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Technology Adoption and Organizational Profitability in the Nigerian Banking Sector

Mgbemena, Ijeamaka Charity[1] Onah, Benedict Chikwendu[2]

[1]Department of Business Administration, Nnamdi Azikiwe University, Awka, Nigeria ic.mgbemena@unizik.edu.ng
[2]Department of Business Administration, University of Abuja
chikwenduonah@gmail.com

Abstract: *This study examined the extent to which technology adoption affects profitability in the banking sector of Nigeria. The study adopted survey research design. Data used for this study were sourced secondarily from CBN Statistical Bulletin and Annual Activity Report covering various years. Multiple Regression Technique was employed in the analysis of data obtained to find out the level of significance between the identified independent variables and the dependent variables. Findings from the analysis showed that technology adoption significantly affects Return on Equity. While ATM Usages and POS Usages were found to be statistically significant, WBT Usages and Mobile transaction Usages were found not to be statistically significant to Return on Investment. It was recommended that to adequately maximize investments and increase profitability, banks should increase focus on web-based technologies and mobile banking technologies.*

Keywords: Information Technology; Profitability; Flexibility

INTRODUCTION

Adamik and Nowicki (2012) indicate that flexibility is an organisational capability that enables firms to exploit potentials in the environment to gain competitive advantage through the ability to promptly exploit changing external conditions, capability of satisfying various expectations of clients, ability to introduce more modern methods of operations, and the ability to build immunity to external threats. Organizations strive for higher flexibility in all aspects because this characteristic helps them to align and adjust their strategies to match the dynamic environments they operate in (Kara, Kayis & O´Kane, 2002; Stavrou, 2005).

Several studies have emphasized the importance of flexibility as a natural source to obtain competitive advantage and also as a management instrument for addressing rapid change situations which emerge from the organization's environment (Spicer & Sadler-Smith, 2006; Alpkan, Yilmaz, & Kaya, 2007). Flexibility gives an organization the ability to introduce new products, adjust capacity swiftly, customize products to rapidly adapt to changing requirements, and exploit emerging markets opportunities, especially when dealing with turbulent environments. In today's business environment, the traditional passive role of the customer in market transactions has shifted towards a more active stance because of information availability, globalization, and ability to network (Prahalad & Ramaswamy, 2004). Using the Internet, the customers can easily access, select, and compare information regarding the available offers of products and services.

Objective of the Study

The objective of the study was to determine how and the extent to which Technology adoption affects the Profitability of the Nigerian banking sector

Flexibility in Technology

Technology, which has the potential to bring about fundamental technological, social and economic changes that support innovation, efficiency, and opportunity maximization, also poses several challenges for organizations. These challenges include hyper-competition from all corners of the world, uncertainty in the nature of product and service offerings, and the absolute necessity to perceive and respond quickly to changing environments (Whinston, Stahl, & Choi, 1997). The need for organisations to deploy assets or capabilities to match the prevailing needs of technology and other vital variables of the marketplace becomes inevitable. Hence, flexibility in technological capability is important. Malhotra (2001) identifies technology flexibility as the ability to cope with the integration of new e-Business applications with the existing brick-and-mortar infrastructures. Technological flexibility which is critical in achieving a competitive advantage for firms in the new market environment, must first determine the effect of technological adoption within the organization. Drastic technological change can convert yesterday's core competence into a core burden today, which makes it necessary to examine how a company's core competence is related to technology and to determine the company's acceptable level of reliance on technology.

Numerous studies have argued that investments in ICT facilitate organizational changes that enhance the flexibility of firms (Bertschek & Kaiser, 2004; Brynjolfsson & Hitt, 2000). However, McEvily et al. (2004) argue that ICT is no panacea but merely an enabling factor whose productive usage requires complementary activities by firms. They argue that ICT, unlike other capabilities primarily supports innovations by improving possibilities of co-operation and information sharing between employees and firms rather than directly increasing productivity. Palanisamy (2005) notes that organizations look for flexibility to cope with environmental changes and thereby gain competitive

advantage. Effective IT integration enhances the flexibility through easier and timelier access to information necessary to respond to the changes (Rai, Patnayakuni, & Seth 2006; Swafford 2006). Alternatively, firms lacking good IT integration have difficulty supporting coordinated activities across the organization, which can lead to inferior decision making (Bharadwaj, Bharadwaj, & Bendoly, 2007).

