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**EXAMINING THE LINK BETWEEN MARKET POWER IN THE
TELECOMMUNICATION INDUSTRY AND FINANCIAL INCLUSION IN
GHANA**

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**THIS LONG ESSAY SUBMITTED TO THE DEPARTMENT OF FINANCE,
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DECLARATION

I declare that this long essay was composed entirely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree or professional qualification, except for unique references and ideas credited to specified sources. Therefore, I take responsibility for any shortfalls that may be identified in the work.

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CERTIFICATION

I hereby certify that this long essay was prepared by the student and was supervised in accordance with the guidelines on supervision of long essay laid down by the University of Ghana.

DR. EDWARD ASIEDU

.....

.....

SUPERVISOR

SIGNATURE

DATE

DEDICATION

This work is dedicated to the Almighty God for his unconditional love and mercies shown me during this course of research. It is also dedicated to family including my parents who made me understand perseverance and how to push for something until it is obtained as well as my siblings and colleagues at work for their constant support and encouragement and prayers during this research work that brought me this far.

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LIST OF ABBREVIATIONS

ACMMT	Number of Active users of Mobile Money
ATH	Automated Clearing House
ATMs	Automated Teller Machines
CCC	Cheque Codeline Clearing System
GIPSS	Ghana Interbank Payment and Settlement System
GNI	Gross National Income
LITR	Literacy Rate
MICR	Micro ink character recognition
MFS	Mobile Financial Services
MFSI	Mobile Financial Institution
MM	Mobile money
MMOs	Mobile Money Operators
MNO	Mobile Network Operators
POP	Population
POS	Point-Of-Sale
ROSCA	Rotating Saving and Credit Association
SSA	South-Saharan Africa
VAMMT	Value of Mobile Money Transaction
VOMMT	Volume of Mobile Money Transaction

ABSTRACT

It is increasingly acknowledged that the telecommunication industry plays a crucial role in enhancing financial inclusion with a considerable literature that explores the relationship between market power in the telecommunication industry and financial inclusion. The purpose of this study is to examine the link between market power in the telecommunication industry and financial inclusion in Ghana with a focus on the mobile financial service. The study uses secondary sources spanning the period 2012 to 2018, from the World Development Indicators (2018) and annual reports of the National Communication Authority and payment systems reports of the Bank of Ghana. Both descriptive analysis and the Person's Moment Correlation Analysis were carried out to analyse the data. The result reveals that there is an upward trend in market power in the telecommunication industry. The trend shows the existence of an oligopolistic market structure which is featured by a leading position of two mobile network operators (MTN and Vodafone) in the period under consideration. The study also reveals a persistent increase in the use, value and volume of the mobile money service, which signifies that a lot of the populace is now financially included which can be a step leading to achieving a cashless economy. Furthermore, it is shown that financial inclusion (i.e. active number of users and volume of mobile money transactions) has a positive and significant impact on the payment system (value of mobile money transactions). Moreover, for the macroeconomic variables, population growth has a negative effect, gross national income has a positive effect, whilst literacy rate has an insignificant effect on financial inclusion and payment system in Ghana. Therefore, the regulators should put in place holistic and sustainable mobile money/payment policy actions (revising the e-money issuer guidelines by the Bank of Ghana) which will incorporate mobile money services into all financial operations and sectors within Ghana.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The telecommunications industry has been one of the most significant industries and a momentous contributor to economic growth in several countries. The significance of this industry ascends from its high technological intensity and the role of telecommunications infrastructure in boosting the development of other sectors of the economy (Ahmed & Ali, 2017). Consequently, several technologies have been introduced in developing countries, which have helped businesses to grow and improved the standard of living of individuals. However, “none of these technologies have had as much influence on individual consumers in developing economies as the mobile phone technology” (Jack & Suri, 2010). Communication is known to be the backbone of human life and cannot be overlooked in our everyday life. Communication has progressed from the early days of letter writing to advanced forms of telecommunications using tools such as mobile phones (Richard & Mandari, 2018). According to Demombynes and Thegeya (2012), “the transformative nature of the mobile phone has been proven to be an effective tool for development in recent years, especially in the developing world.”

