



Powel Maxwell Worimegbe

ORCID ID: 0000-0002-7239-1253
Business Administration
Faculty of Management Science
Olabisi Onabanjo University,
Ogun, Nigeria
powelmaxwell@yahoo.com

Adebiyi Julius Abosedo

Business Administration
Faculty of Management Science
Olabisi Onabanjo University,
Ogun, Nigeria
abosedo.adebiyi@gmail.com

Temitope Mariam Worimegbe

Financial Studies
College of Management
and Social Sciences
Redeemer's University, Osun, Nigeria
worimegbet@run.edu.ng

**Efficiency, customers' satisfaction and deposit money
banks' performance in Nigeria**

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Abstract

Aim/purpose – The study seeks to explore the technical efficiency of Nigerian banks using production approach and; to establish the relationship that exists between technical efficiency, customers' satisfaction and bank performance in the face of a volatile economy.

Design/methodology/approach – Data used in achieving the research objectives were from both primary and secondary sources. The Data Envelopment Analysis (DEA) and Structural Equation Model (SEM) were employed in the analysis of data. 600 hundred questionnaires from 18 deposit money banks.

Findings – The study reveals that technical efficiency leads to customers' satisfaction. The findings also show that customers' satisfaction affects bank performance. Further-more, efficiency influences banks' financial performance and this indicates that banks that pursue improved financial performance using a singular approach may be fundamentally misguided.

Research implications/limitations – The study has important implications because it suggests that Deposit Money Banks should concentrate effort firstly on efficiency before

customers' satisfaction. Bank managers should also seek better way of meeting customers need thereby increasing their customers' satisfaction and increasing bank financial performance. The study is limited in scope since it does not look at other approaches in measuring bank efficiency; further studies should consider using intermediation, user-cost, asset, modern and value-added model approaches in measuring bank efficiency.

Originality/value/contribution – The study focuses solely on deposit money banks in Nigeria and empirically analyses the effect of efficiency, customers' satisfaction on financial performance of deposit money banks in Nigeria.

Keywords: Bank efficiency, customers' satisfaction, bank performance.

JEL Classification: C19 G21 G29.

1. Introduction

Nigerian deposit money banks operate in a dynamic environment, hence their activities are constantly adjusting to the changing needs and aspiration of all stakeholders. The political, socio-economic and cultural changes have made deposits money banks to create values through their intermediation function in meeting customers' needs, increase value of shareholders wealth without undermining its costs and profit. Deposit Money Banks (DMBs) are faced with decisions of minimising costs and optimising profit. Spong, Sullivan, & DeYoung (2011) argue that increasing competition from nonbank institutions and from banks expanding into new markets is putting strong pressure on banks to improve their earnings and to control costs. The issue of costs and profit has re-directed banks to efficiency. Obafemi (2012) posits that banks are more focused on earnings, mobilisation of surplus financial resources and efficient intermediation. DMBs view acquisitions as a way to spread the costs of backroom operations and product development over a larger base and to design more efficient branch delivery systems by eliminating overlapping offices, and other duplicative resources and services. Duncan & Elliot (2004) are of the opinion that the common assumption, which underpins much of the efficiency research and discussion, is that increasing efficiency will lead to improved financial performance. The aim of efficiency is to minimise cost, increase earnings, satisfy customers and improve financial performance.

Customers' satisfaction and its measurement in marketing literature reveal that service quality plays a significant role. The better the service quality rendered by a bank, the more satisfied a customer is (Barlan-Espino, 2017; Ebiringa & Okorafor, 2010). However, there has been limited research into the explicit linkages between bank efficiency, customers' satisfaction and financial performance in DMBs in Nigeria; although past research on this issue has examined a range of performance questions using a wide variety of indicators.

Empirically establishing technical efficiency, customer satisfaction and bank performance has been a tasking and complex issue. From literatures reviewed it was discovered that only the study of Duncan & Elliot (2004) looked into the issue in focus and the study was done among Australian Banks. This study therefore seeks to replicate Duncan & Elliot (2004) study among Nigerian banks and to further test if the results vary in most recent times since that of Duncan & Elliot (2004) took place over a decade ago. This research suggests that there are measurable linkages between efficiency and customers' satisfaction; between customer satisfaction and financial performance and between Customers Satisfaction and efficiency and explores them within the framework of Deposit Money Banks in Nigeria.

