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A Structural Equation Modeling (SEM) Approach for Mobile Banking Adoption - A Strategy for Achieving Financial Inclusion

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ABSTRACT

Mobile Banking is one of the banking technologies that play an important role in financial strengthening especially in rural areas. Mobile Banking services is said to be a simple payment system designed for the customers for making banking transaction in transparent manner. This Paper has done an investigation on factors that determines the usage of Mobile Banking Services among the rural customers and has identified the significant relationship between the factors and intentional behavioral of rural customers towards mobile banking usage. This study has adopted Technology Acceptance Model (TAM) for constructing the theoretical framework. The findings from the study has displayed that attitude, Perceived Usefulness, Perceived Ease of Use, Trust and Perceived risk are the estimated variables for intentional behavior of rural customers towards accessing mobile banking services. The entire hypothesis between the constructs was supported through structural equation modeling.

Keywords*: Rural Customers, Mobile Banking, Financial Inclusion, Banking Technologies, Technological Acceptance Model.*

INTRODUCTION

Delivery of financial services to the rural people residing in unreached segments of the society at a very less affordable cost is termed as financial inclusion[1]. Accessing banking services by the poor people pays a very important role in stimulating a development for making a bank related financial transaction in an easier way. According Reserve Bank of India (RBI) 2015, the penetration of mobile phones has been increased to nearly 80% in India. Therefore it has been stated that banking services could be easily delivered even to the rural people at a very low cost through mobile banking technologies. And moreover through biometric identification security transactions could be done[2]. World Bank in 2014 has stated that financial needs of the people could be easily satisfied and achieved by the poor people mobile payment system in cost effective manner[3]. Therefore this study has done an investigation among the rural customers in the district of Thoothukudi towards the intention for accessing mobile banking services by adopting Technological Acceptance Model.

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OBJECTIVES

1. To examine the factors that determines the adoption of rural customers to use Mobile Banking Services.

2. To evaluate the association between the variables in the model using structural equation Modeling.

2.1. Factors Determining Adoption of Mobile Banking Services

2.1.1. Perceived Usefulness:

Perceived Usefulness is defined as the assumptions of the person that his or her work performance will be intensified by using a particular system[4]. The study has done an investigation on the effects of perceived usefulness towards the mediation effect of attitude of

customers for adopting Internet Banking services. The primary data for the study has been collected from 227 customers in Bangladesh. The findings of the study has highlighted that perceived Usefulness and attitude are positively correlated towards Internet Banking Usage among customers[5]. A Study has identified the factors that have a greater influence on bank customer's adoption towards Internet banking services in Rwanda, Kenya, Tanzania and Uganda. The study has involved nearly 137 respondents. The finding of the study has highlighted that Perceived Usefulness has positively influences the usage of Internet Banking services[6].

2.1.2. Perceived Ease of Use:

Perceived Ease of Use refers that the person or an individual believes that utilizing a specific system will be free of endeavors. Later it has been proclaimed that Perceived Ease of Use determines the degree to which the particular system will not difficult to learn, understand or to work[7]. A study has investigated the impact of perceived ease of use towards internet Banking Adoption through structural equation modeling. Perceived Ease of Use has a significant relationship on intention towards usage of Internet Banking Services among the customers in Tunisia[8]. A study has examined the factors that have a greater influence on Mobile Banking Services among Indian Customers. The study has came out with the findings that Perceived Ease of Use is one among the factors that has the positive impact towards the intention of Indian Customers for adopting Mobile banking services.[9]

2.1.3. Trust

Trust is referred to as the faith or presumption about other trusted group, an intentional behavior of a person or a readiness to relay on another group together with a perception of risk once if the trust is infringed[10]. A study has done an investigation on Adoption of Mobile Banking Services in Isfahanian. The primary data for the study has been gathered by circulating the questionnaire to nearly 310 respondents. The study has concluded with the findings by stating trust is said to be an influential factor which has a positive effect towards the behavioral attitude of customers for adopting mobile banking services[11]. The Researchers has done a study on user adoption on mobile banking services constructed on risk and trust perception. The study has done an adoption model with special reference to mobile banking services. The study has founded that there is a negative correlation between trust and mobile baking services adoption among the bank customers[12].

2.1.4. Perceived Risk

Perceived risk is defined as customer's perception of unpredictability and potential unfavorable outcomes of acquiring a product or services[13]. A study has done an examination on perceived risk and usability of a system on adopting mobile banking services. The study has developed a conceptual configuration to understand the service quality of mobile banking services. The study has dissolved that perceived risk is an important factor for improving the service quality of the mobile banking services[14]. Another study has made an analysis about the effect of perceived risk on online banking services. The result of the study has highlighted that perceived risk has a direct effect on internet banking services[15].

