



**HOW TECHNOLOGY ENHANCES CLUSTERED OF SINGLE  
SMALL BUSINESSES-AGGREGATELY KNOWN AS SMEs:  
A LOOK AT NIGER DELTA'S FORECASTING INDICATORS  
FOR TECHNOLOGICAL ENDORSEMENT BY BUSINESSES**

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**Abstract**

*In this 21st century, Elec-commerce in the business and marketing sector has been accorded the needed recognition and acceptance universally because of its numerous advantages to market development and business growth desire by managers. This study focus on analysing types of Elec-commerce applications adoption by difference kinds of small and medium-size enterprises (SMEs) crucial mediating roles in the adoption of Elec-commerce applications in the Niger Delta. The questionnaire was used as an instrument for primary data collection of which a total of 244 sample of SMES and their SMEs-managers were investigated. The Data analysis entailed the computation of descriptive statistical method such as ANOVA, correlation analysis and multiple regression analysis were employed to validate whether relationships between technological readiness, adaptability of Elec-commerce application, pressure from business rivals, inventiveness of SMEs-managers, assumptive rewards of the applications were major determinants of the adoption of Elec-commerce by the SMEs in Niger Delta. The results from the study showed that factors such as elec- readiness of facility, adaptability of Elec-commerce application, pressure from business rivalries, inventiveness of SMEs-managers, foreseen or assumptive benefits of implementing applications were major determinants of the adoption of Elec-commerce by the SMEs. The SMEs adoption of Elec-commerce for marketing, exchange of information between or infra-firms and supplier's chains, customers and promotion of products. Paradoxically, business-size and education of SMEs-managers had no significant impact of the applications of Elec-commerce by the SMEs. The study therefore, recommends that SMEs must increase the applications of the Elec-commerce in a cost effective and efficient manner.*

*Keywords: SMEs; Elec-Commerce Adoption; forecasting e-commerce predictors, Niger Delta*

**INTRODUCTION**

The era of non-innovation and technological applications are over in view of the advantages that goes with innovation and technology in all spheres of life in this 21<sup>st</sup> century. Consequently, this reality connotes the reason why all progressive managers or SMEs-managers must be innovative -conscious in order to make good use of the available elec-commerce applications to avoid being left out in the scheme of thing as regard to application of state-of-the-art-technology within and outside their business environ particularly in the Sub-Saharan Africa's business environment. Consequently, elec-commerce has consistently metamorphoses in diverse ways over the years in terms of how businesses are conducted in this era of information technology whilst altering the ways businesses sell to their clients, purchase or transacts with numerous

customers and suppliers that has witnessed some major advanced transformations in business operational patterns and trends in recent times; being it from “production excellence” to “customer intimacy” (MacGregor and Vrazalic 2005) and also from being it even just a mere “agent of seller” to being “agent of buyer” (Achrol and Kotler 1999); So, business primary aims are not physical products alone but also focus on service delivery, information and intelligence. (Rayport and Jaworski 2001). Therefore, the contemporary economy era known also as information era - has been laden with innovative ideas for optimum business performance. The trend of electronic commerce in entrepreneurship necessitated the desired for new economy business environment using the internet and electronic gadgets like computer and cell phones and so on. Therefore, the SMEs in this dispensation has got a lot of challenges in an attempt of adopting the elec-commerce that is widely considered inevitable. However, ensuring the full adoption of this much desire innovative technology of elec-commerce in business enterprises will no doubt yield some favourable outcomes when apply in business. This is true in view of business capacity building available via elec-commerce in terms of growth and advancement creating a competitive edge in all spheres of business efforts. Hence, by implication, non-adopters whose fate of extinction in business will lessen more and may soon be left behind in business operational efficiency and cannot compete at all. By the same token, the aforesaid position of non-adopter was further re-echoed by Jerry Jasinowski the then, President of the US National Association of Manufacturers, in the Wall Street Journal by saying that “small firms need to get in the elec-commerce game otherwise they are going to be shut out of a critical part of the marketplace” (Shah Alam, Ali et al. 2011). As a result, all stakeholders such as governments and their agencies have over the years, demonstrated a high level of responsibility by encouraging SMEs in diverse ways, but then again are is yet, attainment of the desired result as projected by experts fell below expectations. Similarly, majority of the African developing economies are still lagging behind as compare to the large enterprises in spite of the relentless efforts to ensure full adoption of elec-commerce even when some barriers have been identified and solutions offered. (Grandon and Pearson 2004, Chong 2008, MacGregor and Kartiwi 2010, Chiliya, Chikandiwa et al. 2011, Pham, Pham et al. 2011, Ayegba, Lin et al. 2018)In few of this presence realities, some rhetorical questions that readily come to one mind include, to what extend are precise factors influencing Forecaster of SMEs adoption of elec-commerceprecise, exact knowledge resolved from the academia and theoretical standpoint?, what government policies or programs are geared toward revitalising elec-commerce in business day to day operations?. As things has always been, it seen to be business as usual with no potent or concrete remedies in sight yet. Actually, SME popularity still glow amidst challenges as a household name in any nation of the world even though its varies from country to country in

