borrowing, meeting lower income families expenses are the advantages of using mobile money. This also moves the target to unbanked consumers. (Christopher, Jom 2010)

Literature Review

1. **Rasheeda sultana, (2009)** [18]**,** This paper is conceptual approach to understand various models of mobile banking and examine regulatory factors in South-Asian countries and in the nations where it is practiced so as to speed up the adoption rate quickly and successfully. It was suggested that banks and mobile operators should frame a solution and encourage new entries in the field However the major challenge is security and trust forcing convergence of banks and telecommunication sector. It was suggested to propose a model on grounds of modern approach so as to contribute to economic growth and development and give scope for encouragement and reward the innovation strategy.
2. **Abdul Razak Munir, M.S.Idrus, A.Rahman Kadir, Jusni, (2013)** [1] - This paper aims to know the customer acceptance of m-banking services in Makassar, Indonesia and also the factors influencing customer adoption using TAM approach. SEM model was used to test the measurement model. 180 sample was selected using purposive sampling technique. The findings showed that perceived ease of use and perceived use are significant factors for intention to use m-banking. It was suggested that banks should give free training on the use of m-banking, communicate the benefits, and distribute m-banking manual online as well as offline to users.
3. **Ramdhony Dineshwar and Munien Steven, (2013)** [17]. The paper signifies the awareness level of m-banking in adoption stage by three famous banks and identify factors that inhibit m-banking usage in Mauritius. Only 169 respondents were considered valid out of 211 using survey made online based on convenience sampling method. From the study it was found that convenience, time and effort, savings, privacy, ubiquity, compatibility were the factors motivating for adoption of m-banking, perceived-risk, security and reliability obtained less scores indicating obstacles for adoption of m-banking. It was found that age, gender and salary except education is not associated with m-banking. TAM and IDT model along with risk and cost were used as constructs in the research.
4. **Shallone K.Chitungo, Simon Munongo, (2013)** [20]**,** In this paper The extended Tam constructs used as independent variable are perceived usefulness, perceived ease of use, social norms, perceived risk, relative advantages, personal innovativeness and cost. Behavioural intention was made as dependent variable. The findings showed that extended Tam (Tam and Tpb) can predict consumer intention to use mobile banking especially perceived usefulness, perceived ease of use, relative advantages, personal innovativeness and social norms have significant effect on user's attitude to adopt mobile banking. One of the limitation of study is that only students were considered and results were derived from snapshot survey data wherein there is a need for longitudinal study as per the author.
5. **Bong - Keun Jeong, Tom E Yoon, (2013)** [10]**,** This paper investigates the factors affecting mobile banking adoption based on extended TAM. The variables are perceived usefulness, perceived ease of use, perceived credibility, perceived self-efficiency and perceived financial cost. 165 respondents were taken for the study in Singapore with 38.1 percent response rate. Perceived usefulness and security and privacy issues are found to be significant in M-banking intention to use for both users and non-users. Perceived ease of use and self -efficacy is significant for users. Longitudinal study is recommended. Only specific user group was studied which is another limitation of the study.

Statement of the problem

Lot of features like convenience, time -saving, transaction alert, savings in cost will improve mobile banking significantly while network issues hinders the effective implementation of mobile banking (Adewoye, 2013) [2]. In countries like Kenya and Africa, social and cultural factors act as mediators unlike demographic factors which has promoted mobile payment solution firstly by telcos (Jonathan, 2007) [14]. The study of adoption behavior by using various models throws light on what favours or hinders m-banking usage. The TAM variables PU and PEOU variables are important for adoption of mobile banking (Abdul, Idrus, Rahman, 2013) [1]. Extended TAM with PU variable and security/privacy issues is significant for users and non-users of m-banking. PEOU and self-efficacy are significant for users of M-banking (Bong, Tom 2013) [10]. Customers adopt m-banking if they believe that it is useful and find that there is less risk in financial transaction to adopt the innovative technology. People with trust and self-efficacy will be the early adopters in M-banking (Xin Luo *et al.*, 2010) [21]. With Tam model as the basis for the study, it is important to know the significant variables that influence behavior of user in mobile banking.

Need of the study

A number of studies have shown the adoption of Tam model

to assess the technology acceptance by the mobile banking users and the variables that influence mobile banking usage. Hence Tam model variables namely perceived use and perceived ease of use was adopted for the study along with other variables like perceived cost, perceived risk, security issues and trust factor, which were found to be important in mobile banking usage from the literature review.

