Acceptance of Internet Banking : Comparing Six Theoretical Models

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Abstract

The aim of the study was to identify the superior technology adoption model measured in terms of the model's explanatory power in predicting the intention to adopt Internet banking by customers. It examined the behavioral intention to adopt Internet banking by comparing six models namely, technology acceptance model (TAM) (1989), TAM (1996), theory of planned behavior, combined TAM and TPB model, theory of reasoned action, and unified theory of acceptance and use of technology. The survey data were collected from 134 respondents using traditional banking services. The results confirmed combined TAM and TPB model as the superior model compared to the other five models. Since a large proportion of Indians lack digital literacy, it is imperative for banks embarking on digital models to design user friendly websites and online portals, demonstrate the benefits of Internet banking, and thereby, influence the intention to adopt e-banking.

Keywords : intention, Internet banking, attitude, explanatory power, C – TAM – TPB

JEL Classification Codes : G0, G2, G4

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There has been a paradigm shift in the way banking services have been offered to customers through extensive adoption of information technology. Specifically, there has been a major shift in the mode of transaction and a great leap towards cashless economy after demonetization (Kotishwar, 2018). The cashless economy will greatly solve the problem of corruption and black money (Narayanaswamy & Muthulakshmi, 2017). Internet banking represents a shift in the distribution channels of banking services towards self-servicing alternatives, which allow the customers to fulfill their banking needs without temporal and spatial barriers (Lai, Chau, & Cui, 2010). Moreover, the provision of Internet banking facilities reduces transaction cost and extensive paperwork for banks (Cheng, Lam, & Yeung, 2006). The success of the innovations in banking technology relies mainly on its adoption since many customers may still prefer traditional mortar banking without making an attempt to try out the technology, let alone its usage. In the context of India, predicting electronic banking adoption is fraught with several challenges where the majority of the population is unaware of

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technological changes in the banking sector. Though today's banking provides a plethora of services, many customers are still hesitant to use e-banking in India (Khosla & Munjal, 2013). Despite the proven benefits, especially convenience and lower transaction costs, the customers are hesitant to adopt Internet banking. Thus, there is a need to conduct technology adoption studies. When the banks invest in incremental and discontinue innovation in self-service technologies, the factors that promote and inhibit technology adoption have to be identified. In this regard, several researchers have attempted to explicate the antecedents of adoption of Internet banking in different countries by empirically testing various technology adoption models.

Earlier researchers proposed the innovation diffusion theory (IDT) (1983), theory of reasoned action (Fishbein & Ajzen, 1975), technology acceptance model (TAM) (Davis, 1989 ; Davis, Bagozzi, & Warshaw, 1989), and theory of planned behavior (Ajzen, 1991; Mathieson, 1991) to understand technology adoption. Later, the unified theory of acceptance and use of technology (UTAUT) proposed by Venkatesh, Morris, Davis, and Davis (2003) compared eight theoretical models and theorized four constructs to be playing the significant role in user acceptance and usage. Due to several theories proposing wide-ranging explanatory variables and the consequent inconclusive evidence on the promoters or inhibitors of technology adoption, the question on the antecedents of e-banking adoption remains unanswered. The literature review reveals a lack of adequate published articles that compare different technology adoption models; hence, this study attempts to address a research question as to which technology adoption model is superior in terms of its explanatory power in predicting adoption intention of the bank customers. The proposed work has compared the following six popular technology acceptance models to understand the customers' intention towards Internet banking adoption : (a) TAM (1989) : Technology acceptance model, (b) TAM (1996), (c) TPB: Theory of planned behavior, (d) C–TAM–TPB: combined TAM and TPB, (e) TRA: Theory of reasoned action, and (f) UTAUT: A unified theory of acceptance and use of technology.

Literature Review

The literature is replete with several studies attempting to understand the technology adoption behavior of the users. The efforts of earlier works are manifested in different versions of the TAM. Theory of reasoned action (TRA) is a model that has been widely used to study the adoption of information technology (Fishbein & Ajzen, 1975). The attitude towards behavior (ATT) and subjective norm (SN) are the core constructs of the model, and few studies have been carried out using this model. Subsequently, the theory of planned behavior (TPB) was proposed by Ajzen (1985) as an extension of TRA by incorporating perceived behavioral control (PBC) as an antecedent to behavioral intention. Davis (1989) presented the TAM that considers perceived ease of use (PEOU) and perceived usefulness (PU) as precursors of the attitude and technology acceptance and usage. Venkatesh and Davis (1996) extended the original TAM by Davis (1986) by adding cognitive instrumental and social influence processes (TAM2).

