

UNIVERSITY OF GHANA BUSINESS SCHOOL
MASTER OF SCIENCE IN ACCOUNTING AND FINANCE

**EFFECT OF BANK INNOVATIONS ON FINANCIAL
PROFITABILITY AND EFFICIENCY OF BANKS IN GHANA**

The image shows a large, faint watermark of the University of Ghana crest in the background. The crest is a shield-shaped emblem with a light blue background and yellow/gold symbols. At the top, there are three stylized leaves or branches. Below them is a horizontal band. The lower half of the shield features a complex, symmetrical design of scrolls and a central cross-like element. At the bottom of the shield, there is a banner with the Latin motto 'INTEGRITATEM PROCEDAMUS'.

HUBERT ANIPA

10700572

**A DISSERTATION PRESENTED TO THE UNIVERSITY OF GHANA
BUSINESS SCHOOL, LEGON IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE
DEGREE IN ACCOUNTING AND FINANCE**

JULY, 2019

DECLARATION

I hereby declare that, except for the references made to other scholarly work which have been duly cited, this dissertation is the result of my own research. I hereby declare that this dissertation has neither been presented in whole or in part for an award of another degree elsewhere.

.....

HUBERT ANIPA (10700572)

(Student)

.....

DATE

.....

PROF. MOHAMMED AMIDU

(Supervisor)

.....

DATE

DEDICATION

I dedicate this research entirely to God Almighty for His Wisdom, Guidance and Faithfulness which saw me through my studies at the University of Ghana. I also dedicate it to my entire family and everyone who supported and encouraged me to complete this program.

ACKNOWLEDGEMENTS

My gratitude and appreciation to God Almighty for guiding and leading me through my studies cannot be expressed fully in words. I am also very thankfully grateful to my Supervisor, Prof. Mohammed Amidu for all his patience and insightful input that has made it possible for me to successfully complete my studies. My last appreciation goes to my family and friends for their prayers and encouragement throughout my studies.

LIST OF ABBREVIATIONS

| | |
|---------------|--------------------------------------|
| ATM | Automated Teller Machine |
| ROOA | Return on Operating Asset |
| ROE | Return on Equity |
| NIM | Net Interest Margin |
| CI | Cost to Income Ratio |
| FC/REV | Fees and Commission to Revenue Ratio |

ABSTRACT

The study was motivated by the growing innovation in the financial system in recent times. Though the move for innovation in the Ghanaian context has been slow relative to the advancements in developed economies, its impact in bank profitability and efficiency cannot be over emphasized. Hence, this study took the challenge to study the effect of bank innovation on Ghanaian banks' profitability and efficiency between 2013 and 2017. The study employed a quantitative research approach in establishing the extent of bank innovation on banks' profitability and efficiency. Data for the study was derived from the published accounts of Thirty – Four (34) banks between 2013 and 2017. Using the panel data, regression analysis was executed using fixed effect which emerged as the most appropriate and preferred model from the Hausman test. The results imply that innovation has a positive impact on profitability and efficiency. These findings are in consonance with the outcomes of Sampong (2016), Jiménez-Jiménez and Sanz-Valle's (2011), Aduda and Kingoo (2012). The results also conform with Sibling's 1983 financial innovation theory which explains that the reason for firms' innovation is higher profitability.

Notwithstanding, the results also showed that profitability and efficiency of the banks over the period seems to be degrading as banks increased their operating assets and loans (based on the control variables). Overall, the results point to the fact that innovative moves by Ghanaian banks led to improved profitability and efficiency; hence, banks have motive to engage more in value – adding innovations.

TABLE OF CONTENTS

| | |
|-----------------------------------------------------------|-----|
| DECLARATION..... | i |
| DEDICATION..... | ii |
| ACKNOWLEDGEMENTS..... | iii |
| ABSTRACT..... | v |
| TABLE OF CONTENTS..... | vi |
| CHAPTER ONE | x |
| INTRODUCTION..... | 1 |
| 1.0 Background of the Study | 1 |
| 1.1 Problem Statement..... | 5 |
| 1.2 Research Objectives..... | 7 |
| 1.3 Significance of the Study | 8 |
| 1.4 Scope of the Study | 8 |
| CHAPTER TWO..... | 10 |
| LITERATURE REVIEW | 10 |
| 2.0 Introduction..... | 10 |
| 2.1 Theoretical Review | 10 |
| 2.1.1 Innovation Diffusion Theory | 10 |
| 2.1.2 Schumpeter Theory of Innovations | 11 |
| 2.1.3 Constraint-induced Financial Innovation Theory..... | 12 |
| 2.2 Conceptual Framework | 14 |

| | |
|------------------------------------------------------|----|
| 2.3 Determining Financial Performance of Banks | 14 |
| 2.4 Financial Innovation Drivers | 17 |
| 2.4.1 Cost of Transactions..... | 17 |
| 2.4.2 Taxes and Regulations | 18 |
| 2.4.3 Inefficiency within Financial Markets | 19 |
| 2.4.4 Agency Problems and Information Asymmetry..... | 22 |
| 2.4.5 Globalization and Risk | 25 |
| 2.5 Bank Innovation and Financial Performance | 25 |
| 2.6 Conclusion | 29 |
| CHAPTER THREE | 31 |
| RESEARCH METHODOLOGY..... | 31 |
| 3.0 Introduction | 31 |
| 3.1 Research Design | 31 |
| 3.2 Data Source and Sample Selection | 32 |
| 3.3 Variable Measurement..... | 34 |
| 3.4 Dependent Variables..... | 34 |
| 3.5 Independent Variables | 35 |
| 3.6 Control Variables..... | 35 |
| 3.7 Model specification | 36 |
| 3.8 Estimation strategy | 37 |
| 3.9 Ethical Issues | 37 |

| | |
|--------------------------------------------------------------------|----|
| CHAPTER FOUR..... | 39 |
| PRESENTATION AND INTERPRETATION OF RESULTS..... | 39 |
| 4.0 Introduction | 39 |
| 4.1 Descriptive Statistics | 39 |
| 4.2 Hausman Test for Endogeneity (Hausman Specification Test)..... | 40 |
| 4.3 Regression Results..... | 41 |
| 4.3.1 Financial Innovation and Return on Equity | 41 |
| 4.3.2 Financial Innovation and Return on Operating Assets..... | 42 |
| 4.3.3 Financial Innovation and Net Interest Margin | 44 |
| 4.3.4 Financial Innovation and Cost – to – Income | 45 |
| CHAPTER FIVE | 47 |
| SUMMARY, CONCLUSION AND RECOMMENDATION | 47 |
| 5.0 Introduction | 47 |
| 5.1 Summary of Findings | 47 |
| 5.2 Conclusion..... | 48 |
| 5.3 Recommendations | 49 |
| 5.4 Suggestions for Future Studies | 50 |
| REFERENCES | 51 |

LIST OF TABLES

| | |
|--------------------------------------------------------------------------------|----|
| Table 3. 1 List of Banks for the Study | 32 |
| Table 4. 1 Descriptive Statistics – Licensed Banks in Ghana (2013 – 2017)..... | 40 |
| Table 4. 2 Hausman Test | 40 |
| Table 4. 3 Regression Model Results (Dependent Variable – ROE)..... | 42 |
| Table 4. 4 Regression model results (Dependent Variable – ROOA)..... | 43 |
| Table 4. 5 Regression Model Results (Dependent Variable: NIM)..... | 44 |
| Table 4. 6 Regression Model Results (Dependent Variable: C/I) | 45 |

LIST OF FIGURES

| | |
|----------------------------------------|----|
| Figure 2. 1 Conceptual Framework | 14 |
|----------------------------------------|----|

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

Innovation plays a crucial role in improving productivity of a financial institution. Jepkorir (2011) writes that Innovation is normally defined as “the introduction of new products to a market or the production of an existing one in a new manner”. Financial innovations occur as a result of market participants perpetually looking for new ways that creates larger profits for shareholders. The process of financial innovation includes changes in money instrument, institutions, practices and markets. Largely, financial innovation affects the character and composition of financial aggregates through new financial instruments or changes in previous instruments; likewise, the terms and conditions of debt/credit arrangements (Jepkorir, 2011).

According to Malak (2014), competition along with the explosive changes in information technology fuels the need for banks to innovate in products, services, and delivery channels. Pushed by growing client demand and also the concern of losing market share, banks invest heavily in banking technology. Collaborating with hardware, software, telecommunications and other companies, banks are introducing new ways for consumers to access their account balances, transfer funds, pay bills and buy goods and services while not using physical cash, mailing a check or leaving home. Humphrey et al (2006) cite ATMS, telephone banking, internet banking, and e-money as being among the significant innovations affecting distribution system that influence financial performance favorably.

According to Lerner and Tufano (2011), “financial innovation is defined as the process of creating and then popularizing new financial assets or products, as well as new financial technologies, organizations and markets”. Bank innovations involve the advent of new products/services or production method that cause economical and effective operations. Nofie (2011), described innovations in the banking industry as the entrance of new or improved products or processes which reduces the operational cost of rendering existing banking services.

In the recent past, it was possible for banks to satisfy their customers and to meet their own performance targets without the need to develop any new products to enhance service delivery as a result of the very fact that account holders and banks were few, with the low volume of transactions, and absence of intense competition in the banking industry. According to the 2014 bank survey by PricewaterhouseCoopers; Ghana has 27 universal banks, 137 rural and community banks, 58 non-bank financial organizations including leasing firms, mortgage providers, finance houses, and saving and loan institutions. These do not include the hundreds of ‘Susu’ collectors, who serve as informal, small-scale depository financial organizations for market sellers, artisans and transport operators.

The traditional banking is declining in terms of competition and this could threaten the financial stability of these banks. Hence, leading to increasing bank failures through the exposure to higher risk by the banks, which either makes more risky advances to clients or by involving in 'non-traditional' banking activities that guarantee higher returns however with further risk. The conventional manual system of banking, for instance, places a lot of stress and strain on bank staff that have to attend to many more customers and handle more

paper work. To reduce the increasing cost of manual processing of clients' data, banks are thus, forced to invent ways of increasing their profitability

One way of keeping up with the competition and high customer demands for convenience is for banks to innovate new/better methods/means of delivering services to their clients. All these activities engaged in by banks to cut down cost and improve customer convenience can be categorized as financial innovation in the banking sector, hence, a clear understanding of the effect of financial innovation on bank performance is vital.

Financial performance measures how well a firm is generating value for the shareholders. It may be measured through varied financial measures like profit after tax, return on asset (ROA), return on equity (ROE), earning per share and any market value ratio that is generally accepted. Additionally, a measure such as Net Interest Margin (NIM) is useful for banks.

Generally, the financial performance of banks and other financial establishments has been measured employing a combination of ratios analysis, benchmarking and actual activity performance against budget.

On the premise of the preceding arguments, it is imperative that thorough investigation be conducted to understand fully the impact of these innovations on the profitability and efficiency of banks. This however, has not seen much attention, despite the obvious importance of financial innovation in explaining banking performance, the impact of innovation on financial performance remains misconstrued for several reasons. It seems that there is a lack of understanding about drivers of innovation and innovation's impact on financial performance. Ahmed et al., 2011; put it this way "that the reverse causality between innovation and financial performance has been neglected in most past literature"

Financial innovation is employed by banks to be able to vie in financial markets and as a result it will improve their performance and maintain their effectiveness (Batiz- Lazo and Woldesenbet, 2006). This inspires financial specialists and academic researcher to find out the connection between financial innovations and bank performance. Cohen and Levinthal (2011) argue that adopting specific innovation type will influence firm performance positively. Thus, organizations add new knowledge by building upon their previous knowledge in financial innovation. Prior expertise with a selected innovation kind can support more application of a similar body of information in areas of past success. Therefore, organizations tend to specialize in adopting one innovation kind since the knowledge accumulated can be integrated to build new opportunities to gain performance advantage (Roberts and Amit, 2010).

The most common financial innovation tools include mobile money and internet banking, ATMS withdrawal and deposits. In association with this, financial innovation can provide consumer base and capital base to enhance their profitability. Thus, any activity carried out by banks which is not part of the core (traditional) activity can be deemed to fall under financial innovation. In many countries, the standard financial performance measurement is CAMEL, an acronym for the five components of a bank condition that are assessed; these are capital adequacy, asset quality management, quality earning and liquidity. Ratings are allocated for each component in addition to the overall rating of a bank financial performance (Jose, 2009). All these developments together with changes within the international financial setting and the increasing integration of domestic and international financial market have resulted to the rapid and increasing financial innovation (Nyangosi, 2008).