The banking industry no doubt has witnessed advancement in technology just like any other sector. The promise of ICTs in the banking sector has been seen in terms of its potential to increase customer base, reduce transaction costs, improve the quality and timeliness of response, facilitate self- service and service customization, and improve customer communication and relationship (Garau, 2002). Liberalisation of Nigerian banking sector has drawn the attention of many banks to application of various technological devices in achieving better customer service delivery that guarantee customer satisfaction, and translates into increase profitability and higher return on investment (Fenuga & Kolade, 2010). Consequently, the introduction of facilities that enhance the delivery of banking services such as mobile banking, internet, Automated Teller Machine in an effective manner was a welcome development. The application of electronic banking products/services to banking operations has become a subject of fundamental importance and concern to all banks operating within Nigeria and indeed a condition for local and global competiveness (Ikechukwu, 2008). This development has increased the ability of firms to react more functionally flexibly towards changes in consumer preferences and introduce innovations.

2.1.4 Organisational Performance

Performance can be described as a measure that reveals the position of an organization as compared to goals and objectives. Organizational performance is defined by the utilization of organizational resources- human, physical, and capital – efficiently and effectively towards accomplishing the shared goals of the organization and satisfying its stakeholders (Carton & Hofer, 2006; Jones & George, 2009). Organizational performance is the actual output measured against the intended output (Richard, Devinney, George & Johnson, 2009). Performance is a set of financial and nonfinancial indicators which offer information on the degree of achievement of objectives and results (Lebans and Euske, 2006). Organizational performance is made up of three specific areas of firm outcomes: financial performance (profit, return on assets, and return on investment), product market performance (sales, market share), and shareholder return (Pierre, Timothy, George and Gerry, n.d.). Performance is usually evaluated by analyzing the values of qualitative and quantitative performance indicators. Effectiveness and efficiency are considered important terms in the assessment of the performance of organisations (Mouzas, 2006). They can be measured using financial indicators such as profit, rate of returns, and costs; and non-financial indicators such as market share, innovation, product quality, and service delivery. Organizational performance in this study refers to the level of firm's performance in terms of Service innovation, profitability and productivity.

The business performance of an organization can be determined by its innovation capability and investment (Cooper 2000; Ali, Ciftci & Cready 2008; Francis et al. 2012). Innovation contributes to higher business performance and strengthens competitive advantage of the firm in a number of industries and sectors in the marketplace (Gunasekaran, Forker & Kobu 2000; Sanz-Valle &Jimenez-Jimenez, 2011; Talke, Salomo&Kock 2011). It allows a firm to adapt to competition and achieve success in the marketplace (Guan and Ma 2003). It can be an invention which may be considered completely new or an improvement of an existing product or system (Dorf& Byers, 2008).Today's changing and competitive business environments inspires organisations to rely on innovations to stay ahead of competitors, create customer value, and accelerate business performance (Yanadori & Cui, 2013).

Productivity is a measure of how well resources are brought together in an organization and utilized for accomplishing a set of intended results. It is often seen as the relationship between input and output (Okoye & Ezejiofor, 2013). It describes the effectiveness of the organization in maximizing available resources towards the provision of required quality and quantity of products. Service productivity represents the efficiency of the processes for developing and providing services and how effectively input resources can be transformed into added value for the customer and economic success for the organisation (Ojasal, 2004).

Financial indicators, such as return on investment (ROI), earnings per share (EPS) and return on equity (ROE) have been used by a number of organizations to measure performance. Return on investment is used to reflect the profitability while corporate performance was measured by operating cash flows and return on investment capital (Hasnan, 2006; Sorenson, 2002). Rashid et al., (2003) measured firm's financial performance using the financial indicators, such as return on equity, return on investments, and current ratios.

