

PERCEIVED RISK AND E-COMMERCE ADOPTION: EVIDENCE FROM SOUTHWEST NIGERIA

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Abstract

Electronic-Commerce has been acclaimed as being one of the major application areas in the modern settings of organized business systems; by virtue of its significant growth in recent years. However, one of the major and prolonged concerns that restrict its adoption by customers and organizations is the risk involved. The study explored the resultant impact of Perceived Risk on e-commerce adoption by customers in South West Nigeria. The study adopted a descriptive method and collected relevant data to aid the research using structured questionnaire and also reviewing important literatures in the subject area. The study sample was drawn from the database of call to pick-up customers of four top e-commerce organizations in Southwest Nigeria using purposive, stratified and accidental sampling techniques. Six hundred and sixty-six copies of questionnaires were administered, 621 were retrieved while 610 were used for analysis. Quantitative data analysis was done through descriptive statistics, Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) using (STATA 12) and the hypothesis was tested with the use of regression analysis. The result of the findings revealed that there is insignificant relationship between perceived risk and e-commerce acceptance. Based on the findings, the study recommended that e-commerce organizations and the government as a body should understand the business requirements and good management of information security sources of organization to ensure optimal security.

Keywords: Perceived Risk, E-commerce, E-commerce acceptance, Technology, Internet.

1. INTRODUCTION

Electronic commerce (e-commerce) has become a controversial issue with the development of the internet. Today, tremendous business exercises are conducted on the internet. Individuals go online to offer and purchase merchandise and services, and numerous exchanges can't be finished without internet innovation. Electronic commerce is a developing exploration study with a history of less than 20 years. The exploding development of electronic commerce exercises in the most recent decade has pulled in huge consideration from education and in addition scholars in various fields (Wang & Chen). In Nigeria, the journey to socio-

political, economic, and technological advancement began after the year 1999. However, electronic banking is one area of internet based business that has demonstrated fruitfulness in Nigeria. Practically all banks in Nigeria offer online, real-time banking services (Economist Intelligence Unit, 2006). Likewise, the Automatic Teller Machine (ATM) is the most broadly utilized medium of e-payment in Nigeria, which isn't extremely reasonable for e-commerce execution (Ayo, Adebisi, Fatudimu & Uyinomen 2008; Chiemeké & Ewwiekpaefe, 2011). Besides, in spite of the worldwide reach of e-commerce, not all nations have exploited or profited by e-commerce. There is a major difference in internet and e-commerce adoption between the developed and developing countries (Licker & Motts, 2000); in this manner making a computerized difference (Aghaunor & Fotoh, 2006; Chiemeké & Ewwiekpaefe, 2011). Additionally, a lot of researches have been carried out in the developed nations to look at the elements influencing internet and e-commerce adoption. However, their findings couldn't be generalised because of the contrasts amongst developed and developing nations, (for example, accessible infrastructure, social and cultural issues) (Kapurubandara & Lawson, 2006; Taylor & Owusu, 2012). E-commerce is as yet another idea to developing nations like Nigeria notwithstanding the fact that e-commerce has been around for quite a while (Aghaunor & Fotoh, 2006).

Perceived risk is an idea that is composed around the possibility that conduct of buyers includes risk as in any activity by customer (some of which may liable to be upsetting) will deliver outcomes that they can't anticipate with anything near assurance (Clemes, Gan & Du, 2012). Perceived risk is powerful in explaining a purchaser's conduct since buyers are more as often as possible propelled to keep away from botches than to boost utility in purchasing and this has been a main consideration influencing the acknowledgment and development of e-commerce in the developing nations (Nasri & Zarai, 2014). Kaur and Kaur (2015) opined that risk is frequently present in a decision situation since customers can't once in a while make certain that an arranged buy will accomplish palatable objectives. When purchasing services, shoppers see high risks than when purchasing merchandise, this is on the grounds that services are elusive, non-institutionalized and most circumstances sold with or without guarantees (Clemes et al. 2012).