Scope of the study

The study will contribute to the existing knowledge on customer perception about adoption in mobile banking in Karnataka region. Being a land of various banks it is important to develop an alternative delivery via mobile so as to cut cost and improve banking efficiency. The innovation in mobile technology will further give a richer experience to user and thus contribute to greater convenience and ease in financial transactions.

Objectives of the study

- To measure the identified factors which influence the perception of customers in usage of mobile banking.
- To evaluate the mobile banking components for various region.

Hypothesis of the study

H_{01}: Perceived factors do not have a significant influence on usage of mobile banking.

H_{02}: Region has no significant impact on the various factors in the adoption of m-banking

Research methodology

In this research the investigation is about the adoption, consumer behaviour, perceptions and satisfaction about the services offered through mobile technology-enabled banking services, the study is confined to the state of Karnataka in India. A metro banked centre (Bangalore city-the only metro city in Karnataka) and two randomly selected, urban banked centres (Mysuru and Belgavi cities) were the geographical limits of the study. 306 sample was obtained in the study analytics with response rate of 64%. Out of 306 samples, 106 were from the metro banked centre and 100 were from the each of the urban banked centres. Overall customer satisfaction level with the bank was measured using a five point Likert scale with 5 points equal to strongly agree ranging to 1 point equal to strongly disagree.

A construct is an image or abstract idea specifically invented for a given research. The constructs for the questionnaire was built using the basic TAM model with extended variables.

The primary data collected from the respondents were tabulated and analysed using the Statistical Package for Social Sciences (SPSS. 20). Frequency distribution and correlation analysis was made. Further Anova was used for testing the variables.

Results and discussion

Table 1: Demographic profile of the study

		Frequency	Percent
Region	Bengaluru	106	34.7
	Belagavi	100	32.7
	Mysuru	100	32.6
Gender	Male	249	81.4
	Female	57	18.6
Age	18-30	222	72.7
	31-45	64	20.9
	>46	19	6.3
Education	Illiterate	1	.2
	High school	6	1.9
	Intermediate	13	4.2
	Degree	177	57.7
	Masters Degree	101	33.1
	Others	8	2.8
Marital Status	Married	105	34.2
	Single	201	65.8
Occupation	Employee	119	38.8
	Business	45	14.6
	Profession	31	10.0
	Student	108	35.5
	Others	4	1.2
Monthly Income	<20,000	146	47.9
	21,000-40,000	101	33.2
	41,000-80,000	43	14.2
	>80,000	14	4.7
Type of Bank	Public	181	59.1
	Private	125	40.9

The above shows the respondents surveyed, 34.7% were from Bengaluru. The respondents from Belagavi and Mysuru constituted 32.7% of the sample. Males constituted the vast majority of the sample (at 81.4%) rest constitute the Females. The respondents from the age group 18-30 years constituted the vast majority of the sample at 72.7%. Those from the age group 31-45 years are the majority from the sample constituting 20.9 %. The degree holder respondents constituted majority of the sample at 57.7%. The 'single' respondents constituted majority of the sample (at 65.8%). Employees constituted the single largest category at (38.8%) of respondents. The respondents earning less than Rs. 20,000 per month constituted the majority of the sample at (47.9%). The respondents from public banks constituted the majority of the sample at (59.1%). Respondents from private banks constituted the remaining 40.9% of the sample.

Measuring the perception with regard to the usage of mobile banking services in commercial banks

An analysis of the above table brings out that 'Perceived Usefulness' achieved the highest mean score while the 'Perceived Risk' achieved the least mean score. Probably for this reason there is slow adoption of m-banking.

Correlations - various mobile banking factor

Table 2

	Perceived Usefulness	Perceived Ease	Perceived cost	Perceived Risk	Security	Reliability /Trust	Using Mobile Device for various services
Perceived Usefulness	1.00						
Perceived Ease	.556**	1.00					
Perceived cost	.512**	.429**	1.00				
Perceived Risk	-.001	-.054	-.013	1.00			
Security	.415**	.370**	.308**	-.049	1.00		
Reliability /Trust	.466**	.412**	.368**	-086	.567**	1.00	
Using Mobile Device for Various Services	.366**	.317**	.301**	-.137	.352**	.376**	1.00

**. Correlation is significant at the 0.01 level (1-tailed)

From the correlation analysis it is observed that when risk exists there is no relation with the other variables which influence the usage of mobile banking transactions. It can be analysed that the respondents are not risk takers.