Technology Adoption and Organisational Performance

The relationship between IT and firm performance has been documented (Evangelia & Michalis, 2006; Karimi, Somers, & Gupta, 2001; Oghojafor, Aduloju, & Olowokudejo, 2011).While some studies have found that IT can affect business performance directly or indirectly (Duh, Chow, & Chen, 2006; Neirotti & Paolucci, 2007), others have found negative impact of IT on firm performance (Berndt and Morrison, 1995; Warner, 1987). Several studies suggest that IT capabilities provide a basis of gaining competitive advantage and enhancing organizational performance (Santhanam & Hartono, 2003; Bhatt & Grover, 2005). Floyd and Wooldridge (1990) argued that IT capabilities enhance service reliability, reduce transaction errors, and increase consistency in performance. Kozak and Kowalski (2005) observed that banking service such as electronic payments, loans deposits or securities have become heavily dependable on ICT and this has greatly enhanced banks'

performance in terms of profits and customer retention.IT is said to have become a critical enabler of business performance by enhancing or supporting a business process (Banker & Kauffman, 2004; Bharadwaj *et al.,* 2007). The increasing volume, complexity, competitiveness, customers' sophistication, and globalization of financial services have induced a number of technological developments in the Nigerian banking industry (Sampson, 2005; Ogwuma, 1998; Mohammed 2005; and Ovia, 2006).The performance of the banking sector is measured not only by the number and variety of products/ services provided but also more importantly by the speed, efficiency and safety with which these products/services are provided. The only way of achieving this is through well-built technological systems (Ogwuma in Alabar and Agema, 2014), that can easily be adjusted to suit changes in the business environment. Ray et al. (2005) argue that when a firm fails to invest in IT resources and capabilities, by sourcing them internally or externally, such a firm is put at a competitive disadvantage in terms of the performance of its customer service process. A number of studies have argued that investments in ICT facilitate organizational changes that enhance the flexibility of firms (Bertschek & Kaiser, 2004; Brynjolfsson & Hitt, 2000).The increasing use of new technologies has increased the ability of firms to react more functionally flexibly towards changes in consumer preferences and introduce innovations (Hempell & Zwick, 2005). The use of ICT provides workers with rapid and cheaper access to information which facilitates communication among employees and allows for better co-operation between functionally flexible staff (Lindbeck & Snower, 2000; Coutrot, 2003).

Bharadwaj (2000) found that firms which possess superior IT capabilities have a significantly better performance than firms that do not possess and exploit superior IT capabilities. Reichheld (1990) demonstrate that technological change has had a dramatic impact on organizations. Technology is essential in providing faster and more efficient services to customers. While developments in the application of new technologies in ICT systems to banking have brought in a lot of benefits including offering extended services through ATMs, diversification of products, and entry into new markets (Alabar & Agema, 2014), technology acquisition must be based on actual needs and the proven ability to deliver customer – friendly solutions (Ezejiofor, 2014). Peppard and Ward (2004) argued that IT alone is unlikely to be a source of sustainable competitive advantage, but the IT capability, which is embedded within the fabric of the organization, can be tacit and difficult to imitate. It is important for banks to ensure compliance with evolving ICT in the industry and further adopt the initiative of investing in areas of improving or inventing new technologies to ensure efficient delivery of services (Alabar & Agema, 2014). By lowering the costs of communication and data storage, continuously cheaper and more enabling ICT facilitates co-operation among workers within organisations, as well as the coordination of business processes beyond firm boundaries (Bresnahan *et al*., 2002). As ICT facilitates coordination by reducing its costs, it induces organisations to adopt flexible organizational forms towards enabling increased efficiency and effectiveness.

Empirical Review

Aduloju (2014) sought to find out whether IT investments and IT managerial capabilities can account for variations in customer service performance among insurance companies in Nigeria. Using survey research design, hypotheses were tested with data gathered from 402 staff at the managerial level drawn from the selected insurance companies in Nigeria. Responses were analyzed using linear regression. A major finding of this study is that IT is a necessary, but not sufficient condition for sustainable competitive advantage in customer service. Results show that the interaction of IT investments and tacit, path-dependent, and firm-specific IT managerial capabilities significantly explains variations in customer service performance.

Wu (2011) examined the impact of environmental uncertainty on different dimensions of HR flexibility. A survey research was conducted using a sample of publicly traded Taiwan firms. Correlation and regression analysis were used to test the hypotheses. The results of the analysis supported the argument that environmental effect uncertainty was positively associated with skill and market oriented flexibility. The findings showed that firms with inability to predict the effect of a future state of the environment on the organization developed their employees with more skills and higher levels of customers' responsiveness.

