

Consumers' Behaviour With Respect To Adoption of M-Banking Services in Tamilnadu

Deepa Damodaran, N. Sambandam

Abstract: *Advancement in technology created lots of challenges for banking services providers; nature to buy and sell has changed dramatically. Use of smart phones is the latest channel to perform banking activities. This article focused to study the adopters and diffusion of m-banking services in Tamil Nadu. Results provide an insight about attributes of customers of m-banking and to have effectiveness in segmentation process. The purpose is to identify a different factor that affects m-banking services adoption behaviour of consumers within Tamil Nadu. A survey on 250 customers using banking services was conducted within Chennai city of Tamil Nadu. Literature was reviewed to develop hypothesis. Study advised the banks to pay more attention towards parameters such as PU, SI, SE, CMPTBLT, RA, and RISK while designing strategies for m-banking services.*

Index Terms: *Intention, Adoption, Innovation Adoption, Mobile Banking, Satisfaction, Technology.*

I. INTRODUCTION

Stiff competition within the BFI sector has forced the players to develop strategies to overcome competition level and to survive within this environment [1]-[3]. Need is to develop, adopt innovative technologies and to transform their business operations to web-based by adding element of mobility. Mobile based banking activities ushered a new era within banking sector across the globe [4], leaving with the banks as their only survival strategy.

Despite of the fact that m-banking extends numerous advantages to users, the adoption process is not exciting [4]-[6]. The success is decided how user uses m-banking services in daily activities [7], [8]. Lot of studies were conducted to explore various factors that effects consumers' to accept m-banking [1], [3], [9]-[12]. However, findings remained fragmented. No relation identified between different factors that effect IN in adoption m-banking services offered by banks [6], [13].

A. Objectives of Research

Very first objective is to measure the effect of PEOU, PU, SE, FC, RA, SI, CMPTBLT, COMPLX, TRIAL, AWNS and RISK on consumers' IN towards adopting m-banking services. Secondly, to measure the impact of IN on USE of

mobile based banking services. Lastly, to measure the impact of demographic profile on IN to adopt m-banking services.

II. LITERATURE REVIEW

A.M-banking

In present scenario, almost all of the banks are now busy in providing their product mix and services mix electronically that reduces the use of traditional practices followed from decades. Customers' likelihood towards smart phones also provided a new channel of marketing in the hand of banking industry. More and more banking activities are now technology driven creating a need to identify and understand competition within the industry. Technological developments have given a new dimension to concepts of services marketing [14]. Using the term 'electronic banking' means making the information related to services and product offerings available to users via electronic or wireless channels [15]. It is necessary to quote at this point that though the technology based applications that expediate the users to perform banking services are available, but the fact is that the USE (usage rate) within India and across the globe is too low. Even the financial institutions of developed nations offered mobile based banking services to their users, very recently. Hence, m-banking services are still in infancy stage [16], [17]. Technology based m-banking blessed customers and banks with number of advantages. Banks are able to reduce down the cost and time of serving their users; whereas, provided convenience of place and time to conduct transactions resulting in quality service delivery [1]-[3], [8], [18]. However, these benefits will get applause if m-banking are adopted by every single user using banking services [6]-[8], [10], [13].

B.M-banking Scenario in India

Recent telecommunication developments is considered as genesis of m-banking and given a channel in hands of shoppers to transact [19]. M-Banking may also be considered to be as m-commerce where users carry bank with them and enjoy all the services over it phone with the help of mobile applications, economically. This also helps in increasing customer's satisfaction and thus leading to loyalty [20].

Indian users does not believe in taking risks especially when it is related to monetary aspects, therefore banks need to ensure security of customer's money. Quick technological developments have re-drafted all the processes of providing services, which finally become the backbone of economic growth. Banking sector also admires the effect of technology

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* Correspondence Author

Deepa Damodaran*, Assistant Professor, VIT Business School, VIT University, Chennai Campus, Tamil Nadu, India,

N Sambandam, Pro Vice Chancellor, VIT Business School, VIT University, Chennai Campus, Tamil Nadu, India.

