

**Integrating Security/Privacy and Computer Self-Efficacy with TAM  
in internet banking adoption**

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*Abstract*

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*This paper proposes a conceptual framework for examining the interaction of the structural properties of internet banking among users. The framework integrates Security/Privacy and Computer Self-Efficacy with the Technology Acceptance Model (TAM) theory concepts in individual adoption of internet banking. The study has come up with an integrated model including four variables (Perceived Usefulness, Perceived Ease-Of-Use, Security and Computer Self-Efficacy) which influence the adoption of internet banking by users.*

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**Keywords:** Internet Banking, TAM, Perceived Usefulness, Perceived Ease-Of-Use, Security/Privacy, Computer Self Efficacy.

**1.0 Introduction**

The new information technology (IT) is turning into the most important factor in the future development of banking, influencing banks' marketing and business strategies [1]. In the bid to catch up with global developments and improve the quality of their service delivery, Nigerian banks have invested much on technology, and have widely adopted electronic and telecommunication networks for delivering a wide range of value-added products and services. They have, in the last few years, transformed from manual to automated systems. The numerous advances in Internet technology has made considerable impact in business environs and have in particular brought about a shift in banking operations. This has necessitated the adoption of internet banking by banks. With the application of the internet to banking, banks are able to work effectively and make high profits. The chief driving forces of internet banking among customers include better access to the services, better prices and higher privacy [2]. Through internet banking, customers can transact banking operations at the comfort of their homes and office anywhere. Ovia [3] posited that the hype of e-commerce, e-banking and e-everything is gradually being embraced by Nigerian financial institutions who are poised to be in the vanguard of narrowing the digital divide. Also, the findings of Ezeoha [4] showed that internet banking was yet to take center stage despite its widely acclaimed benefits against the traditional branch banking practice. According to some authors [1], the driving forces behind the rapid transformation of banks are influential changes in the economic environment: innovations in information technology, innovations in financial products, liberalization and consolidation of financial markets, deregulation of financial inter-mediation etc. The financial services market is continuing to change rapidly, which brings into question whether traditional banks, as they are now structured, will actually continue to exist by the end of the decade or even survive through the next five years.

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Technological innovations are having significant importance in human general and professional life. This era can safely be attributed as technology revolution. The quick expansion of information technology has imbibed into the lives of millions of people [5]. Also, Technological advances nowadays are providing the framework necessary to make easier the tasks that individuals carry out on a daily basis [6 - 8]. To understand the user's behaviour towards new innovation, one must learn the technology adoption process [9]. Information technology (IT) acceptance has been the subject of much research in the past two decades [10] . Researchers have concentrated their efforts on identifying the conditions or factors that could facilitate the integration of information system (IS) into business [11]. Many factors attracting users to IS such as internet banking are perceived usefulness, perceived ease of use, Trust (Security) and computer self efficacy [12].

This study therefore examines internet banking adoption amongst users. It identifies the major inhibiting factors to internet banking adoption in Nigeria. Therefore, this paper proposes and validates a conceptual framework based on an integrated Technology Acceptance Model (TAM)'s with Computer Self-Efficacy and Security/Privacy in internet banking adoption.