Lee (2009) sees perceived risk similar to a composite of a few group of dangers which includes security perceived risk, budgetary risk, execution risk, mental risk, social risk and time risk. A few empirical investigations like Lee (2009); Agwu, Atuma, Ikpefan and Iyoha (2014); Kraft and Kakar (2009), have distinguished perceived risk as having a critical negative impact on the acceptance of e-commerce. The security protection risk as one of the significant parts of perceived risk is by all accounts the most frustrating element in the adoption, use and acceptance of e-commerce in developing economies. It is against this background that this paper seeks to investigate the impact of perceived risk on the acceptance of e-commerce in Nigeria.

2. LITERATURE REVIEW

Perceived risk is powerful in explaining a purchaser's conduct since buyers are more as often as possible propelled to keep away from botches than to boost utility in purchasing and this has been a main consideration influencing the acceptance and use of e-commerce in the developing nations (Nasri & Zarai, 2014).

2.1 Conceptual and Theoretical Synthesis

2.1.1 Perceived Risk and E-Commerce Adoption

Perceived risk has formally been depicted as a 'mix of vulnerability, and the reality of result included (Yousafzai, Pallister, & Foxall, 2009). The extraordinary and non-individual nature of the online condition and the unlimited uncertainty of the utilization of global facilities for transactions can raise a few risks that can be caused by functional defects or issues of security or by the direct of individuals associated with the online-transaction (Pavlou, 2003). The risk idea is composed around the possibility that the conduct of customers includes risk as in any move made by buyers (some of which might be displeasing) will create repercussions that they can't anticipate with anything close to certainty (Ackerman & Davis, 2008). Perceived risk has a capacity of clarifying purchaser's conduct since customers are more of the time impelled to avoid mistakes than to maximize utility in purchasing (Clemes et al. 2012). Risk is as often as possible exhibited in a choice situation as clients cannot generally be sure that a planned purchase will accomplish satisfactory goals (Niranjanamurthy & Chahar, 2013). Customers saw higher risks when purchasing services as opposed to merchandise since services are not tangible, non-institutionalized and every now and again sold without certifications or guarantees (Yousafzai et al. 2009). Consequentially, vulnerabilities related with the purchase of services and the likelihood of service failure result into a high level of risk in the service purchase situation (Ackerman & Davis, 2008).

E-commerce is seen by numerous buyers as the least secure technique for payment with credit-card contrasted with other shopping strategies, such as shopping in the high street and telephone shopping (Pita & Chris, 2002). Presently, an extensive number of buyers not just have negative attitude to shopping on internet, yet in addition have wrong recognition that the compromise of credit card number is most likely to happen amid the transmission of information (Ayo, Adebisi, Fatudimu & Uyinomen, 2008). However, most issues of credit card data compromise are because of merchant internet server's weaknesses (Zhu, 2013). This was upheld by Nasri and Zarai (2014) who contend that the touchy data trade off in e-commerce is not practical amid transmission however the reasonable event can be through inadequate protection of merchant internet servers. If the merchant use security socket layer, at that point the channel of communication will be ensured and along these lines the dangers over the course of transmitting information will be successful and adequately minimized. Different similar studies recognized perceived risk as the one that have a noteworthy negative and direct impact on adoption of e-commerce by customers (Haseeb, Arshad, Ali, & Yasin, 2011; Clemes et al. 2012; Hassan & Sobhan, 2012; Zhu, 2013; Kaur et al. 2015). In any case, the security privacy risk shows to be the major hindering factor in the acceptance and growth of e-commerce in the developing economy.

3. METHODOLOGY

In the light of the above synthesis, the following research question was put forward:

- i. What role does perceived risk play on the acceptance of e-commerce by customers in Southwest Nigeria?

In line with the research question above, the following was hypothesized:

H_{01} : Perceived risk does not have significant effect on the acceptance of e-commerce.