terms of capital-used, sizes, number of employees and so on. Traditionally, most developed economies' moved along the paths of micro to macro-economic without being stagnated all their life span in the early micro-stage. As noted in extant publications, over the years, these small businesses gradually transformed to large enterprises henceforth, contributed to their homeland economies first, and then over a period of time extended their realms of influenced overseas. Secondly, every societal economic growth primarily relies heavily on its micro-economic contributions especially the developing economies; In order, to ascertain progress and degree of economic growths and maturity utilised in planning policies and so on, most professionals source for data via surveyed via obtaining primary data-set in form of numeric statistical values used for quantifying globe's famous standardized like the gross domestic products (GDP), human development index (HDI) and so on. Apparently, world bodies like EU, World bank, IMF, UNDP's policies, programs and actions are usually drawn from available economic data along with others criteria. Therefore, SMEs are strategic participants and the engine growth of developing economies' vibrancy and operational growths from the start. (Kurnia, Choudrie et al. 2015) Importantly, most families especially in Africa have no state welfare, but economic-self-reliance thereby, earning their living through petty businesses to support their families economically; this informed the survival mentality with no ambitions to mature their businesses to become innovative but perpetually remain micro path, meeting just basic needs. On the contrary, advanced nations enjoy improved social status created politically by states policies or scheme for wellbeing for the masses. According to Carl, (Liedholm 2002) developing especially in Asia and Africa economies the roles of SMEs cannot be over emphasized in ensuring eradication of abject poverty among the masses, reduction in joblessness (Sin Tan, Choy Chong et al. 2010, Ayegba, Lin et al. 2018) Large enterprises especially in developed economies have had numerous studies carried out on themselves through research grant funding, by so doing, it created understanding of their operational crescendos improving their businesses optimum performance, particularly in innovative business ideas through information sharing techniques and investment in research and development (Daniel and Grimshaw 2002, Williams, Dwivedi et al. 2009). On the contrary, only few studies probed Sub-Saharan African SMEs operational subtleties as related to ecommerce adoption Forecaster in their economics adoption as per requiring concise knowledge henceforth, extant shortage of valuable information in this area which may stir up knowledge on African SMEs contextual nature yearning for innovation needs. As a result, developing economies must keep thriving to discovered and applied same principles advanced nations adopted, Interestingly, there are great differences that still existed between the SMEs and large enterprises. SMEs are not just 'a little big business' (Hanna and Walsh 2008), Their small sizes make them behave in a certain

patterns which include centrally control management, decision-making capacities, having said that, they lack major ingredients that are crucial to their growth and development; one of their frequent challenges is that the SMEs are grossly underfunded and cannot sell or have limited shares in stock market (MacGregor and Vrazalic 2007), All the above-mentioned lapses are attributed to the limitations face by SMES. Firstly, Nigeria is one of the developing countries in Africa, and recognized as having the 1<sup>st</sup> largest population in the African continent. It also has the largest geographical area in West Africa. Furthermore, Nigeria is also recognized as the biggest exporter of crude oil and gas in the world, consisting of more than two million barrels per day. On the other hand, as commonly found in most developing countries, the adoption of elec-commerce by Nigerian SMEs is still lagging behind when compared to SMEs in developed countries, (MacGregor and Kartiwi 2010)

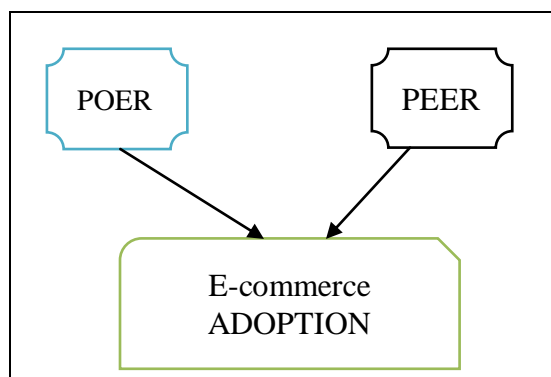
### **THEORETICAL FRAMEWORK AND THE EMERGING PATTERNS OF ELEC-COMMERCE ADOPTION BY SUB - SAHARAN AFRICA'S SMEs**

The four major mechanisms of Elec-commerce adoption are innovativeness, the firm or organization, the business environ and the business-drivers or managerial team. All these crucial factors are interwoven and function as a system in ensuring an interactionism which is the basis for dynamic actions that affects conditions outside the organization framework to be realized. This perception plays a major role such that all these factors co-influence among the each other to regulate innovation, both within and outside the organizational environment which by articulating a real-world sense of challenge with the concept of resolving a problem when dysfunctional or unintended(Jarvenpaa and Leidner 1998). In two contextual environments similar ideologies might produce difference outcomes. However, this deduction gave reasons for some kind of innovations either within or outside certain environment that varies in performance by not producing equal results as desire. However, the interactionism model can point out or give concise clarity about this latent fact. A lot of literature derived from advanced nations has explained the interactionism perspective for example, Kuan and Chau (Kuan and Chau 2001), discussed the model EDI attributed on the framework of technological-organizational-environmental factors. Similarly, Stacey, investigated the conceptualizations of SMEs' goals on seeking chances through identifications of opportunities(Urban and Stacey 2015). Research has a mixture of innovation along with other elec-commerce perceived influential variables for adoption. Likewise, in 2015, Shao, Zhang et al (Shao, Zhang et al. 2015) using their unique investigative model, theoretically demonstrated how clients' feedbacks can be an innovative driver for business growth. Another issue raised by Chen and Chung (Chen and Chung 2017)in their conceptualization of CEO's choices can influenced business growth either ways; they