The research objectives include to:

1. Ascertain the effect of bank efficiency on customers' satisfaction.
2. Examine the effect of customers satisfaction on bank performance.
3. Examine the effect of bank efficiency on bank performance.

The remaining part of the study is divided into sections covering the review of literature, methodology, discussion of findings, conclusion and recommendations.

2. Literature review

2.1. Determinants of bank performance

In the analysis of bank performance, both financial and economic literature have reached a consensus on two indicators of bank performance (Bikker & Hu, 2002; Smirlock, 1985) and these are the profitability of the assets (return on equities and returns on assets) and the net interest margin although opinions differ on the effect of certain variables on bank performance. The study shows various potential determinants of bank performance by grouping the determinants into internal variables (specific to banks), macro-financial (related to banking industry) and external (macroeconomic). The internal determinants of bank performance her size, capitalisation, efficiency, ownership structure, risk and market share (Guillen, Erick, & Emre, 2014; Kasman, 2010; Noualli, Abaoub, & Ochi, 2015; Pasiouras & Kosmidou, 2007). The macro financial determinants of bank performance are market concentration, financial market maturity while the macro-economic determinants are business cycle and inflation (Casu & Girardone, 2009; Dietrich & Wanzenried, 2011; Naceur & Omran, 2011).

2.2. Efficiency measurement in banks

Omankhanlen (2013) revealed that the choice of efficiency is determined by the purpose of measuring it and that there are three levels at which efficiency is measured. The macro level where efficiency is measured at an aggregate level with the aim of determining allocative resources. The industrial level where is measured to ascertain relative performance of a firm within an industry with the aim of giving structure to the industry and the micro level where efficiency is measured with the aim of utilising resources within the firm. The purpose of this study is to determine efficiency micro level in relation to utilization of resources by the banks.

According to Nyong (2005) and Lovell (1993), there are four measures of measuring efficiency which give the actual values of efficiency. The measures identified are technical efficiency, allocative efficiency, scale efficiency and cost efficiency.

2.2.1. Technical efficiency

Technical efficiency is achieved by a firm when optimal output is achieved given a particular set of input. It is measured as the ratio between the observed output and maximum output under the assumption of fixed point or alternatively as the ratio between the observed input and maximum input under the assumption of fixed output (Porcelli, 2009). A production unit is considered technically efficient if it produces the maximum possible output from the input it processes or if in producing a given set of output, the firm utilized the smallest quantities of input. According to Koopmans (1951), technical efficiency degree measure of a production unit is obtained if the last unit can increase its production without consuming, at the same time more resources, or reduce the use of at least one unit of input by conserving at the same time, the same level of production. The measurement of technical efficiency is based on deviations of observed output from the best production or efficient frontier. Portela & Thanassoulis (2005) viewed that technical efficiency can be measured from the standpoint of profit, transaction and operations.

Money deposit banking industry is a difficult sector to measure output, input, technical change and efficiency. Berger & Humphrey (1997) argued that there is a disagreement over which services banks produce and how to measure them. As stated by Lovell (1993), the productivity of a production unit can be measured by the ratio of its outputs to input and that productivity varies accord-

ing to differences in production processes, environment in which production occurs and differences in production technology. Efficiency measurement is only part of the overall measurement of performance and efficiency measurement can be seen as the degree to which resources are optimally managed. A firm is efficient if it produces optimally with available inputs and if output is produced at minimum cost. Farrel (1957) stated that efficiency of a firm is made of two parts which are technical efficiency and allocative efficiency. The allocative efficiency is the capacity of a firm to utilise input optimally at given price and production technology while technical efficiency is the capacity of a firm to obtain maximum output from a given set of inputs.

2.3. Defining and measuring bank variables

In analysing bank efficiency, the ability to identify the right inputs and outputs pose a major problem. According to Berger & Humphrey (1992), money deposit banking subsector is a very difficult service industry in which to measure output, technical change or productivity growth. Variables may represent different information even when they carry the same label. There is major disparity and argument about what banks produce, their services and how to measure them. They identified three measures of banking output the number of transactions processed in deposit and loan accounts (flow measure), the constant or real value of money in the loan and deposit accounts (stock measure), and the number of loan and deposit accounts serviced by banks (stock measure). Casu & Molyneux (2000) posit that the three alternative approaches of selecting bank variables relating outputs are: the asset approach, user cost, and value-added approaches. Obafemi (2012), identified six approaches to bank variables (input and output) which are the production approach, intermediation approach, asset approach, user cost approach, value-added approach and modern approach. The study adopts the production approach.