1.1 Problem Statement

The fast-changing competitive atmosphere, globalization, economic changes, regulation, privatization and different connected factors demand that industrial banks are run with efficiency and effectiveness by incessantly partaking in financial innovations (Melody, 2009).

Banks in Ghana have generally been slow in adopting new and fashionable innovative ways of service delivery to their clients. Modern technological advancements like E-zwich, internet Banking, and Telephone Banking are all envisaged to reduce operational costs, and to attract more retail depositors to the banks. According to Frimpong (2010), innovations give associate impetus for banks to enhance their market performance recovering from palpable inefficiencies rife within the banking system, as is the case in Ghana and other emerging countries. However, what still remains uncertain to bank executives is whether bank innovations assist to attain the expected financial performances of the banks and the customer welfare.

Even though bank innovations have attracted substantial interest by researchers, the effect of these innovations on bank performance in Ghana has not been extensively researched, hence, the need to conduct this study. Thus, most of the current literature derived from other western and Asian economies. For example; a study was conducted by Wu, et al (2007) in china on the empirical impact of financial development and bank characteristics on the operational performance of banks in the Chinese Transitional Economy. Pooled cross- sectional banks and time series data was employed in the empirical estimation with sample of 14 Chinese banks. The period under consideration was from 1996-2004. Empirical results exhibit higher levels of monetization that may translate into higher ROA performance for banks.

Although the amount of literature on financial innovation and bank performance in the developed economies is enormous, this is not representative of what pertains in developing economies like Ghana. This is premised on the fact that technology which is the key driver of financial innovation is unequally distributed between the developed and developing economies (Ingenico, 2012)

Mwangi (2007) conducted a study on factors influencing financial innovation of forty-eight corporations listed at NSE. The objective of the study was to establish the macro-environmental and its factors influencing financial innovation in Kenya's Securities Market. The study was conducted between 2005 and 2006. Mwangi concluded from their study that financial competition associated with integration had an influence on financial innovation amongst financial institutions.

Also, a study by Sampong (2015) on the effect of bank innovations on financial performance of universal banks discovered that most of the innovations have positive effect on the income generating potentials of the universal banks in Ghana. Thus, financial innovation was found out by Sampong (2015) to have improved efficiency, liquidity and profitability of the banks. Sampong (2015) also observed that E-zwich as associate innovation within the financial sector has no direct result on financial performance of the universal banks in Ghana.

Clearly, there is the need for more research in the area of financial innovation and performance of banks in Ghana. More importantly, because most of the existing literature in this area were conducted outside Ghana; this necessitates additional and extensive research in this area within the Ghanaian economy. Notwithstanding, a number of researches including Mensah (2014), Sarpong (2015) and Kumi, Amoamah and Winful (2014) were

conducted within the Ghanaian sector; however, none of these were conducted solely on Ghanaian banks.

Therefore, this study fills a contextual gap in research by contributing to existing literature in the area of financial innovation and its effect on Ghanaian banks.

Additionally, while most of the existing used ROA and ROE to measure the performance of banks, this study uses NIM in addition to ROA and ROE. The researcher measures that Net Interest Margin is a more specific measure of performance in the banking sector and that its use would give a better perspective of bank performance. This study also measures innovation with the ratio of Fees and Commissions to Interest income (revenue) on the accounts of the banks. This measure is not common in the banking innovation literature; however, the researcher premises its use on the argument that the level of diversification away from the traditional banking activities is innovation in itself. Thereby proxies innovation with the ratio of Fees and Commissions to Interest income (revenue). The use of these measurements, the researcher believes would solve the problem of unrealism recorded in most of the variables used in past literature.

1.2 Research Objectives

The general objective of the study is to examine the effect of financial innovation on the financial performance of banks in Ghana. Specifically, the study seeks to:

1. To examine the effect of financial innovations on the efficiency of banks in Ghana.
2. To examine the effect of financial innovations on the profitability of banks in Ghana

1.3 Significance of the Study

The relevance of a profitable and spirited banking sector is undeniably one of the bedrocks of a well performing economy. The banking sector aids in the money creation function of every economy by taking deposits and making loans to both individuals and business, which is its core/traditional business.

Banks in the distanced past have had little or no challenge in making a good margin on their operations and hence, were under no pressures for improving on their operations. However, with the advent of keen competition resulting from a number of factors predominantly including communication technology and the consequential or resulting appetite of customers for simpler and easier ways of banking; innovative banking products and processes came to the fore.

To this score, this study examines the effect of financial innovation on the performance of banks in Ghana. This study contributes to existing literature in helping policy makers, bank managers and the government of Ghana to formulate appropriate policies that would aid a more vibrant banking economy. The results and findings of this study will also be the foundation for future scholarly research in the area of financial innovation. The study will also be important in creating awareness on the importance of financial innovation implementation challenges measures as an essential process of a new entrance in the Banking sector. Finally, investors, policy makers as well as economic developers will use this important finding to broaden their knowledge and further help to contribute to administer their economies.

1.4 Scope of the Study

The study was conducted to determine the effect of financial innovation on bank performance in Ghana between 2013 and 2017. The aspects of innovation covered in the study includes every form of activity undertaken by banks other than the core or traditional

activity of taking deposits and making loans. Thus, the study identified innovation with diversification for the makes.

Although the study meets its full objectives, it could have presented a more robust findings by corroborating the secondary data from the banks' financial statements with primary data from bank managers of how they feel innovation has influenced their performance. But the researcher was unable to do this due to time constraints.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter undertakes an academic appraisal of diverse literatures pertaining to bank innovation. The study focuses on the following important areas of the phenomenon under review; bank innovations and their effect on bank performance.

2.1 Theoretical Review

Aguilar (2009), notes that a theoretical framework is fundamental in a study for the purpose of identification of the variables to be evaluated in a particular study. According to Dawson (2006) posits that a theory is the basis of generalization of a phenomenon. Thus it is true to suffice that theories helps in making general observations about things. This study will be based on the following theories:

2.1.1 Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) seeks to explain the flow of innovations within an organization. According to Rogers (2003), there are various factors that lead to the diffusion of innovations from one point to another. For instance if there is a relative advantage of the new innovation when compared to the already existing tools, the innovation will be regarded as an improvement and may be adopted in the entire organization. Also, the compatibility of the innovations is crucial with respect to the already existing tools and practices in that those are that are compatible are easily adopted. Innovations are also weighed on the ease of use, if they can be put on trial before being commenced in full and if their inputs and outputs can be measured with ease. It is important to note that the ease of use is viewed as subjective since expertise is not uniform across all people.

Lundblad and Jennifer (2003), notes that diffusions across the departments of organization may not be probable due to the differences of operations. This theory is crucial to this study since it helps explain how innovation diffuses from one segment of the economy to another or from one department to another within the same organization. According to Rogers (2003) this theory is based on mainly four elements; innovation, time, communication channels and the social systems effects due to the particular innovation. Hernandez and Mazzon, (2006); notes that innovations are likely to be adopted by an entity if they are consistent with the values of the specific entity. This theory explains how innovations are adopted by entities across the industry. In particular, the banking sector is characterized by changing customer preferences and need for timely delivery of services. For this reason, the theory gives insights on how electronic funds transfers and mobile banking has become a common feature in the banking industry. Electronic funds transfer ensures that a customer transacts without having to visit the banking hall in person. Mobile banking on the other is fast and involves the diffusion of the mobile technology from telecommunication industry to the banking sector.

2.1.2 Schumpeter Theory of Innovations

According to Schumpeter (1934) chances of profits could be created by entrepreneurs who were independent. Schumpeter argued that this was particularly observed from independent inventors or from people who were in Research and Development engineering. Consequently, due to the abnormal profits, new groups of imitators would join and lower the profits as a result of the innovation. However, Schumpeter idealized that before equilibrium could be reached, there resulted into a new set of innovation that would ultimate another business cycle. Thus, at any point in time, there is something new being innovated in the economy and the financial sector is not exempted.

This theory has a central theme that entrepreneurship has a role in searching for new opportunities and creating utility in the economy. Further, the author argues that there is a difference between invention and innovation. To this end, Schumpeter (1934) views invention as the seeking of new dimensions that are potentially adopted by entrepreneurs while innovations basically are seen as the forces leading to growths in a self-propagating system. This theory posits that innovations are sought by the daring individuals who have the zeal to take risks by self-will.

Schumpeter (1934) puts it that innovations are always happening in the industry and for this reason, institutions need to be cognizant of them. The theory argues that even before innovations have been accepted by firms other innovations usually emerge leading to a new cycle again. It is for this reason that there are a variety of innovations that commercial banks implement in order to boost their financial performance. For instance, a commercial bank may at a single point in time adopt agency banking and mobile banking.

Financial innovation is involved in creating new opportunities for more profits while at the same shouldering the hazards linked to its existence. New dimensions present risks and thus banks must have mitigating measures. As discussed by Schumpeter (1934), innovations are enhanced by entrepreneurs who are independent and are willing to take risks as an act of will. This theory is important to this study since it helps in explaining why commercial banks are involved in new innovations and also discusses on the causes of innovations.

2.1.3 Constraint-induced Financial Innovation Theory

Sibler (1983) argues that the entities have a purpose of maximizing their profits and this is the main factor contributing to innovations. However, the author notes that there are inherent restrictions to towards profit maximization. These include: policies governing the sector and internal factors including the style of management adopted by the organizations. This

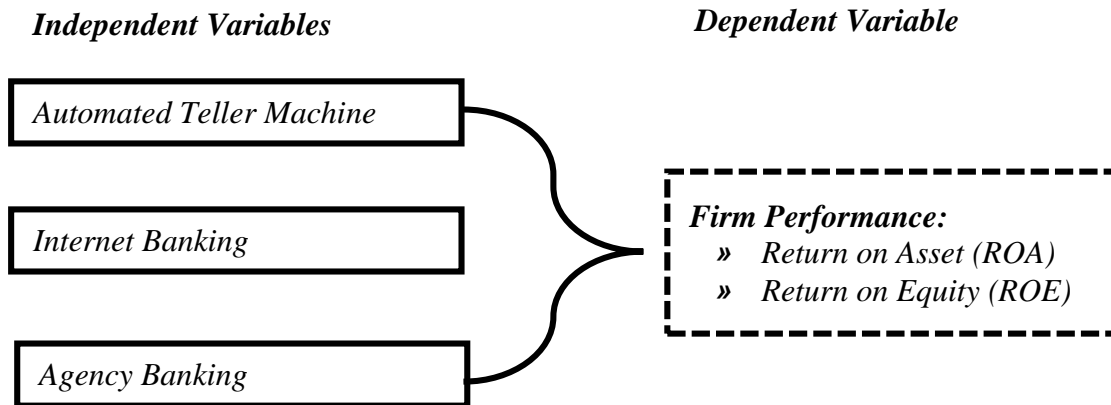
theory is very relevant to this study since the author narrows down to innovations in the banking sector.

According to Sibling (1983), the banking sector is strictly regulated and thus has restrictions towards innovations and thus may limit innovations. The presence of these restrictions is two folds: reduce the banks' abilities to venture into new innovations and also may reduce the efficiency of the banking institutions and it is for this reason that commercial banks will always, constantly act to keep them off. The theory thus is important in that it helps shed light on the reasons that make banks venture into financial innovations. More so, banks in Kenya are strictly regulated by the central banks of Kenya and may not be free to adopt all financial innovations without the express approval of the regulator. Financial innovations have been noted as per the theory to be a move to increase the profits of the financial institutions. Thus this research will seek to establish the effects of financial innovations on the performance of commercial banks in Kenya.

This theory idealizes that innovations are geared towards the alleviation of a certain constraint. In connection to commercial banks in Kenya, there are a variety of constraints arising from internal environment and the external environment. Banking halls operate within stipulated time of the day with rare cases of extension past the normal business hours. Thus, Sibling (1983) indicates that entities must work towards reducing the losses brought about by the constraints. To this end, mobile banking, internet banking and agency banking ensures that customers can transact round the clock. The traditional banks operate in a confined location and with strictness of time. It is due to this shortcoming that led to adoption of technologically enabled means of delivery customer service to customers.