identified key dimensions of factors to emphasized on their point of views. All this mentioned theoretical factors originated from diverse developing economies scholarly contributions of theoretical concepts in discussing innovative ideas. Asikhia and Awulusi also conceptualized business process re-engineering (BPR), they suggested how existing businesses can be revolutionized to achieving innovation successes which enhance performance and business profitability(Asikhia and Awolusi 2015).Electronic commerce readiness (eReadiness) as a factor when it comes to elec-commerce adoption in developing economies. On the other hand, just of recent, a number of eReadiness assessment tools have been developed and many countries attempt to assessed for their eReadiness status(Bridges 2005). The business environmental factors are the underlying framework of multiple e-Readiness indicators were formulated by innovation experts and researchers alike to ascertain how ready a country is, when it time to absorb innovative technology in small businesses sector of her economy. Even though it not precise or clearly explains in all environmental contexts like the developing countries context for example, the major differences still exist between the non-adopters and adopters of innovation; and again, it provided some clues for further studies.(Ozdemir and Trott 2009) secondly, a rhetorical question easily come to mind such as, is there any definite period of time frame set for an adopter of elec-commerce progression to attain maturity from the period of adoption? This kind of question can help further researchers to fathom out precisely. Definite information provides the needed guides for stakeholders, such as the governmental organizations or agencies and business managers to gain precise knowledge or accurate indicators required on specific environmental and contextual variables for innovation adoption especially for elec-commerce forecaster the benefits include, helping policies and programs formulations(Deise, Wright et al. 2000, Choucri, Maugis et al. 2003). To clearly ensure that a credible paradigm is provided to base on, a theoretical basis such as the interactionism model which explained why an organization innovative concerns can be influential both internally or externally when predicting developing economies' innovation adoption for the SMEs without ambiguity. In addition, we assumed that numerous perspectives can create some chances that are capable of measuring up to the four earlier mentioned factors. The status of the decision-makers particularly the managerial role or inputs is our primary focus especially the untraceable vagueness attributed to their e-Readiness clause. Therefore, managerial decision-making may be influence by external forces, coordinated by surrounding innovative trends, however, business environ and competitive situations may play some vital roles by informing managers the needs for immediate innovative readiness which might finally influence their final decisions on adoption of elec-commerce for their firms. Perceived eReadiness Model (The (PERM), to ensure that the model is robust, we postulated two important theories; Perceived

Organizational Readiness (POER) and then the Perceived external Readiness (PEER), the modeling of POER's dynamics was represented and explained by considerable numbers of researchers had done works on this model hence, according to Molla and Licker in their study conducted in 2005 noted that EDI bases constituted two of which non bases comprises of developing countries(Molla and Licker 2005) another notable researcher is ChoucriMaugisetali acknowledged the need for comparison and identification of weaknesses which can become a stepping stone for the next ecommerce great success(Choucri, Maugis et al. 2003). Having said that, what easily comes to mind is; to what extent does an organization understood the perception and development require when projecting future plan to adopt Elec-commerce having quantified the alternatives and recognized the risks and obligations aspect of the innovative-gains. (Firm's innovative preparedness-stance point)To what extent are managers' 'e-readiness-engulf' as per fully dedicated and fully persuaded to adopt the Elec-commerce (Managerial attitudinal-stance point); and to what extend can a firm or organization be willing to judiciously disburse its resources for the course of innovations quest in terms of business equipment, infrastructure personnel to mentioned but a few (Firms' Resource-capacity-stance point).

Figure 1 highlight of basic structure of the Elec-commerce model.



Source: Adapted from EDI Model (Choucri, Maugis et al. 2003)

Firms or an organizational evaluation in terms of relevant external relevant, immediate environmental factors can be noted and identified through the PEER (environmental-encroachment-stance point). Therefore, the merging of the dual conceptual paradigms' - PEER and POER as shown in figure 2; indicated the existence of synergised which informed the basis for determining future forecaster of Elec-commerce adoption and even explaining the relevance parts of the discrepancies that existed which necessitated the willingness and readiness to

arrive at a decision prior to adopting of innovation such as Elec-commerce. Secondly, certain post adoption assessments can be carryout to ascertain the maturity level of elec-commerce over time. In general, every innovation progresses through various phases depending the contextual environmental factors surrounding it, therefore, Elec-commerce is not exempted. In most developing economics, six variables as factors were identified as the basic migration pathway from the view point of elec-commerce maturity model; the six-phases are crucial in (Deise, Wright et al. 2000, McKay, Prananto et al. 2000). Therefore, these indicators for understanding developing countries' progression are highlighted as follows; zero-Elec-commerce, active-Elec-commerce, passive-Elec-commerce, engaging-Elec-commerce, progressive-Elec-commerce, and robust-Elec-commerce.