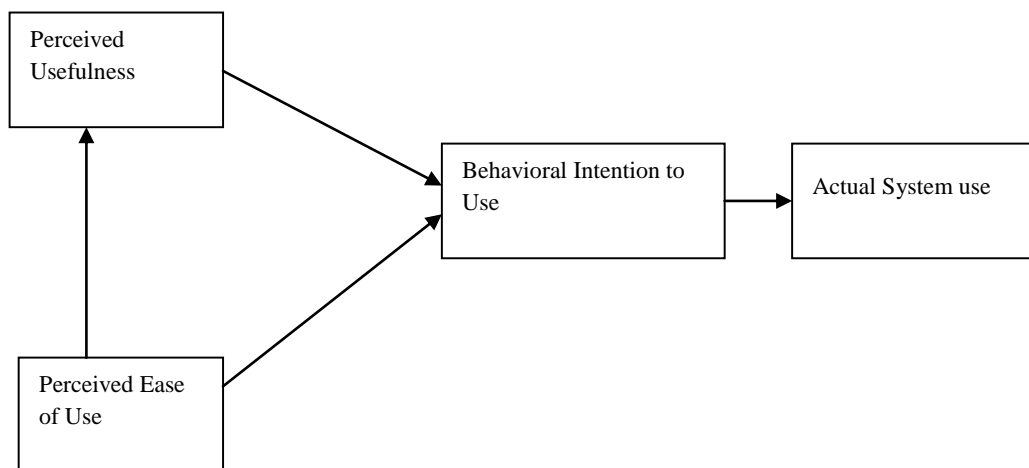
## 2.0 Theoretical Background

### 2.1 The Technology Acceptance Model (TAM)

A number of acceptance models have been proposed to aid the understanding of factors imparting the acceptance of information technologies. Among these studies, the Technology Acceptance Model (TAM) is one of the most influential and robust in explaining IT/IS adoption behavior [13]. TAM [14] has been applied in different contexts to investigate a wide variety of information technologies and to determine the acceptance of various information systems (IS) in the past decades [15]. TAM is an extension of the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). TAM has become popular amongst researcher because of its shrewd approach and the amount of empirical support for it. An extensive body of subsequent research has confirmed the usefulness of TAM – and various extensions and revisions – as a tool for investigating and predicting user information technology acceptance [16, 17]. Thus, this study investigates the role of computer self efficacy and Security/Privacy on the TAM constructs as it applies to internet banking perception.

In general, TAM is capable of explaining user behavior across a broad range of end-user computing technologies and user populations theoretically justified [14]. TAM is based on the following core concepts:

- Perceived Usefulness (PU), which has been defined as a user's subjective perception of the ability of Internet Banking to increase job performance when completing a task, and
- Perceived Ease-Of-Use (PEOU), which is a person's subjective perception of the effortlessness of internet banking, which affects the perceived usefulness thus having an indirect effect on a user's technology acceptance.



**Figure i: Technology acceptance Model (TAM)**  
Source: [14]

## 2.2 Computer Self Efficacy (CSE)

Self-efficacy is defined as an individual's confidence in his or her ability, which may impact the performance of tasks. Self-efficacy reflects an individual's confidence in his/her ability to perform the behavior required to produce specific outcome and the thought to directly impact the choice to engage in a task, as well as the effort that will be expended and the persistence that will be exhibited. The greater people perceived their self-efficacy to be, the more active and longer they persist in their effort [18]. Computer and Internet self-efficacy are specific types of self-efficacy.

An individual's belief about his or her ability to successfully use a computer or a technological service to accomplish a specific task is known as their computer self-efficacy (CSE).

Studies of computer self-efficacy suggest that computer self-efficacy is a significant determinant of an individual's decision to use computers and that computer self-efficacy influences an individual's expectation of the outcomes of using computers and ultimately affects his/her decision to use computers. Compeau and Higgins [19] also reported that computer self-efficacy plays an important role in shaping an individual's feeling and behavior. Individuals with high computer self-efficacy use computers more frequently, derive more enjoyment from their use, and experience less computer anxiety.

## 2.3 Perceived Security/Privacy

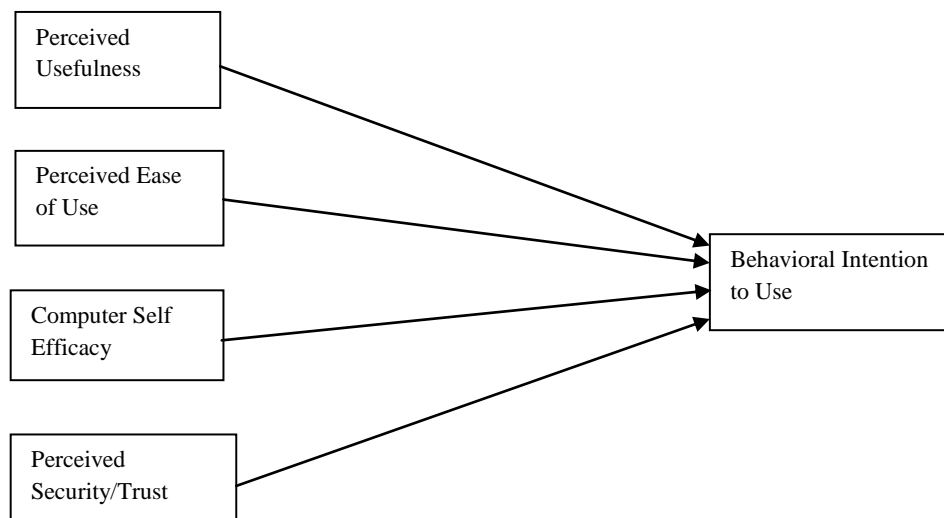
The significance of security and privacy concerns in an online environment cannot be over emphasized. Godwin [20] reported that privacy and security concerns were found to be a major barrier to internet shopping. This concern has been extended to the internet banking environment. Security has been widely recognized as one of the main obstacles to the adoption of electronic banking [21] and privacy issues have proven important barriers to the use of online services [22].