Tatjana and Marko (2015) compared and analysed the correlation between the different types of flexibility and security in work and organizational efficiency in randomly selected organisations in Slovenia. Descriptive survey design was adopted. It was found that there is a low positive level of correlation between different types of flexibility and security in the context of work and also between different types of flexibility in work and organizational efficiency. The correlation between different types of security in work and organizational efficiency was found to be positive.

Alabar and Agema (2014) sought to determine the relationship that exists between the current state of ICT and customer satisfaction in the banking industry. Descriptive survey design was adopted. Regression analysis was used in testing the hypotheses. It was discovered that while the present state of ICT had significant influence on customer satisfaction, there was need for banks to continually explore the possibility of raising the standard of ICT based systems and services, intensify efforts in meeting up with global operational systems and demonstrate a high sense of reliability and responsiveness in the application of ICT in their operations.

Hempell and Zwick (2005) investigated the extent to which the usage of information and communication technology (ICT) fosters innovation activities by facilitating more flexible organizational structures in firms. Results from a large and representative data set of firms in Germany show that ICT use is associated with an increase in both types of flexibility but the implications for innovation activities differ. While functional

flexibility was found to be strongly positively associated with product innovations, numerical flexibility tends to increase innovations only in the short term, while in the long run, cost savings seem to be the dominant motive.

RESEARCH METHODS

Research Design

This study employed descriptive survey design which has the purpose of collecting detailed and factual information that describes an existing phenomenon.

Sources and Method of Data Collection

Data used for this study were sourced from secondary sources, generated from CBN Statistical Bulletin and Annual Activity Report covering various years

Variables of the Study

Variables of the second objective are Profitability(Y) as the dependent variable and Technology adoption(X) as the independent variable represented by ATM Usages(X1), Point of Sale terminal usages(X2), Mobile payments usages, and Web Based Transactions(X3).

Model Specification

The following model is specified to determine the extent to which technology adoption affects profitability

$Y= \beta o + \beta 1x1 + \beta 2x2 + \beta 3x3 + + \beta 4x4 \mu$

Where:

Y= Profitability
x1= ATM usages
x2= POS usages
x3=Mobile Banking
x4=WBT
μ = the error term

Operational Definitions of the Variables

Profitability is the state of yielding a financial profit or gain. It is the primary goal of all business ventures. Without profitability, a business organisation will not survive in the long run. Return on investment or Return on Equity is usually used to reflect the profitability (Hasnan, 2006)

Automated Teller Machine usages, Point of Sale terminal usages, Mobile banking, and Web technologies seem to have increased the ability of firms to react more flexibly towards changes in consumer preferences and introduce innovations. The application of electronic banking technologies to banking operations has become a subject of fundamental importance to all banks, and indeed a condition for local and global competiveness (Ikechukwu, 2008).

DATA PRESENTATION AND ANALYSIS

The technique employed in the analysis of data obtained was Multiple Regression Technique. Multiple regression analysis was used to find out the level of significance between the identified independent variables and the dependent variables.

Data Presentation

TABLE 1: PROFITABILITY EQUATION. ROE=f (ATM, POS, WDT, MOB)

YEAR	RETURN ON EQUITY (millions)	ATM USAGE RATE(millions)	POS USAGE RATE(millions)	WBT USAGE RATE(millions)	M0BILE (millions)
2005	0.4	3.6	1.1	0	0
2006	0.55	12.1	0.8	0.2	0.04
2007	1.88	15.7	0.4	0.9	0.7
2008	1.63	60.1	1.2	1.6	3.2
2009	4.26	109.6	0.9	2.7	1.8
2010	7.59	186.2	1.1	7.2	1.2
2011	18.49	347.6	2.1	3.6	1.9
2012	61.75	375.5	2.6	2.3	2.3
2013	73.7	295.3	9.4	2.9	15.8
2014	90	357.4	18.3	4.5	18.4

Source; CBN Annual reports, Various Issues

Table 1 Shows the variables used for the second model, where Return on Equity serves as the dependent variable and Automated Teller Machine Usage Rate, Point Of Sale Terminal Usage Rate, Web Technology Usage Rate, and Mobile banking Usage Rate (in volumes) serve as independent Variables

Data Analysis

Profitability Equation

Dependent Variable: Return on Equity
Method: Ordinary Least Square
Sample: 2005-2014
No of observation: 10

Table 2: Results of Profitability Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.540	6.351	-.400	.706