In addition, Aker and Mbiti (2010) assert that, “as telecommunication markets mature, mobile phones in Africa are evolving from simple communication tools into service delivery platforms, which has shifted the development paradigm surrounding mobile phones from one that simply enhances communication and reduces costs to one that could transform lives through innovative applications and services.” Mbiti and Weil (2011) argue that “the significant changes seen in the financial sector can be attributed to competition and also the proliferation of mobile devices that are capable of undertaking transactions.” Also, Nyame – Mensah (2013) asserts that “high mobile

phone penetration rates, coupled with high economic growth in developing regions like Sub-Saharan Africa have demonstrated that adopting newer, more cost-effective communication technologies such as the mobile phone has the potential to stimulate economic growth, and expand access to communication and financial services.”

Consequently, the presence of mobile phones in several parts of the world have made mobile banking very common due to their internet adaptableness characteristics (Nyame-Mensah, 2013). Mobile financial service is one of the innovative products available to users of mobile phones. It comprises an electronic money account in which an individual can gain access to using a mobile phone. Aker and Wilson (2012) assert that “mobile money provides fast and reliable transaction of financial services such as the cash withdrawal, transferring of a cash deposit, transferring of bills, transacting other related activities especially in the developing countries, and it has the capacity to integrate the poor population with the financial transaction.” The GSMA (2018) survey report that, “there were more than 30 million active users of mobile financial services globally and that more than 56.9 million people have opened mobile money accounts in Sub-Saharan Africa.”

The adoption of mobile financial services as a payment system (for the banked, unbanked, and underserved) benefits subscribers in several ways, such as speed, convenience, affordability, and flexibility. “Overall improvement in payment systems reflects in the entire economy through its inter-linkages with the fiscal, external and real sectors” (GSMA, 2018). Competition between telecommunications companies will have a benefit to end-users and financial inclusion in general since the platform of the mobile money includes all the financially excluded. The World Bank tech consultant, Martin Warioba, told Quartz. “As long as pricing is low enough to include the unbanked, mobile money services and healthy competition between telecom companies will benefit consumers and increase financial inclusion.”

Individual telcos with access to millions of users are exclusively engaged to bring about a thorough shift in financial inclusion. Regardless of who these telcos serve (individuals, SMEs, or large corporations), it is a boon for those being served (Mago & Chitokwinda, 2014). In the telecommunication sector, effective competition can enhance financial inclusion in so many ways:

- Effective competition between operators stimulates them to work more proficiently and provide competitive prices for their products to attract consumers.
- Effective competition drives operators to provide high-quality products to the market.
- Effective competition also drives operators to bring onboard to the market, new and innovative mobile financial services, which promotes the use of financial services among the poor.
- Effective competition brings about quality service delivery.

Until recently, “Sub-Saharan Africa had very low access to basic banking services (16% of the adult population) likened to other developing regions in the world (28% of the adult population)” (GSMA, 2018). The main reason is the proximity to banks, especially of the rural community. Lack of access to banks makes it difficult to maintain and accumulate investments, start a business or prevent unforeseen emergencies (Karlán et al., 2016). Luckily, mobile financial services and payment technology has helped the statistics to become increasingly remarkable. Mobile money has been proven to be significant for financial inclusion through its general acceptance in developing economies, particularly in Africa.

In the specific context of Ghana, almost everyone uses a mobile phone irrespective of their financial status or educational level. A report by the Bank of Ghana in June 2018, perks the registered number of mobile money accounts at 29.99 million. This is an incremental jump from

21.36 million in June 2017. This shows an over 40% increase in just one year. Market leader MTN subscribers currently increased by 6.2% to 21.3 million, with registered mobile money subscribers increasing by 4.1% to 14.2 million. The Bank of Ghana further reported that there are now over GHC52 billion mobile money transactions as at the end of 2019. Mobile money has significantly played a role in boosting access to financial services and has also financially included the poor and young in Ghana.

1.2 Problem Statement

There is no doubt that banks and telecom companies in Ghana are the two key players in taking financial services to the populace. Banks, microfinance and savings and loans institutions as it is well known, have a role to play as they are tasked by the Bank of Ghana to offer core financial services to the country; yet they seem to fail or rather are less interested in catering for rural masses since their products, service models and delivery mechanisms vary for each target segment and need a robust method (Nyame-Mensah, 2013). That's where the role of mobile financial institutions (MFIs) come into play since they handle low-cost distribution channel and huge low-value transactions in the rural and unbanked areas.

