

## E-banking and Bank Performance: Evidence from Nigeria

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### Abstract

*The resultant of technological innovation has been the transformation in operational dimension of banks over some decades. Internet technology has brought about a paradigm shift in banking operations to the extent that banks embrace internet technology to enhance effective and extensive delivery of wide range of value added products and services. However, the fact that e-banking is fast gaining acceptance in Nigerian banking sector does not assuredly signify improved bank performance nor would conspicuous use of internet as a delivery channels make it economically viable, productive or profitable. Whether progression is made in the use of internet technology (e-banking) or not, there should be parameter to empirically assess its impact over specified period of adoption. Consequently, the study examined the impact of electronic banking on banks' performance in Nigeria. Panel data comprised annual audited financial statements of eight banks that have adopted e- and retained their brand name banking between 2000 and 2010 as well as macroeconomic control variables were employed to investigate the impact of e-banking on return on asset (ROA), return on equity (ROE) and net interest margin (NIM). Result from pooled OLS estimations indicate that e-banking begins to contribute positively to bank performance in terms of ROA and NIM with a time lag of two years while a negative impact was observed in the first year of adoption. It was recommended that investment decision on electronic banking should be rational so as to justify cost and revenue implications on bank performance.*

**Key Words:** Bank Performance, Electronic Banking, Internet Technology.

### 1.0 Introduction

Explosive growth in Information and Communication Technology (ICT) have removed narrowed digital divide and turned business sphere to electronic world (e-World). Specifically, technological innovations have led credence to global transformation of operational dimension of traditional banks over a decade ago. Internet technology has brought about a paradigm shift in banking operations to the extent that banks embrace internet technology to enhance effective and extensive delivery of wide range of value added products and services. Consequently, Nigerian banks, especially the commercial ones, recognised electronic banking to be the most effective means of distinguishing themselves from other competitors by investing in

sophisticated technology (Ovia, 2001; Ayo, Uyinomen, Ibukun & Ayodele, 2007; Auta, 2010).

In the last few years, Nigerian banks have been witnessing tremendous success in the delivery of a wide range of value added products and services through e-banking and there have been evidences on increasingly acceptance of e-banking (Agboola, 2006; Ayo, 2010). Idowu, Alu and Adagunodo (2002) also observed that Nigerian banks have realised that the way in which they can gain competitive advantage over their competitors is through the use of technology (e-banking). Thus, there is growing rate of technology adoption in the Nigerian banking operations (Salawu & Salawu, 2007). However, the fact that e-banking is fast gaining acceptance in Nigerian banking operation does not assuredly signifies improved performance nor would conspicuous use of internet as a delivery channels make it economically viable, productive or profitable. Whether progressions are made in the use of internet technology (e-banking) or not, there should be parameter to adequately measure performances of these banks over specific period of adoption.

Globally, several empirical studies exist on e-banking and its impact bank performance. However, some studies carried out, though offered useful guide for e-banking strategic decisions, provide empirical mixed evidences. For example, Furst, Lang and Nolle (2000), Hasan, Maccario and Zazzara (2002), Yibin (2003), Hasan, Zazzara and Ciciretti (2005), Hernado and Nieto (2006), De Young, Lang and Nolle (2007) and Ciciretti, Hansan and Zazzara, (2009) reported positive impact; Delgado, Hernando and Nieto (2004) and AL-Samadi et al. (2011) observed a negative impact while Eglan et al. (1998) observed no significant impact. Also, there is a relative dearth of empirical studies that provide quantitative evidence on the impact of e-banking on bank performance in Nigeria, despite its increasing rate of adoption by Nigerian banks. Hence, this study sought to provide empirical quantitative evidence on impact of e-banking on bank performance in Nigerian context using a sample of 8 Nigerian banks that have adopted e-banking over the period 1999-2010.

### 2.0 Theoretical and Empirical Framework

#### 2.1 Conceptualizing E-banking

The term e-banking is technically and intricately complex to define as it may be interpreted differently from different accessing viewpoints. The versatility of e-banking as delivery multichannel increases the intricacy of being precisely defined in the literature. Nonetheless, several

attempts have been made to offer succinct and all-inclusive meaning of e-banking (Furst et al, 2000; Basel Committee Report on Banking Supervision, 1998; Kricks, 2009; Auta 2010). For example, Furst et al (2000) viewed e-banking or internet banking as the employment of a remote delivery channel in performing banking services; Kricks (2009) termed e-banking as automated delivery of new and conventional banking products and services directly to customers through electronic, interactive channels. Kricks (2009) is more emphatic in definition of e-banking as the emergence of e-banking has not relinquished traditional banking products and services but rather transformed traditional models to enhance quality service delivery, real time access, reduce operational cost and ultimately achieve maximum efficiency in banking operations (Ovia, 2001; Gonzalez, 2008). While e-banking serves as automated, interactive channels by which customers conveniently gratify their demands for bank transactions, elsewhere the term is observed to be a larger concept than users' satisfactions (Pyun, 2002).