Several researchers have empirically tested TAM and identified PEOU and PU to be the significant predictors of customers' intention to adopt electronic banking (Alsajjan & Dennis, 2010 ; Yiu, Grant, & Edgar, 2007). Various empirical studies have also tested the validity of the extended version of TAM in the area of Internet banking and concluded that PU and PEOU are the primary requisites for the adoption of electronic banking (Al-Sharafi, Arshah, Herzallah, & Abu-Shanab, 2018 ; Kumar, Lall, & Mane, 2017 ; Mutahar, Daud, Ramayah, Putit, & Isaac, 2017). However, few researchers incorporated new constructs to the TAM model, for instance, trust, e-trust, and perceived credibility as the determinants of the attitude towards usage of Internet banking (Mansour, 2016 ; Santouridis & Kyritsi, 2014) and customer satisfaction as the mediator between PEOU, PU, and customer service and intention to adopt Internet banking (Ghani, Rahi, Yasin, & Alnaser, 2017). Chong, Ooi, Lin, and Tan (2010) considered consumers' trust in security and privacy and government support as a part of TAM.

The combined TAM and TPB (C–TAM–TPB) is a hybrid model which combines TAM and TPB core constructs (Taylor & Todd, 1995). Jaruwachirathanakul and Fink (2005) used TPB in their study in Internet banking and concluded the ATT and PBC factors to be the significant predictors of adoption intention. Lee (2009) added perceived risk and benefit to C–TAM–TPB model and reported PU, perceived benefit, security risk, financial risk, PBC, SN, and attitude as the determinants of adoption intention.

The unified theory of acceptance and use of technology (UTAUT) model was proposed by Venkatesh et al. (2003) after comparatively evaluating the widely used eight models of technology adoption and diffusion. UTAUT includes performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) as antecedents and explains almost 70% of the variance in intention to accept technology. Studies (Ghalandari, 2012 ; Rahi, Ghani, Alnaser, & Ngah, 2018 ; Tan & Leby Lau, 2016) in online and mobile banking confirmed the significant and positive impact of PE, EE, and SI on customers' intention to adopt Internet banking or mobile banking. However, there are also studies, which found the non-significant impact of EE (Oliveira, Faria, Thomas, & Popovič, 2014 ; Yu, 2012 ; Zahir & Gharleghi, 2014) and SI (Oliveira et al., 2014 ; Zahir & Gharleghi, 2014) on the intention to adopt Internet or mobile banking.

Many researchers were intrigued by the predictive power of these models and carried out comparative studies to identify the model that has a superior explanatory power. It has been studied in different contexts such as the Internet of things (Mital, Chang, Chowdhary, Papa, & Pani, 2018), shop-bots (Gentry & Calantone, 2002), automotive telematics (Chen & Chen, 2009), advanced driver assistance system (Rahman, Lesch, Horrey, & Strawderman, 2017), and household technology (Brown, Venkatesh, & Hoehle, 2015).

Few researchers have compared TRA, TPB, and TAM models in the Internet and mobile banking adoption. Yousafzai, Foxall, and Pallister (2010) and Rouibah, Thurasamy, and May (2009) documented the highest explanatory power for the TPB model than the TRA and TAM. Lai et al. (2010) compared diffusion of innovation theory (DOI), TAM and integrated TAM, and DOI. The integrated model had a higher explanatory power compared to TAM and DOI models. Gounaris and Koritos (2008) compared three theoretical frameworks namely TAM, DOI, and perceived characteristics of the innovation (PCI). PCI was found to be performing superior to TAM and DOI in predicting Internet banking adoption. Hence, this paper widens the scope by comparing the popular six theoretical models : TAM (1989), TAM (1996), TPB and TRA, C–TAM–TPB, and UTAUT to understand which model predicts the intention to adopt Internet/online banking. In comparing the above models, we use behavioral intention as the dependent variable as many research studies have found a strong relation between behavior intention (BI) and actual usage. Even though Internet banking arrived in India in the late 1990s, the actual usage was relatively low until the last few years. Hence, studying intentions to adopt e-banking rather than usage is more appropriate for cross-sectional studies (Agarwal & Prasad, 1999).