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advancement over its functioning and customer's-centric activities that can be easily amended because of information technology. Technological developments not only assisted banks in extending their offerings to customers such as ATM, Internet Banking, and M-Banking etc., but drawn their attention towards customization also. Replacement of plastic money over conventional note is the result of such technological advancement [21].

Growth of Indian Economy in recent years is the result of liberalization in 1991 that also leads to transform banking sector in a great way [22]. The government has taken corrective measures resulting the growth in monetary sector. Indian banking discovered vital reforms in recent times with a focus around profit, minimum investment and maximizing the value and satisfaction of the client. In spite of all these happenings, one area of concern is left behind i.e. long waiting queues within banks. Therefore, mobile banking could be the answer to this issue [23], [24] as customers can perform different banking activities without actually moving to the banks, physically [25].

There exists a direct relationship between the use of new technology and bank's performance. Therefore, it is said that technology plays an important role in elevating quality of banking services, however, Indians believe to have face to face contact with the personnels of service provider which is not available in technology based services [26]. Therefore it is required to identify those factors that effects customers' to adopt technology based services i.e. m-banking in India and how customers react to it after adopting the same [27], [28].

India enjoys second largest mobile user base of the world which accounts to be 10% of total global users. Approximately, 983.21MM customers' are mobile users, out of which 57.69% represents urban area and remaining 42.31% represents rural areas of India (Table 1).

Table 1: Telecom Users in India.

Particular	Wireless	Wire line	Total
Telephone Subscribers (in Million)	1,009.46	25.72	1,035.18
Urban Telephone Subscribers (in Million)	577.84	21.08	598.92
Rural Telephone Subscribers (in Million)	431.61	4.64	436.26
Tele-Density (Overall)	79.78	2.03	81.82
Urban Tele-Density	146.89	5.36	152.25
Rural Tele-Density	49.51	0.53	50.04
Share of Urban Subscribers (%)	57.24%	81.94%	57.86%
Share of Rural Subscribers (%)	42.76%	18.06%	42.14%
Broadband Subscribers (in Million)	115.11	16.38	131.49

Sources: TRAI, 30th November, 2015,
<http://censusindia.gov.in/>.

In India, ICICI bank and Union bank must be praised for introducing the concept of m-banking [29]. Presently, banks are targeting to the segment of users who might not have access to computer but have a mobile phone. Introduction of idea 'Digital India' developed the prospects for m-banking growth in India. Security, privacy, quick changing technology and lack of information are creating problems in the way of m-banking revolution in India [30].

C. Diffusion of Mobile Based Banking Services

The term diffusion is defined as time taken by any society as whole or by its some segment, in accepting a new idea, a

particular behaviour or an innovation [31]. Bass Diffusion Model focus on dissemination of message over different channels of communication and how it influences the adoption process [32]. Diffusion research categorized the users as 'innovators', followed by 'early adapters', 'early majority', 'late majority' and finally as 'laggards' considering the demographic, cultural, socio-economic variables [33].

It is required to study the behaviour of mature customers towards internet adoption [15] to identify the attributes that tends the users to behave differently from each other. Research submitted that attributes of innovation are the major cause of such difference [31]. Attributes such as advantage, complexity, trail, risk, observability were identified as the major characteristics that evaluated the innovation [34], [35], but the value added by mobility attribute extended the freedom to the users. Conclusions can be drawn from the survey that in near future, the customers will attach more weight-age to mobility aspect because of technology advancement, which forcefully will draw attention of telecom players towards improving wireless connectivity helping bankers to gain edge over competitor's w.r.t. banking activities and services offered to customers.