2.1.5. Theoretical Framework for the study

Figure [1] illustrates the structural equation modeling framework that determines the factors exploring the usage of Mobile Banking Services among the rural customers.

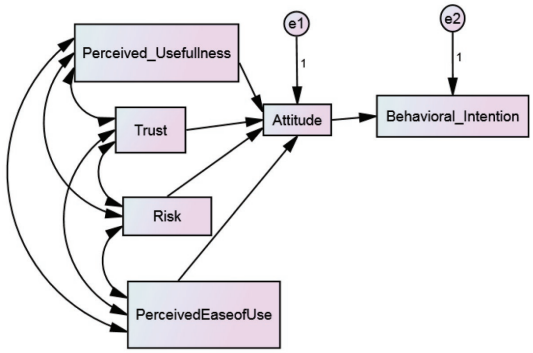

Figure [1]: The Proposed Model

2.1.6. Attitude

Attitude is defined as the negative and positive feelings of an individual about executing a selected behavior[16]. A Study has explored the factors that have influencing the adoption of Internet banking usage in Malaysia. The authors have investigated the attitude of customers and their intention towards accessing Internet banking services by the bank customers in Malaysia. The study has analyzed that perceived enjoyment is considered as an important factor that has a positive relationship towards the usage of Internet banking[17]. The paper has investigated the attitude of retail banking

customers in South Africa towards the usage of Internet banking services. The result of the study has revealed that there is a positive relationship between the factors involving the usage of internet banking services and the attitude of consumers[18].

2.1.7. Behavioral Intention towards Usage of Mobile Banking Services

According to the theory of planned behavioral intention is described as the forecaster of future behavior for a person or an individual towards the usage of a particular system[19]. The study has analyzed the factors that are affecting the usage of mobile banking services. The study has adopted two different theories for constructing a model such as theory of planned behavior and technological acceptance model. Nearly 165 questionnaires have been circulated to the randomly selected customers of Meli Bank. The researches have highlighted their findings in their study by stating that behavioral intention is positively affecting the usage of mobile banking services among the people[20].

RESEARCH METHOD

3.1. Sampling Techniques

Rural customer's perception towards mobile baking adoption has been studied using a structured questionnaire and the questions were taken from the literature review of various articles. The study consists of five dependent variable constructs namely Perceived Usefulness, Perceived Ease of Use, Trust, Risk and Attitude. There are totally 30 items were used in the study. The sample constitute of bank customers from rural areas of Thoothukudi District. The research study is descriptive in nature. The study has adopted simple random sampling techniques.

3.2. Data Collection

The Primary Data for this study has been collected from 300 bank customers in the rural areas of Thoothukudi District. The demographic summary of the respondents is shown in Table [1] .The questionnaire was circulated among the rural bank customers by randomly selecting a group of respondents. For analyzing the data Statistical Package of Social Sciences has been used.

Table [1]: Demographic Profile of the Respondents

Demographic Variables	Frequency	Percentage
Age Group		
18-25	24	8.0
26-30	52	17.3
31-35	91	30.3
40 Above	133	44.3
Gender		
Male	131	43.7
Female	169	56.3
Level of Education		
Illiterate	187	62.3
Secondary	96	32.0
Degree	17	5.7
Occupation		
Farmer	73	24.3
Job	27	9.0
Own Business	34	11.3
Land Labor	128	42.7
Others	38	12.7
Annual Income		
<25K	16	5.3
25K-50K	124	41.3
>50K	160	53.3

3.3.2. Data Analysis & Results

Hypothesis:

The relationship between the constructs has been shown in Table [2]

H1: Perceived Usefulness is positively associated with attitude – Accepted

H2: Perceived Ease of Use is positively associated with attitude – Accepted

H3: Trust is positively associated with Attitude – Accepted

H4: Risk is positively associated with Attitude – Accepted

H5: Attitude is positively associated with Behavioral Intention – Accepted

Table[2] shows that the Critical Ratio as high as 15.456 in absolute value lesser than 0.001 and also the shows that all the items were associated with the indicator of the constructs. The associations were also with only one construct.

Table [2]: Regression Weights

Dependent Variable		Independent Variable	Estimate	S.E.	C.R.	P
Attitude	<---	Perceived_Usefulness	0.238	0.043	5.532	***
Attitude	<---	PerceivedEaseofUse	0.190	0.071	2.654	***
Attitude	<---	Trust	0.434	0.061	7.065	***
Attitude	<---	Risk	0.266	0.055	4.870	***
Behavioral_Intention	<---	Attitude	0.558	0.036	15.456	***

For analyzing the collected primary data and to confirm the model fit Structural Equation Modeling (SEM) was used. Reliability test has been done to analyze the validity of the questionnaire and Cronbach's Alpha values are studied. The reliability value is 0.852.