## **METHODOLOGY**

This study investigated the adoption of Elec-commerce by SMES in Nigeria using the Niger Delta Region as a case study. The study specifically identified the predominant scope of applications of Elec-commerce by the SMES and the determinants of the adoption of the Elec-commerce applications.

### **Population and sample for the study**

The study was conducted using different categories of SMES in the Niger Delta Region in Nigeria ranging from those in the service sector, manufacturing, retail and wholesale in the Delta region. The target population of the study constituted all the SMES in the region however all these SMES could not be used for study. Nevertheless, a sample was selected and the table below gives the details of the target SMES and the sample selected. In all about 244 SMEs-managers managing these SMES were finally randomly selected for the study.(Merriam 1998, Sauerbrei, Royston et al. 2007), in the case of fractional approach to determining sample size, a fraction of 10% or more is enough to be a good representative sample and it is possible to achieve its purpose. In this situation, the sample size of 244 will be adequate enough to achieve the intended objectives of the study. During the study, 244 major SMES in the 10 major commercial industrial cities in the region were randomly selected. These ten cities were purposively selected due to the fact that they were classified as the commercial hub of the region. These SMES comprised of Food and Beverage Metal works, Auto mechanics Chemicals, Agro- industries, Clothing & Textile, Biscuits, Restaurant & bar, Metal construction Metal fabrication, Soap and production Hair dressing& barbing salon, interlocking tiles Ballotters Production Electric Production Candle Production Plastic Production Paint production, Oil palm processing, Fish production Poultry Production Piggery, Other livestock processing,



Garment/fashion Foot Wears Leather bags. In each of the ten cities, 24 SMES were selected from each except for Akwa industrial cities who has a greatest number of SMES where 28 were selected randomly. From each of the 244 SMES considered, their SMEs-managers were selected to form the respondents for the study. The chief research instrument used was the structured questionnaires which constitute questions items in a Likert Scale form ranging from 1-strongly disagree to 5- strongly agree. The questionnaires covered the demographic features of the SMEs-managers, the predominant applications or adoptions of the Elec-commerce applications and the major factors that influence their adoption of the SMES ranging from technological factors, organizational factors, individual factors and the environmental factors. The reliability test results of the construct using Cronbach alpha has been presented below.

### Reliability Test of the Instrument Construct

Table 1 Reliability test

Constructs	Number of items	Cronbach Alpha
Perceived benefit	4	0.721
Adaptability	3	0.802
Perceived EXPENDITURE of EC	2	0.732
CEO's knowledge about IS	2	0.733
CEO's innovativeness	3	0.740
BIZ RIVALRY	3	0.832
Buyers/suppliers pressure	3	0.761
Support from technology vendors	2	0.84
CEO's experience in IS	3	0.732
Technology readiness	4	0.781
Elec-commerce adoption	7	0.853

The reliability coefficients of each of the eleven constructs were more than 0.7 which shows that, the items were reliable hence can produce meaningful and consistent results (Creswell 2009).

### Analysis of Data

The primary data collected were first vetted, validated and coded into SPSS computer software for the analysis. Descriptive statistics, and regression analysis were used to answer the research questions of the study (Norušis 2006). The Regression model was used to estimate the magnitude of impact of independent variables (determinants of Elec-commerce adoption) on a

dependent variable (Elec-commerce adoption) (Karlsson and Sheiner 1993, Greene 2003, McMillen 2004). The regression model was used to analyze how technological factors, organizational factors, environmental factors and individual factors on the adoption of Elec-commerce. The regression equation is given as:

$$y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \dots + \beta_nx_n + \mu_i(1)$$

The dependent variable is denoted by  $y$ , and the independent variables are represented as  $x$ 's while the error term is indicated by  $\mu_i$ . The empirical regression model to estimate how technological factors determines the adoption of Elec-commerce is given as:

$$ELECADOPTION = \beta_0 + \beta_1Assumreward_1 + \beta_2Adaptability + \beta_6expenditure_3 + \mu_i(2)$$

$$ELECADOPTION = \beta_0Firmcapacity + \beta_2Equipmentavailability_2 + \mu_i(3)$$

$$ELECADOPTION = \beta_0 + \beta_1Bizrivalry + \beta_2Purchasefrenzy_2 + \beta_6Equipinvent + \mu_i(4)$$

$$ELECADOPTION = \beta_0 + \beta_1SMEENCIS_1 + \beta_2SMEINVE_2 + \beta_6ACA_3 + \beta_6SMEISCLUE_3 + \mu_i(5)$$

These four empirical regression models were estimated where Model 1, 2, 3, and 4 estimated the influence of Technological, organisational, environmental and individual's factors on the adoptions of Elec-commerce respectively. From the equations, ELEC-ADOPTION is the dependent variable which denotes the adoption of Elec-commerce by the SMEs. In this study, the scope of the applications of Elec-commerce use by the SMEs was used as a proxy for Elec-commerce adoption. The use of this proxy was inspired by (Gibbs and Kraemer 2004) who defined the scope of elec-commerce use as the extensive applications of number of various different-commerce activities such as for advertising, sales, procurement, communicating with customers, and sharing information with suppliers in the firm's activity. While the independent variables:

ASSUMREWARD - Assumptive reward of the Elec-commerce application

ADAPTABILITY - adaptability of the Elec-commerce application

EXPENDITURE - expenses of Elec-commerce DIGITAL application

PURCHASEFRENZY - pressure from Purchasers /clients

EQUIPINNOV - equipment assistant from innovative vendors

BIZ RIVALRY - BIZ RIVALRY from rival businesses

FIRMCAPACITY - firm capacity

EQUIPAVAIL - equipment availability

SMEENTIS - SME's manager ENCOUNTER with Information systems and internet

SMEISKNOW - SME-manager's Academy prowess in INFORMATION SYSTEMS

SMEINVENT - inventiveness of the Business Establishment

ACADCLUE - state of the academy clue of SME's manager

## RESULTS AND DISCUSSION

This study examined how technological contexts, organizational context, environmental contexts and individual contexts, are identified as determinant factors that influence the adoption of Elec-commerce by SMES in Nigeria. This section discusses the results and findings from the study.

### Demographic characteristics of respondents

#### *Gender of Respondents*

Results from Table 2 below reveal the gender of the participants of the study who were the SMEs-managers of the SMEs selected for the study. The results from the Table below indicated that, 74(30.3%) constituted females where 170(69.7%) were male SMEs-managers. This shows that, among the SMEs in the Region, the SMES-manager positions are dominated by Males. This confirms that study by who found that, females are left behind when it comes to the establishment of SMEs and this has even accounted for the limited studies on females in SMEs. Though, there was no gender balance in the data, the research was able to achieve the intended objectives since gender did not have significant influence on the adoption of Commerce among SMEs.

Table 2 Gender of Respondents

Gender	Frequency	Valid Percent	Cumulative Percent
FEMALE	74	30.3	30.3
MALE	170	69.7	100.0
Total	244	100.0	

#### *Age of respondents*

The study examined the age of the participants of the study since studies have Found that, Age of SMEs-managers in charge of SMES are necessary factors regarding their activities and operations. The results from Table 2.0 below show that, about 112(45.9%) of the participants are within the age of 21-30 years, 81(33.2%) are in the age group 31-40 years while only 16(6.6%) are in the age range of 51-60 years. The results show that, the SMEs are predominated by young and energetic SMEs-managers who take charge of the businesses. This implies that, these young SMEs-managers have high affinity to apply new technologies introduced into business investment and the SMEs such as the Elec-commerce. The results create a picture that, the older SMEs-managers are few indicating that, the SMEs in the Nigeria has a bright and promising future as more young stars are involved in the activities.

Table 3 Age of Respondents

Age	Frequency	Valid Percent	Cumulative Percent
21-30	112	45.9	45.9
31-40	81	33.2	79.1
41-50	32	13.1	92.2
51-60	16	6.6	98.8
60+	3	1.2	100.0
Total	244	100.0	

### ***Educational background of respondents***

The study again assessed the educational background of the participants who were the SMEs-managers of the various SMES considered for the study. The findings from the Table 3.0 indicate that, majority of the SMEs-managers (52.9%) managing these SMEs considered for the study had Senior Secondary education as their highest educational qualification while 53(21.7%) had obtained their degrees from the tertiary institution while 50(20.5%) had Junior Secondary school as their highest educational qualification. Only 12(4.9%) of the participant had basic education as their highest level of education. Educational level of the SMEs-managers is expected to influence their individual innovativeness, and adoption of the Elec-commerce applications. It is argued that, as individual move higher in the academic level, the more they adopt new technology easily. The educational level of the respondents is presented in Table 4.

Table 4 Educational background of respondents

Educational level	Frequency	Valid Percent	Cumulative Percent
Tertiary	53	21.7	21.7
SEC/VOC/TECH	129	52.9	74.6
JHS	50	20.5	95.1
Basic Education	12	4.9	100.0
Total	244	100.0	

### **Elec-commerce applications**

The main goal of the study was to identify the Elec-commerce adoption of by the SMEs and the factors that determines the adoption of these Elec-commerce applications. The Table 5 below reveal the descriptive statistics of the various applications of the E-adopted by the SMEs

through their SMEs-managers. The results show that, the predominated adoption and application of Elec-commerce is for 'Exchange of information with clients Information search with IT (Mean=4.26, Std Dev. =1.034), 'Browsing company homepages Market and product research online' (Mean=3.877, Std Dev.=0.956), Using the social media such as what Sapp, face book, for marketing (Mean=3.784, Std Dev. =1.11) Placing orders to suppliers with IT(Mean=3.664, Std Dev.=1.02). SMEs employ the Elec-commerce to benefit the business by increasing volume of sales, profit, expanding their marketing size and improve their accessibility to information sharing. Some of these SMEs share their contacts to clients and potential buyers through the internet, social media and also utilize these platforms for their sales and supplies. Again the results show that, these SMEs employ the Elec-commerce technology in receiving orders from suppliers.