In addition, e-banking is viewed as the process by which a customer carries out banking transactions electronically without going to a brick-and-mortar institution (Simpson, 2002). In this case, e-banking is defined from the state of branchless or virtual banking indicating that geographical location in banking sphere seems to be less important as banks continue to adopt e-banking. However, the most commonly accepted definition of e-banking is the one given by Basel Committee Report on Banking Supervision (1998). The committee defined e-banking as "the provision of retail and small value banking products and services through electronic channels". In this paper, e-banking is defined as the use of intelligent devices through internet to effect banking operations. Such intelligent devices may be mobile or immobile.

## 2.2 Adoption and State of E-banking in Nigeria

Several research have been conducted on the adoption, customers' acceptance and choice of banks, and state of e-banking in Nigeria (Idowu *et al.*, 2002; Ezeoha, 2005 & 2006; Chiemeké et al, 2006; Agboola, 2006; Salawu et al, 2007; Egwali, 2008; Ayo, Adebisi, Fatudimu & Uyinomen, 2008; Agboola & Salawu, 2008; Ayo, Uyinomen, Ibukun & Ayodele, 2007; Maiyaki & Mokhtar, 2010; Adepoju et al, 2010; Olanmi, 2010; Ayo, 2010; Ajah & Chibueze, 2011). For example, Chiemeké et al. (2005) examined the level of adoption of internet banking in Nigeria and found that internet banking was being offered at the basic level of interactivity with most the bank having mainly information sites and providing little internet transactional services while Ayo et al (2010) reviewed the state of e-banking implementation in Nigeria and evaluated the influence of trust on the adoption of e-payment using an extended technology acceptance model (TAM), found that e-banking was increasingly adopted by Nigerian banks which was confirmed by Ovia (2001). Also, Auta (2010) empirically examined the impact of e-banking in Nigeria's economy using Kaiser-Meyer-Olkin (KMO) approach and Bartlett's Test of Sphericity, found that Nigerian customers banking

sector have no enough knowledge regarding e-banking services being offered in Nigerian banking sector. As far as Nigeria is concern, e-banking is extensively gaining prominence and the recent implementation of cashless policy by Central Bank of Nigeria increases its rate of adoption (Nigerian Television Authority, October, 2012).

## 2.3 E-banking vis-à-vis Traditional Banking in Nigeria

Nigerian banks started adopting e-banking five years after US banks launched their electronic channels (Chiemeké, Ewiewpaefe & Chete, 2006). Before year 2000, all banks in Nigeria were virtually bricks and mortar banks. That is, they were operating manually and highly restricted to fundamental role of safekeeping. Hence, all commercial banks before this time were traditional banks. Customers went to their banking premises to effect transactions, though element of e-banking was present because customers used telephone to effect transactions. After this period, most of the commercial banks in Nigeria started e-adopting e-banking at almost the same time. Currently, all commercial banks in Nigeria are fully automated e-banking but the impact of e-banking on bank performance vis-a-vis traditional banks is yet to be empirically validated, which this paper revealed.

## 2.4 Previous Empirical Studies

Chunks of empirical studies exist in the literature on the performance of banks adopting e-banking. The reason is that e-banking has cost and revenue implications and hence on the profitability of banks adopting it (Guru & Staunton, 2002; Berger, 2003). Hernado et al. (2006) examined the impact of the adoption of a transactional web site on financial performance using a sample of 72 Spanish commercial banks over the period of 1994-2002 and found a positive impact on profitability, which was similar to DeYoung et al. (2007) who found that internet banks are more profitable than non-internet banks, though no specification were made as to time of significant reality. Also, Onay, Ozsoz & Helvacioğlu (2008) examined the impact of internet banking on banks' profitability of Turkish over the period (1995-2005). They found that internet banking starts contributing to banks' ROE with a time lag of two years confirming the findings of Hernando et al. (2007) while a negative impact was observed for one year lagged dummy.

Contrarily, Malhotra and Singh (2009) examined the impact of internet banking on performance and risk tracing the experience of Indian commercial banks during June 2007 and found that that the profitability and offering of internet banking does not have any significant association, which was correspond to the findings of DeYoung (2005) and Arnaboldi and Claeys (2010). In addition, Mohammad and Saad (2011) examined the impact of electronic banking on the performance of Jordanian banks over the period (2000-2010) using OLS regression and found that electronic banking has a significant negative impact on banks

performance which was similar to the findings of Delgado et al. (2007) and Siam (2006).