3.1 Model specification

This study model was developed following the procedures of Unified Theory of Acceptance and Use of Technology (UTAUT) Model by Venkatesh, Morris, Davis, and Davis, (2003), a model for intention to use and adopt a new technology. UTAUT model explains user intention to use an internet service and further the usage behavior. In literature, this model is an integrated model that merges eight previously used models in internet service (technology) field. However, UTAUT model was significantly adjusted to suit the need of the current study. Accordingly, the study model was developed as thus;

$$ACCE = \bar{\alpha} + \beta_1 PERI + \mathcal{E} \dots \dots \dots (Model 1)$$

$ACCE$ = e-commerce Acceptance;

$PERI$ = Perceived Risk;

$\bar{\alpha}$ = intercept; β_1 and β_2 = coefficients of predictors; and \mathcal{E} = stochastic error term.

The *a priori* expectation is that X_2 is expected to produce positive effect on e-commerce acceptance (or Intention to Use e-commerce) while X_1 is expected to produce negative impact.

This is mathematically stated as; $\beta_2 > 0$ and $\beta_1 < 0$

And the second model is developed as;

$$EUSE = \bar{\alpha} + \beta_3 ACCE + \mathcal{E} \dots \dots \dots (Model 2)$$

Where $EUSE$ = E-commerce Use;

B_3 = coefficients of predictors

The *a priori* expectation is that X_3 is expected to have positive effect on e-commerce use or adoption. This is mathematically stated as; $\beta_3 > 0$. The population of current research consists of total citizens or people in Southwest, Nigeria assumed to be users of e-commerce platforms in the country. These people are assumed to have shopped online at one time or the other. The assumption is made possible by the researcher given the difficulty in determination of total e-commerce users in the study area. However, the study population is considered to be infinite as figure exceeds 50,000. To reach targeted population, the study focuses on four main pillars of e-commerce service providers in Nigeria which are Jumia, Konga, Payporte, and Yudala (CBN Bulletin, 2017). In the main, the targeted population who are e-customers in Southwest represents the customers of these e-services providers. Further, the researcher utilized a sample determination formula by Cochran (1977) for infinite population to determine a representative sample

for the study. Representative sampling is considered as a criterion for drawing inference about the population (Brown, 2001; Burns, 1999). Accordingly, the formula is given as thus;

$$n_0 = \frac{z^2 pq}{e^2}$$

where, n_0 is the sample size, z is the selected critical value of desired confidence level, p is the estimated proportion of an attribute that is present in the population, $q = 1 - p$ and e is the desired level of precision (Cochran, 1977).

The study assumes the maximum variability to be 50% ($p = 0.5$) and taking 99% confidence level with $\pm 5\%$ precision, the calculation for required sample size will be as follows;

$p = 0.5$ and hence $q = 1 - 0.5 = 0.5$; $e = 0.05$; $z = 2.58$

So,

$$n_0 = \frac{(2.58)^2(0.5)(0.5)}{(0.05)^2}$$

$$n_0 = 665.64 = 666$$

Given the fact that n_0 derived is less than 5% of the population size. This, however, brings no need to use correction formula as suggested by Cochran (1977) and as such the figure (666) represents final sample size. In selecting sample for the study from each e-commerce provider and from each state upon which questionnaire were administered, the study adopted multi-stage sampling techniques. This comprises of convenience, stratified and random sampling techniques. The proportional allocation method originally proposed by Bowley (1926) was used to allocate sample size among States in Southwest, Nigeria based on the States proportion to total population in the study area. State capitals were used because of the availability of infrastructures, other telecommunication services and the presence of the e-commerce organizations in these states which made it easier for data collection used for this study. Similarly, the method was used to allocate samples among e-commerce providers in the study area from which samples of respondents (users) were selected. More so, the study utilized a well-developed structured questionnaire to obtain data from e-commerce users on the perception of legislation and risks associated with e-commerce acceptance and adoption in Southwest Nigeria. Information in Table 3.1 reveals that study obtained a retrieval rate of 93.2% which is considered adequate and sufficient (Sekaran, 2003).