2.3.1. The production approach

The production approach to banking applies the micro economy theory of production to defining and determining banks input and output variables. This approach makes use of traditional factors of production as inputs while the output measures are transactional variables. The transactional variables are those variables which determine to the extent which a bank carries out its operation

using medium of distribution. According to Shen, Liao, & Weyman-Jones (2008), the production approach takes a different view by considering bank activity as production of services, thereby considering deposits as output without considering interest paid on deposits in the total cost of production. Obafemi (2012) posits that the approach considers banks as producers of bank deposits and loan thereby neglecting financial intermediation of banks. The traditional production variables of input are land, labour and capital. Ziorklui (2001) considers expenditure on materials, cost of supplies, occupancy costs and expenditure on furniture. The production efficiency considers transactional efficiency of banks. This approach considers all variables that make transactions possible. Under this approach, an efficient banking system leads to reduced transaction cost. Arguments against this approach are the measurements of outputs and the fact that it does not consider financial intermediation of banks.

2.4. Customers' satisfaction

In literature the concept of customers' satisfaction has not had a specific way of measurement, but rather different authors measure the concepts using various parameters. Levy (2009) opines that there are three ways of measuring customer satisfaction and these include a survey where customer feedback can be transformed into measurable quantitative data, focus group or informal where discussions orchestrated by a trained moderator reveal what customers think and Informal measures like reading blocs, talking directly to customers. The National Business Research Institute (NBRI, 2009) opine that any of the following parameters can be used in measuring customer satisfaction; service quality, speed of service, pricing, complaints or problems, trust in employees, the closeness of the relationship with contacts in your firm, other types of services needed and positioning in clients' minds.

According to Felix (2017), customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy in a competitive market place where businesses compete for customers and that it is a global issue that affects all organisations, regardless of its size, whether profit or non-profit, local or multinational. Customers' satisfaction is a post-choice and behavioural evaluation or judgment of a specific purchase which indicates and precedes particular decisions if such purchase meets and performs below or above customers' expectations.

2.5. Empirical literature

Silvestro & Cross (2000) established that there is a strong negative link between customers' satisfaction and retail store financial performance.

Duncan & Elliot (2004) explored empirically the relationships between efficiency, financial performance and customer service quality among a representative cross-section of Australian banks and credit unions and the correlations between these categories of measures. In particular, it sought to explore the strength of the relationship between efficiency, financial performance and service quality. Results showed that all financial performance are positively correlated with customer service quality scores. In contrast, the absence of a consistently positive relationship between efficiency and financial performance suggests that financial institutions that pursue improved financial performance through the single-minded pursuit of lower costs may be fundamentally misguided.

Felix (2017) did a study to determine the relationship between service quality and customer satisfaction in Banque Populaire du Rwanda, Kigali branches. It was based on both descriptive and cross-sectional survey designs. The findings showed a significant and positive relationship between service quality and customer satisfaction while comparing dimension like customer loyalty with reliability, responsiveness and assurance. The researcher recommended that organizations should maintain on error-free records service, handle customer problems in constant manner, be willing to solve customer problems promptly and understand specific needs of individual customers. From the foregoing, the following research questions arose and hypotheses were formulated:

2.6. Research questions and hypotheses

The following research questions were raised in this research:

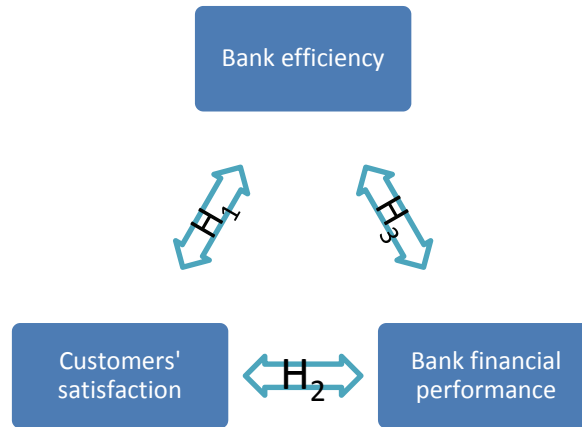
1. To what extent does bank efficiency affect customers' satisfaction in deposit money banks in Nigeria?
2. How does customers' satisfaction affect financial performance of deposit money banks in Nigeria?
3. To what extent does bank efficiency affect financial performance of deposit money banks in Nigeria?