Table 5 Descriptive characteristics of the adoption of Elec-commerce applications

Major Elec-commerce Applications And Adoptions	N	Min.	Max.	Mean	Std. Deviation	Var.
1.Browsing company homepages Market and product research	244	1.00	5.00	3.8770	.95648	.915
2.Exchange of information with clients Information search with IT	244	1.00	5.00	4.2615	1.03454	1.070
3.Exchange of information with suppliers Using net	244	1.00	5.00	3.1721	1.13451	1.287
5.Receiving orders from clients using internet	244	1.00	5.00	3.0656	1.29728	1.683
6.Placing orders to suppliers Intra-company communication Medium of payment	244	1.00	5.00	3.6680	1.02662	1.054
7.Using the social media such as what Sapp, face book, for marketing	244	1.00	5.00	3.7213	1.11490	1.243

### Results from the regression analyses

The regression analyses were performed to estimate the determinants of the adoption of the Elec-commerce applications by considering technological factors, organisational factors, environmental factors and individual related factors of the SMES-MANAGER and their SMEs by. The analyses employed the regression equations 2, 3, 4, and 5 to estimate their impact on the adoption separately of the Elec-commerce separately as this approach has been employed

in similar studies such as (Chwelos, Benbasat et al. 2001, Gibbs and Kraemer 2004); Gibbs & Kraemer, 2004; Poon & Swatman (Cloete, Courtney et al. 2002, Daniel, Wilson et al. 2002)) The results are presented in the Tables below.

### Technological factors influencing the adoption of elec-commerce

The table 6 below present the model summary of the regression analysis of how technological factors determines the adoption of Elec-commerce among the SMEs. The results from the Table reveals an R-square of 0.949 which implies that, about 94.9% of the variation in the dependent variable which is the adoption of the Elec-commerce are explained by the model. This show a high explaining powered of the model. The Durbin-Watson value of 1.748 also shows that, there is no autocorrelation among the variables in the regression model.

Table 6 Model Summary

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.950	.949	1.10369	1.748

a. Forecaster: (Constant), EXPENDITURE, ASSUMREWARD, ADAPTABILITY

b. Dependent Variable: ELEC-ADOPTION

The ANOVA table shows the results for the overall significance of the model. The Probability for the F statistics ( $P=0.000$ ) shows that, all the explanatory variables in the model jointly explains the variable in the dependent variable Adoption of the Elec-commerce applications among the SMEs. The results also show that there is significant difference among the variables used in the models.

Table 7 ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	5519.419	3	1839.806	1510.352	.000 <sup>b</sup>
1	Residual	292.351	240	1.218		
	Total	5811.770	243			

a. Dependent Variable: ELEC-ADOPTION

b. Forecaster: (Constant), EXPENDITURE, ASSUMREWARD, ADAPTABILITY

Table 8 Results from the regression model 1

Model		Unstandardized		Standardized	T	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	-1.096	.354		-3.101	.002
	ASSUMREWARD	.472	.028	.317	16.559	.000
	ADAPTABILITY	1.135	.038	.632	29.491	.000
	EXPENDITURE	-.297	-.043	.148	-6.883	.000

There are three variables identified in technological contexts in this study that influence Nigerian SMEs in utilisation/optimisation ecommerce, these are perceived benefits, perceived adaptability and EXPENDITURE. It was found in this study that the perceived benefit has a positive and significant impact on the adoption of elec-commerce utilisation. The results show that, perceived benefit was significant at 1% level thus ( $P < 0.01$ ). The coefficient of 0.472 means that, a unit increase in the perceived benefit will increase the applications of the Elec-commerce by 40%. This implies that, the perceived benefit is one of determinant factors of elec-commerce utilisation by SMEs in Nigeria. Therefore, this finding may be consistent with previous studies such as (Chwelos, Benbasat et al. 2001, Christou and Sigala 2002, Gibbs and Kraemer 2004, Quaddus and Achjari 2005, Migiro 2006, Al-Qirim 2007, Chong 2008, Shah Alam, Ali et al. 2011) who also found that, perceived benefits of the Elec-commerce increases its adoption which in this case was measured by the number of applications the Elec-commerce.

The results also showed that, perceived adaptability has a positive impact with elec-commerce utilisation and this was statistically significant at 1% level. The results denote that, as the Elec-commerce applications become more compatible, the number of the applications among the SMES increase. Thus, a unit increase in the adaptability of the Elec-commerce applications, the number of applications of the Elec-commerce increase by 1.2 units This finding is also consistent with the findings of the (Grandon and Pearson 2004, Grandon and Pearson 2004, Sin Tan, Choy Chong et al. 2009, Sin Tan, Choy Chong et al. 2010, El-Gohary 2012) studies, in which the perceived adaptability was a determinant factor of elec-commerce utilisation. One explanation for this result might be that SMEs, especially in Nigeria, utilize the Elec-commerce applications provided they are compatible. It also confirms the fact that Nigeria has developed in terms of technology and IT applications and their systems are available for their integration into the operation of the SMEs

However, EXPENDITURE has negative and statistically significant impact on Elec-commerce utilisation among the SMEs. A possible explanation for this finding may be because

the price of hardware and software related to elec-commerce technology may be really expensive for SMEs due to the emergence of powerful personal computers (and now tablets etc.). As EXPENDITURE increase by unit, the number of applications reduces by 0.297 units. Studies have suggested that, Elec-commerce applications should be made affordable as IT develops in this modern and global era.

