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Adoption of Internet Banking Services in India: An Empirical Study

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Abstract- Understanding the adoption of a new technology is an essential process to determine its uses and future advancements. This study aims at investigating the adoption of such similar technology i.e., Internet Banking (IB). The study adapted the Technology Acceptance Model (TAM) and Perceived Web Security (PWS) construct to understand the adoption of IB services in India. Perceived Usefulness (PU) and Perceived Ease of Use (PEoU) are considered as the two main determinants to evaluate the Attitude towards Use (ATU) and Intention to Use (INTU) internet banking services. A well-designed questionnaire is used and 340 responses were collected to empirically test the hypothesized relations of the theoretical model developed. The relationship between the constructs are tested using Structural Equation Modelling. The extended model of TAM once again confirmed the role of PU and PEoU in affecting the attitude and intention to use IB services. All the hypothesis were significant except the effect of PWS on attitude towards use of IB services.

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I. Introduction

Technology across the globe creating wonders in every sector, from automobile to animation and from medicine to machinery. Internet is one such advancement of technology which has changed the landscape of few industries; banking is one among them. Internet banking brought a breakthrough changes in the operations of banking. Customer is now equipped with faster and simpler ways to perform their banking transactions like funds transfer, bill payments, electronic clearances etc.

According to metrics.com (2013), 72.5 million of the households are utilizing internet banking in the world and are very much loyal to the banks. The number of users of internet banking are increasing exponentially; this is due to the several advantages assigned with the online banking system. According to www.roymorgan.com (2015), 90.2% is the satisfaction level of internet banking and 88.4% is the satisfaction of branch banking. Generation Y are the main users of the new technology in banking.

Though there are many advantages of IB, the increase online fraudulent poses greater risk in using IB. BBC report confirms that online banking fraud is increasing and is up by 48% in the year 2014. This is one of the major concern for the banking customers in using IB.

The present study is aimed at investigating the adoption of IB in India. For the same purpose, the study adapts the widely accepted Technology Acceptance Model (TAM). Since web security is one of the main concern, we also included Perceived Web Security (PWS) as one of the construct in understanding the attitude and behavioral intention of the customers in adopting IB services.

II. Review of Literature

The present study would focus on the use of TAM to understand the behavioral intention of the customers to use internet banking services. Though a significant number of studies were conducted in the past related to understanding of customers' adoption of new technology using, relatively less number of studies used the extension of TAM (Cheng, Lam, & Yeung, 2006). Extension of TAM to study the adoption of internet banking services; especially in India are significantly less till date.

Technology Acceptance Model (TAM) by (Davis, 1989), which was based on the Theory of Reasoned Action (TRA) by (Ajzen & Fishbein, 1975), has proposed two important determinants to study the adoption of new technology(Legris, Ingham, & Collerette, 2003). The model has been widely used in various contexts to study the behavioral intention.

According to (Davis, 1989, p. 3), Perceived Usefulness (PU) is "the degree to which a person believes that using a particular system would enhance his or her job performance'' and in contrast, Perceived Ease of Use (PEoU) is defined as "the degree to which a person believes that using a particular system would be free of effort." "An attitude is an individual's self-description of his affinities for and aversions to some identifiable aspects of his environment" (Greenwald, Brock, & Ostrom, 2013).

TAM has been extended in various researches to study the effect of other determinants in understanding customer behavior in different context. In the present study context i.e., Internet Banking (IB), apart from the Perceived Usefulness and Perceived Ease of Use, Perceived web security (PWS) is considered as one of the important determinant effecting the adoption. As many a customers expressed

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their concern towards security as one of the major factor in using online transactions (Salisbury, Pearson, Pearson, & Miller, 2001).

Hence the present study, considers PWS as an important predictor of intention and attitude towards use of internet banking. The study adapts the four items of PWS developed by (Salisbury et al., 2001) earlier in their study.