Security is defined as a threat which creates "circumstances, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of service and/or fraud, waste and abuse" [23].

Privacy represents the control of transaction between users and others (usually the sites). Margulis [24] claimed that the ultimate aim is to minimize vulnerability of the personal data. In the context of Internet banking, information privacy is defined as the claim of individuals, groups, or institutions to determine when, and to what extent, information about them is communicated to others [25]. Thus, "perceived security and privacy" (PSP) is defined as users' perception of protection against security threats and control of their personal data information in an online environment. On the whole, perceived security and privacy is about the self-belief that a user has in the system to conclude a transaction securely and to maintain the privacy of personal information [22].

## 2.4 The Proposed Conceptual Framework

A research model based on an integrated Technology Acceptance Model (TAM) with Computer Self Efficacy is proposed in order to examine the factors influencing users' perception of internet banking. The research model is designed to test the effects of Perceived usefulness, Perceived ease-of-use, Computer self-efficacy and perceived security/privacy on intention to adopt internet banking. See the proposed framework in Figure ii.



**Figure ii: Proposed Research Model**

### **Hypotheses**

In TAM, perceived usefulness refers to the degree to which the user believes that using the technology will improve his or her work performance, while perceived ease of use refers to how effortless he or she perceives using the technology will be. Both are considered distinct factors influencing the user's behavioural intention toward using that technology. Thus we present the list of hypotheses based on the diagram of the proposed model. Thus, these hypotheses are stated below in abbreviated forms for simplicity and clarity.

H1: Perceived usefulness is positively related to intention toward using internet banking.

H2: Perceived ease of use is positively related to intention toward using internet banking.

H3: Computer Self Efficacy is positively related to intention to use internet banking.

H4: Security/Privacy is positively related to intention to use internet banking.

### **3.0 Methodology**

The survey instrument was administered randomly to 91 respondents (internet banking users) within a federal institution in the northern part of Nigeria. Participants include: students, business men/women, civil servants, public servants, lecturers, IT professionals and applicants who are users of internet banking. It was only 56 participants who fully completed the questionnaire signifying 61.5% participation. Measurement instrument is in the form of a questionnaire which uses the 5 likert scale for individual behavior. This scale has been used by previous internet banking adoption research [12].

### **4. 0 Results and Discussion**

#### **4.1 The demographic profile**

The demographic profile of the overall participants is presented in Table 1. The proportion of sex of participants has more males 38(67.9%) while females are 18 representing 32.1%. Most of them are between 20–29 years of age (50.0%), have a bachelor's /HND degree (73.2%) and have a monthly income of N100,000 and above (44.6%).The occupation of respondents distribute amongst business men/women (19.6%), public servants (17.6%), students (16.1%) and civil servants (16.1%) as shown in Table 1.

From the view-point of how long respondents have been using the computer, most respondents, i.e. 39(69.6%) respondents are 5 years and above users where 14 (25%) are between 1 and 5 years users and the rest 3 (5.4%) are between 6-12 months computer users. It was also found that 36 (64.3%) respondents have years of experience in internet usage with between high 25(44.6%) and average (46.4%) knowledge about computer/internet. Again, virtually all respondents have used internet banking 55 (98.2%) but majorly between 1 and 5 years i.e 21 (37.5%) and 5 years and above 19 (33.9%) as shown in Tables 2,3, 4,5and 6.

#### **4.2 Factor Analysis (Construct validity) , Reliability Test and Adequacy Test**

##### **Construct validity**

For the construct validity test, in order to test for convergent and discriminant validity of the constructs, factor analysis with varimax rotation was used. To determine the minimum loading necessary to include an item in its respective construct, variables with loading greater than 0.3 were considered significant; loading greater than 0.4, more important; and loadings 0.5 or greater were very significant [26]. Hence, this study accepts items with loading of 0.4 or greater. Therefore the items PEOU4, CSE2 and SP4 were deleted since their values were lesser than the benchmark of 0.4 as show in Table 7.