### Organizational Factors Influencing the Adoption of Elec-commerce by SMES

The table 9 below present the model summary of the regression analysis of how organizational factors determines the adoption of Elec-commerce among the SMEs. The results from the Table reveals an R-square of 0.836 which implies that, about 83.6% of the variation in the dependent variable which is the adoption of the Elec-commerce are explained by the model 2. This show a high explaining powered of the model. The Durbin-Watson value of 2.00 also shows that, there is no autocorrelation among the variables in the regression model.

Table 9 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.915 <sup>a</sup>	.838	.836	1.97920	2.00

a. Forecaster: (Constant), EQUIPAVAIL, FIRMCAPACITY

b. Dependent Variable: ELEC-ADOPTION

The ANOVA table 10 shows the results for the overall significance of the model. The Probability value for the F statistics (P=0.000) shows that, all the explanatory variables in the model jointly explains the variable in the dependent variable Adoption of the Elec-commerce applications among the SMEs. The results also show that there are significant differences among the variables used in the models.

Table 10 ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	4867.718	2	2433.859	621.322	.000 <sup>b</sup>
1	Residual	944.052	241	3.917		
	Total	5811.770	243			

a. Dependent Variable: ELEC-ADOPTION

b. Forecaster: (Constant), EQUIPAVAIL, FIRMCAPACITY



Results from the Table 11 show shows that, Technology readiness and company size will be classify as organizational context and identified in this study as determinant factors of elec-commerce utilisation by SMEs in Nigeria. However, based on the proposed model of regression, on the regression analysis, it was found that only technology readiness that has a positive and significant impact on the elec-commerce adoption, while company size was found not to be significant. The technology readiness was statistically significant and positive determinants of the adoption of Elec-commerce at 1% level. The coefficient implies that, as technology readiness increase by a unit, the adoption also increases by 1.6 units. This result indicates that the technology readiness is one of the determinant factors that may influence SMEs in Nigeria in Utilising elec-commerce technology. This result is consistent with previous studies, such as (Iacovou, Benbasat et al. 1995, Zhu, Kraemer et al. 2006, Oliveira and Martins 2010, Ramdani, Chevers et al. 2013). Even morefound that technology readiness was the most critical factor in e-business utilisation by business in developing countries especially Nigeria and results in Table 11 below confirms that.

Table 11 Results from regression model 2

Model	Unstandardized Coefficients		Standardized	t	Sig.	
	B	Std. Error	Coefficients			
			Beta			
	(Constant)	4.167	.517		8.064	.000
1	FIRMCAPACITY	.050	.143	.011	.346	.730
	EQUIPAVAIL	1.613	.056	.909	28.960	.000

a. Dependent Variable: ELEC-ADOPTION

On the other hand, it is indicated that the Nigerian SMEs do not recognize the company size as a factor that influences them in utilisation of elec-commerce. A closely related result was found also in (Gibbs and Kraemer 2004, Zaidi, Al-Qirim et al. 2005, Al-Qirim 2007). A possible explanation for this condition is because Nigerian SMEs are majorly still at a lower level in the utilisation of elec-commerce(Rahayu and Day 2015),whereby most of them have just an inactive or non-interactive website or even just e-mail. This technology is certainly less expensive than other technologies such as EDI for example(Chwelos, Benbasat et al. 2001).

### Environmental Factors Influencing the Adoption of Elec-commerce

The table 12 below presents the model summary of the regression analysis of how environmental factors determines the adoption of Elec-commerce among the SMEs. The results

from the Table 12 reveals an R-square of 0.60 which implies that, about 60.% of the variation in the dependent variable which is the adoption of the Elec-commerce are explained by the model. This show a high explaining powered of the model. The Durbin-Watson value of 1.82 also shows that, there is no autocorrelation among the variables in the regression model.

Table 12 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.779 <sup>a</sup>	.607	.602	3.08470	1.823

a. Forecaster: (Constant), EQUIPTECH, PURCHASEFRENZY, BIZ RIVALRY

b. Dependent Variable: ELEC-ADOPTION

The ANOVA table 13 shows the results for the overall significance of the model. The Probability value for the F statistics (P=0.000) shows that, all the explanatory variables in the model jointly explains the variable in the dependent variable Adoption of the Elec-commerce applications among the SMEs. The results also show that there are significant differences among the variables used in the models.

Table 13 ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	3528.085	3	1176.028	123.593	.000 <sup>b</sup>
1	Residual	2283.686	240	9.515		
	Total	5811.770	243			

Three variables which are customers/suppliers pressure, BIZ RIVALRY and external support from technology vendors were classified as environmental contexts in this study, and these variables are identified as the factors that influence SMEs in Nigeria in utilising of elec-commerce technology. This results show that, pressure from Competitors has a positive and statistically significant impact on the adoption of Elec-commerce at 1% level. The coefficient implies that, as the BIZ RIVALRY from rival firms' increases, the adoption of the Elec-commerce applications also increases. Similarly, Support from Technology vendors and the pressure from customers also increase the adoption of the Elec-commerce and these two factors were statistically significant at 1% level. The results indicate that, customers/suppliers pressure, competitor pressure and external support may be recognized by Nigerian SMEs as variables that influence them in utilisation of elec-commerce technology.