III. Objectives

The main objective of the study is to investigate the behavioral intension of the customers to use Internet banking services in relation with the perceived ease of use of services, usefulness of the internet banking services, attitude and the perceived web security towards the IB services.

- To study the effect of Perceived Usefulness on the attitude towards IB services and the Intension to use the services.
- To study the Perceived Ease of Use of Internet Banking services and its effect on attitude and intension of customers to use IB services.
- To study the Perceived Web Security of the customers towards their intension to use the IB services.

IV. Methodology

The study adapts a descriptive and causal research methodology to test the relationship between the TAM constructs in the adoption of IB services. To test the formulated hypotheses, the data is collected using a structured questionnaire; designed by adapting the developed scales. Perceived Usefulness (PU), Perceived Ease of Use (PEoU) and Attitude towards Use (ATU) were measured by adapting the original items developed by (Davis, 1989). These have also been used by (Bhattacherjee, 2000; Davis, Bagozzi, & Warshaw, 1989; Taylor & Todd, 1995). Intention to Use (INTU) construct items have been adapted from (Bhattacherjee, 2000; Mathieson, 1991).

The items related to Perceived Web Security (PWS) has been adapted from the scale developed by (Sathye, 1999). A five-point Likert scale is used; 1 representing "Strongly Disagree" and 5 representing "Strongly Agree".

The data is collected from students, scholars and employees of a university. A total of 400 questionnaire were distributed, out of which 362 were received and finally 340 responses were considered after eliminating the incomplete questionnaire.

V. Hypothesis

The study is using TAM as the base model for the study. Further based on the theoretical model developed and the objectives of the study, the hypotheses to be tested are:

H1a: Perceived Usefulness (PU) has a direct positive effect on Attitude towards Use (ATU) of Internet Banking (IB) services.

H1b: Perceived Usefulness (PU) has a direct positive effect on Intention to Use (INTU) of Internet Banking (IB) services.

H2a: Perceived Ease of Use (PEoU) has a direct positive effect on Attitude towards Use (ATU) of Internet Banking (IB) services.

H2b: Perceived Ease of Use (PEoU) has a direct positive effect on Perceived Usefulness (PU) of Internet Banking (IB) services.

H3a: Perceived Web Security (PWS) has a direct positive effect on Attitude towards Use (ATU) of Internet Banking (IB) services.

H3b: Perceived Web Security (PWS) has a direct positive effect on Intention to Use (INTU) of Internet Banking (IB) services.

H4: Attitude towards Use (ATU) has a direct positive effect on Intention to Use (INTU) of Internet Banking (IB) services.

VI. Results

Demographics characteristics of the respondents is analyzed; Of the 340 respondents, 55% are male and 45% are female. 33% are between 20-30 years of age group, 38% are between 31-40 years, 20% are between 41-50 years and 9% are above 50 years of age.

Reliability and validity of the measures have been assessed before the actual testing of the hypotheses is done. All the values are adhering to the prescribed standards; and are shown in Table 1. Cronbach's alpha values for the measures are above 0.7 as per Nunnally (1991).

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Table 1: Reliability and Validity measures for the constructs

	Cronbach's Alpha	CR	AVE	MSV	ASV	PWS	PEOU	ATU	PU	INTU
PWS	0.932	0.932	0.774	0.024	0.012	0.880				
PEOU	0.956	0.958	0.850	0.361	0.110	0.155	0.922			
ATU	0.953	0.954	0.838	0.035	0.019	0.049	0.186	0.915		
PU	0.947	0.948	0.822	0.023	0.017	0.076	0.145	0.151	0.907	
INTU	0.968	0.970	0.915	0.361	0.103	0.123	0.601	0.132	0.138	0.957

Discriminant and Convergent validity measures of the constructs are also satisfying the standards prescribed by (Fornell & Larcker, 1981). These values for the constructs are presented in Table 1. Confirmatory Factor Analysis (CFA) was done for the sample and the results are very much in accordance with the required standard values. Model fit values for the same are shown in Table 2.