Table 3.1: Breakdown Aggregate of Questionnaire Distribution and Retrieval

S/N	Southwest States, Nigeria	Total Distributed	Number of Retrieved Questionnaire				Total Retrieved	% Total Retrieved
			Jumia	Konga	Payport	Yudala		
1	Lagos	219	68	64	42	32	206	94.0
2	Ogun	90	33	28	14	8	83	92.2
3	Oyo	134	49	40	21	12	122	91.0
4	Osun	82	28	29	12	7	76	92.6
5	Ondo	83	35	26	11	6	78	93.9
6	Ekiti	58	28	21	3	4	56	96.5
	Total	666	241	208	103	69	621	93.2

Source: Field Survey, 2017

The study, in part, followed Partial Least Squares (PLS,) statistical procedures employed by original developer of UTAUT Model (Venkatesh *et al*, 2003). PLS regression is used particularly to predict a set of dependent variables from a set of independent predictors (Ayo *et al*, 2008). It provides framework for complex context like current study to be empirically analysed with components latent factors which possess predictive power. In other words, this method combines characteristics of both principal components analysis and multiple regression analysis. On the other part, the study employed Ordinary Least Square (OLS) method to complement non-estimation power of PLS in arriving at models adjusted R – Square measures which can be used to assess the relative significance of several models. Adequate and reflective components of e-commerce acceptance and e-commerce predictors were obtained through PLS prior to further analysis via OLS. The selection of adequate and reflective components was based on high values for item-variable loadings through PLS. This practice is consistent with Venkatesh *et al* (2003). Again, the selection based on item loadings has been recommended in psychometric literature by Nunnally & Bernstein (1994). Further, internal consistency reliabilities of items or observed variables in explaining latent factors and validity (convergent and discriminant) among factors were determined through measurement model estimation from PLS. This is consistent with previous research on technology acceptance by new users (Venkatesh *et al*, 2003). Behavioural e-commerce acceptance to use e-commerce in the study area was measured with two unobserved factors, perceived risk of users and perceived legislation by them, and moderated with internet experience. The use of users' perceived risk to measure the acceptance of technology has been studied by Agwu *et al* (2014); Agwu and Murray (2014); Clemes *et al* (2012); Yousafzai *et al* (2009). Eight items were each used to proxy the predictor of e-commerce acceptance while five items and six items were used to measure e-commerce acceptance and users' e-commerce use behaviour respectively. The study hypotheses were tested using Hierarchical Regression. The measurement model shown in the table below reveals outcome of ICR, validity test and item loadings from PLS.

Table 3.2: Preliminary Test of Constructs (Measurement Model)

	ICR	Mean	S. Dev.	$\sqrt{\sigma^2}$	PERI	ACCE
PERI	0.79	4.01	1.04	0.87	1.000*	
ACCE	0.88	3.87	0.55	0.85	0.533*	1.000*

* p < .01; ** p < .05

Note: i. ICR: Internal Consistency Reliability

- ii. $\sqrt{\sigma^2}$: Square root of the shared variance between the constructs and their measurement items.
- iii. Diagonal elements represent Pearson Correlation coefficient between constructs (PERI= Perceived Risk; and ACCE = E-Commerce Acceptance)

Table 3.3: Measurement Model - Loadings from Partial Least Regression

Construct	Items	Loadings
Perceived Risk (PERI)	PERI1	0.864
	PERI2	0.629
	PERI3	0.761
	PERI4	0.698
	PERI5	0.879
	PERI6	0.936
	PERI7	0.629
	PERI8	0.891

E-Commerce Acceptance (ACCE)	ACCE1	0.808
	ACCE2	0.693
	ACCE3	0.835
	ACCE4	0.731
	ACCE5	0.855