From empirical review above, it is clear that there is mixed evidences on the impact of e-banking on banks performance in the literature. Hence, this paper attempted to provide evidence of impact of electronic banking on banks' performance in Nigeria using panel data approach.

### 3.0 Empirical Estimation Methods

In order to establish empirical relationship between bank performance and electronic banking in Nigeria, a multiple regression model was predicted in equation 1 having followed Athanasoglou, Brissimis and Delis (2005).

Data set employed in this study include annual financial statement of eight commercial banks (over period 1999-2010), macroeconomic variables as obtained from the publications of the Central Bank of Nigeria Statistical Bulletin, World Economic Outlook (2012), Factbook published by the Nigerian Stock Exchange, World Bank Data Sheet and National Bureau of Statistics. Records on the date of adoption of e-banking by the sample banks were obtained through Delphi technique whereby questionnaires were sent to the headquarters of each of the sample banks via their e-mail. Relevant accounting ratio analysis was performed on the financial statements obtained before subsequently imputed for further analysis by using SPSS version 20 and Gretl Econometric Software.

### 3.1 The Predicted Model

$$BP_{it} = \alpha_i + \sum_{i=1}^J \lambda_i Ebanking_{it} + \sum_{t=2}^T \gamma_t BCON_{it} + \sum_{k=1}^K \beta_k X_{itk} \quad (1)$$

Where  $BP_{it}$  = dependent variables (bank performance) of bank  $i$ , in year  $t$ ,  $Ebanking^1$  = the matrix of dummy variables to account for adoption of electronic banking by the bank  $i$ , in year  $t$ . Thus,  $Ebanking^1$  is a dummy variable that takes 1 if bank introduced in year  $t$  (that is, in the last 1 year);  $Ebanking^2$  takes 1 if the bank adopted e-banking in  $t+1$ ,  $BCON^T$  = the dummy variable to account for bank consolidation during the sample period. It takes value of 1 if bank  $i$  was consolidated, otherwise 0,  $X_{it}$  = the vector of  $k$ th explanatory variables (determinant of banks performance) for each bank  $i$ , in year  $t$ ,  $\varepsilon_{it}$  = disturbance error term  $\{\varepsilon_{it}$  is independently and identically distributed as  $N(0, \sigma^2)\}$ .  $\alpha_i$  is a bank fixed effect term that captures time-invariant influence specific to bank  $i$ . The main interest of the study was on the coefficient of e-banking while other variables were infused into the model as control variables. Table 1 is a summary of variable specification of the predicted model.

A general test of specification error was conducted on equation (1) to determine the relevance of bank

consolidation dummy variable included in the model. To achieve this, Ramsay's RESET test was carried out. Evidence found that dummy variable accounting for bank consolidation was adequate. White's test of heterogeneity indicated no existence of heterogeneity across the banks.

### 4.0 The Results

The result of estimation using Pooled Ordinary Least Square (OLS) is available on Table 2. In the year of adoption ( $Ebanking^1$ ), e-banking seems to have significant negative impact on the performance of banks in Nigeria in terms of NIM but no significant impact of e-banking in terms of ROA and ROE. This could be attributed to high cost on IT as a result of employing modern technology as well as informational level of e-banking adoption as at that time. The result is similar to Mohammad et al. (2011) and Khrawish and Al-Sa'di (2011) who conducted the same analysis on Jordanian banks using OLS regression and found that e-banking has a significant negative impact on banks performance in terms of NIM and no significant impacts of recent adopter's bank in terms of ROA and ROE due to higher financial cost of adopting electronic banking. In addition, Delgado et al (2004) observed a negative relationship between e-banking and bank performance due to higher financial costs and lower fee income of e-banking.

However, in the second year following the adoption of e-banking ( $Ebanking^2$ ), there is a significant positive impact in terms of ROA and NIM estimations. This result corresponds to the findings of Onay et al. (2008) who examined the same analysis on Turkish banks over the period (1995-2005) and found that e-banking starts contributing to bank performance with a time lag of two years.

### 5.0 Conclusion

Technological innovations have led credence to global transformation of operational dimension of traditional banks over a decade ago. Consequently, electronic banking has brought about a paradigm shift in banking operations to the extent that banks embrace internet technology to enhance effective and extensive delivery of wide range of value added products and services.

In this research, the impact of e-banking on the performance of Nigerian banks was analysed. By using panel data from 8 commercial banks that retained their brand name and have adopted e-banking between 1999 and 2010, estimations were done on the impact of e-banking on bank performance in terms of return on asset, return on equity and net interest margin.