Table 2: CFA model fit statistics

Fit Statistic	Recommended	Obtained
Chi-square		289.984
df		142
CMIN/DF(Wheaton, Muthen, Alwin, & Summers, 1977)	<5.0	2.042
Chi-square significance	P<=0.05	0.000
GFI(JOreskog & Sorbom, 1988)	>0.90	.918
NFI(Bentler & Bonett, 1980)	>0.90	.962
TLI(Hu & Bentler, 1999)	>0.90	.976
CFI(Bentler, 1990)	>0.90	.980
RMSEA(MacCallum, Browne, & Sugawara, 1996)	<.05	.055

The structural model is tested using SPSS AMOS 20.0. The Chi-square value of the model is 426.516 at 144 degrees of freedom and is significant at $P < 0.05$. Other fit indices like CFI, TLI, NFI and GFI also are well within the minimum acceptance levels i.e. > 0.90. The model fit statistics are presented in Table 3.

The relationship between the constructs is tested using the path model and the results are shown in the Figure 1. All the hypotheses H1a, H1b, H2a, H2b, H3b and H4 are supported, except the hypothesis H3a. According to the results all the hypothesized relations have a direct positive effect, however the Perceived Web Security (PWS) does not have a direct significant effect on Attitude towards Use (ATU).

Hypothesis H3a is not significant is very much in line with the results of Cheng et al. (2006). As supported by (Moore & Benbasat, 1991), Attitude towards use of IT can be synthesized from the characteristics perceived of innovation (Cheng et al., 2006; Rogers, 1995). However, the hypothesis H3b is significant i.e., PWS has a positive direct effect on Intention to use, which is a powerful predictor of user behavior (Davis et al., 1989).

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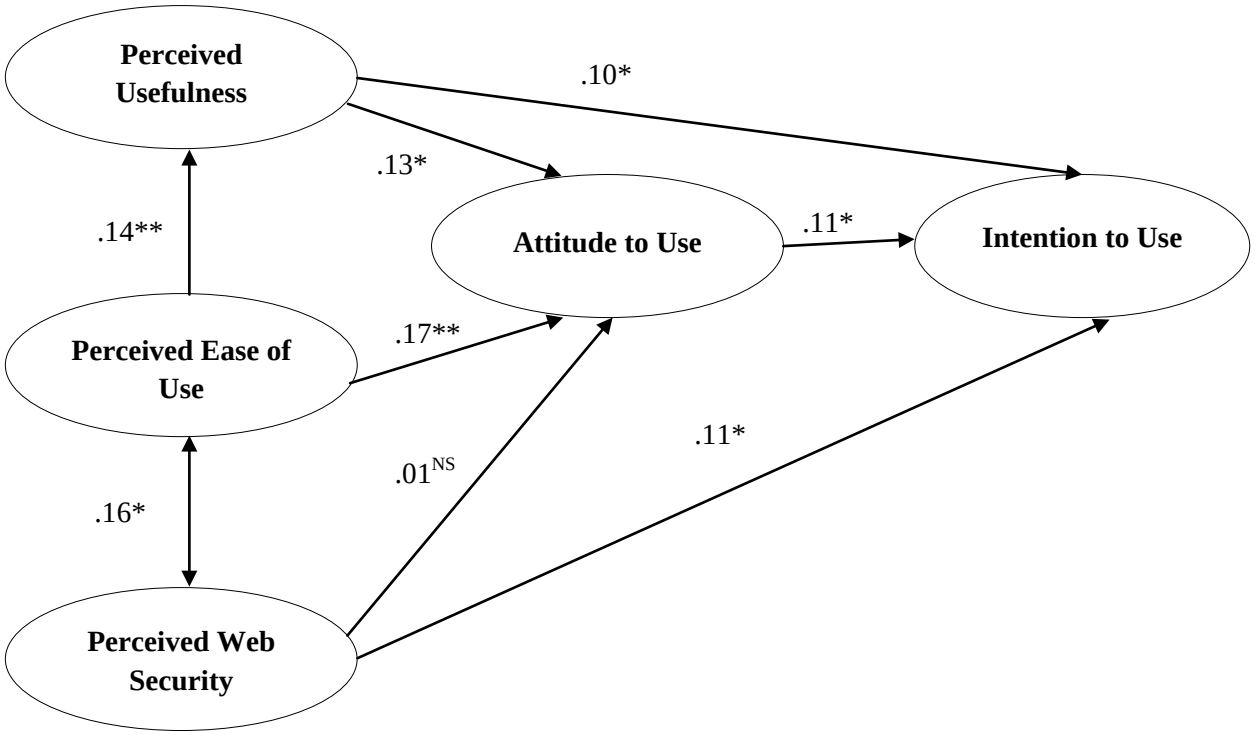