The following research hypotheses were formulated in this research (Figure 1):

1. Bank efficiency significantly affects customers' satisfaction in deposit money banks in Nigeria.

2. Customers' satisfaction significantly affects bank financial performance of deposit money banks in Nigeria.
3. Bank efficiency affects bank financial performance of deposit money banks in Nigeria.

Figure 1. Conceptual framework showing relationship among variables



3. Research methodology

For the purpose of this research, DMBs were divided into three groups based on the Central Bank of Nigeria (CBN, 2011) classification. International Banks (10 DMB), National Banks (10 DMBs) and Regional Banks (2 DMB). Data to calculate financial performance and efficiency were taken from five years' annual reports for each financial institution and only 18 of the DMBs qualify for the analysis. In measuring efficiency, secondary data were sourced from annual financial reports of the 18 selected deposit money banks for a period of five years from 2012 to 2016. These banks were chosen because they have been in operations for over 15 years period and their stocks are quoted on the floor of Nigerian Stock Exchange as at September 2017.

Customer satisfaction data were purposively collected through the instrument of questionnaire from 600 (33 respondents from each sampled bank) survey respondents in Lagos State. Lagos state was selected because it has the highest number of banks branches and all the banks have their headquarters there. According to McIntyre (1999), surveys can elicit information about attitudes that are otherwise difficult to measure using observational techniques. A 4-point Likert scale questionnaire on customer satisfaction was distributed among Nigerian

deposit money bank customers who are 18 years and above. The questionnaires are good for asking closed-ended questions and effective for consumer research.

Structural equation models (SEM) and particularly Linear Structural Equations (LISREL) software was used to test whether there is a measurable relationship between customer service, efficiency and financial performance measures.

Data envelopment analysis (DEA) was employed in determining the technical efficiency scores of banks. The Charnes, Cooper, and Rhode (CCR) model was developed by Charnes, Cooper, and Rhode in 1978. This model proposes that the efficiency of any Decision Making Unit (DMU) can be obtained as the maximum ratio of weighted outputs to weighted inputs subject to the condition that similar ratios for every DMU are less than or equal to one. Using fractional programming, the ratio optimisation problem is transformed into an ordinary line programming problem.

$$\text{Max } e^0 = \frac{\sum_{j=1}^j u_j^0 Y_j^0}{\sum_{i=1}^i v_i^0 X_i^0}$$

Subject to

$$\frac{\sum_{j=1}^j u_j^0 Y_j^n}{\sum_{i=1}^i v_i^0 X_i^n} \leq 1 \quad n = 1, \dots, n,$$

$$v_i^0, u_j^0 \geq 0 \quad i = 1, \dots, I; j = 1, \dots, J$$

Where Y_j^n, X_i^n are positive known outputs and inputs of the n th DMU and v_i^0, u_j^0 the variable weights to be determined by solving the problem (1). The DMU being measured is indicated by the index 0, which is referred to as the base DMU. The maximum objective function e^0 given by problem (1) is the DEA efficiency score assigned to DMU^0 . Since every DMU can be DMU^0 , this optimization problem is well defined for every DMU. If the efficiency score $e^0=1$, DMU^0 satisfies the necessary condition to be DEA efficient, otherwise it is DEA inefficient.

The constraints mean that the ratio of virtual output vs. virtual input should not exceed 1 for every DMU. The objective is to obtain the ratio of the weighted output to the weighted input weights. By virtue of the constraints, the optimal objective value is at most 1.