##### **Reliability Test**

Cronbach's Alpha tests were conducted for the PU, PEOU, CSE, SP and INT constructs to determine the internal consistency across items for each measure. Three items, PEOU item (PEOU4), CSE item (CSE2) and SP item (SP4) had low inter-item correlations or loadings. The Cronbach's Alpha for PEOU, CSE and SP with the three items are .734, .619 and .701, while without them Cronbach's Alpha were .795, .721 and .783 respectively. It appears that the low reliability of these items may have been due to users' misunderstanding to the items wording. Nunally [27] suggested that the score for each construct should be greater than 0.6 for it to be reliable. Thus, a score of 0.6 and above were accepted in this study. Cronbach's Alpha values ranges from 0.721 to 0.838. Accordingly, all variables are reliable. Reliability analysis results for all constructs measured are presented in Table 7 indicating good reliability on all measures.

Table 1: Demographic Profile of participants

		Count	Percentage (%)
Sex of respondents	Male	38	67.9
	Female	18	32.1
Age of respondents	16-19	0	0.0
	20-29	28	50.0
	30-39	17	30.4
	40-49	8	14.3
	50 and above	3	5.4
Educational qualification of respondents	Primary	0	0.0
	Secondary	0	0.0
	OND	0	0.0
	B.Sc/HND	41	73.2
	Masters, Ph.D	15	26.8
	Others	0	0.0
Occupation of respondents	Student	9	16.1
	Business man/woman	11	19.6
	Civil Servant	9	16.1
	Public Servant	10	17.9
	Lecturer	7	12.5
	IT Professional	5	8.9
	Unemployed	4	7.1
	Others	1	1.8
Income of respondents	Below N10,000	2	3.6
	N10,000 - N39,999	8	14.3
	N40,000-N69,999	13	23.2
	N70,000-N99,999	6	10.7
	N100,000 and above	25	44.6

Table 2: How long have you been using the computer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	6-12 months	3	5.4	5.4	5.4
	Between 1yr and 5yrs	14	25.0	25.0	30.4
	5yrs and above	39	69.6	69.6	100.0
	Total	56	100.0	100.0	

Table 3: State your years of experience in internet usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 yr	4	7.1	7.1	7.1
	Between 1 and 5 yrs	16	28.6	28.6	35.7
	5 yrs and above	36	64.3	64.3	100.0
	Total	56	100.0	100.0	

**Table 4: How would you rate your knowledge about computer/internet?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	25	44.6	44.6	44.6
	Average	26	46.4	46.4	91.1
	Low	4	7.1	7.1	98.2
	Uncertain	1	1.8	1.8	100.0
	Total	56	100.0	100.0	

**Table5: Have you used Internet banking?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	55	98.2	98.2	98.2
	No	1	1.8	1.8	100.0
	Total	56	100.0	100.0	

**Table 6: If yes, state how long you have been using it**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1yr	6	10.7	11.3	11.3
	Between 1 and 5yrs	21	37.5	39.6	50.9
	5 yrs and above	19	33.9	35.8	86.8
	Uncertain	7	12.5	13.2	100.0
	Total	53	94.6	100.0	
Missing	No response	3	5.4		
Total		56	100.0		

**Table7: Results of reliability and Construct validity**

Variable	Items	Mean	Std. Deviation	Item loadings	Cronbach $\alpha$
Perceived Usefulness	PU1	4.18	.641	.656	.756
	PU2	4.27	.706	.783	
	PU3	4.45	.503	.762	
	PU4	4.40	.627	.713	
	PU5	4.42	.567	.660	
Perceived Easy of use	PEOU1	3.95	.644	.874	.795
	PEOU2	4.04	.713	.753	
	PEOU3	4.02	.751	.813	
	PEOU5	4.11	.562	.712	
Computer Self Efficacy	CSE1	3.73	.798	.615	.721
	CSE3	3.80	.773	.899	
	CSE4	3.95	.749	.883	
Security /Privacy	SP1	3.70	.711	.903	.783
	SP2	4.05	.644	.804	
	SP3	3.64	.699	.641	
Behavioural Intention	INT1	4.32	.606	.889	.838
	INT2	4.30	.601	.918	
	INT3	4.38	.590	.797	

### Adequacy Test

KOM and Bartlett's Test of Sphericity

Also Kaiser-Meyer-Olkin (KMO) and Bartlett test were carried out. SPSS 16 was the software used because of its robustness and flexibility in research analysis. KMO values larger than 0.5 are considered adequate [28]. The research variables and their KMO values used are shown in Table 8.