2.2 Conceptual Framework

Figure 2. 1 Conceptual Framework



Source: Adapted from Aduda and Kingoo (2012).

2.3 Determining Financial Performance of Banks

In shaping the financial status of banks, there are many factors to be taken into consideration. The determinants of financial performance of banks have been divided into two categories according to most studies. The categories are made of internal and external factors. The internal factor of profitability is further classified in two categories. This category includes non-financial statement variables and financial statement variables. (Linyiru, 2006).

The financial statement variable consists of decisions that directly include items in the income statement and statement of financial position. The non-financial statement factors includes factors which indirectly relate to financial statements. For example; number of branches, location of bank and status of bank (Haron and Sudin, 2004). The external factors beyond the control of management are regarded external factors. Examples of the external factors includes regulation, inflation and size, market share, scarcity of capital, appointment based on political affiliation as well as frequent change in membership of boards. Notwithstanding this, members of boards consider themselves as representatives of political leaders in sharing national resources and rather forgetting the core objectives of the bank.

On the side of the privately-owned banks, shareholders constituted a problem. As a result of the insiders abuse of recruiting inexperienced and incompetent personnel to hold key positions in the bank, deterioration of management culture and weak internal control system instigated by the squabbles among the high rank management decision making team, and non-compliance with laws and prudential standards, mismanagement seemed to play a major role in bank failure in Ghana.

Bank losses increased and management resorted to hiding the losses in order to buy time and remain in control, (Ogumu, 2006). The banking industry being the nerve centre of the economy is invariably affected by economic and political environment/condition of the country. For instance the Structural Adjustment Programme (SAP) introduced in 1986 led to a wide range of economic reforms that affected the banking system. Also political situation like the political crisis like the disputed election in 2008, led to massive withdrawal of funds that affected banks (especially) those around affected regions, (CBK, 2008).

The regulatory and supervisory measures of the CBK are unable to keep pace with the rapid changes in the banking industry. The CBK brief (2007) noted that the ability of the CBK to perform its regulatory role had in the past been affected by political leadership and corruption in the former regime. According to Kotelnikov (2008), product innovation is the result of bringing to life the new way of solving customer's problem that eventually benefits both customers and banks. Both external and internal factors contribute to development of innovative products tailored to specific needs and special niches. Important external factors include market research, exchange of new product ideas between banks and research or technological developments. Internal factors could relate to in-house development of new products, monitoring and evaluation of existing products and feedback from employees and customer (Sharma, 2004). There are many aspects of the performance of commercial banks

that can be analyzed. This study focuses on the financial performance of a commercial bank due to its products. Arun and Turner (2004) and (Athanasoglou *et al.*, 2006) argued that the importance of banks is more predominant in developing countries because financial markets are usually underdeveloped, and banks are typically the only major source of finance for the majority of firms and usually the main depository of economic savings.

Generally, a bank's performance is measured by fundamental analysis, which primarily relies on examining its financial statements (Thoraneenitiyan, 2010). The principal aim of financial analysis is to improve the ability of the firm to forecast future movements in stock performance, which can then be used to design investment strategies (Avkiran and Morita, 2008). Whilst some studies examine whether earnings reflect some of the financial information in stock prices, recent research, however, has shifted towards the use of additional data such as economic value added and efficiency to understand how they affect stock prices and returns (Thoraneenitiyan, 2010).

There are many aspects of the performance of commercial banks that can be analyzed and measured. Line items such as revenue from operating income or cash flow from operations can be used, as well as total unit sales. Furthermore, the investors may wish to look deeper into financial statement and seek out margin growth rates or any declining debt. Four useful measures of firm profitability are the rate of return on firm assets, the rate of return on firm equity, operating profit margin and net firm income (Zenios *et al.*, 1999). Reilly and Brown (1997) argue that organizational performance can be measured in terms of profitability. This measure is used to evaluate on how well is the management of the firms total capital and the raising of funds. Profits do serve as a cushion against adverse conditions such as losses on loans or caused by unexpected changes in interest rate (Chen, 2001).

2.4 Financial Innovation Drivers

There is no general agreement on the drivers of financial innovation as a result of varying explanations. In this study, a considerable review of a number of drivers of financial innovation was considered.

2.4.1 Cost of Transactions

Cost minimization is one of the main factors that has given rise to financial innovation (Merton, 1989). This will help maximize revenue while reducing the cost of marketing which is inherent in security design environment (Madan & Soubra, 1991). According to the views of Merton's (1989), which is in line with Tufano (2003) work, it was demonstrated that there is a significant growth in ATMs and smart cards is propelled by the need to reduce transaction costs. The study concludes that ATMs have a potential to reduce transaction costs by a factor of 100. Innovation in payment systems are in the process of replacing traditional paper based payments in a number of countries.

Accordingly, Humphrey, Kim, & Vale; (2001), postulated that electronic payments cost around thirty-three percent to fifty percent compared to paper-based non cash payments. Humphrey *et al.* were of the opinion however, that major determinants of cost are the kind of transaction as well as the value of the transaction, these also inform the type of payment methods customers use in various countries. Their study used proxies such Point of Sale (POS) payments, bill payments, payroll payments and financial payments B2B dealings. Also, mobile transactions have revolutionized the money transfer industry in the recent past. The introduction of mobile payment system M-Pesa and other mobile payment platforms in Ghana has forced the established money transfer companies such as Western Union and MoneyGram to substantially reduce their money transfer charges (Mbiti & Weil, 2011). These examples provide evidence of practical reduction in transaction costs credited to the usage of different financial innovations.

2.4.2 Taxes and Regulations

Taxes and regulations have crucial roles to play in financial innovation. Literature review suggests that there is a negative link between tax and financial innovation while there is a positive link between regulations and financial innovation. There have been debates as to whether a tax system applies different tax rates on different income streams or on different types of assets, the higher taxed parties will find ways of reducing the tax burden (Frame & White, 2004). The study finds that higher taxation levels will lead to larger flow of financial innovations and that, regulations may or may not inhibit financial innovations. For example where regulation prevents banks from owning insurance companies, any innovation that would arise from joint ownership will not occur. As far as the relationship between regulation and financial innovation is concerned, Frame and White state that "...it is impossible *a priori* to assign a positive or negative sign to the connection between the stringency of regulation (however measured) and the pace of financial innovation" (2004, p.121). The implication of Frame & White's (2004) findings is that the impact of regulation on financial innovation depends on the intention of the regulation or the tax regime introduced by the state.

Although significant studies link regulation to financial innovations, Frame and White (2004) argue that no hypothesis has been tested to support the broad literature. This argument is consistent with Silber (1983) and Cohen and Levin (1989) studies.

Alderson and Fraser (1993) study of auction rate preference stocks, considers new security innovations by issuing firms for the period 1980s to early 1990s to establish the characteristics of early issuers and the motivations behind early redemption of the preferred stocks. The study posits that banks and thrifts deemed risk takers are early issuers and that this special purpose vehicle is driven by tax benefits. The authors' assertion of tax benefits from use of the security, however, is not supported by any empirical test. However, Frame

and White (2014) contend that regulation can curtail innovation and at the same time promote others, in an attempt to bypass the regulation. For example, according to the authors, "...regulatory capital arbitrage – or the ability to hold a particular risk in a different form and receive regulatory capital relief for doing so – has been a key driver of U.S. mortgage securitization activity for two decades. Finally, taxes can spur financial innovations to the extent that they create incentives to repackage (or re-label) specific income streams so as to reduce tax liability..." (p.6). Conversely, recent study observes that financial innovations are more likely to cause bank instability and drops in performance in times of financial crisis in countries with very stringent capital regulations (Beck et al., 2014). These studies reveal a broad consensus on the fact that regulation and taxes have an impact on financial innovation although this is not backed by adequate empirical evidence. The implication is that the impact of regulation and taxes on financial innovation is positive but the speed and magnitude of innovation will vary depending on the nature of the regulation or tax. Secondly, the impact of regulation on financial innovation is positive but with a different time lags depending on the intention of the regulation. Thirdly, if the regulation is meant to stifle financial innovation, management counter actions aimed at side stepping the regulation will have a longer time lag than when the intention of the regulation is positive. Consequently, it will take a fairly longer time to design financial products and processes aimed at countering the regulation than the time it would take to develop products and processes promoted by the regulation. The risk of developing financial innovations to sidestep regulations and taxes is that further regulation or tax may be imposed which makes the new innovations redundant, unattractive or illegal.

2.4.3 Inefficiency within Financial Markets

According to Home (1985), a market is said to exist when all contingencies within the world is in line with exclusive marketable securities. Horne (1985) asserted that when the number

and types of available securities does not cover these contingencies, incomplete markets will prevail. Where there is an incomplete market it is not possible to span all the possible states of nature, leading to a situation where players are unable to move the funds freely over time and space and are unable to manage risks (Tufano, 2003). For a marketable security to cover every contingency in the world, the market where the security is traded will need to be efficient. Basu (1977) argues that in an efficient capital market, security prices provide unbiased estimates of the underlying values by fully reflecting the available information in a rapid and unbiased manner. This is supported by Malkiel (2005), who finds that equity prices rapidly adjust to new information, denying investors any arbitrage opportunities of attaining above average returns without accepting above average risks. The implication is that security prices will rise in response to breaking good news and fall in response to breaking bad news consistent with the random walk theory.

However, Ball (2009) argues that the Efficient Market Hypothesis (EMH) does not mean that one should be able to predict future security prices as this would make the market inefficient for failure to reflect the information contained in the forecast. The EMH argues that it is not possible for an investor to make abnormal returns by using the information that the market already has, casting aspersions on the value of financial statement analysis. A market can operate at a weak, semi-strong or strong form efficient. Borges (2010) argues that in a weak form efficient market security prices traded in the market cannot be predicted by use of historical price information, implying that prices in such markets are largely uncorrelated. In a semi-strong efficient market, security prices reflect past and published information, while in a strong efficient market security prices reflect the past, published and private (inside or private) information.

Households in incomplete markets, borrow by only accepting a financial contract specifying a fixed repayment (Sheedy, 2013). Due to unavailability of credit from formal sources for low income earners or households, such borrowers are forced to borrow from informal lenders at borrowing rates far above the market rates. However, Sheedy concedes that the borrower is largely uncertain as to the source of income that will be used to repay the borrowed amount, which leads to inefficient distribution of risks. Inefficient distribution of risks could be due to the fact that financial market imperfections are characterised by information asymmetry, weak institutions for contract enforcement and high transaction costs (Guizar-Mateos, 2013). In addition, incompleteness in financial markets is caused by financial repression and/or imperfect information (Steel, Aryeetey, Hettige, & Nissanke, 1997). According to Johansson and Wang (2011), financial repression or financial regulation is one of the main causes of structural imbalances especially in highly regulated countries. Structural imbalances in an economy are evidenced by fragmentation in financial markets.

The cost of remittances or funds transfer in incomplete markets can be very punitive in view of the high transaction costs incurred in remitting cash through official channels (Gupta, Pattillo, & Wagh, 2009) Considering a sizeable proportion of households in such economies live on less than a US dollar a day, the high commissions on remittances and funds sent to poor rural based relatives erode the incomes that would otherwise be used to purchase foodstuffs. Consequently, any innovation that substantially reduces such transaction costs is likely to be embraced by masses within a short time leading to immediate gains for the innovators. Studies show that financial innovations are as a result of incompleteness in financial markets and thus innovations arise to complete the markets by introducing securities markets for securities with no close substitutes so as to hedge against crucial risks

(Duffie & Rahi, 1995b; Tufano, 2003). Although financial innovations are designed to reduce risks in incomplete markets, recent studies show that overconfidence with respect to risks of new financial products was central to the 2008 U.S.A credit crisis (Araujo, Kubler, & Schommer, 2012). Process financial innovations such as mobile money and agency banking arise to address inefficiencies in customer service, high costs of service delivery as well as the high costs of funds transfer in inefficient markets (Masila, Chepkulei, & Shibairo, 2015).

Developing countries have a lion's share of unfulfilled needs in financial markets and some of the innovations such as mobile money that have failed to take off in developed countries have become an instant hit in developing countries (Ingenico, 2012). Secondly, the low penetration of formal financial services in addition to the high rate of mobile subscription has significantly contributed to the rise in mobile payments (Capgemini & RBS, 2013).