The following research models of efficiency, customers' satisfaction and bank performance were proposed:

Model 1

Customer's satisfaction = f(Bank efficiency)

Customer's satisfaction = $\beta_0 + \beta_1$ Bank efficiency + ϵ

Model 2

Bank financial performance = f(Customer's satisfaction)

Bank financial performance = $\beta_0 + \beta_1$ Customer's satisfaction + ε

Model 3

Bank financial performance = f(Bank efficiency)

Bank financial performance = $\beta_0 + \beta_1$ Bank efficiency + ε

4. Research findings**4.1. Comparative efficiency means****Table 1.** Comparative efficiency mean

Measure	Internationalised banks means	National banks mean	Regional banks mean	Combined F between groups	Sig. *p*
Technical efficiency	92.223	85.912	56.341	43.210	0.005
Scale Efficiency	87.012	89.101	93.02	32.012	0.002

Table 1 shows the comparative means for each efficiency measure for the three groups of deposit money banks in Nigeria and shows that the means for the three groups of deposit money banks are significantly different for technical efficiency and scale efficiency. The regional clearly have the highest overall technical efficiency and scale efficiency scores. ANOVA results confirm that these differences are significant. The result reveals that internationalised banks (DEA Mean = 92.223) are more technically Efficient compared to National banks (DEA Mean = 85.912) and Regional banks (DEA Mean = 56.341). It further shows that Regional Banks (DEA Mean = 93.02) are more efficient in terms of Scale Efficiency compared to Internationalised banks (.DEA Mean = 87.012) and National banks (DEA Mean = 89.101). The result corroborates the findings of Duncan & Elliot (2004) and Karray & Chicht (2013) that there is high level of scale inefficiency among larger banks.

Table 2 shows the five-year means of the selected financial performance indicators. It shows that during the five years from 2012 to 2016, internationalised banks had the highest Capital Adequacy Ratio and Cost/Income Ratio compared to other groups of deposit money banks. This reveals their comparative level of income generated in relation to their cost of running the banks. The ANOVA result reveals that Cost/Income Ratio is a better measure of financial perfor-

mance in Nigerian banks. The findings are in line with the study of Duncan and Elliot (2004).

Table 2. Financial performance means

Measure	Internationalised banks means	National banks mean	Regional banks mean	Combined F between groups	Sig.*p*
Capital adequacy ratio	42.012	32.011	28.10	87.011	0.130
Cost/income ratio	54.32	41.342	31.211	69.086	0.000

4.2. Examining research models

Hypothesis 1: Bank efficiency significantly affects customers' satisfaction in deposit money banks in Nigeria.

Model 1

Customers' satisfaction = 2.372 + 0.0731*Scale efficiency – 0.0333*Technical efficiency + Error

Standerr	(0.369)	(0.110)	(0.0949)
Z-values	6.429	0.664	–0.351
P-values	0.000	0.006	0.035
Error Variance =	0.795		
R ² =	0.494		

From the Z-values associated with the coefficients, there is empirical evidence for rejecting the statistical hypotheses of nullity of the coefficients associated with the causal relationships between Scale efficiency ($Z = 0.664$, $p = 0.006$) and Technical efficiency ($Z = -0.351$, $p = 0.035$) which are measures of efficiency and Customers' satisfaction. Therefore, we can confirm the existence of these two relations of causality and must therefore reject the null hypothesis and accept H_A . The R^2 which is the coefficient of determination shows 0.494 and this indicates that 49.4% variation in Customer's satisfaction is caused by efficiency. The P-values of all the variables measured show that Scale efficiency and Technical efficiency are significant to the model. This is because $P < 0.05$ at 5% confidence significant interval.

Model 2

Hypothesis 2: Customers' satisfaction significantly affects bank financial performance of deposit money banks in Nigeria.

Bank financial performance = 2.569 – 0.163*Customers' satisfaction + Error

Standerr	(0.258)	(0.0963)
Z-values	9.956	-1.689
P-values	0.000	0.001
Error Variance =	0.099	
R ² =	0.283	

From the Z-values associated with the coefficients, there is empirical evidence for rejecting the statistical hypotheses of nullity of the coefficients associated with the causal relationships between customers' satisfaction ($Z = -1.689$, $p = 0.001$) and bank financial performance. Therefore, we can confirm the existence of these two relations of causality and must therefore reject the null hypothesis and accept H_A . The R^2 which is the coefficient of determination shows 0.283 and this indicates that 28.3% variation in bank financial performance is caused by customers' satisfaction. The P-value shows that customers' satisfaction is significant to the model. This is because $P < 0.05$ at 5% confidence significant interval.

Model 3

Hypothesis 3: Bank efficiency affects bank financial performance of deposit money banks in Nigeria.