3.2 Presentation and Discussion of Results

3.2.1 Presentation of Results

3.2.1.1 Socio-Demographic Characteristics of Respondents

Table 3.4: Demographic Information of Nigerian Citizens in the South-West Region

Variable	Item	Frequency	Percentage (%)
Gender	Male	418	68.5
	Female	192	31.5
	Total	610	100
Age	20 – 30 years	134	22.0
	31 – 40 years	232	38.0
	41 – 50 years	195	32.0
	51 years and above	49	8.0
	Total	610	100
Marital Status	Single	116	19.0
	Married	366	60.0
	Divorced	98	16.0
	Separated	30	5.0
	Total	610	100
Education	WAEC/WASCE	37	6.1
	ND/NCE	114	18.7
	HND/B.Sc	380	62.3
	Masters	48	7.8
	Others	31	5.1

	Total	610	100
Employment	Full Time	293	48.0
	Part Time	122	20.0
	Not in Employment	61	10.0
	Self-Employment	134	22.0
	Total	610	100
Internet Experience	0 – 2 years	125	20.5
	3 – 5 years	246	40.3
	6 – 8 years	173	28.4
	9 years and above	66	10.8
	Total	610	100
Income Level	10,000 – 50,000	79	13.0
	51,000 – 100,000	159	26.0
	101,000 – 150,000	146	24.0
	151,000 – 200,000	122	20.0
	201,000 and above	104	17.0
	Total	610	100

Source: Field Survey, 2018

3.2.1.2 Constructs Preliminary Test

The study conducted preliminary test for all the constructs with the exception of e-commerce usage. A measurement model for the three constructs via PLS was estimated to this effect. Information revealed in Table 3.2 indicates that all the constructs internal consistency reliabilities were greater than 0.7, thus, the constructs possess high reliability and as such acceptable Hair *et al* (2006); Pallant 2011); Hinton *et al* (2004); Compeau *et al* (1999); Compeau & Hoggins (1995); Fornell & Larcker (1981). Still from the Table, the square roots of the shared variance between the constructs and their measurements items were greater than the correlation (ρ) across latent factors. This result supports evidence of convergent and discriminant validity for the constructs under study.

Moreover, reduced sets of items were taken from measurement model based on loading factors of 0.8 and above for further structural model analysis. Information regarding items selection is contained in Table 3.3. The practice of taking highest loading items is consistent with Venkatesh *et al* (2003). In the main, items *PERI1*, *PERI5*, *PERI6* and *PERI8* were considered as best weighty items to explain users' perceived risk. E-commerce acceptance by users was adequately and effectively captured by *ACCE1*, *ACCE3* and *ACCE5*. Following procedure by Venkatesh *et al* (2003), a single composite mean was used for users' e-commerce use behaviour in the regression analysis.

3.4 Structural Model Estimation

One major deficiency of PLS is its inability to produce Adjusted R^2 in an estimation process, therefore, the current study employed an alternative technique that produces the statistic. The adjusted R^2 provides comparison of descriptive power of regression models that include numbers of predictors in models Pallant (2011). In this manner, an alternative technique OLS (Hierarchical Regression) was adopted by the study. Adjusted R^2 obtained from OLS models was used for assessment of improvement of the models at each level of the analysis. The latent variables generated through measurement model from PLS were utilized to estimate structural equation model using Ordinary Least Square technique. The outcomes of structural equation modelling are displayed in the following Tables extracted from hierarchical regression analyses.