**Table 8: Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity**

Variable	KMO	Bartlett's Test		
		Approx. Chi-Square	df	Sig.
Perceived Usefulness	.788	58.903	10	.000
Perceived Easy of use PEOU	.754	68.544	6	.000
Computer Self Efficacy CSE	.586	48.927	3	.000
Security /Privacy	.533	38.763	3	.000
Behavioural Intention	.672	73.081	3	.000

### 4.3 Correlation Analysis and Model Summary

Table 9 provides a summary of a Spearman correlation analysis to test the relationships among the TAM constructs. While the TAM model suggests a positive relationship between Perceived Usefulness and Behavioral Intention, it appears that the data do not support a significant relationship between these two concepts. However, significant relationship can be found between Perceived Ease of Use and Behavioral Intention at the .05 level of significance. Unfortunately, no significant relationships can be found between Perceived Computer Self Efficacy and Perceived Security/Privacy with respect to Behavioral Intention.

### Summary of Hypotheses Testing

Hypothesis	Relationship Tested	Results
H1 toward using internet banking	Perceived Usefulness is positively related to intention	Null hypothesis is Supported ( $p > .05$ )
H2 toward using internet banking.	Perceived ease of use is positively related to intention	Alternative hypothesis is Supported ( $p < .05$ )
H3 toward using internet banking.	Perceived Computer Self Efficacy is positively related to intention	Null hypothesis is Supported ( $p > .05$ )
H4 toward using internet banking.	Perceived Security/Privacy is positively related to intention	Null hypothesis is Supported ( $p > .05$ )

**Table 9: Correlations**

			PU	PEOU	CSE	SP	INT
Spearman's rho	PU	Correlation Coefficient	1.000				
		Sig. (2-tailed)	.				
		N	56				
	PEOU	Correlation Coefficient	.229	1.000			
		Sig. (2-tailed)	.090	.			
		N	56	56			
	CSE	Correlation Coefficient	.402**	-.129	1.000		
		Sig. (2-tailed)	.002	.342	.		
		N	56	56	56		
	SP	Correlation Coefficient	.352**	.175	.143	1.000	
		Sig. (2-tailed)	.008	.198	.292	.	
		N	56	56	56	56	
	INT	Correlation Coefficient	.263	.340*	-.088	.215	1.000
		Sig. (2-tailed)	.051	.010	.517	.111	.
		N	56	56	56	56	56

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Tables 10 and 11 presents the squared multiple correlations of the various variables in the model. For the “intention to use internet banking,” the value of  $R^2$  is 0.164, which means the model can explain only 16.4% variations of the “intention to use internet banking.” This is obviously very low.

**Table 10: Model Summary**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.405 <sup>a</sup>	.164	.099		.49397

a. Predictors: (Constant), SP, PEOU, CSE, PU

**Table 11: Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.302	.927		2.483	.016
	PU	.284	.173	.244	1.641	.107
	PEOU	.309	.169	.243	1.829	.073
	CSE	-.168	.118	-.200	-1.422	.161
	SP	.048	.118	.055	.403	.689

a. Dependent Variable: INT



## **Conclusion**

The authors have proposed a framework for defining and describing the degree of users using the internet banking. This framework will prove important and useful to organizations and individuals that are using or considering using internet banking. The paper investigated the TAM model and proposed a modification particularly with regards to the internet banking and the need for the integration of computer self efficacy and security/privacy into the TAM model. The framework will assist researchers already involved in internet banking research by providing a tool to describe and assess the level of its current activities. Although, the sample size of 56 used in the study represents a limitation to this research

This paper employed regression analysis of survey data to measure the impact of perceived security and privacy on the intention to use internet banking. An extended Technology Acceptance Model (TAM) is used to explore the relationship of computer self efficacy, perceived security and privacy, and TAM two beliefs: perceived usefulness, perceived ease of use towards the intention to use Internet banking. Four hypothetical situations were proposed in this study. Results of the regression analysis have only 16.4% supported for the model and only Perceived ease of use, PEOU, hypothesis substantiated. The sample size of 56 used in the study represents a limitation to this research and may have contributed to the poor model support since the research findings showed that all variables used in the model were valid, reliable and adequate.

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