ATM USAGE RATE	.130	.036	3.583	.016
POS USAGE RATE	1.382	2.259	.612	.047
WBT USAGE RATE	-3.398	2.218	-1.532	.186
MOBILE	2.034	1.900	1.071	.333

Sources: Extract from SPSS Ver. 21

Durbin-Watson = 3.108
Adjusted $R^2 = 0.887$
F-Statistic =18.689, Prob (F-Statistic) = 0.003

Explanation of Result

The model specified examines the extent to which Technology adoption affects the Profitability of the Nigerian Banking Sector. The result of the regression analysis reveals positive relationships between the independent variables and the dependent variable. While, ATM usage rate and POS usage rate were found to be statistical significant, Mobile payment and WBT usage rate were found not to be statistically significant. The Adjusted R-squared (R^2) value of 0.887 shows that 89% change in the dependent variable is explained by the independent variables. The Durbin-Watson (DW) result 3.108 indicates a negative autocorrelation. The F-statistic was found to be statistically significant, with a result of 18.689 and p-value of 0.003 percent. This implies that the independent variables (Technology adoption variables) put together have a statistically significant relationship with the dependent variable (Return on Equity). Therefore, we accept the alternate hypothesis that Technology adoption significantly affects the Profitability of the Nigerian Banking Sector.

Result for Hypothesis

Table 2 regresses Return on Equity on Automated Teller Machine usages, Point of Sale terminal usages, Web Technologies usages, and Mobile Banking usages. The result of the analysis indicates that technology adoption significantly affects the profitability of the Banking Sector. The result indicates that the R^2 (R-squared) approximately 94 percent, and this shows a very good fit, meaning that there is a strong relationship between the variables used. The F-statistics shows that the model is statistically significant, and as such, technology adoption has a significant influence on banks profitability in Nigeria. This is consistent with the opinions of Fenuga and Kolade(2010); Garau (2002); Bertchek and Kaiser (2004); and Brynjolfsson and Hitt (2000) that proposed that the adoption of technologies lead to higher return on investment, facilitate customized services, reduced transaction cost, and increased flexibility. In the model, Return on Equity was used to proxy profitability as the dependent variable while ATM usages, POS usages, WBT usages, and Mobile Payments usages were used to proxy Technology Adoption as the independent variable. The result shows that ATM usages and POS usages assume positive sign and are statistically significant while WBT usages and Mobile banking usages were found not to be statistically significant even though mobile payment has a positive relationship with ROE.

The coefficient of ATM Usage rate has a positive sign and it is statistically significant to Profitability. This implies that the adoption of the ATM technology over a number of years has contributed positively to the increase in ROE of commercial banks in Nigeria. This is because it has facilitated customer service delivery by increasing the number of service delivery within a minimum time. This finding is consistent with the study of Itah (2014) who observed that the use of ATM has contributed positively with the performance of banks in the country. This finding is also supported by the view of Alabar and Agema (2014) that the advent of Automated Teller Machine (ATM) in Nigeria has made bank transaction easy and efficient.

The coefficient of POS terminal usages has a positive sign and it is statistically significant to Profitability as its P-value is less than 5 percent. Having a P-value of 4.7 percent, though significant, POS usage is not highly significant to the profitability of banks. This implies that while customers are becoming increasingly aware of the ease of using POS, many customers still do cash payments instead. This contrary the finding of Itah (2014) that POS is statistically insignificant, though found to be positively related with ROE

Findings

The analysis of the model which was specified to examine the extent to which technology adoption affects the profitability of the banking sector showed that technology adoption significantly affects Return on Equity, showing values of 0.887 and 0.003 for Adjusted R-squared (R^2) and F-statistic respectively. ATM Usages and POS Usages were found to be statistically significant while WBT Usages and Mobile transaction Usages were found not to be statistically significant to Return on Investment. This could be because WBT and Mobile transactions are not yet as popularly used.

Conclusion

The influence of IT flexibility on the performance of commercial banks in Nigeria was the focus of this study. From the findings, the study concludes that designing an appropriate flexibility strategy necessary to ensure effective response to and exploitation of dynamic environment requires identifying and deploying the right type of technologies.

Recommendation

To adequately maximize investments and increase profitability, banks should make their customers more aware of web-based technologies and mobile banking technologies. This will lead to an improvement in service delivery and a reduction in cost and time for the organisations.

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