Materials and Methods

(1) Data Collection and Sample : The study uses PLS (partial least square) path modeling approach as it does not require a large sample size for complex models and does not rely on the assumptions of normality. The path model and parameters are estimated using Smart PLS 3.00. The data collection took place between July – August 2017. A descriptive cross-sectional survey was carried out in Karnataka to empirically compare the predictive power of six technology adoption models. The population for this study was the customers of various public and private sector banks in the state of Karnataka. The data were collected from 134 respondents by using snowball sampling technique where the respondents were approached through both physical contact and electronic medium.

(2) Survey Instrument : The survey items used in the study to measure the constructs were adopted from TAM

(Davis et al., 1989) and UTAUT (Venkatesh et al., 2003) and were slightly modified to the Internet banking context. All the items related to the constructs were measured on a 7- point Likert scale ranging from 7 *(strongly agree)* to 1 *(strongly disagree)*. The instrument contained 22 items based on research constructs and demographic questions.

Analysis and Results

The demographic profile of the respondents is given in Table 1. Most of the respondents were male (72.4%), aged between 18 – 26 years (53%) and were postgraduates (50.7%).

(1) Evaluation of Measurement Model : PLS – SEM approach recommends confirmatory factor analysis that assesses the reliability and validity of items and constructs in the measurement model. The measurement models which are reflective in nature are assessed for internal consistency, indicator reliability, convergent and discriminant validity (Table 2) as suggested by Hair, Ringle, and Sarstedt (2011).

The internal consistency reliability is assessed through composite reliability (CR). CR in the range of 0.7 – 0.9 is considered satisfactory, greater than 0.9 is not desirable, and it should not be above 0.95 (Hair et al., 2011). Except for BI and SN, all other constructs are in the satisfactory range of 0.7 – 0.9 (refer Table 2). As the constructs, BI and SN are below the range of 0.95 and the indicator variables of these constructs are different, thereby not measuring the same phenomenon are retained in the study.

The convergent validity of the constructs is assessed through outer loading (for indicator reliability) and average variance extracted (AVE). The indicators with outer loading of ≥0.7 (Hair et al., 2011) are to be retained. BI2, PEOU1, PBC4, and SN2 which were below the threshold value were deleted. The convergent validity at the construct level is assessed through AVE (Table 2) and all the constructs are above the threshold value of 0.5 (Hair et al., 2011).

The discriminant validity of the constructs is assessed through heterotrait - monotrait ratio (HTMT) of the correlations (Henseler, Ringle, & Sarstedt, 2015) instead of traditional cross loading and Fornell – Larcker criterion. The HTMT-value of greater than 0.90 indicates a lack of discriminant validity. To establish the

Table 1. Demographic Characteristics of the Respondents

Characteristics	Frequency (N =134)	Percentage
Gender		
Female	37	27.6
Male	97	72.4
Age		
18–26	71	53.0
27–36	23	17.2
37–52	30	22.4
53–63	7	5.2
64–71	3	2.2
Education Level		
Bachelor degree	44	32.8
Master degree	68	50.7
Other	22	16.4

Table 2. Indicator Reliability, Convergent Validity, and Discriminant Validity

Construct	Items	FL	AVE	CR	Heterotrait - Monotrait Ratio (HTMT)				
					ATT	BI	EE/PEOU	FC	PE/PU
ATT	ATT2 : Internet banking makes work more interesting.	0.857	0.753	0.900					
	ATT3: Working with Internet banking is fun.	0.848							
	ATT4: I like working with Internet banking.	0.897							
BI	BI2: I will always try to use Internet banking in my daily life.	0.927	0.847	0.917	0.842				
	BI3: I plan to continue to use Internet banking frequently.	0.913							
PEOU/ EE	PEOU2 : My interaction with Internet banking is clear and understandable.	0.876	0.794	0.885	0.728	0.875			
	PEOU4: It is easy for me to become skillful at using Internet banking.	0.906							
PBC/FC	PBC1: I have the resources necessary to use Internet banking.	0.827	0.734	0.892	0.719	0.891	0.893		
	PBC2: I have the knowledge necessary to use Internet banking.	0.896							
	PBC3 : Internet banking is compatible with other technologies I use.	0.845							
PU/PE	PU2 : Using Internet banking increases my chances of achieving things that are important to me.	0.782	0.696	0.873	0.541	0.775	0.825	0.812	
	PU3 : Using Internet banking helps me accomplish things more quickly.	0.870							
	PU4 : Using Internet banking increases my productivity.	0.849							
SN/SI	SN1: People who are important to me think that I should use Internet banking.	0.945	0.894	0.944	0.780	0.562	0.694	0.432	0.513
	SN3 : People whose opinions I value prefer that I use Internet banking.	0.946							

discriminant validity, some items (ATT1, PEOU3, and PU1) which were strongly correlated to the items of different constructs were eliminated. After removal of the said items, the output for HTMT-values is below the threshold value of 0.9 (Table 2), thereby confirming the discriminant validity.