Bank financial performance = 1.539 + 0.147*Scale efficiency+ 0.0737* Technical efficiency + Error

Standerr	(0.352)	(0.105)	(0.0905)
Z-values	4.373	1.400	0.814
P-values	0.000	0.002	0.001
Error Variance =	0.795		
R ² =	0.332		

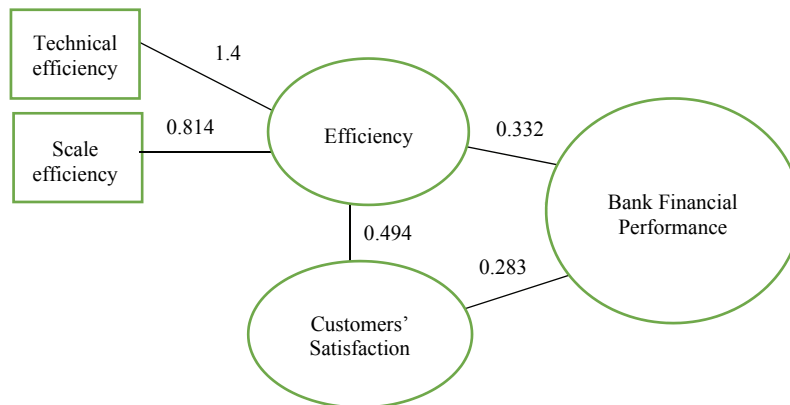
From the Z-values associated with the coefficients, there is empirical evidence for rejecting the statistical hypotheses of nullity of the coefficients associated with the causal relationships between Scale efficiency ($Z = 1.400$, $p = 0.002$) and Technical efficiency ($Z = -0.814$, $p = 0.001$) which are measures of efficiency and bank financial performance. Therefore, we can confirm the existence of these two relations of causality and must therefore reject the null hypothesis and accept H_A . The R^2 which is the coefficient of determination shows 0.332 and this indicates that 33.2% variation in bank financial performance is caused by bank efficiency. The P-values of all the variables measured show that scale

efficiency and technical efficiency are significant to the model. This is because $P < 0.05$ at 5% confidence significant interval.

Test of goodness fit

All of the paths were freely estimated, and error variances were constrained to one, which is the program default. The proposed structural equation model achieved a good fit ($\chi^2 = 459.93$, $df = 103$, $p < 0.00$; $GFI = 0.93$, $IFI = 0.96$, $CFI = 0.98$, $RMSEA = 0.091$). The path coefficients are reported in Figure 2.

Figure 2. Path analysis model of the study



Furthermore, the estimated values of the coefficients of the structural equations provide relevant information about the ways in which bank efficiency and customers' satisfaction affect bank financial performance. The result reveals that technical efficiency is the main cause of efficiency. The path analysis also shows that bank efficiency plays a more significant role in determining bank financial performance than customers' satisfaction.

5. Conclusions and recommendation

This study looks into and provides evidence on the causality between efficiency, customers' satisfaction and deposit money banks performance in Nigeria. From the empirical evidence, we concluded that with respect to hypotheses, H_1 , H_2 , and H_3 there was enough empirical evidence available to reject the statistical hypothesis of nullity of the coefficients associated with the causal relationships of bank efficiency, customers' satisfaction and deposit money banks financial performance. Therefore, we can confirm the existence of these three causal relationships and we accepted the alternative hypotheses. The result shows that efficiency and customers' satisfaction all affect deposit money bank performance. The estimation of SEM, which relates the dimensions of efficiency and

there observed measure to performance, provides a number of interesting conclusions. Performance depends primarily on efficiency and to a large extent on technical efficiency; to a lesser extent on customers' satisfaction. It is therefore of utmost importance to conclude that bank efficiency plays a pivotal role in deposit money bank financial performance.

This conclusion has important implications because it suggests that deposit money banks should concentrate effort firstly on efficiency before customers' satisfaction. The findings of this study support the works of Duncan & Elliot (2004) and Karray & Chicht (2013). Based on the results from the study, the study recommends that DMBS should explore ways to be more technically efficient. Bank managers should also seek better way of meeting customers need thereby increasing their customers' satisfaction and increasing bank financial performance.

The study is limited in scope since it does not look at other approaches in measuring bank efficiency; further studies should consider using intermediation, user-cost, asset, modern and value-added model approaches in measuring bank efficiency.

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