Figure 1: Structural Model with path coefficients

*Note: ** is Significant at 0.01; * is Significant at 0.05; NS is Not Significant at 0.05*

Attitude towards Use to Intention of the customer to Use Internet Banking is also supported. Thus, the overall results of the structural model support TAM and are consistent with the findings of (Davis et al., 1989).

VII. Conclusion

Finally, we can conclude that Perceived Usefulness (PU) is one of the important determinant of Attitude and Intention towards the use of Internet Banking. Similarly, Perceived Ease of Use (PEoU) also determine the Attitude and Intention to Use Internet Banking Services. However, Perceived Web Security (PWS) is influencing Intention to Use and does not have a direct positive effect on attitude.

The importance of Perceived web Security (PWS) is consistent with the results of (Sathye, 1999). Web Security is one of the important concern expressed by the customers while using internet banking. Due to the increased fraudulent in the online context, banking customers are very much concerned about the security of online banking transactions. Some of the other factors like Non availability of internet and difficult to use are major issue besides web security.

Studies related to Online banking services(Chan & Lu, 2004; Cheng et al., 2006; Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Sathye, 1999; Yee-Loong Chong, Ooi, Lin, & Tan, 2010) in other countries have confirmed the importance of Perceived usefulness and Perceived ease of use as the important determinants of Intention to use online banking services. Studies in India (Roy, Kesharwani, & Singh Bisht, 2012; Safeena, Date, & Kammani, 2011) have also emphasized that PU and PEoU are the important determinants of attitude and intention to use internet banking services.

Table 3: Fit indices for the Structural model

Fit Statistic	Recommended	Obtained
Chi-square		426.516
Df		144
CMIN/DF (Wheaton et al., 1977)	<5.0	2.962
Chi-square significance	P<=0.05	0.000
GFI (JOreskog & Sorbom, 1988)	>0.90	.896
NFI (Bentler & Bonett, 1980)	>0.90	.984
TLI (Hu & Bentler, 1999)	>0.90	.956
CFI (Bentler, 1990)	>0.90	.963
RMSEA (MacCallum et al., 1996)	<.05	.076

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The usefulness and ease of use of online banking has increased the number of customers. Well-designed web, its functionality and user friendliness are some of the other important factors in adaptation. On the other hand, increased risk in the use of internet is posing grave challenges to the banks.

No matter how robust the service is designed and safety measures are taken up, security remains one of the major issue in the online banking today. Hence, the bankers should take the web security as the priority concern and assure the customers about the secure use of internet banking.

Table 4: Hypotheses results

Hypothesis				Standardized Regression Estimate	C.R.	P
H1a	ATU	<---	PU	0.126	2.27	0.023
H1b	INTU	<---	PU	0.109	2.021	0.043
H2a	ATU	<---	PEoU	0.168	3.011	0.003
H2b	PU	<---	PEoU	0.145	2.65	0.008
H3a	ATU	<---	PWS	0.013	0.226	0.821
H3b	INTU	<---	PWS	0.112	2.038	0.042
H4	INTU	<---	ATU	0.112	2.046	0.041

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