The predictors in each model are examined for the presence of the collinearity issue. The variance inflation factor (VIF) >4.0 (Hair, Black, Babin, & Anderson, 2010) suggests a multicollinearity problem. The VIF value of predictors in all comparative models is below the value 4.0 (Table 3), thereby confirming the absence of multicollinearity.

(2) Strength of Individual Paths and Explanatory Power of Each Model : The path coefficients and the significance of paths are estimated for each model and are shown in Table 4. The R^2 values for all the models are depicted in Table 5.

Table 3. Collinearity Statistics

	TAM			R-TAM	TPB	C–TAM–TPB			TRA		UTAUT
	BI	ATT	PU	BI	BI	BI	ATT	PU	BI	PU	BI
ATT	1.241				2.470	2.501			1.811		
BI											
EE/PEOU		1.644	1.0	1.670			1.644	1.0		1.0	2.011
FC					1.579	2.340					1.485
PE/PU	1.241	1.644		1.670		1.912	1.644		1.811		1.671
SI/SN					1.818	1.964					

Table 4. Significance and Strength of Individual Paths

	β (Path Coefficients)					
	TAM	R-TAM	TPB	C–TAM–TPB	TRA	UTAUT
PU→ATT	0.121	-	-	0.121	-	-
PEOU→ATT	0.507***	-	-	0.507***	-	-
PEOU→PU	0.632***	0.633***	-	0.632***	-	-
ATT→BI	0.537***	-	0.393***	0.417***	0.704***	-
PU→BI	0.386***	0.315**	-	0.223***	-	0.304**
SN→BI	-	-	0.034	0.025	0.006	0.096
PBC→BI	-	-	0.484***	0.345***	-	-
PEOU→BI	-	0.489***	-	-	-	0.444***

Note. $*p < 0.10; **p < 0.05; ***p < 0.01$.

✤ **TAM :** The structural model of TAM shows that PEOU (t-value = 3.944) is a significant indicator of ATT, explaining 33.9% of the variance. Both PU (t-value = 5.463) and ATT (t-value = 8.419) are a significant indicator of intention, ATT being the strongest among the two. Both constructs explain 61.3% of the variance in intention. Even PEOU (t-value = 6.810) has a significant impact on PU, accounting for 39.4% of the variance. The path is PEOU->PU and ATT->BI.

✤ **R-TAM (Revised TAM, i.e., TAM 1996) :** Both PU (t-value = 2.401) and PEOU (t-value = 3.672) are found to be the significant indicators of intention, PEOU being the strongest predictor. Together they explain 52.5% of the variance in intention. The impact of PEOU (t-value = 6.949) on PU is also seen to be significant, explaining 39.7% of the variance. The path is PEOU->BI, PEOU->PU->BI.

Table 5. Explanatory Power of the Models and the Model Fit

Explanatory Power	TAM	R-TAM	TPB	C–TAM–TPB	TRA	UTAUT
R^2_{BI}	61.3	52.5	64.2	66.5	49.4	53.1
R^2_{ATT}	33.9	-	-	33.9	-	-
R^2_{PU}	39.4	39.7	-	39.4	-	-
Fit Index SRMR	0.08	0.08	0.070	0.073	0.063	0.07

✎ **TPB :** Only ATT (t-value = 4.168) and PBC (t-value = 5.016) have a significant impact on intention. Together they explain 64.2% of the variance in intention. The impact of SN (t-value = 0.369) on intention is insignificant.

✎ **C–TAM–TPB :** The results of TAM paths confirm the results discussed in Model 1, however, the strength of PU→BI has decreased. The variance explained by PEOU on ATT remains the same at 33.9%. Among the four constructs (PU, ATT, SN, and PBC), only PU (t-value = 2.774), PBC (t-value = 3.436), and ATT (t-value = 4.546) are found to be the significant predictors of intention, ATT being the strongest like in TAM results discussed above. ATT, PU, and SN together explain 66.5% variance in intention.