2.4.4 Agency Problems and Information Asymmetry

Jensen and Meckling (1976, p. 308) define an agency relationship as "... a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf, which involves delegating some decision making authority to the agent..." The authors argue that agency cost is the aggregate of costs incurred by the principal to monitor the agent, bonding costs by the agent and the residual loss. The study posits that, firstly, monitoring costs entail budget restrictions, policies regarding compensation and rules of operation while residual loss is the cost arising from the agent's diversion of commitment from the principal's firm. Secondly, bonding costs are incurred by the principal to reward the agent to ensure that the agent does not engage in activities, which would amount to conflict of interest and to ensure that if the agent undertakes such acts, the principal will be adequately compensated by the agent. Thirdly, as managerial ownership

decreases, agency costs increase. These findings are consistent with J. S. Ang, Cole, and Lin (2000) study, which posits that agency costs are higher among firms whose management owns less than 100% shares and that as equity share of the owner declines, agency costs increase.

Agency problems arise even where the managing director (or management) controls 99% shareholding since the director or the management remains an agent or agents for the other one percent shareholders. In general, every employee is an agent of the shareholders and hence, failure or refusal of the employee to perform well would lead to agency problems. In the banking sector, agency problems arise where: The management fails either knowingly or unknowingly to carry out due diligence when appraising loan applicants leading to bad debts, frauds, poor customer service or low staff efficiency with regard to customer service rate per staff member. In such cases, banking halls get congested, customer dissatisfaction grows, and staff morale goes down resulting in bank's poor financial performance in the long run. Poor staff performance could be related to the systems and processes in use at the bank. If the systems are user friendly and fast, this has positive implications in terms of efficiency score per staff, which is measured by the number of customers served by an employee over a given time period. However, an attempt by the management to resolve staff performance issues could lead to conflict of interest between the management and shareholders.

Agency relationships may create costs associated with information asymmetry as far as the company's performance is concerned. This is because the management at any given time has information that is not available to outsiders in general and investors in particular (Boot & Thakor, 1997; Healy & Palepu, 2001; Oluwabiyi, 2014). The problems associated with information asymmetry between a buyer and sellers of an investment product, commonly

referred to as the ‘lemons problem,’ have been exemplified in a number of studies (Akerlof, 1970; Myers & Majluf, 1984; Zhang, 2014). According to Akerlof, information asymmetry leads to economic cost of dishonesty which comprises the sum by which the purchaser is cheated and the loss incurred from driving genuine firms out of businesses. This is consistent with F. Allen and Gale (1999) who show that participation of firms and investors in complex stock markets is hampered by the need for expensive information acquisition and analysis. According to Tufano (2003) the early history of development of securities shows that innovations were in response to information asymmetries. Tufano observes that certain innovations in the nineteenth century capitalised on the availability of more reliable and cheaper information. According to Akerlof (1970), developing countries take the lion’s share of dishonesty in business and that credit markets in these countries strongly reflect the operations of the ‘lemons principle’.

The ‘lemons’ problem in developing countries has been exemplified in later studies such as Anayiotos (1994), (Menkhoff, Neuberger, & Rungruxsirivorn, 2012) and (Mieno & Chaleunsinh, 2014). These findings have implications for financial innovations in developing countries in general and Kenya in particular. Firstly, high levels of information asymmetry increases agency costs and thus provides a higher incentive for development of financial innovation than in developed countries. Secondly, the needs of the households in developing countries are not homogeneous to those of developed countries owing to variations in the level of economic development. This means that agency problems in developing and developed economies are heterogeneous as well. Thirdly, the nature of financial innovations that appeal to the developed countries may not necessarily appeal to developing countries.

2.4.5 Globalization and Risk

Globalization “...refer to a high (and increasing) degree of interdependency and interrelatedness among different and geographically dispersed actors...” (Archibugi & Iammarino, 2002, p. 99). The authors contend that the economic application of new ideas and knowledge is technical, organizational, managerial and institutional. This argument suggests that innovations have implications for technical application, organizational structures, managerial decisions and institutional designs. According to Norris (2000), globalization eliminates national boundaries, integrates national economies, technology, governance and cultures thereby generating complex relations of mutual interdependence. The integration of national financial systems has led to the emergence of an integrated financial system which presents opportunities, risks and threats to financial innovation development. For example, globalization exposes firms to foreign exchange risks, interest rate risks, political risks and transaction exposure risks (Boyer, 2000). The actors in the global financial system are affected by different political, economic, social, cultural, religious and legal environments that affect the design and distribution of their financial products and processes.

2.5 Bank Innovation and Performance

Jiménez-Jiménez and Sanz-Valle’s (2011) work finds a positive relationship between innovation and firm performance. The authors argue that the strength of the relationship between innovation and firm performance is higher for bigger and older firms in the manufacturing sector. The respondents to the questionnaires used in the study were asked about the evolution of their firm’s performance over the preceding 3 years. The findings of the study; however, may not be replicated in other studies in view of the subjective nature of the performance measures used. Recent studies observe a link between innovation and firm performance. For instance, Aduda and Kingoo’s study in (2012) of the relationship between

electronic banking and financial performance of commercial banks in Kenya finds a strong positive relationship between bank performance and e-banking innovations. Using ROA as proxy for bank performance and the number of ATMs and debit cards as proxy for e-banking, Aduda and Kingoo (2012) find that innovation contributes to performance of large firms as well as small and medium enterprises. Additionally, Rosenbusch et al. (2011) argue that innovative products enable small- and medium-sized enterprises (SMEs) to compete with large and established firms. According to Rosenbusch et al. (2011), innovative products enable small firms to avoid price competition and also create new demands which contribute to the firm's growth.

A number of studies have reviewed the relationship between firm financial performance and innovation in manufacturing as well as innovation in services. For instance, Rosenbusch et al. (2011), and Andreas (2011) meta-analysis of previous research on the relationship between innovation and firm performance aims at establishing the direction and strength the relationship has on the performance of small and medium enterprises. The study makes a number of findings. Firstly, a positive relationship between innovation and performance is established. Secondly, fostering innovation orientation has a stronger positive relationship with performance than generating innovation process output such as products and services. Thirdly, investment in process innovation leads to higher firm performance than investment in product innovations. The findings are largely equivocal as to what explains the variation in returns from investment in process and product innovations. Laforet (2013) considers innovation orientation as a pre-requisite for innovation. According to the study, innovation orientation entails risk taking attitude as the main feature of innovative companies.

According to Laforet (2013), few companies have empirically examined innovation outcomes at firm level or the link between firm's innovation and firm performance. However, the author does not provide a plausible explanation for shortage of the empirical studies.

Conversely, Artz, Norman, Hatfield, and Cardinal (2010) study 272 firms derived from 35 industries over 19 years to establish the firms' ability to generate benefits from their inventions and innovation as well as the effect of the innovation on firm financial performance. The study observes a negative relationship between patents and performance as measured by both ROA and sales growth. However, the negative link between innovation and firm financial performance observed in Artz et al. (2010) could be as a result of the use of an inappropriate proxy for innovation, namely patents. This is because patents may not necessarily result to innovation.

It appears from the literature that most of the studies on firm performance and innovation have been carried out in developed countries. However, critical success factors for innovation may not be replicable across geographical regions and markets due to cultural differences (Al-Ansari, Pervan, & Xu, 2013; Laforet & Tann, 2006). Consequently, more studies are needed across geographical regions for purposes of comparison. Using ROI, ROA, ROS and Overall profitability as proxies for firm performance with data from a wide range of US industries, Calantone, Cavusgil, and Zhao (2002) find that a firm's innovativeness is strongly positively related to firm performance.

The link between firm performance and innovation is complex necessitating further research (Jiménez-Jiménez & Sanz-Valle, 2011). The study, however, finds a positive relationship between innovation and firm performance. The authors argue that the strength of the relationship between innovation and firm performance is higher for bigger and older firms in

the manufacturing sector. The respondents to the questionnaires used in the study were asked about the evolution of their firm's performance over the preceding three years. The findings of this study, however, may not be replicated in other studies in view of the subjective nature of the performance measures used.

Cainelli et al. (2006) assess the impact of innovation on the service firms' economic performance by conceptually and empirically exploring the bi-relationship between innovation and firm level economic performance in services. The authors attempt to establish the existence of virtuous circle between innovation and firm level economic performance. The study generates important findings. Firstly, the study finds a strong positive relationship between innovation and firm's economic performance. Secondly, innovating firms perform better than non-innovating firms in terms of economic growth and productivity. Thirdly, the study observes reverse or circular relationship between innovation and firm performance evidenced by the higher propensity for better performing firms to innovate and commit their capital to innovation. The findings indicate that firms with high turnover as evidenced by high sales growth show above average innovation expenditure in ICT encompassing both hardware and software. These findings are consistent with earlier work of Gopalakrishnan (2000) on the reverse causality between innovation and financial performance.

DeYoung et al. (2007) studied 424 community banks comprising the earliest adopters of internet banking in USA. The study compares the change in the banks' year 1999-2001 financial performance with that of 5,175 community banks using branch-only banking. The authors find an improvement in the profitability of the early adopters of internet banking among community banks associated with internet banking. The authors largely attribute this profitability to revenues from deposits and service charges. According to the study, internet

banking is used as a complement for physical branch use as opposed to being a substitute for it.

The studies reviewed in the preceding section provide evidence of existence of a link between innovation and firm performance in different setups. From the reviewed studies, there is evidence linking innovation to firm financial performance for both small and large firms. Product and process innovation helps the firms in improving performance as well as enabling small firms compete with large firms. Small firms use innovation to create niche markets for their new products and to avoid price competition with large firms. The relationship between innovation and firm performance is two way, meaning there is a reverse causation between the two. Innovation enables small firms to become big enough to afford huge expenditures in innovation and associated research and development.

2.6 Conclusion

From the literature review, product innovation in banks as the introduction of new credit, deposit, insurance, leasing, hire purchase, derivatives and other financial products such as e-banking, investment and retail banking. These products are introduced to respond better to changes in market demand or to improve efficiency. However, considering the evolution of bank products, Watkins (2007) categorizes bank's products into three groups - Core products, Formal products, and augmented products.

Core products are products which define the business. For a bank, some of the core products are Savings Bank Account, Current Account, Term deposit, Recurring deposit, Cash credit, Term loan, overdraft and the like. Formal product is usually a combination of two or more core products and they have strong marketing content as they cater to some specific customer needs. Formal product has the quality of providing right product with specific names as according to the requirements of customers to boost the banking business.

Augmented product is a further modification of formal product. This is the age of value addition. Everybody is sold to the idea of value added product and services. The main advantage of an augmented product stems from its strong marketing content because augmented product is made out of formal product which itself has a strong marketing content. All these forms of products have constitutes banking business operations. Some of the products have undergone innovative transformation as a marketing and competing strategy. As a result, innovative products determine the status of growth and the general performance of banks.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This section provides the methodology adopted for the study. It highlights the research design; Population, sampling techniques; data sources; Variables measurement; model specification; estimation strategy and ethical issues.

3.1 Research Design

In undertaking a research either a qualitative approach, quantitative approach or a mixed research approach can be employed. This research uses a quantitative research approach in the compilation and analysis of data for the research. The appropriateness of a quantitative approach is due to the numerical nature of the secondary data (i.e. banks financial statements) to be used in assessing or examining the econometric effect of bank innovation and other relevant control variables on bank performance in Ghana.

This study uses a panel regression in order to examine the effect of bank innovation and other control variables on bank performance. This will help the researcher to examine a number of banks over a number of years using variables from their financial statement.

This research uses explanatory research approach since the objective of the study was to know and understand the trait and mechanisms of the relationship and association between the independents and dependent variables. According to Cooper and Schindler (2006), this approach is appropriate for this kind of study because it sought to describe the relationship between two variables in which one variable led to a specified effect on the other variable. Explanatory research seeks to recognize and clarify a causal association which is substantively

significant and meaningful. The relationship being investigated in this study is the effects of bank innovation on financial performance of banks in Ghana.

3.2 Data Source and Sample Selection

This study uses secondary data from the annual financial statements of all the licensed banks in Ghana between 2013 and 2017. The sample for the study comes from the banks in Ghana over the study period, the study includes all the thirty – four (34) licensed banks in Ghana as at 2017 in the analysis in order to arrive at a comprehensive and complete research finding.

Thus, the study uses longitudinal (panel) secondary data from 2013 to 2017. The panel however, is unbalance due to the following reasons among others:

- Some of the banks could not publish their financial statements for some of the years.
- Some of the banks only commenced operation somewhere over the study period.
- Some of the banks also stopped operations somewhere over the study period.