Table 3.5: Hierarchical Regression Result (PERI)

Dependent Variable: ACCEMEAN

Model	Predictor	Coefficient	Std. Error	P> t	P-value	R ²
1- Item Level	<i>F – Stat</i>				0.0000	0.41
	Peri1	-.0603481	.033228	0.070		
	Peri5	.0902111	.0192304	0.190		
	Peri6	-.5427728	.0291565	0.000		
	Peri8	.5427728	.0234153	0.275		
	_cons	-1.004407	.2841022	0.000		
	AIC	-300.702				
	BIC	-278.938				
	Breusch-Pagan	236.92			0.4421	
2- Aggregate Level	<i>F - Stat</i>				0.0000	0.12
	Perimean	-.7045532	.0771799	0.080		
	_cons	1.142054	.3498709	0.001		
	AIC	454.5513				
	BIC	445.7244				
	Breusch-Pagan	64.64			0.5910	

The result in Table above depicts the overall significance of risk variable models both at item and aggregate data levels to explain e-commerce acceptance and hence exhibits joint significance of all risk predictors. Probability value of *F – statistics* (.0000) confirmed this result. At item-level, information criteria indicate that Schwarz Bayesian Information Criterion (BIC) was preferred to Akaike Information Criterion (AIC) given its smaller value. The assumption of equal spread (homoscedasticity) among the error terms of the models was not violated. Breusch-Pagan / Cook-Weisberg test confirmed this non-violation. From the Table, the findings

revealed that apart from item PER16 all other predictors of e-commerce acceptance in terms of risk factor were statistically insignificant. Thus, only incidence of intrusion as a risk factor significantly affects e-commerce acceptance in the study area. The result indicates that an increase in incidence of intrusion reduces users' adoption level by 0.41. In addition, the researcher estimated the total impact of perceived risk proxy by component mean score. Here, the researcher considered aggregate risk variable as the predictor in the second model. The analysis of aggregate risk variable in the second model is premised on the need to explain indirect effect of the predictor on e-commerce use and allow comparison between item level model and aggregate data level model. The result in the Table reveals that at aggregate level, users' perceived risk of e-commerce significantly reduces the acceptance of e-commerce in Southwest Nigeria. However, the result proves to be insignificant. In this manner, the null hypothesis that there is no significance relationship between users' perceived risk and acceptance of e-commerce platforms in the study area was not rejected rather accepted. However, the adjusted R-square measures from the two models indicate that item level model was good and adequate than aggregate model though the outcomes of the two models exhibit better fits.

4. CONCLUSION

The current study empirically evaluated the relationship between e-commerce acceptance and adoption behaviour (use) in Southwest Nigeria through indirect and direct effects. Prior to the latter, researcher analyzed indirect effect via users' perceived risk about e-commerce technology. From the study analysis, key findings emerged. It was discovered that perceived risk have no significant effects on e-commerce acceptance. When users' risk perception level increases, the level of e-commerce acceptance in Southwest Nigeria diminishes significantly. This result conforms to *a priori* expectation of the study and in agreement with previous findings such as Agwu *et al* (2014); Agwu and Murray (2014); Clemes *et al* (2012). However, findings revealed that the strength of relationship between e-commerce acceptance and e-commerce use in Southwest geopolitical zone varies with the level of internet experience. This finding is consistent with previous finding by Venkatesh *et al* (2003). In a nutshell, this study provides empirical evidence that users' perceived risk about e-commerce platforms in Southwest Nigeria is an important determinant of such technology (e-commerce) acceptance which ultimately have positive and significant effect on adoption rate.

5. CONTRIBUTIONS TO KNOWLEDGE

The following are the contributions of the paper:

- i. The study expanded the application of theory discussed in this study which allow for contribution to the theorizing of e-commerce adoption by substituting behavioural variables (Performance Expectance, Effort Expectancy, Social Factors and Facilitating conditions) with internet security variables (Perceived trust, privacy, risk, legislation and internet experience) to the already established UTAUT model.
- ii. This study contributed to the body of knowledge by recommending to managers of e-commerce organizations that internet security variable (perceived risk) are very significant to the adoption of e-commerce in developing countries most importantly Nigeria. Also, customers are now aware that organizations must provide security for online transactions in order for them to adopt e-commerce. The questionnaire developed for this study can also be used as a template for further researches in this area

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