✎ **TRA :** The impact of SN (t-value = 0.066) on intention is found to be insignificant, thereby confirming the result (SN→BI) discussed in Model 3 and Model 4. ATT (t-value = 8.680) is found to be the significant predictor of intention explaining 49.4% of the variance.

✎ **UTAUT :** Among the three constructs (PE, EE, and SI), only EE (t-value = 3.536) and PE (t-value = 2.226) are found to be the significant predictors of intention, explaining 53.1% of the variance. Like in other models, the impact of SN (t-value = 1.022) on BI is found to be insignificant. As the actual use is not considered in the present study, the variable PBC/FC has been eliminated.

To summarize, the path coefficient of PEOU→ATT (TAM, C–TAM–TPB), PEOU→PU (TAM, R-TAM, C–TAM–TPB), ATT→BI (TRA, TAM, TPB, C–TAM–TPB), PU→BI (TAM, R-TAM, C–TAM–TPB, UTAUT), PBC→BI (TPB, C–TAM–TPB), and PEOU→BI (R-TAM, UTAUT) are significant across the models. The significant effect of ATT on intention is also confirmed by effect size result seen in Table 6, where it can be seen that the effect size of dropping ATT is either high (TAM and TRA) or medium (TPB, C–TAM–TPB) across the models. It can be observed that in the presence of ATT (TAM, C–TAM–TPB), the strength of the relationship between PU and BI is more significant. The path coefficient of PU→ATT (TAM, C–TAM–TPB) and SN→BI (TRA, TPB, C–TAM–TPB, UTAUT) is insignificant across the models. The insignificant impact of SN/SI on BI is further confirmed by the effect size result (Table 6), where an effect size of dropping SN is near to zero/insignificant across three models (TPB, C–TAM–TPB, TRA, UTAUT). Therefore, the stronger BI to adopt Internet banking can be associated with ATT, PU, PEOU, and PBC.

The R^2 adjusted is recommended to be used when comparing the models having different exogenous constructs or having a different number of observations (Hair et al., 2011). C–TAM–TPB appear to be superior to the other five models in terms of BI, explaining 66.5% of the variance. The R^2_{BI} values (Table 5) of TAM, TPB, UTAUT,

Table 6. Effect Size of Each Construct with Relevance to Intention : Model Wise Comparison

Construct	f^2					
	TAM	R-TAM	TPB	C–TAM–TPB	TRA	UTAUT
ATT	0.61(H)		0.18(M)	0.21(M)	0.55(H)	
PU	0.32(M)	0.13(S)		0.08 (S)		0.12(S)
PEOU		0.31(M)				0.21(S)
SN			0.00	0.00	0.00	0.01
PBC			0.42(H)	0.16(M)		

Note. Effect size: 0.02 = Small (S), 0.15 = Medium (M), 0.35 = High (H) ; variables lesser than 0.02 have no effect size.

TRA, and R-TAM are 61.3%, 64.2%, 53.1%, 49.4%, and 52.5%, respectively. Among the models without attitude, that is, R-TAM and UTAUT, UTAUT appears to be superior to R-TAM in terms of the explanatory power of BI. The R^2_{ATT} is the same (33.9%) in both the models (TAM, C–TAM–TPB) comprising of the construct ATT. The R^2_{PU} is the same (39.4%) in the two models (TAM, C–TAM–TPB), slightly higher in R-TAM, that is, 39.7%. The variance of 60% is deemed satisfactory for social science studies (Hair et al., 2010). Therefore, TAM, TPB, and C–TAM–TPB reveal a satisfactory variance in terms of BI. The standardized root mean square residual (SRMR) measures the model's approximate fit. A model is said to be having a good fit if the SRMR< 0.08 (Hu & Bentler, 1998). All the six models compared are having the SRMR value of lesser than $\leq$0.8 (Table 5).

Effect Size

The f^2 effect size or the R^2 change effect is given in Table 6. The effect size examines the contribution of a predictor variable on the dependent variable's R^2 value. The effect size values $\geq$ 0.35, 0.15, and 0.02 may be labelled as a high, medium, and smaller effect size of dropping a construct from the model (Cohen, 1988). All constructs except SN have either medium, high, or small effect size on BI (Table 6). SN is seen to be having no effect size in case of all six models, indicating that SN is not contributing towards the variance explained by behavioral intention in case of Internet banking. ATT and PBC have either high or medium effect size on intention across the relevant models. PU and PEOU have either medium or small effect size on the intention to use Internet banking.