As a result of the above reasons, the panel used for the study is unbalanced.

Below is the list of licensed banks for the study:

Table 3. 1 List of Banks for the Study

| S/ N | Name of Bank | Codin g | Majority ownership | No. of Branches |
|---------|---------------------------------------|------------|-----------------------|--------------------|
| 1 | Access Bank (Ghana) Limited | ACB | Foreign | 47 |
| 2 | Agricultural Development Bank Limited | ADB | Local | 78 |
| 3 | Bank of Africa Ghana Limited | BOA | Foreign | 26 |
| 4 | Barclays Bank Ghana Limited | BBGL | Foreign | 60 |
| 5 | CalBank Limited | CAL | Local | 30 |

| | | | | |
|----|----------------------------------------|-------|---------|-----|
| 6 | Ecobank Ghana limited | EBG | Foreign | 68 |
| 7 | Energy Commercial Bank Limited | ECB | Foreign | 12 |
| 8 | Fidelity Bank Ghana Limited | FBL | Local | 72 |
| 9 | GCB Bank Limited | GCB | Local | 183 |
| 10 | Guaranty Trust Bank (Ghana) Limited | GTB | Foreign | 32 |
| 11 | HFC Bank Ghana Limited | HFC | Foreign | |
| 12 | National Investment Bank Limited | NIB | Local | 49 |
| 13 | Prudential Bank Limited | PBL | Local | 40 |
| 14 | Societe General Ghana Limited | SG-GH | Foreign | 43 |
| 15 | Standard Chartered Bank Ghana Limited | SCB | Foreign | 27 |
| 16 | The Royal Bank Limited | TRB | Local | 28 |
| 17 | UniBank Ghana Limited | UGL | Local | 57 |
| 18 | United Bank for Africa (Ghana) Limited | UBA | Foreign | 28 |
| 19 | Zenith Bank (Ghana) Limited | ZBL | Foreign | 27 |
| 20 | OmniBank Ghana Limited | OBL | Local | 25 |
| 21 | Heritage Bank Limited | HBL | Local | 6 |
| 22 | The Biege Bank | TBB | Local | 70 |
| 23 | First Atlantic Bank | FABL | Foreign | 31 |
| 24 | Bank of Baroda Ghana Limited | BOB | Foreign | 3 |
| 25 | FNB Bank Ghana Limited | FBN | Foreign | 18 |
| 26 | First National Bank | FNB | Foreign | 7 |
| 27 | Universal Merchant Bank Ltd | UMB | Local | 38 |
| 28 | Republic Bank Ghana Ltd | RBL | Foreign | 43 |
| 29 | Sovereign Bank Ltd | SBL | Local | 4 |
| 30 | Premium Bank Ghana Ltd | PRB | Local | 4 |
| 31 | Sahel Sahara Bank Ghana Ltd | BSIC | Foreign | 17 |

| | | | | |
|----|---------------------------------|-----|-------|-----|
| 32 | The Construction Bank Ghana Ltd | TCB | Local | 1 |
| 33 | GN Bank Ltd | GNB | Local | 298 |
| 34 | UT Bank Ghana Ltd | UTB | Local | 30 |

Source: PWC, 2018

3.3 Variable Measurement

The objective of the study is to examine the effect of financial innovations on the performance and efficiency Ghanaian banks between 2013 and 2017. To be able to run analysis, the study defines the study variables as follows:

3.4 Dependent Variables

The dependent variable of a study is the variable being tested and measured in a scientific research. The dependent variables of this study are Profitability and Efficiency of Ghanaian banks.

The study posits that the adoption of financial innovation should ideally improve the profitability (i.e. performance) and efficiency of the banks. The study measures profitability using the return on operating asset (**ROOA**), return on equity (**ROE**) and net interest margin (**NIM**). The first two measures; **ROOA** and **ROE** have been used extensively in literature as measures of profitability. In addition to the two, the researcher uses (**NIM**) which is another determinant that shows not only the performance, but also the efficiency of the banking system. **NIM** shows the difference of interest income and interest expense divided by total earning assets. It is believed that more efficient banking systems have lower margins, and as the efficiency decreases banks charge higher markups from their clients. **ROOA**, **ROE** and **NIM** will make up the dependent variables that will proxy for the performance of the banks.

Efficiency is measured using **Cost to Income Ratio** (ratio of overheads to operating income), this ratio reflects the operational costs generated for realizing a unit of income. The lower this ratio, the more cost-efficient a bank is in its operations.

3.5 Independent Variables

The independent variable is the variable that is changed or controlled in a scientific research to test the effects on the dependent variable.

There are many channels that a bank can adopt innovation. It may exist many different forms such as Internet Banking, Automated Teller Machines (ATMs), Credit Cards, and Mobile Banking. This study believes that what a form bank innovation takes, it has the ultimate effect of increasing the non-traditional income of banks on their financial statement. Thus, the extent of financial innovation undertaken by a bank would be reflective in its Fees and Commission income on the financial statement. Hence, this paper proxies innovation with **Fees and Commission divided by Revenue**.

3.6 Control Variables

The control variables are other variables or factors that affect the result of the research (in this case, the performance and efficiency of banks). In order not to distort the results of the research and to show clearly the effect of financial innovation on bank performance and innovation; the study holds the control variables constant.

Other factors that are assumed to have an impact on bank performance are the size of loans on the financial statement and the total assets of the banks. These are represented by **Log of Total Loans** and **Log of Total Assets** respectively for size of loans and total assets of banks.

3.7 Model specification

The study objectives in chapter one conditioned the Performance and Efficiency of banks on Innovation. Considering the measurement variables of innovation and other control variables, Bank Performance and Efficiency is modeled as a function of **Fees and Commissions divided by Revenue** as well as relevant control variables.

The model is specified as follows;

$$P/E_{it} = \alpha_i + \beta_1 \log(FC / Rev_{it}) + \beta_2 \log(TA_{it}) + \beta_3 \log(Loans_{it}) + \varepsilon_{it}$$

The study uses panel regression model as per the above to estimate the relationship between financial innovations and bank financial performance.

Where P/E_{it} is the measure of Profitability and Efficiency (*i.e.* ROOA, ROE, NIM, Cost/Income) of bank i at time t , α_i is the constant value of P/E when all independent variables are equal to zero, $\beta_1(FC/Rev_{it})$ is the measure of Financial Innovation (*i.e.* fees and commissions divided by revenue) of bank i at time t , $\beta_2 \log(TA_{it})$ is the log of the total assets of bank i at time t , $\beta_3 \log(Loans_{it})$ is the log of Loans for bank i at time t and ε_{it} is the error term for a given bank i at time t .

In order to meet the objectives of the study, the model is dissected as follows;

$$ROA_{it} = \alpha_i + \beta_1 \log(FC / Rev_{it}) + \beta_2 \log(TA_{it}) + \beta_3 \log(Loans_{it}) + \varepsilon_{it} \quad (1)$$

$$ROE_{it} = \alpha_i + \beta_1 \log(FC / Rev_{it}) + \beta_2 \log(TA_{it}) + \beta_3 \log(Loans_{it}) + \varepsilon_{it} \quad (2)$$

$$NIM_{it} = \alpha_i + \beta_1 \log(FC / Rev_{it}) + \beta_2 \log(TA_{it}) + \beta_3 \log(Loans_{it}) + \varepsilon_{it} \quad (3)$$

$$C/I_{it} = \alpha_i + \beta_1 \log(FC / Rev_{it}) + \beta_2 \log(TA_{it}) + \beta_3 \log(Loans_{it}) + \varepsilon_{it} \quad (4)$$

3.8 Estimation strategy

The data for the study is on all the thirty – four (34) licensed banks in Ghana over the study period (2013 – 2017). This represents a panel data. The researcher would use the *Eviews* application to run regression analysis using the model specified. To ensure the authenticity of the results, a number of tests would be conducted on the data.

The study employs serial Linear Model (Breusch – Pagan Lagrange Multiplier) test in the measuring the serial correlation effect present in the model/equation and to measure the effect of autocorrelation in the absence of the Durbin Watson test. Accordingly, if the p-value of the F-statistic is insignificant at the 5% level of significance then there is no autocorrelation among the residual values. On the other hand, if the P-value of the F-statistic is significant at the 5% level of significance, autocorrelation exists among the residual values.

Additionally, in order to determine the appropriateness of using the random effects model (REM) or the fixed effects model (FEM) the researcher would use the Hausman test. If the p-value is greater than 5% (i.e. insignificant), the Random Effect would be used otherwise; the fixed effect (i.e. if there is significance) would be used.

The study also shows a descriptive analysis of the data to show the general characteristics of the data over the study period.

3.9 Ethical Issues

The study uses data from the published financial statements of the licensed banks gathered from the website of the banks. The main research tool for the regression analysis of data is the econometric package, *Eviews*. Consequently, there is no confidentiality regarding the use of these data but when necessary; confidentiality will be maintained as standard practice requires.

No financial statements will be requested from the individual banks but where additional data is necessary to support data from the financial statements, such information obtained would be used solely for research purposes. In sum, the researcher pledges complete allegiance to any confidentiality requirement (s) and laws or regulation.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents the results of the study. The chapter begins with presentation and analysis of the general characteristics of the research data collected. This was followed by a Hausman test, to help in choosing between fixed effect and Random effect (Esarey and Jaffe, 2017).

The actual presentation and analysis of the research findings are done in two parts. First, the study analyses the effect of financial innovation of Banks' Performance; using return on equity, return on operating asset and net interest margin. The second part examines the effect of financial innovation on banks' efficiency; using cost to income ratio.

4.1 Descriptive Statistics

The descriptive statistics of the dependent and explanatory variables are presented below in table 4.1. From the table, the mean (maximum) Return on Equity (measured as post – tax profit divided by the average total shareholders fund) of the banks was 13.18% (51.11%); also, the average (minimum) Return on Assets was 0.0245 (-0.1020). The Net Interest Margin recorded a mean (minimum) of 10.17% (3.6%) while the Cost to Income ratio showed a median (maximum) of 0.5950 (6.0900).

The ratio of Fees and Commissions to Interest income recorded a minimum (maximum) of 0.1% (37.7%); thus, the banks in Ghana had a minimum is 01% and a maximum of 37.7%. The table also shows that the banks had an average (median) of 3.1114 (3.1705) for the Log of Operating Assets, while the Log of Total Loans showed an average (maximum) of 8.3356 (9.5420).

Table 4. 1 Descriptive Statistics – Licensed Banks in Ghana (2013 – 2017)

| | ROE | ROOA | NIM | C/I | FC/REV | LOG_OA | LOG_TL |
|--------------|---------|---------|------------|-------------|---------|----------|------------|
| Mean | 0.1318 | 0.0245 | 0.1017 | 0.6638 | 0.1306 | 3.1114 | 8.3356 |
| Median | 0.1510 | 0.0255 | 0.0940 | 0.5950 | 0.1300 | 3.1705 | 8.8495 |
| Maximum | 0.5110 | 0.1000 | 0.3970 | 6.0900 | 0.3770 | 3.9170 | 9.5420 |
| Minimum | -0.7000 | -0.1020 | 0.0360 | 0.1200 | 0.0010 | 2.0250 | 3.0180 |
| Std. Dev. | 0.1892 | 0.0342 | 0.0448 | 0.5180 | 0.0781 | 0.4178 | 1.3271 |
| Skewness | -1.0415 | -0.6162 | 2.8258 | 7.8445 | 0.5804 | -0.3983 | -2.3927 |
| Kurtosis | 5.6369 | 4.1195 | 16.4250 | 81.6790 | 3.4152 | 2.4059 | 8.5541 |
| Jarque-Bera | 70.5794 | 17.3266 | 1,326.0630 | 40,228.3000 | 9.4988 | 6.1723 | 335.9312 |
| Probability | 0.0000 | 0.0002 | 0.0000 | 0.0000 | 0.0087 | 0.0457 | 0.0000 |
| Sum | 19.7750 | 3.6820 | 15.2550 | 99.5627 | 19.5920 | 466.7033 | 1,250.3340 |
| Sum Sq. Dev. | 5.3347 | 0.1741 | 0.2993 | 39.9878 | 0.9078 | 26.0031 | 262.4127 |

4.2 Hausman Test for Endogeneity (Hausman Specification Test)

In order to successful use the regression model stated in the methodology, the Hausman test was ran to detect any endogenous regressor in the model; so as to make the use of linear regression possible. Table 4.3 below displays the results from the Hausman test.