Model Fit Assessment

Structural Equation Modeling (SEM) was used to analyze the collected primary data. Structural Equation Modeling (SEM) describes the casual relationship between the variables and confirms the fitness of the evaluated model. Importance has been given to the value of Chi-Square (CMIN/DF), Probability Value (P-Value), Comparative Fit index (CFI), Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI), Root mean square error of approximation (RMSEA) and RMR. From Table 3 it has been found that the P Value of Chi Square is 5.364 which are more than 0.05 and indicates the model fit. The Value of CFI, GFI, AGFI, NFI, IFI and TLI for this study is greater than 0.90 that represents the goodness of fit. And the value of RMR and RMSEA is lesser than 0.08 that designate the model fit.

Table 3: Model Fit Summary for Structural Equation Modeling

Fit Indices	Results	Suggested values
Chi-square	5.364	P-value >0.05
Chi-square/degree of freedom (x2/d.f.)	2.682	≤ 5.00 (Hair et al., 1998)
Comparative Fit index (CFI)	0.998	>0.90 (Hu and Bentler, 1999)
Goodness of Fit Index (GFI)	0.994	>0.90 (Hair et al. 2006)
Adjusted Goodness of Fit Index (AGFI)	0.938	> 0.90 (Daire et al., 2008)
Normated Fit Index (NFI)	0.996	≥ 0.90 (Hu and Bentler, 1999)
Incremental Fit Index (IFI)	0.998	Approaches 1
Tucker Lewis Index (TLI)	0.982	≥ 0.90 (Hair et al., 1998)
RMR	0.03	<0.08
Root mean square error of approximation (RMSEA)	0.075	< 0.08 (Hair et al., 2006)

The construct reliability and discriminant validity for each constructs were calculated through Cronbach's Alpha, by which construct reliability and average variance value has been extracted. Table [4] shows the construct reliability and Average variance for each construct. The factor loadings for each and every construct should be greater than or equal to 0.5, Composite Reliability should be greater than or equal to 0.7 and Average Variance Extracted (AVE) should be greater than or equal to 0.5[21].

Table 4: Factor Loading, Composite Reliability and AVE Values

Variable Name	Item	Factor Loading	AVE	CV
Perceived Usefulness	PU1	0.835	0.702	0.921
	PU2	0.836		
	PU3	0.843		
	PU4	0.839		
	PU5	0.838		
Perceived Ease of Use	PEOU1	0.854	0.713	0.868
	PEOU2	0.842		
	PEOU3	0.841		
	PEOU4	0.84		
	PEOU5	0.845		
Trust	T1	0.845	0.714	0.874
	T2	0.839		
	T3	0.844		
	T4	0.851		
	T5	0.848		
Perceived Risk	PR1	0.861	0.757	0.868
	PR2	0.862		
	PR3	0.872		
	PR4	0.879		
	PR5	0.878		
Attitude	A1	0.842	0.705	0.922
	A2	0.836		
	A3	0.836		
	A4	0.846		
	A5	0.84		
Behavioral_Intention	BI1	0.839	0.708	0.924
	BI2	0.837		
	BI3	0.839		
	BI4	0.842		
	BI5	0.852		

According to Bagozzi in 2007, Discriminant Validity estimates the extent to which an abstract and its indicators vary from another abstract and its indicators[22]. Hair, et.al in 2010 has stated that the correlations of any two items between the constructs should be lesser than the square root of Average Variance Extracted (AVE) values that was shared by its items within that construct. Thus Table [5] satisfies the discriminant validity of Hair, et.al (2010) and hence the measurement model has demonstrated the sufficient reliability and validity[23].

Table 5: Discriminant Validity

Construct	PU	T	PR	PEOU	A	BI
PU	0.838					
T	0.361	**0.845**				
PR	0.483	0.233	**0.870**			
PEOU	0.436	0.190	0.508	**0.844**		
A	0.529	0.465	0.450	0.446	**0.840**	
BI	0.524	0.440	0.339	0.458	0.746	**0.842**

DISCUSSION AND CONCLUSION

The study has revealed that all the four factors are significantly impacting behavioral intention of rural people using mobile banking services through mediating the attitude of rural customers. Theoretical model has proved TAM. The findings from the study displayed that attitude; Perceived Usefulness, Perceived Ease of Use, Trust and Perceived risk are the estimated variables for intentional behavior of rural customers towards accessing mobile banking services. The findings from the research have shown that the determined model has perfect fit. The entire hypothesis between the constructs was supported through structural equation modeling. Finally the study has explained the factors that affect the usage of mobile banking services for achieving financial inclusion.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not Required