Table 14 Results from regression model 3

Model	Unstandardized		Standardized	t	Sig.	Collinearity		
	Coefficients		Coefficients			Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
	(Constant)	1.972	1.007		1.957	.051		
1	BIZ RIVALRY	.821	.108	.428	7.614	.000	.517	1.934
	PURCHASEFRENZY	.581	.103	.305	5.645	.000	.561	1.784
	EQUIPTECH	.516	.137	.180	3.762	.000	.714	1.400

a. Dependent Variable: ELEC-ADOPTION

Hence in this study, a possible explanation for this condition is that majority of customers in Nigeria may be recognize as an “online shopper with a conventional manner” (Rahayu and Day 2015), in which the customer visits online sites only to see products offered, and if they are interested, they place an order conventionally through mobile cell phone, fax or even face to face. As a result, business generally, SMEs in particular as a results it has become a common trend to attracted customers.

### Individual Factors that Influence the Adoption of Elec-commerce

The table 15 below presents the model summary of the regression analysis of how factors determines the adoption of Elec-commerce among the SMEs. The results from the Table reveals an R-square of 0.56 which implies that, about 56 % of the variation in the dependent variable which is the adoption of the Elec-commerce are explained by the model. This show a high explaining powered of the model. The Durbin-Watson value of 1.89 also shows that, there is no autocorrelation among the variables in the regression model.

Table 15 Model Summary

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate	Durbin-Watson
1	.756 <sup>a</sup>	.571	.564	3.22885	1.886

a. Forecaster: (Constant), SMEISCLUE, ACAD, SMEENCPIIS, SMEINVEN

b. Dependent Variable: ELEC-ADOPTION

The ANOVA table 16 shows the results for the overall significance of the model. The Probability value for the F statistics (P=0.000) shows that, all the explanatory variables in the model jointly explains the variable in the dependent variable Adoption of the Elec-commerce applications

among the SMEs. The results also show that there is significant differences among the variables used in the models.

Table 16 ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	3320.089	4	830.022	79.615	.000 <sup>b</sup>
1	Residual	2491.682	239	10.425		
	Total	5811.770	243			

a. Dependent Variable: ELEC-ADOPTION

b. Predictors: (Constant), SMEISCLUE, ACAD, SMEENCNIS, SMEINVEN

Table 17 Results from regression model 4

Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
	(Constant)	3.764	1.414		2.662	.008
	SMEENCNIS	.258	.106	.113	2.442	.015
1	ACAD	-.233	.265	-.037	-.877	.381
	SMEINVEN	.740	.102	.413	7.266	.000
	SMEISCLUE	.976	.146	.366	6.687	.000

a. Dependent Variable: ELEC-ADOPTION

SMEs-manager's IT encountered by experienced of (SMEENCNIS), SME's inventive awareness (SMEINVEN), and SMEs-managers' IT clues through knowledge (SMEISCLUE), were found to be statistically significant and have positive impact on the adoption of elec-commerce applications by the SMES managers. The results show that, factors such as SMEs-manager's inventive understanding (SMEINVENT), and SMEs-managers' IT level of awareness (SMEISCLUE) were significant statistically at 1% level while SMEs-manager's IT encounter via awareness (SMEENCNIS) was significant at 5% level. The results imply that, as the SMEs-managers' experience, knowledge and innovativeness in the information systems and technology increase, they tend to apply more of the Elec-commerce. These findings are in agreement with previous studies, such as (Thong 1999, Wymer and Regan 2005, Al-Qirim 2007, Ramdani, Kawalek et al. 2009, Al-Zoubi, Thi et al. 2011, Ghobakhloo and Hong Tang 2013) who confirm that, personal attributes of SMEs-managers have positive effect on their adoption of Elec-commerce.

## LIMITATIONS AND FUTURE DIRECTION

We noted that this research focus majorly on small businesses located in some selected big cities in the Niger Delta region which limit the generalisability of the research thereby excluding other major cities in the region hence, future researchers should include all major cities in the Niger Delta, to make it robust having said that, the scope of the research should increase possibly all the major cities which will increase above the 244 sample sized adopted and utilized to examined the SMEs-managers in the region.

## CONCLUSION

Based on the findings, it can be safely drawn that the utilisation of elec-commerce by SMEs in Nigeria is most likely to be influence by several determinants which are mostly perceived or seen as benefits, technology readiness, owners' innovative awareness, owners' IT experience and owners' IT ability. The expected results are also likely to prove the individual attribute or denominator is likely to also play a significant role in utilisation of elec-commerce technology by SMEs in Nigeria. Specific knowledge may likely to be drawn simultaneously both from SMEs as premier or distinct from large enterprises (LE) and for SMEs in developing countries as against their counterparts in the developed world. Finally, the goal of this study is which analysed the type of Elec-commerce applications adopted by difference kinds of SMEs and the dynamic factors that motivate adoptions of those Elec-commerce applications by managers in the Niger Delta Region of Nigeria's oil rich region was achieved as projected from the start of this empirical investigation.

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