Table 4. 2 Hausman Test

| Correlated Random Effects - Hausman Test | | | |
|------------------------------------------|-------------------|--------------|--------|
| Equation: Untitled | | | |
| Test cross-section random effects | | | |
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Cross-section random | 22.434619 | 3 | 0.0001 |

As a general rule, when using the Hausman test to choose between fixed and random effect; the null hypothesis is that the preferred model is random effects and the alternate hypothesis is that the preferred model is fixed effects (Esarey and Jaffe, 2017).

As shown above, the p – value from the Hausman test is less than 5% and hence, fixed effect is appropriate for running the regression.

4.3 Regression Results

4.3.1 Financial Innovation and Return on Equity

Table 4.3 shows the regression results of between the dependent variable (return on equity) and the explanatory variables. From table 4.3, the R^2 implies that 69% of the banks over the period are represented by the variables in the model.

The results show a positive but insignificant relationship between return on equity and the ratio of fees and commission to interest income (which proxies for innovation). The insignificance and positive coefficient of the ratio of fees and commission to interest income suggests that for banks in Ghana; innovation does not necessarily influence return on equity (i.e. performance); thus, though financial innovation may have a positive effect on ROE, the impact is not significant. This results vary slightly from the findings of Sampong (2016), Jiménez-Jiménez and Sanz-Valle's (2011) and Aduda and Kingoo (2012) in terms of the significance, thus, they reported the relationship to be positively significant.

The results also show how other firm level factors affect profitability and efficiency. As shown in table 4.3 below, both total operating assets and total loans (control) have a reverse relationship with return on operating assets, with total operating assets indicating an insignificant reversed relationship while total loan indicated a significant negative relationship. The implication is that, total operating asset and total loan does not necessarily affect the profitability of Ghanaian banks. Interestingly, the negative relation means that increasing total loans is associated with decrease in profitability (ROE).

Table 4. 3 Regression Model Results (Dependent Variable – ROE)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---------------------------------------|-------------|-----------------------|-------------|-----------|
| C | 1.454186 | 0.468843 | 3.101647 | 0.002400 |
| FC/REV | 0.548874 | 0.337005 | 1.628684 | 0.106100 |
| LOG_OA | -0.013620 | 0.106521 | -0.127860 | 0.898500 |
| LOG_TL | -0.161955 | 0.075916 | -2.133355 | 0.035000 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.691987 | Mean dependent var | | 0.132609 |
| Adjusted R-squared | 0.594720 | S.D. dependent var | | 0.188827 |
| S.E. of regression | 0.120210 | Akaike info criterion | | -1.190164 |
| Sum squared resid | 1.647358 | Schwarz criterion | | -0.450830 |
| Log likelihood | 126.8574 | Hannan-Quinn criter. | | -0.889808 |
| F-statistics | 7.114297 | Durbin-Watson stat | | 1.897556 |
| Prob(F-statistic) | 0.000000 | | | |

4.3.2 Financial Innovation and Return on Operating Assets

Table 4.4 shows the regression results of between the dependent variable (return on operating assets) and the explanatory variables. From table 4.4, the R^2 implies that 82% of the banks over the period are represented by the variables in the model.

Table 4. 4 Regression model results (Dependent Variable – ROOA)

| Dependent Variable: ROOA | | | | |
|---------------------------------------------------|-------------|-----------------------|-------------|-----------|
| Method: Panel Least Squares | | | | |
| Date: 06/10/19 Time: 17:08 | | | | |
| Sample: 2013 2017 | | | | |
| Periods included: 5 | | | | |
| Cross-sections included: 34 | | | | |
| Total panel (unbalanced) observations: 151 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| c | 0.250984 | 0.065145 | 3.852698 | 0.0002 |
| FC/REV | 0.103415 | 0.046826 | 2.20848 | 0.0292 |
| LOG_OA | 0.014916 | 0.014801 | 1.007791 | 0.3157 |
| LOG_TL | -0.034338 | 0.010548 | -3.255287 | 0.0015 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.817312 | Mean dependent var | | 0.024570 |
| Adjusted R-squared | 0.759621 | S.D. dependent var | | 0.034068 |
| S.E. of regression | 0.016703 | Akaike info criterion | | -5.137467 |
| Sum squared resid | 0.031805 | Schwarz criterion | | -4.398134 |
| Log likelihood | 424.8788 | Hannan-Quinn criter. | | -4.837112 |
| F-statistics | 14.167100 | Durbin-Watson stat | | 2.052660 |
| Prob(F-statistic) | 0.000000 | | | |

Table 4.4 above sets out the results of how innovation impacts return on operating assets. As shown above, financial innovation has a positive significant impact on profitability (ROOA). Thus, an increase in innovation by Ghanaian bank increases ROOA, this is consistent with the findings of Jiménez-Jiménez and Sanz-Valle, 2011; Aduda and Kingoo, 2012; and Rosenbusch et al., 2011. Additionally, table 4.4 shows that total operating assets has an insignificantly positive relationship with ROOA, at the same time; total loans indicate a negative significant relationship with ROOA. This implies that an increase in total loans result in a decrease in ROOA while increase or decrease in total operating asset does not necessarily affect ROOA.

4.3.3 Financial Innovation and Net Interest Margin

Table 4.5 below shows the results of the effect of financial innovation and other control variables on NIM. From the table, the R^2 implies that 50% of the banks over the period are represented by the variables in the model.

Table 4. 5 Regression Model Results (Dependent Variable: NIM)

| Dependent Variable: NIM | | | | |
|---------------------------------------------------|-------------|-----------------------|-------------|--------|
| Method: Panel Least Squares | | | | |
| Date: 06/10/19 Time: 17:09 | | | | |
| Sample: 2013 2017 | | | | |
| Periods included: 5 | | | | |
| Cross-sections included: 34 | | | | |
| Total panel (unbalanced) observations: 151 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| c | 0.520473 | 0.140577 | 3.70241 | 0.0003 |
| FC/REV | -0.113208 | 0.101047 | -1.120356 | 0.2649 |
| LOG_OA | -0.032671 | 0.031939 | -1.022918 | 0.3085 |
| LOG_TL | -0.036217 | 0.022762 | -1.591085 | 0.1144 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.505267 | Mean dependent var | 0.101642 | |
| Adjusted R-squared | 0.349036 | S.D. dependent var | 0.044673 | |
| S.E. of regression | 0.036044 | Akaike info criterion | -3.599194 | |
| Sum squared resid | 0.148102 | Schwarz criterion | -2.859860 | |
| Log likelihood | 308.7391 | Hannan-Quinn criter. | -3.298838 | |
| F-statistics | 3.234096 | Durbin-Watson stat | 1.924858 | |
| Prob(F-statistic) | 0.000001 | | | |

As show above (table 4.5), there is no significant relationship between financial innovation and NIM. This implies that bank innovation in Ghana does not have any palpable effect on banks' NIM. This finding contradicts Aduda and Kingoo, 2012. Also, both total operating assets and total loans show a negative and statistically insignificant relationship with NIM. Which means that banks' engagement in huge operating assets investment and giving out large loans would not necessarily improve their NIM.

4.3.4 Financial Innovation and Cost – to – Income

Table 4.6 below shows the results of the effect of financial innovation and other control variables on Cost – to – Income (measure of efficiency). From the table, the R^2 implies that 50% of the banks over the period are represented by the variables in the model.

Table 4. 6 Regression Model Results (Dependent Variable: C/I)

| Dependent Variable: C/I | | | | |
|---------------------------------------------------|-------------|-----------------------|-------------|--------|
| Method: Panel Least Squares | | | | |
| Date: 06/10/19 Time: 17:10 | | | | |
| Sample: 2013 2017 | | | | |
| Periods included: 5 | | | | |
| Cross-sections included: 34 | | | | |
| Total panel (unbalanced) observations: 150 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| c | -0.903215 | 0.378835 | -2.384192 | 0.0188 |
| FC/REV | -0.274995 | 0.273142 | -1.006784 | 0.3162 |
| LOG_OA | -0.064371 | 0.086891 | -0.740822 | 0.4603 |
| LOG_TL | 0.216322 | 0.061665 | 3.508045 | 0.0006 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| R-squared | 0.973324 | Mean dependent var | 0.663751 | |
| Adjusted R-squared | 0.964826 | S.D. dependent var | 0.518049 | |
| S.E. of regression | 0.097159 | Akaike info criterion | -1.614853 | |
| Sum squared resid | 1.066702 | Schwarz criterion | -0.872230 | |
| Log likelihood | 158.114000 | Hannan-Quinn criter. | -1.313149 | |
| F-statistics | 114.529600 | Durbin-Watson stat | 2.049562 | |
| Prob(F-statistic) | 0.000000 | | | |

Table 4.6 above shows how financial innovation in Ghanaian banks affect efficiency, as measure by cost – to – income ratio. The results indicate that financial innovation in the banks has a negative and statistically insignificant effect on efficiency. What this means is that, innovative engagements by Ghanaian banks would not necessarily give rise to a palpable improvement in cost of running the banks as compared to their operating income. This supports

the findings by Sampong, 2016; where he posited an unclear relationship between financial innovation and efficiency.

Additionally, table 4.6 above shows the relationship between control variables (operating assets and total loans) and efficiency. As indicated, operating assets show a negative and statistically insignificant effect; total assets on the other hand shows a positive and statistically significant effect. Implying that, for Ghanaian banks; increased investment in operating assets does not guarantee increased efficiency. Contrarily, an increase in the total loans would lead to a material increase in the efficiency (cost – to – income ratio) of the banks.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This section summarizes the finding of the study, draws implied conclusions and the makes recommendations to bank managers as well as suggestions for future studies.

5.1 Summary of Findings

This study is motivated by the fact that most related work done in the field of bank innovation and its impact on performance (i.e. profitability and efficiency) had certain gaps which needed to be addressed.

Thus, most of the empirical studies depended mainly on primary data from individual stakeholders and hence, examined only fragmented aspects of bank innovation and not the entirety of the concept. Additionally, most of the empirical studies derived outside the Ghanaian context, and the few within the Ghanaian context did not use a panel regression approach which is most likely the best approach to establishing a clear relationship between financial innovation and firm profitability and efficiency over time. Available Ghanaian empirical studies also sampled only a number of the banks in Ghana for their studies.

Consequently, this study examines the effect of bank innovation on the profitability and efficiency of all Ghanaian banks between 2013 and 2017 by analyzing banks' financial statements and proxied innovation with the amount of Fees and Commissions (i.e. other income). By using Fixed Effect in estimating the regression equation, it was found out that innovation impacts positively but not so significantly on Ghanaian banks' ROE. ROOA shows a significantly positive association with bank innovation, thus, increased innovation in Ghanaian banks tend to increase profitability. The results also implied an insignificant

relationship between bank innovation and NIM. With regards to efficiency, there seems to be a negatively insignificant relationship between bank innovation and cost-income ratio; implying that efficiency among Ghanaian banks is not necessarily improved by engaging in innovation.

Regarding the other controlling variables (i.e. Total Operating Assets and Total Loans), there is an insignificantly inverse relationship with profitability and efficiency. Thus, increase in operating assets and loans does not have any obvious impact on the profitability and efficiency of Ghanaian banks.

5.2 Conclusion

The findings of this study have successfully established a relationship between bank innovation in Ghanaian banks and profitability and efficiency. The results imply that innovation has a positive impact on profitability and efficiency. These findings are in consonance with the outcomes of Sampong (2016), Jiménez-Jiménez and Sanz-Valle's (2011), Aduda and Kingoo (2012); all of which posited that bank innovation has a significant positive impact on the profitability and/or efficiency of Banks. By this, the findings from other similar empirics are confirmed by this paper's results; signifying that bank innovations increase profitability and efficiency of Ghanaian banks.

Results from the analysis lend credence to the fact from previous literature that; banks which engage in innovative products and/or processes have a high chance of improving their profitability and efficiency.

These findings also support Sibling's 1983 financial innovation theory which explains the reason for firms' innovation to be the quest for higher profitability. And since Ghanaian banks are able to improve on profitability and efficiency through innovation, Sibling's 1983 theory is confirmed as an underpinning theoretical source for Ghanaian bank innovation.