Discussion

This study empirically compares the six models that are most commonly used in various studies in technology adoption. It also explores the important constructs that consistently predict behavioral intention to adopt electronic banking. The results of the study prove the superiority of C–TAM–PCB compared to other models. The impact of ATT, PU, PEOU, and PBC is found to be significant across the models. However, the impact of SN on BI and PU on ATT is seen to be insignificant. Some additional findings observed are : (a) PEOU mediates the relationship between PU and intention to adopt e-banking (TAM, R-TAM, C–TAM–TPB), and also significantly influences ATT(TAM, C–TAM–PCB) and BI (R-TAM, UTAUT), (b) ATT to BI is significant in all the four models (TAM, TPB, C–TAM–TPB, TRA), (c) SN/SI is insignificant in all the four models (TPB, C–TAM–TPB, TRA, and UTAUT), (d) PU influences BI in all four models (TAM, R-TAM, C–TAM–PCB, UTAUT). Adjusted R^2 is used to analyze the explanatory power of the six models. TAM model explicates 61.3% of the variance, R-TAM expounds 52.5% of the variance, TPB could explain 64.2% of the variance, C–TAM–TPB explains 66.5% of the variance, TRA supports 49.4% of the variance and UTAUT 1 accounts for 53.1% of the variance of intention to adopt e-banking ; thus, C–TAM–TPB can explain a higher proportion of variation of user intention. The f^2 analysis reveals that ATT→BI has a large effect with a value of 0.61 and 0.55 in TAM and TRA models, respectively ; whereas, it has medium effect on BI in both TPM and C–TAM–TPB models. PU has a medium effect (0.32) and PEOU has a medium effect (0.31) in R-TAM. PBC has a large effect (0.42) in TPB and medium effect in C–TAM–TPB models. SN has relatively no effect in all the six models. In C–TAM–TPB, it appears that ATT and PBC have medium effect size on the endogenous construct of BI.

PEOU is found not only indirectly affecting BI, but also directly influencing BI in R-TAM and UTAUT models. The customers of banks would adopt e-banking if they perceive the system easy to understand and operate. Venkatesh and Davis (2000) and Davis et al. (1989) also found the significant influence of PEOU on BI. The indirect effect of PEOU on BI through PU is supported by Cheng et al. (2006) and Lee (2009). The users would be inclined to adopt if they have to invest lesser time and effort to learn to use e-banking and consequently

perceive greater benefits in using e-banking. When people lack financial and digital literacy, the barriers to adopt technology for banking transactions in terms of difficulty in opening the webpage, creating or storing passwords, maneuvering the banks' websites, and carrying out financial transactions requires user friendly and simple to understand interface. On account of this, ease of using the system becomes an utmost priority for acceptance of e-banking and suggests that PEOU might be a major factor in determining not only PU of e-banking, but also a predominant factor affecting user adoption.

The benefits of technological advances provided through the online banking channel are to be communicated to the end users to intensify the adoption. The results of our study are in line with the findings of several researchers who found that PU has a significant influence on intention to adopt e-banking (Amin, 2009 ; Basri & Shetty, 2018 ; Kesharwani & Bisht, 2012 ; Lee, 2009 ; Venkatesh & Davis, 2000). Moreover, our result that PEOU significantly affects PU is supported by Bashir and Madhavaiah (2015). When the users find it easy to operate and understand various features of e-banking, they tend to form a positive attitude towards adoption and thus, PEOU indirectly affects user intention to adopt e-banking. The banks aiming to penetrate the market with e-banking channels should design products considering user's expectations and implement extensive integrated marketing campaigns to improve the knowledge and skills in using e-banking. Hence, familiarity and convenience would increase the expectations of usefulness from the adoption, indicating the outcome and process orientation of users who intend to adopt e-banking.

Attitude is found to be one of the strongest indicators of intention, and this finding was noted by Rouibah et al. (2009) in the area of Internet banking. PEOU directly and significantly shapes the attitude, which in turn is affected by behavioral intention. Al-Ajam and Md Nor (2015) and Kesharwani and Bisht (2012) demonstrated the positive role of attitude on behavioral intention to adopt technology and Internet banking. Thus, the banks aiming to reach the customers through Internet banking should focus on implementing easily comprehensible websites that enhance the easiness of use and promote positive attitudinal beliefs about e-banking.