Bass Diffusion Model is based on the assumption that potential users are influenced either by media (external influence) or by word of mouth publicity (internal influence), where the impact of latter is more when compared with former one. Conversely, users who adopt any innovation under the influence of media remain constant over time; whereas, the users who adopt any innovation based on word of mouth publicity keeps on increasing rapidly for a certain period before the decline begins. This scenario can be illustrated by using S-shaped diffusion curve as shown in Fig.1. Model also presumes the adoption rate to be symmetrical initially when compared with remaining one [31]. This concludes that every user differs from others.

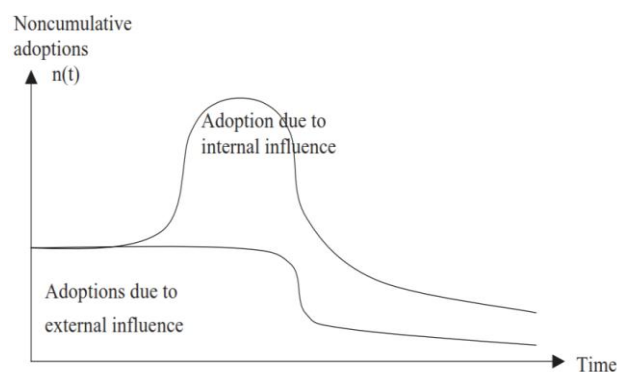


Fig.1: Adoption due to Influence (External and Internal) over a period in Bass Diffusion Model

Sources: Mahajan et al, 1990 [33].

III. FACTORS INFLUENCE M-BANKING SERVICES ADOPTION PROCESS & HYPOTHESIS DEVELOPMENT

PU is defined as user belief that adopting an innovation would improve job performance [1], [10], [11]. It was found that PU influence IN [6]. PU was found to completely influence the IN [5], [11]. Thus, hypothesis is:

H1: Relationship between PU on IN is positive.

PEOU is defined as user belief that adopting an innovation would free from effort [3], [11]. It was found that PEOU have a positive impact on IN [11]. Thus, hypothesis is:

H2: Degree of PEOU on IN is direct in nature.

SE is defined as user's confidence level in using an innovation [2]. It is defined as individual ability to use innovation to complete a particular task [36]. The higher the degree of SE, the additional probably is associate degree innovation to be adopted [3]. Thus, hypothesis is:

H3: Degree of SE on IN is direct in nature.

SI refers to change in users behaviour as a result of interaction with another individual and believes that the individual would approve the sure behaviour [2], [37]. Thus, hypothesis is:

H4: Impact of SI on IN is positive.

FC refers to user assessment w.r.t. the availability of structural and technical infrastructure exists to deploy Innovation [36]. FC increases the adoption possibility of innovation. If a condition remains favourable, probability that customers can adopt an innovation is high. Thus, hypothesis is:

H5: More the FC, more be the IN.

RA refers to customers assessment about innovation is high than its precursor [36]. Users weight an innovation high over its precursor. Another probability is the users will simply accept the innovation [6], [36]. Thus, hypothesis is:

H6: Impact of RA on IN is positive.

CMPLX describes the extent to that people understand that employing an explicit technology or system is troublesome [6], [36]. When customers understand that associate degree innovation is tough to use, they're unlikely to adopt it [31]. Thus, hypothesis is:

H7: Impact of CMPLX on IN is negative.

CMPTBLT is defined as compatibility of product / services w.r.t user's value system, lifestyle, desires and experiences [2], [37], [38]. Compatibility found to influence the IN to use m-banking [11]. It was acknowledged that associate degree of innovation that's compatible with associate degree of individual fashion will be adopted quicker (probably) than that of not compatible [38]. Thus, hypothesis is:

H8: Impact of CMPTBLT on IN is direct in nature.

The extent to that a user perceives to try a innovation termed TRIAL. Innovations which are tested before implementing have more chances to be adopted by the people who can't be tried or tested [38]. Thus, hypothesis is:

H9: More the TRIAL, higher the IN.