The result of the study indicates that e-banking begins to contribute positively to bank performance after two years of adoption in terms of ROA and NIM while a negative impact was observed in first year of adoption. Hence, decisions regarding investment in electronic banking should be

rational so as to justify cost and revenue implications on bank performance.

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**Table 1: Summary of Variables Specification**

	Variable	Computation	Legend	Expected Sign
<b>Dependent</b>	Banks' performance	<sup>1</sup> Net Profit(before taxes) / Total Assets	ROA	
		<sup>2</sup> Net Profit (before taxes) / Equity	ROE	
		<sup>3</sup> Net Interest Income / Total Assets	NIM	
<b>Explanatory</b>	Liquidity	Loans/Assets	Liq	+
	Credit Risk	Loans/Deposit	CrR	-
	Capital	Equity / Total Assets	Cap	+
	Operating Expenses	Operating Expenses/Total Asset	OpExp	-
	Size	Logarithm of Total Assets	S	+
	Market Power	Logarithm of Operating Expenses	MrkPower	-
	Electronic Banking	Dummy variable equal to 1 if the bank offer e-banking, otherwise 0.	Ebanking	+
<b>Control</b>	Bank Consolidation	Dummy variable takes 0 from period prior to 2004 (including 2004) and 1 from 2005.	BCON	?
	Inflation	Current Period Inflation rate	INF	?
	Cyclical Output	<sup>1</sup> GDP growth rate	Ecgrowth	+

**Table 2. Estimation Result using 96 observations included 8 cross-sectional units (1999-2010)**

<i>Explanatory Variables</i>	<i>Dependent Variables</i>								
	<i>ROA</i>			<i>ROE</i>			<i>NIM</i>		
	<i>Coefficient</i>	<i>t-statistic</i>	<i>p-value</i>	<i>Coefficient</i>	<i>t-statistic</i>	<i>p-value</i>	<i>Coefficient</i>	<i>t-statistic</i>	<i>p-value</i>
Const	-	-	0.00377**	6.17385	0.0307	0.97579	29.6516	1.2618	0.24743
	201.11	3.276	*						
	2	7							
LIQ	0.0811	0.665	0.51349	-0.49064	-2.2383	0.03674**	0.079562	1.4029	0.20342
	075	2							
CR	-	-	0.22611	-	-0.9807	0.33845	-	-2.6631	0.03232**
	0.1014	1.248		0.115834			0.052944		
	09	9					2		
CAP	0.1314	5.596	0.00002**	-	-1.9828	0.06129*	0.055241	2.3448	0.05148*
	65	7	*	0.188788			9		
OpExp	1.2067	3.136	0.00520**	-	-0.4258	0.67483	-	-0.8829	0.40657
	2	3	*	0.501512			0.269929		
Size	4.9024	1.027	0.31662	-16.9785	-1.0223	0.31885	-2.14286	-0.5590	0.59360
	3	1							
Mrkp	-	-	0.51122	15.9462	1.0402	0.31065	3.07097	0.7604	0.47183
	2.8453	0.668							
	4	9							
LGDP	35.947	3.178	0.00472**	9.31799	0.2794	0.78279	-3.70439	-0.7440	0.48112
	9	3	*						
INF	0.1587	0.564	0.57847	0.491125	0.5485	0.58942	0.138399	1.2044	0.26756
	46	8							
BCON	-	-	0.00648**	-1.25808	-0.0917	0.92788	-4.03578	-1.9977	0.08591*
	14.611	3.039	*						
	5	0							
E_Banking	-	-	0.53711	6.33586	0.8792	0.38975	-3.19234	-9.0514	0.00004**
	2.3568	0.628							*
	5	0							
E_Banking_1	16.952	-	0.01358**	-4.72827	-0.2428	0.80923	2.31433	2.9642	0.02098**

	9	0.859 9					
Standard Error	4.82		14.21		1.09		
Unadjusted R2	0.459094		0.31		0.95		
Adjusted R2	0.309482		0.12		0.84		
F-statistic	3.06856 (p-value =0.0024)		1.65 (p-value = 0.106)		8.89 (p-value =0.003)		
Regression Method	Pooled OLS		Pooled OLS		Pooled OLS		
No of banks included	8		8		8		

**Table 3: Descriptive Statistics**

	Mean	Std. Deviation	Skewness
ROA	3.68	4.99	5.320
ROE	26.46	16.08	0.620
NIM	5.55	2.55	1.105
LIQ	29.51	10.61	0.641
CR	46.95	17.61	0.653
CAP	13.36	10.40	5.047
OpExp	7.53	3.12	0.569
Size	7.24	1.30	-0.369
Mrkp	6.08	1.22	-0.437
LGDP	5.54	0.22	-0.299
No of Observations	96	96	96