Table 3: Reliability

	Cronbach's Alpha	N of items
Perceived Cost	0.844	7.00
Perceived Ease of Use	0.798	3.00
Perceived Risk	0.680	2.00
Perceived Usefulness	0.751	5.00
Security	0.675	5.00
Trust	0.855	5.00
Usage of Mobile Applications	0.757	8.00

An analysis of the above table shows that there exists good reliability of the sample.

Major findings of the study

1. The profile of customers details from Bengaluru are majority with Males dominating the sample population mostly with youngsters. The major population is educated with degree qualification and is unmarried. The single large categorized people are employees with income composition of less than 40,000 with more than 50% from public sector banks.
2. From the correlation analysis it is observed that when risk exists there is no relation with the other variables which influence the usage of mobile banking transactions. It can be analysed that the respondents are not risk takers.
3. From the result, to test whether age has a significant difference with the mobile banking parameter, it is observed that age group do not influences the factors of mobile banking usage in terms of usefulness, cost, trust, using mobile device for various service. It is also observed that the age group will influence for perceived ease, risk and security in mobile banking usage. The sample respondents based on the age group, it was observed that 18 to 30 years greatly influence the variables influencing the mobile banking usage than other age groups. Finally, it can be inferred that age will influence the mobile banking usage.
4. On Examination of the relationship between usage of mobile banking parameter and occupation revealed that, the occupation will not influence the perceived usefulness, perceived ease, perceived cost, perceived risk, security, perceived trust and usage of mobile device factors. It is observed from the sample that employees followed by students prefer m-banking. As per the sample response the business people find it riskier. Finally, it is inferred that occupation will not influence the mobile banking usage.
5. The study reveals that, perceived use, ease of use, cost, risk, security, trust and using mobile device for banking functions are not significantly related to each other with regard to usage of mobile device. However, perceived ease will lead to perceived usefulness.

Recommendations

In the light of outcome of the research work involving the process of testing the hypothesis, the following recommendation has been taken place.

The current research work clearly indicates that there are certain factors of TAM model are important for adoption of mobile banking i.e., perceived use, perceived ease of use, perceived cost, security and trust. It is further suggested to develop security as an important parameter to decide the success of mobile banking services. Security in turn enhances trust in the mobile banking model. The RBI has also come up with supervisory actions to handle security and cyber fraud. Apart from this to combat risk in mobile banking, launch of central fraud registry holding 13 year database of various fraud that took place is maintained so as to give an idea for banks to take operational decisions. Similarly Large value banking frauds Committee were also set up comprising of the FINMIN, department of financial services including investigating agencies.

There is a surge in smart phones in recent months because of also of the banks who insist the retail customers to go for mobile banking for their financial transactions. There was a 46% growth in mobile banking transaction totaled to 49029 crore in December. There was a surge of 82% between Septembers to December along with the growth in retail mobile transactions. This is because of the increase in the adoption of smart phones across the country. (mint, dec.2015). There is a record of 112.34 million subscribers as on 30th June 2016 for wireless broad band service providers among top five companies such as Bharti Airtel, Vodafone, Idea Cellular, Reliance communication and BSNL (TRAI). They contribute to 84.38% of the total market share. The recent launch of smart phone feature by Reliance as less than Rs.1500 is another motivation consumers including rural people to explore m-banking features.

Conclusion

The faster new age technologies like 4G and competitive prices of the new smart phones with as less as Rs.5000 will add to flexibility in varied fields including banking sector. The socio-political influence for digitalized India and National telecom new policy (for more than 2 Mbps) will lead to higher network quality. Under the broad band /Wi-Fi facility access for 100 railway station in 2016 and increase this to another 400 by 2017, the same plan to make other areas as free zones can bring more digital participation. The 100 smart cities plan in India would call for more investment in technology based industries which will lead to digital empowerment by citizens. Make in India plan similar to China will bring down the electronic value like smart devices, dongles and routers/access points. This will lead to high affordability and adoption of brand service. The optic fibre connection to around 2 million gram panchayat covering nearly 80000 kms will lead to digital infrastructure and in turn lead to financial inclusion and economic growth. According to Inclusive Finance India report, 2016 at the global inclusive finance India Summit reveals that areas where traditional branch model has failed to rapidly scale up there is a sharp increase in the branchless mode outlets in villages from 34,316 in year 2010 to 5,34,477 in year 2016. The explosion of mobile banking transactions has aimed to deepen the engagement of PAN India population. This staggering improvement in the banking infrastructure can be foreseen both in rural and urban areas. All this will lead to probably, to a mobile (moving) India, synching for progress.

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