RISK worries with the chance that one thing can happen and therefore the consequences of the end result square measure sometimes undesirable once it happens [8]. It is usually in agreement that RISK considerably influences the adoption of innovation [8], [37], [39]. RISK have negative

influence on IN to use m-banking [11]. Thus, hypothesis is:

H10: Effect of RISK on IN is negative.

AWNS describe user knowledge on innovation. AWNS will result in the adoption of innovation and reduces the uncertainty related to it [40]. Thus, hypothesis is:

H11: Impact of AWNS on IN is positive.

Perceived ease of use has a positive impact on perceived utility [41] that influences the adoption of m-banking [12]. Thus, hypothesis is:

H12: Impact of PEOU on PU is positive.

It was found that SE features a positive impact on PEOU within the adoption of m-banking [12], [41]. Thus, hypothesis is:

H13: Impact of SE on PEOU is positive.

It had been found that IN features a positive influence on USE behaviour [36]. Thus, hypothesis is:

H14: Impact of IN on USE is positive.

Demographic factors play a significant role in promoting any product / services and significantly influences the shoppers behaviour leading to create sub-segments within existing market [42], [43]. Demographic factors also effect adoption process of innovations. Gender and Education level have insignificant impact on the adoption of m-banking [2], [44]. There exists a positive relation between level of income and adoption of innovative merchandise [37]. However, customers with higher incomes were less probably to adopt m-banking [2]. Thus, hypothesis is:

H15a: There exists important distinction within the IN owing to gender.

H15b: There exists important distinction within the IN owing to age.

H15c: There exists important distinction within the IN owing to education.

H15d: There exists important distinction within the IN owing to financial gain.

IV. METHODOLOGY USED

A. Instrument Design (Questionnaire)

The instrument has fourteen sections: PEOU, PU, SE, FC, SI, RA, CMPTBLT, CMPLX, TRIAL, AWNS, USE, RISK, IN, and demographic factors. 7-point Likert scale was used whose extremes ranges from 'Strongly Disagree' to 'Strongly Agree'.

B. Sampling Design and Data Collection

Present study was conducted on 250 customers. Random sampling method was used on customers walked out of 5 banks located in Chennai of Tamil Nadu. Only 232 questionnaires found fit for analysis. Statistics are presented in Table-II.

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Table 2: Demographic Profile

Characteristics		Frequency	Percent (%)
Fertile	Male (M)	149	64.2
	Female (F)	83	35.8
Time of Life (in Years)	21–30 years	90	38.8
	31–40 years	106	45.7
	41–50 years	26	11.2
	>50 years	10	4.3
Education	High School	10	4.3
	Intermediate	10	4.3
	Graduation	90	38.8
	Post-Graduate	122	52.6
Income (In Rs. per Month)	5000or Less	38	16.4
	5001– 10000	32	13.8
	10,001– 20000	103	44.4
	20,001– 30000	28	12.1
	> 30000	31	13.4

Sources: Primary Data through Questionnaire

Table-II shows that the sample was majorly dominated by males. Majority of sample represents the age group between 21 - 40 years. Most of the respondents were at least graduates. Majority of respondent's earnings falls between Rs. 10,001 - 20,000.

V. ANALYSIS & RESULTS

Data validation was done to test hypotheses before using SEM.

Data Normality (DN): Results represents Gaussian distribution (data distribution is normal). Shapiro-Wilks statistics were insignificant ($p > 0.05$).

Convergent Validity (CV): Results recommend that CV was attained as value is less then 3. Individual item reliabilities were above then 0.5 and composite reliability coefficients is more then 0.7. Standardised factor loadings were significant ($p < 0.001$) and more then 0.6. Table-3 shows that item reliabilities and Table-4 shows that AVE for all the constructs were more than 0.5.