Notwithstanding, profitability and efficiency of the banks over the period seems to be degrading as banks increased their operating assets and loans (based on the control variables); a phenomenon which suggests an inconclusive and wild inference that Ghanaian banks over the period probably acquired non-value adding assets or gave out bad loans – this however requires further probing.

It is worth noting also that the above inferences were based on a number of assumption which may render the findings limited or confined. For example, the study relied solely on secondary data which in one vein is objective in nature, could in another vein be seen as susceptible to bank managers' manipulation. Also, due to the inadequacy of previous work on the subject matter across the Ghanaian economy, a good majority of the literature reviewed to support the study originated from outside the Ghanaian context; and drawing inferences from such may not have the required geographical relevance.

5.3 Recommendations

Based on the conclusions drawn, the study makes the following public policy recommendations.

Firstly, there is the need for Ghanaian bank managers to re-assess their innovative products and process to ensure that they are in tandem with the needs and preferences of their clientele. Thus, banks should decide on whether to develop innovative products/processes that would serve the needs of all their clientele or on those products/processes that would serve a selected niche.

Secondly, since bank innovation has been found to be a positive contributor to bank performance, Ghanaian banks need to engage more in innovative products and processes by either establishing (or resourcing) their own innovation departments or partnering with expert innovation firms whose core activity is developing innovative products/processes.

Thirdly, the regulator (Bank of Ghana), should encourage bank innovation by abolishing regulations which might stifle banks' ability to innovate and also by enacting regulations which encourage good innovation among Ghanaian banks.

5.4 Suggestions for Future Studies

This study analyzed the effect of bank innovation and efficiency of all Ghanaian banks.

However, future studies can consider the following options:

1. Conducting a similar study on listed and unlisted banks separately.
2. Conducting a similar study on pre and post the 2017; to reflect the effect of the financial system restructuring done by the BoG in 2017.
3. A study on the quality of operating assets and loans on the balance sheet of Ghanaian banks.

REFERENCES

- Abdul Latif Alhassan, (2015) "Income diversification and bank efficiency in an emerging market", *Managerial Finance*, Vol. 41 Issue: 12, pp.1318-1335
- Aduda, J. & Kingoo, N., (2012). 'The relationship between electronic banking and financial performance among commercial banks in Kenya', *Journal of Finance and Investment Analysis* 1(3), 99–118.
- African Review of Economics and Finance*, 4(1), 53-72.
- Ahmed, H. K., Raza, A., Amjad, W. & Akram, M. (2011). Financial performance of Finance companies in Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 2(12), 732- 744
- Akhisar, İlyas & Tunay, K & Tunay, Necla. (2015). The Effects of Innovations on Bank Performance: The Case of Electronic Banking Services. *Procedia - Social and Behavioral Sciences*. 195. 369-375. 10.1016/j.sbspro.2015.06.336.
- Arellano, M. & Bover, O., (1995). 'Another look at the instrumental variable estimation of error-components models', *Journal of Econometrics* 68(1), 29–51. [https://doi.org/10.1016/0304-4076\(94\)01642-D](https://doi.org/10.1016/0304-4076(94)01642-D)
- Ary, F., Lukan, J., & Razavier, M. (2002). *Research in Education*. London:
- Ogbuji, C. N., Onuoha, C. B., & Izogo, E. E. (2012). Analysis of the negative effects of the automated teller machine (ATM) as a channel for delivering banking services in Nigeria. *International Journal of Business and Management*, 7(7), p180.
- Ohlson, J. A. (1995). Earnings, book values, and dividends in equity valuation. *Contemporary accounting research*, 11(2), 661-687.
- Olatokun, W. M., & Igbinedion, L. J. (2009). The adoption of automatic teller machines in Nigeria: an application of the theory of diffusion of innovation. *Issues in Information Science and Information Technology*, 6, 373-379.
- Aduda, J., & Kingoo, N. (2012). The relationship between electronic banking and financial performance among commercial banks in Kenya. *Journal of finance and investment analysis*, 1(3), 99-118.
- Batiz- Lazo, B. & K, Woldesent, (2006). The dynamics of product and process
- Blakstad, O. (2015). *Research Designs*. Retrieved from <https://explorable.com/research-designs>
- Brazil*: World Bank Publications.

- Carbonell, P., & Rodríguez Escudero, A. I. (2010). The effect of market orientation on innovation speed and new product performance. *Journal of Business & Industrial Marketing*, 25(7), 501-513.
- Carbonell, P., & Rodríguez-Escudero, A. I. (2009). Relationships among team's organizational context, innovation speed, and technological uncertainty: An empirical analysis. *Journal of Engineering and Technology Management*, 26(1), 28-45.
- Carey, M., Post, M., & Sharpe, S. A. (1998). Does corporate lending by banks and finance companies differ? Evidence on specialization in private debt contracting. *The Journal of Finance*, 53(3), 845-878.
- Castillo, J. J. (2009). *Research population*. Retrieved from www.experimentresources.com/research-population.html
- Cavusgil, S. T. (2008). An assessment of the measurement of performance in international business research. *Journal of International Business Studies* 39(6), 1064-1080.
- Cohen, W. M. & Levinthal, D. A. (2011). Absorptive capacity: a new perspective on learning and innovation, *administrative science quarterly*, (35). 128- 54
- Chen, M.-J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of management journal*, 38(2), 453-482.
- Chen, S., & Dodd, J. L. (1997). Economic value added (EVA™): An empirical examination of a new corporate performance measure. *Journal of Managerial Issues*, 9(3), 318-333.
- Chen, Y.-M. (2010). The continuing debate on firm performance: A multilevel approach to the IT sectors
- Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9). New York: McGraw-Hill Irwin.
- Cracknell, D. (2012). *"Policy innovations to improve access to financial services in developing countries: Learning from case studies in Kenya."* Retrieved from http://www.cgdev.org/doc/LRS_case_studies/Cracknell_Kenya.pdf
- Creswel, J. W., & Clark, V. L. (2011). *Designing and Conducting Mixed Methods Research* (2 ed.). United States of America: SAGE Publications. Retrieved April 16, 2015, from www.sagepub.com/upm-data/35066_Chapter3.pdf

- Daley, L. A. (1984). The valuation of reported pension measures for firms sponsoring defined benefit
- Dollar, D., Hallward-Driemeier, M. & Taye, M., (2005). 'Investment climate and firm performance in developing economies', *Economic Development and Cultural Change* 54(1), 1–31. <https://doi.org/10.1086/431262>
- D'Este, P., Iammarino, S., Savona, M., & von Tunzelmann, N. (2012). What hampers innovation? Revealed barriers versus deterring barriers. *Research Policy*, 41(2), 482-488.
- Dedoose. (2012, October 1). *Mixed Methods & Qualitative Research Software*. Retrieved December 16, 2018, from <http://blog.dedoose.com/2012/10/what-is-mixed-methods-research/>
- Delen, D., Kuzey, C., & Uyar, A. (2013). Measuring firm performance using financial ratios: A decision tree approach. *Expert Systems with Applications*, 40(10), 3970-3983.
- Delimatsis, P. (2012). Financial Innovation and Prudential Regulation–The New Basel III Rules.
development: a profile of industry practices. *Journal of Product Innovation Management*, 3(3), 187-194.
- Devinney, T. M., Yip, G. S., & Johnson, G. (2010). Using frontier analysis to evaluate company performance. *British Journal of Management*, 21(4), 921-938.
- DeYoung, R., Lang, W. W., & Nolle, D. L. (2007). How the Internet affects output and performance at community banks. *Journal of Banking & Finance*, 31(4), 1033-1060.
- Eccles, R. G. (1990). The performance measurement manifesto. *Harvard business review*, 69(1), 131-137.
- EIU. (2012). *Global Microscope on the Micro finance business environment 2012*. Retrieved from Eric Reidenbach, R., & Moak, D. L. (1986). Exploring retail bank performance and new product
- Empirical evidence from Turkey. *Management Research Review*, 34(10), 1125-1146.
- Esarey, J., & Jaffe, J. (2017). A Direct Test for Consistency of Random Effects Models that Outperforms the Hausman Test.
- Esarey, J., & Jaffe, J. (2017). A Direct Test for Consistency of Random Effects Models that Outperforms the Hausman Test.
- Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. (1984). Organization strategy and structural differences for radical versus incremental innovation. *Management Science*, 30(6), 682-695.

- Evans, D. S. (2013). Economics of Vertical Restraints for Multi-Sided Platforms *University of Chicago Institute for Law & Economics Oline Research Paper 626*.
- Fernandez, P. (2001). EVA, economic profit and cash value added do not measure shareholder value creation.
- Filistrucchi, L., Geradin, D., Van Damme, E., & Affeldt, P. (2014). Market definition in two-sided markets: theory and practice. *Journal of Competition Law and Economics*, 10(2), 293-339.
- Finance Act, Kenya Gazette Supplement ACTS 2009, Acts No. 8 Stat. 577-642 (The Government Printer 2009 22nd December, 2009).
- Finance Act, Kenya Gazette Supplement, ACTS, 2008, No. 8 of 2008 Stat. 99-147 (The Government Printer, Nairobi 2008 15th December, 2008).
- Finegan, P. T. (1991). Maximizing shareholder value at the private company. *Journal of Applied Corporate Finance*, 4(1), 30-45.
- Frimpong, J.M. (2010). "Investigating efficiency of Ghana banks: A non-parametric approach", *American Journal of Scientific Research*, vol. 7.
- Galbreath, J., & Galvin, P. (2008). Firm factors, industry structure and performance variation: new empirical evidence to a classic debate. *Journal of Business Research*, 61(2), 109-117.
- Gentry, R. J., & Shen, W. (2010). The relationship between accounting and market measures of firm financial performance: How strong is it? *Journal of managerial issues* (2010): . 22(4), 514-530.
- German-Soto, V., & Flores, L. G. (2015). Contribution of Education and Innovation to Productivity among Mexican Regions: A Dynamic Panel Data Analysis. *Theoretical Economics Letters*, 5(01), 44.
- Griliches, Z., (1967). 'Distributed lags: A survey', *Econometrica* 36(1), 16-49. <https://doi.org/10.2307/1909382>
- Gujarati, D.N., (2003). *Basic econometrics*, 4th edn., McGraw-Hill, New York.
- Gupta, S., Pattillo, C. A., & Wagh, S. (2009). Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World Development*, 37(1), 104-115.
- Hannan, T. H., & McDowell, J. M. (1984). The determinants of technology adoption: The case of the banking firm. *The RAND Journal of Economics*, 328-335.
- Haron, J.K., Kim, N. & Srivastava, R.K. (2004). Market orientation and organizational performance: is innovation the missing link? *Journal of Marketing*, 62 (4) :4-7

- Hoopes, D. G., Madsen, T. L., & Walker, G. (2003). Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity". *Strategic Management Journal*, 24(10), 889-902.
- Holmstrom, B. (1989). Agency costs and innovation. *Journal of Economic Behavior & Organization*, 12(3), 305-327.
- Horne, J. C. (1985). Of financial innovations and excesses. *The Journal of Finance*, 40(3), 621-631.
- Hoskisson, R. E., Hitt, M. A., Wan, W. P., & Yiu, D. (1999). Theory and research in strategic
- Hottenrott, H., & Peters, B. (2012). Innovative capability and financing constraints for innovation: More money, more innovation? *Review of Economics and Statistics*, 94(4), 1126-1142.
- Hitt, M. A., Hoskisson, R. E., & Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of management journal*, 40(4), 767-798.
- Hughes, N., & Lonie, S. (2007). "M-PESA: Mobile money for the "unbanked" turning cell phones into 24 hour tellers in Kenya". *Innovations*, 2(63), 1-2.
- Hult, G. T. M., Ketchen, D. J., Griffith, D. A., Chabowski, B. R., Hamman, M. K., Dykes, B. J.,
- Humphrey, D. B., Kim, M., & Vale, B. (2001). Realizing the gains from electronic payments: Costs, pricing, and payment choice. *Journal of money, credit and banking*, 216-234.
- IMF. (2007). *Global financial stability report*. Retrieved from Washington, DC:
- Inoue, Y., & Lee, S. (2011). Effects of different dimensions of corporate social responsibility on corporate financial performance in tourism-related industries. *Tourism Management*, 32(4), 790-804.
- Industrial and corporate change*, 6(1), 83-118.
- innovations in recovery and future prosperity. Retrieved from <http://www.milkeninstitute.org/newsroom/press-releases/view/160>
- Ittner, C. D., & Larcker, D. F. (1997). Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research*, 1-35.
- Johansson, A. C., & Wang, X. (2011). Financial repression and structural imbalances. *China Research Centre, Stockholm School of Economics*, 2011-2019.
- Jose L, A. (2009). Using CAMELS rating to monitor bank condition, *FRBSF economic letter* 99- 119