REFERENCES

1. K C Chakrabarty: Financial inclusion of urban poor in India, The American India Foundation, New Delhi, 28 January 2013.
2. Reserve Bank of India, Report of the Committee on Medium-term Path on Financial Inclusion, 28 Dec 2015.
3. World Bank, Global Findex Database, 2014
4. Davis, F.D., 1989. Perceived usefulness, perceived ease of use and user acceptance of information technology. MIS Quarterly, 13: 319-340.
5. Nadim Jahangir and Noorjahan Begum, The role of perceived usefulness, perceived ease of use, security and privacy, and customer attitude to engender customer adaptation in the context of electronic banking, African Journal of Business Management Vol.2 (1), pp. 032-040, February, 2008.
6. Silvance O. Abeka, Perceived Usefulness, Ease of Use, Organizational and Bank Support As Determinants of Adoption of Internet Banking in East Africa, International Journal of Academic Research in Business and Social Sciences October 2012, Vol. 2, No. 10 ISSN: 2222-6990
7. Rogers EM (1962) Diffusion of Innovations (1st ed.): Free Press, New York, NY.
8. Wadie Nasri and Mohamed Zarai, EMPIRICAL ANALYSIS OF INTERNET BANKING ADOPTION IN TUNISIA, Asian Economic and Financial Review, 2014, 4(12): 1812-1825
9. Rahmath Safeena, et.al, Technology Adoption and Indian Consumers: Study on Mobile Banking, International Journal of Computer Theory and Engineering, Vol. 4, No. 6, December 2012.
10. Mayer, R. C., & Davis, J. H. (1999). The effect of the performance appraisal system on trust for management: A field quasi-experiment. Journal of Applied Psychology, 84, 123–136
11. Ali Kazemi, et.al, Factors Affecting Isfahanian Mobile Banking Adoption Based on the Decomposed Theory of Planned Behavior, International Journal of Academic Research in Business and Social Sciences July 2013, Vol. 3, No. 7 ISSN: 2222-6990
12. YAO Huili, et.al, A Study of User Adoption Factors of Mobile Banking Services Based on the Trust and Distrust Perspective, International Business and Management, Vol. 6, No. 2, 2013, pp. 9-14,
13. Lichtenstein, S. &. Williamson, K. 2006.

Understanding consumer adoption of Internet banking: An interpretive study in the Australian banking context. Journal of Electronic Commerce Research, 7 (2), 50-67.

14. Zhihong Li and Xue Bai, Influences of Perceived Risk and System Usability on the Adoption of Mobile Banking Service, Proceedings of the Third International Symposium on Computer Science and Computational Technology(ISCSCT '10) Jiaozuo, P. R. China, 14-15, August 2010, pp. 051-054
15. Fereshteh Farzianpour, CONSUMERS' PERCEIVED RISK AND ITS EFFECT ON ADOPTION OF ONLINE BANKING SERVICES, American Journal of Applied Sciences 11 (1): 47-56, 2014.
16. Fishbein, M. & Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.
17. Arunkumar , A study on attitude and intention towards Internet banking with reference to Malaysian consumers in klang valley region, The International Journal of Applied Management and Technology, Vol 6, Num 1,
18. D.K. Maduku, Predicting retail banking customers' attitude towards Internet banking services in South Africa, Southern African Business Review Volume 17 Number 3 2013.
19. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179–211.
20. Hossein Rezaie Dolat Abadi, et.al, Investigate the Customers' Behavioral Intention to Use Mobile Banking Based on TPB, TAM and Perceived Risk (A Case Study in Meli Bank), International Journal of Academic Research in Business and Social Sciences October 2012, Vol. 2, No. 10 ISSN: 2222-6990
21. Fornell C, Larcker DF. Structural equation models with unobservable variables and measurement error: Algebra and statistics. Journal of Marketing Research. 1981; 18(3):382–8.
22. Bagozzi, R. &Dabholar, P. (2000). Discursive psychology: an alternative conceptual foundation to the means-end chain theory, Psychology and Marketing, 17(7), 535-586.
23. Hair, J. F., Black, W. C., Basin, B. J. &erson, R. E. (2010). Multivariate data Analysis. (7thed.). New Jersey: Upper Saddle River, Pearson Prentice Hall.
24. Hu LT, Bentler PM (1999). Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives, Struct. Equ. Model. 6(1):1-55.
25. Daire H, Joseph C, Michael RM (2008). Structural Equation Modeling: Guidelines for Determining Model Fit. Electron. J. Bus. Res. Methods 6(1): 53-60.