Table 3: Item Reliabilities

Construct	Item	Standerdised Factor Loadings	Individual Item Reliabilities	Composite Reliabilities
PU	PU1	.820***	.671	.949
	PU2	.854***	.730	
	PU3	.898***	.808	
	PU4	.801***	.643	
PEOU	PEOU1	.745***	.555	.946
	PEOU2	.802***	.640	
	PEOU3	.775***	.597	
	PEOU4	.886***	.787	
	PEOU5	.857***	.734	
SE	SE1	.740***	.548	.905
	SE2	.843***	.711	
	SE3	.815***	.664	
SI	S11	.746***	.555	.892
	S12	.696***	.520	

	S13	.907***	.824	
FC	FC1	.744***	.553	.946
	FC2	.889***	.790	
	FC3	.890***	.789	
	FC4	.862***	.739	
RA	RA1	.846***	.715	.958
	RA2	.941***	.885	
	RA3	.857***	.735	
	RA4	.846***	.716	
CMLPX	CMLPX1	.694***	.505	.843
	CMLPX2	.712***	.509	
	CMLPX3	.612***	.501	
	CMLPX4	.660***	.551	
CMPTBL T	CMPTBLT 1	.840***	.704	.961
	CMPTBLT 2	.846***	.716	
	CMPTBLT 3	.926***	.856	
	CMPTBLT 4	.904***	.816	
	CMPTBLT 5	.774***	.602	
TRAIL	TRAIL1	.869***	.757	.960
	TRAIL2	.944***	.894	
	TRAIL3	.854***	.731	
	TRAIL4	.842***	.710	
RISK	RISK1	.729***	.532	.930
	RISK2	.827***	.682	
	RISK3	.924***	.852	
	RISK4	.756***	.571	
AWNS	AWNS1	.785***	.614	.933
	AWNS2	.922***	.850	
	AWNS3	.816***	.665	
I	I1	.910***	.828	.983
	I2	.924***	.853	
	I3	.947***	.894	
	I4	.945***	.893	
USE	USE1	.930***	.862	.885
	USE2	.717***	.518	

Sources: Data Analysis

Note: ***Significant at $p < 0.001$

Discriminant Validity (DV): Results showed that the DV was achieved.

Table 4: Mean (M), Standard Deviations (SD), AVE and SIC

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PU	5.763	1.348	.821												
2. PEOU	5.111	1.461	.411	.781											
3. SE	4.976	1.601	.222	.364	.764										
4. SI	4.273	1.746	.125	.101	.154	.744									
5. FC	5.084	1.631	.153	.145	.115	.049	.825								
6. RA	4.555	1.620	.225	.211	.103	.144	.116	.857							
7. CMLPX	3.957	1.690	.003	.012	.008	.002	.002	.002	.578						
8. CMPTBLT	4.917	1.608	.362	.349	.290	.211	.140	.320	.021	.841					
9. TRIAL	4.662	1.732	.038	.002	.002	.063	.123	.021	.052	.005	.864				
10. RISK	4.601	1.707	.008	.004	.003	.002	.002	.003	.113	.003	.010	.778			
11. AWNS	4.581	1.652	.113	.264	.404	.153	.014	.076	.002	.198	.003	.010	.817		
12. IN	5.252	1.526	.321	.237	.302	.265	.083	.268	.009	.337	.006	.007	.188	.927	
13. USE	4.404	2.035	.206	.318	.422	.167	.028	.141	.002	.024	.021	.002	.332	.424	.796

Sources: Data Analysis

Note: M=Mean,SD= Standard Deviation

Multicollinearity: Results shows that no multicollinearity issue exists within data.

Common Method Bias (CMB): Results showed 29.7% of variance in 1 factor which is less than $< 50\%$. Further, measurement model was compared against one-factor model and located that, former had a better fit than the later one.

Hypotheses Testing: For testing hypothesis H_1 to H_{14} , SEM was used as it display a good fit. Results are presented in Table 5.