- Jose, M. L., Lancaster, C., & Stevens, J. L. (1996). Corporate returns and cash conversion cycles.
- Jepkorir, S. (2011). *Challenges of implementing financial innovations by commercial banks in Kenya*. (Master of Business Administration), University of Nairobi, Unpublished
- Jiménez-Jiménez, D. & Sanz-Valle, R., 2011, 'Innovation, organizational learning, and performance', *Journal of Business Research* 64(4), 408–417. <https://doi.org/10.1016/j.jbusres.2010.09.010>
- Kamasak, R. (2011). Firm-specific versus industry structure factors in explaining performance variation:
- Karabag, S. F., & Berggren, C. (2014). Antecedents of firm performance in emerging economies: Business groups, strategy, industry structure, and state support. *Journal of Business Research*, 67(10), 2212-2223.
- Kaszniak, R., & McNichols, M. F. (2002). Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. *Journal of Accounting Research*, 40(3), 727-759.
- Katz, M. L., & Shapiro, C. (1986). Technology adoption in the presence of network externalities. *The journal of political economy* 822-841.
- Kayanga, A. M. (2008). *Essays in corporate governance: Issues and evidence from equity carve-outs*.
- Kazan, E., & Damsgaard, J. (2013). "A framework for analyzing digital payment as a Multi-Sided
- Koyck, L.M., (1954). *Distributed lags and investment analysis*, North Holland Publishing Company, Amsterdam.
- Kiviluoto, N., Brännback, M., & Carsrud, A. (2011). Are firm growth and performance the same or different concepts in empirical entrepreneurship studies? An analysis of the dependent and independent variables. In M. Raposo, D. Smallbone, K. Balaton, & L. Hortovaenyi (Eds.), *Entrepreneurship, growth and economic development*. UK: Edward Elgar Publishing.
- Kumar, A. (2006). *Expanding bank outreach through retail partnerships: correspondent banking in*
- Kumar, P. R., & Ravi, V. (2007). Bankruptcy prediction in banks and firms via statistical and intelligent techniques-A review. *European Journal of Operations Research*, 180(1), 1-28.

- Kumi, K.P., Amoamah, O.M., & Winful, E. (2013). Evaluation of the Performance of Banks in Ghana Using Financial Ratios: A Case study of Barclays Bank Limited (BBG), Ghana Bank (GCB) and Agricultural Development Bank (ADB). *European Journal of Business and Management*, Vol. 5, No. 28, 2013
- Laeven, L., Levine, R., & Michalopoulos, S. (2015). Financial innovation and endogenous growth.
- Laforet, S. & Tann, J., (2006). 'Innovative characteristics of small manufacturing firms', *Journal of Small Business and Enterprise Development* 13(3), 363–380. <https://doi.org/10.1108/14626000610680253>
- Laforet, S. (2013). Organizational innovation outcomes in SMEs: Effects of age, size, and sector. *Journal of World Business*, 48(4), 490-502.
- Laforet, S., (2013). 'Organizational innovation outcomes in SMEs: Effects of age, size, and sector', *Journal of World Business* 48(4), 490–502. <https://doi.org/10.1016/j.jwb.2012.09.005>
- Laukkanen, T. (2007). Internet vs mobile banking: comparing customer value perceptions. *Business Process Management Journal*, 13(6), 788-797.
- Lee, O.-K., Wang, M., Lim, K. H., & Peng, Z. (2009). Knowledge management systems diffusion in Chinese enterprises: A multistage approach using the technology-organization-environment framework. *Journal of Global Information Management (JGIM)*, 17(1), 70-84.
- Lerner, J., & Tufano, P. (2011). "The consequences of financial innovation: A counterfactual research agenda". Innovation in UK banking, *International Journal of Financial Service*
- Lin, R.-J., Tan, K.-H., & Geng, Y. (2013). Market demand, green product innovation, and firm performance: evidence from Vietnam motorcycle industry. *Journal of Cleaner Production*, 40, 101-107.
- Linyiru, B. M. (2006). Survey of corporate governance practices in banks in Kenya. *Unpublished MBA project*. School of Business, University of Nairobi
- Lütz, S. (1998). The revival of the nation-state? Stock exchange regulation in an era of globalized financial markets. *Journal of European Public Policy*, 5(1), 153-168.
- Lyman, T., Ivatury, G., & Staschen, S. (2006). Use of agents in branchless banking for the poor: rewards, risks, and regulation. *Focus Note*, 38.

- Lynn, L. H. (2008). Recovering from Success: Innovation and Technology Management in Japan (review). *The Journal of Japanese Studies*, 34(2), 543-548.
- Madan, D., & Soubra, B. (1991). Design and marketing of financial products. *Review of Financial Studies*, 4(2), 361-384.
- Mahler, A., & Rogers, E. M. (1999). The diffusion of interactive communication innovations and the critical mass: the adoption of telecommunications services by German banks. *Telecommunications policy*, 23(10), 719-740.
- Malak, P.M. (2014). The effects of financial innovation on the financial performance of banks in South Sudan. A research project submitted in partial fulfilment of the requirements of the degree of master of business administration, school of business, the University of Nairobi.
- Malerba, F., & Orsenigo, L. (1997). Technological regimes and sectoral patterns of innovative activities.
- Malkiel, B. G. (2005). Reflections on the efficient market hypothesis: 30 years later. *Financial Review*, 40(1), 1-9.
- Maltz, A. C., Shenhar, A. J., & Reilly, R. R. (2003). Beyond the Balanced Scorecard:: Refining the Search for Organizational Success Measures. *Long Range Planning* 36(2), 187-204.
- management: Swings of a pendulum. *Journal of management*, 25(3), 417-456.
- Mans-Kemp. (2014). *Corporate governance and the financial performance of selected Johannesburg Stock Exchange industries*. (Doctor of Philosophy), Stellenbosch University, South Africa.
- March, J. G., & Sutton, R. I. (1997). Crossroads-organizational performance as a dependent variable.
- Mauri, A. J., & Michaels, M. P. (1998). Firm and industry effects within strategic management: an empirical examination. *Strategic management journal*, 19(3), 211-219.
- Mawutor (2014) Impact of E-banking on the profitability of banks in Ghana.
- Monteiro, A. (2006). A quick guide to financial ratios. *The Citizen*.
- Morck, R., & Yeung, B. (2003). Agency problems in large family business groups. *Entrepreneurship Theory and Practice*, 27(4), 367-382.
- Moussu, C., & Petit-Romec, A. (2014). RoE in banks: myth and reality. *SSRN 2374068*.

- Mbiti, I., & Weil, D. N. (2011). *Mobile banking: The impact of M-Pesa in Kenya*. . Retrieved from McGahan, A. M., & Porter, M. E. (1997). How much does industry matter, really?
- McGahan, A. M., & Porter, M. E. (1999). The persistence of shocks to profitability. *Review of Economics and Statistics*, 81(1), 143-153.
- McGahan, A. M., & Porter, M. E. (2003). The emergence and sustainability of abnormal profits. *Strategic Organization*, 1(1), 79-108.
- McGahan, A. M., & Porter, M. E. (2005). Comment on 'Industry, corporate and business-segment effects and business performance: a non-parametric approach' by Ruefli and Wiggins. *Strategic management journal*, 26(9), 873-880.
- McGahan, A.M. & Porter, M.E., (1999). 'The persistence of shocks to profitability', *Review of Economics and Statistics* 81(1), 143–153. <https://doi.org/10.1162/003465399767923890>
- McGahan, A.M. & Porter, M.E., (2003). 'The emergence and sustainability of abnormal profits', *Strategic Organization* 1(1), 79–108. <https://doi.org/10.1177/1476127003001001219>
- McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate social responsibility and firm financial performance. *Academy of management journal*, 31(4), 854-872.
- Miles, I. (1993). Services in the new industrial economy. *Futures*, 25(6), 653-672.
- Miles, I., Kastrinos, N., Flanagan, K., Bilderbeek, R., Den Hertog, P., Huntink, W., & Bouman, M.
- Milken. (2010). "Financing the Future: Market-Based Innovations for Growth" examines role of financial
- Miller, C. C., Washburn, N. T., & Glick, W. H. (2013). Perspective—The myth of firm performance.
- Miller, M. H. (1986). Financial innovation: The last twenty years and the next. *Journal of Financial and Quantitative Analysis*, 21(04), 459-471.
- Mueller, C. W. (2004). Conceptualization, operationalization, and measurement. *The Sage Encyclopedia of Social Science Research Methods* (pp. 162-166).
- Mwando, S. (2013). Contribution Of Agency Banking On Financial Performance Of Commercial Banks In Kenya. *Journal of Economics and Sustainable Development*, 4(20), 26-34.

- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial economics*, 13(2), 187-221.
- Nofie, I. (2011). "The diffusion of electronic banking in Indonesia", Manchester Business School.
- Nohria, N., & Gulati, R. (1996). Is slack good or bad for innovation? *Academy of management journal*, 39(5), 1245-1264.
- Nelson, R. R. (1991). Why do firms differ, and how does it matter? *Strategic management journal*, 12(S2), 61-74.
- Ngumi, P. M. (2013). "Effect of Bank innovations on Financial Performance of Banks in Kenya".
- Ntim, C. G. (2013). Why African stock markets should formally harmonise and integrate their operations.
- Nyangosi, R. (2008), E- banking: an integration technology in Kenya. *The African executive publication, finance and banking. Management* 1(4), 400- 421
- Roberts, P.W. & Amit, R. (2010), 'the dynamic of innovative activity and competitive advantage: the case of Australian retail banking, 1981, to 1995, *organization science*, 14, 107- 122
- Rosenbusch, N., Brinckmann, J. & Bausch, A., 2011, 'Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs', *Journal of Business Venturing* 26(4), 441–457. <https://doi.org/10.1016/j.jbusvent.2009.12.002>
- Rosenbusch, N., Brinckmann, J., & Bausch, A. (2011). Is innovation always beneficial? A meta-analysis of the relationship between innovation and performance in SMEs. *Journal of business Venturing*, 26(4), 441-457.
- Sampong, Y. W. (2015). Effect of bank innovations on financial performance of Universal banks in Ghana. A thesis submitted to the department of Accounting and Finance, Kwame Nkrumah University of Science and Technology, in partial fulfillment of the requirement for the award of Master of Business Administration in Finance.
- Saumure, K., & Given, L. M. (2008). Population. In L. M. Given (Ed.), *The Sage encyclopedia of qualitative research methods* (Vol. 1&2, p. 644). United States of America: SAGE Publications, Inc.
- Sampong, W. Y. (2016). *EFFECT OF BANK INNOVATIONS ON FINANCIAL PERFORMANCE OF UNIVERSAL BANKS IN GHANA* (Doctoral dissertation).

- Semykina, A., & Wooldridge, J. M. (2010). Estimating panel data models in the presence of endogeneity and selection. *Journal of Econometrics*, 157(2), 375-380.
- Shuttleworth, M. (2008). *Case Study Research Design*. Retrieved September 8, 2018, from <https://explorable.com/case-study-research-design>
- Silber, W. (1983). The Process of Financial Innovation. *The American Economic Review*, 73(2), 89-95. Retrieved from <http://www.jstor.org/stable/1816820>
- Trochim, W. M. (2006). *Research Methods Knowledge Base*. Retrieved May 6, 2014, from <http://www.socialresearchmethods.net/kb/sampnon.php>
- Yount, R. (2006). *Research Design and Statistical Analysis for Christian Ministry* (4 ed.). United States of America. Retrieved from bsd.napce.org/documents/research-design-yount/00_Front_4th.pdf
- Yeasmin, S., & Rahman, K. F. (2012, September). 'Triangulation' Research Method as the Tool of Social Science Research. *BUP Journal*, 1(1). Retrieved May 4, 2015, from <http://www.bup.edu.bd/journal/154-163.pdf>
- Zainal, Z. (2007). Case study as a research method. *Journal Kemanusiaan*, 9. Retrieved from core.ac.uk/download/pdf/11784113.pdf