The positive effect of PBC on BI suggests that if the user perceives a greater ability to perform Internet transactions, the intention to adopt would be higher. Few researchers noted that the explanatory power of the TPB model increased when PBC was added (Ajzen, 1991) including Internet banking adoption models (Lee, 2009 ; Yaghoubi & Bahmani, 2011). Thus, the banks should promote the factors that enhance an individual's ability and ease to adapt and control external factors by removing the anticipated obstacles in adopting e-banking.

The path coefficient of SN/SI to BI is insignificant in all the four models (TPB, C–TAM–TPB, TRA, and UTAUT). SNs are found to an insignificant predictor of BI, as proven by other studies (Venkatesh & Davis, 2000 ; Yousafzai et al., 2010). The SI and pressure to comply with expectations of significant others is not a strong motivator for technology adoption. Personal experience and control beliefs are more predictive of adoption that the opinions of others while adopting the technology.

Practical and Managerial Implications

Theoretical comparison of models is necessary as it helps in identifying a model which is more adequate in measuring the behaviour intention to adopt the technology. Bank managers may apply the optimal model (C–TAM–TPB for Internet banking) in understanding the intention to adopt e-banking by their customers. By considering the six models, we confirm the superiority of C–TAM–TPB mainly because of the considerable influence of PEOU, PU, PBC, and attitude on BI. These four variables are the critical components of TAM and TPB ; hence, in developing countries like India, where majority of the population lacks digital literacy, designing user friendly websites and online portals, demonstrating the benefits of Internet banking, and thereby, shaping positive attitudes that e-banking is faster, more comfortable, service-oriented, and less expensive would foster BI.

If online banking does not add any value to customers in terms of saving time (travelling to a branch office), avoiding the risk of carrying huge cash to branch, and carrying transactions without loss of much time at high speed or money through seamless interconnected devices, they would be less likely to adopt e-banking. Therefore, banks should educate and increase knowledge about the advantages : lower transaction costs and high speed of transactions, quick processing of credit applications, quick bill payments, and account information at fingertips to lure customers towards online banking.

Conclusion

To conclude, we have identified C–TAM–TPB to have higher explanatory power than the other five models. The models, when ranked on the basis of their explanatory power, it is observed that the first three ranked (C–TAM–TPB, TPB, and TAM) have attitude as one of the predictive constructs of BI. Thus, C–TAM–TPB, which is a hybrid model of TAM and TPB, could be the most preferred model for testing the emerging technologies in the banking sector. All paths across the models are found to be having a significant impact except that of SN on BI (across models) and PU on ATT (in both TAM and C–TAM–TPB). Thus, this paper proposes a new model for Internet banking, which has slightly higher explanatory power than C–TAM–TPB.

Limitations of the Study and Scope for Further Research

Although a comprehensive study is carried out, a few limitations do exist. First, the research is carried out with a smaller sample size and is restricted to the Indian context. The results from a larger sample size are more reliable, which help in drawing more meaningful conclusions. Second, the study is cross-sectional in nature. However, a longitudinal study will provide insights into user behaviour over time after adoption. Therefore, a longitudinal study is a potential for future research. Third, the study is restricted to behaviour intention and does not consider the use behaviour/usage of respondents. Including the actual usage will deepen our understanding of the interrelationship between variables in the model. Moreover, we have not included the moderating effect of age, gender, experience, and voluntariness of use on BI (UTAUT 1). Future research must examine the impact of behaviour intention on actual usage. A final limitation, the study is limited to six behavioral models. There are many other behavioral models like UTAUT 2, which may be included in comparing the models.

Authors' Contribution

I. S. Rekha conceived the idea, conducted literature review, designed the conceptual model, prepared measurement instruments (established scales) and research design, collected the data, obtained results from PLS–SEM, and prepared the draft of the paper. Savitha Basri strengthened the literature review, crystallized the research problem, assisted in research design including questionnaire design, analyzed the data, and interpreted the results, revised and re-wrote the paper with emphasis on implications, and provided qualitative inputs for discussion. Kavitha T. C. assisted in preparing the conceptual model and data collection, provided inputs in interpreting the results, and writing the paper.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter, or materials discussed in this manuscript.

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