Table 5: Test Result

Hypothesis	Path			Standard Estimates	Remarks
H_1	IN	<--	PU	.326***	H_1 is Positive
H_2	IN	<--	PEOU	-.084 ^{ns}	H_2 is Negative
H_3	IN	<--	SE	.263***	H_3 is Positive
H_4	IN	<--	SI	.220***	H_4 is Positive
H_5	IN	<--	FC	-.024 ^{ns}	H_5 is Negative
H_6	IN	<--	RA	.185**	H_6 is Positive
H_7	IN	<--	CMLPX	.002 ^{ns}	H_7 is Negative
H_8	IN	<--	CMPTBLT	.146 *	H_8 is Positive
H_9	IN	<--	TRIAL	-.024 ^{ns}	H_9 is Negative
H_{10}	IN	<--	RISK	-.116*	H_{10} is Positive
H_{11}	IN	<--	AWNS	.080 ^{ns}	H_{11} is Negative
H_{12}	PU	<--	PEOU	.641***	H_{12} is Positive
H_{13}	PEOU	<--	SE	.562***	H_{13} is Positive
H_{14}	USE	<--	IN	.881***	H_{14} is Positive

Sources: Data Analysis

Note: Standard Estimate = Standardised Estimate

*** denote significance at ($p < 0.001$)

** denote significance at ($p < 0.01$)

* denote significance at ($p < 0.05$)

ns denote in-significance at ($p > 0.05$)

Table-5 shows that $H_1, H_3, H_4, H_6, H_8, H_{10}, H_{12}, H_{13}, H_{14}$ is positive; whereas, $H_2, H_5, H_7, H_9, H_{11}$ is negative. Independent sample t-test was used to test hypothesis H_{15a} as shown in Table-6.

Table 6: Independent – Sample T-test Result

	Gender	Number	Mean	S.D.	t	d.f.
I	Female	83	5.23	1.43	-.197 ^{ns}	230
	Male	149	5.27	1.46		

Sources: Data Analysis

Note: M= Mean,t=TStatistic

To test hypothesis H_{15b}, H_{15c} and H_{15d} , one-way Anova is used as shown in Table-7. Results showed, age, income and education did not influence the IN w.r.t. adoption of mobile based banking services. Hence, H_{15b}, H_{15c} and H_{15d} were not supported.

Table 7: ANOVA Results on Age, Income, and Education

	Age	Mean	S.D.	F
B1	21–30 years	5.5	1.30	1.389 ^{ns}
	31–40 years	5.1	1.57	
	41–50 years	5.0	1.51	
	>50 years	5.1	.97	
Education				
B1	High School	4.3	1.65	1.759 ^{ns}
	Intermediate	5.5	1.34	
	Graduation	5.3	1.34	
	Post-Graduate	5.3	1.47	
Income				
B1	5000 or Less	5.1	1.47	.367 ^{ns}
	5001–10000	5.1	1.63	
	10,001–20000	5.3	1.45	
	20,001–30000	5.2	1.38	
	>30000	5.4	1.31	

Sources: Data Analysis

VI. CONCLUSION

The study is different from others in a manner that it test influence of different factors on m-banking services adoption in Chennai city of Tamil Nadu. The study found 5 attributes such as PU, SI, SE, CMPTBLT and RA have a positive relationship; whereas, RISK has a negative effect with IN. FC, PEOU, TRIAL, CMLPX, demographic factors and AWNS did not influence the IN towards adoption of m-banking. It is also identified that the effect of PEOU on PU and SE effect on PEOU is positive. Influence of IN found to be positively affecting the USE of m-banking services.



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Banks must work on RISK to reduce its effect on m-banking and must also ensure that customers perceive the utilities of services in the manner they want to extend it.

Present study was conducted in Chennai City of Tamil Nadu State. Therefore, recommendation is to conduct extensive research on other cities of India.

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