The facilitation of “mobile financial services” (MFS) by telcos in Ghana are the main drivers of financial inclusion. This is because telcos aid in the provision of access to payments, transfers, savings, credit, and insurance to low-income consumers (Amegbe et al., 2017). Currently, the main battle over consumer homes and phone in Ghana appears to be between MTN and Vodafone. From sightings, MTN escapes with a carrier crown. It has the highest percentage of voice and data subscribers and the highest number of mobile money users.

However, in spite of this general acceptance of responsible financial inclusion offered by telcos in Ghana, there still exists a substantial disparity in the use and quality of financial services available in the market, with several individuals still without access (GSMA, 2018). Understanding the effect of financial services on individuals, firms, and economies, has recently ignited the interest of researchers, policymakers and funders from banks and microfinance companies to telecom companies since there has been a recent global drive towards achieving a cashless economy by many countries.

Despite the vast studies on the mobile financial service and financial inclusion (see, for instance, Richard & Mandari, 2018; Kisaka et al., 2015; Thulani et al., 2014; Demombynes & Thegeya, 2012; Aker & Wilson, 2012), none of these studies have concentrated on the role of market power in the telecommunication industry in enhancing financial inclusion and deepening the payment systems for a cashless economy in the Ghanaian context. Specifically, access to funds consistently through the provision of mobile financial services by telcos has the tendency of deepening financial inclusion and contributing to Ghana's fight for a cashless economy. Due to the intricacy of the mobile financial service, studies that investigate this phenomenon thoroughly on the Ghanaian economy are much needed to provide a novel understanding of the adoption of this service. Against this background, this study contributes to the extant literature by assessing the mobile money's role in enhancing financial inclusion and deepening Ghana's payment systems.

1.3 Research Objectives

1.3.1 General Objective

This research has the key goal of carrying out an in-depth evaluation of the role of telecom companies (i.e. providing mobile money services) in boosting financial inclusion and deepening Ghana's payment system.

1.3.2 Specific Objectives

The specific objectives of this study are:

- I. To examine trends in market power within the telecom industry in Ghana from 2012 to 2018.
- II. To examine trends in financial inclusion (volume of mobile money transactions and active users) and payment system (value of mobile money transactions) in Ghana from 2012 to 2018.
- III. To examine the impact of financial inclusion on the payment system in Ghana.

1.4 Research Questions

1.4.1 General Research Question

What is the role of mobile telecom companies (providing mobile money services) in boosting financial inclusion and deepening Ghana's payment system?

1.4.2 Specific Research Questions

- I. What has been the trend in market power within the telecom industry in Ghana from 2012 to 2017?
- II. What has been the trend in financial inclusion (volume of mobile money transactions and active users) and payment systems (value of mobile money transactions) in Ghana from 2012 to 2018?
- III. What is the effect of financial inclusion on the payment system in Ghana?

1.5 Justification of the Study

In most countries in the developing world, “the number of bank account owners is fewer than mobile phone subscribers” (Nandhi, 2012). The situation is not different for Ghana. A large number of Ghanaians do not possess bank accounts but are able to perform some financial transactions by virtue of mobile financial services. The use of mobile money services has increased financial inclusion in Ghana. “Mobile money service is utilised for various reasons by Ghanaians to send and receive funds from friends and loved ones, payment of fees, remittances, and payment of merchants to aid critical business processes” (Kofigah, 2010).

The study seeks to make substantial contributions to the existing research on mobile financial services. With the view that mobile money technology is mostly adopted by individuals and to the extent that it aids financial access at any given time, its adoption could have an impact on their lives. But no strong evidence can be drawn in this respect until it has been proven empirically by this study. Also, due to the sheer volume of transactions and the amounts involved any failure in mobile money services and transactions will have deep economic repercussions for subscribers and the country as a whole, thus the successful completion of this study is useful to policymakers,

mobile network operators, regulatory authorities and other mobile money stakeholders and assist them in making sound decisions on mobile financial services.

1.6 Scope of the Study

This study is limited to assessing the role of mobile financial service in boosting financial inclusion and deepening the payment system in Ghana. Quantitative data from secondary sources will be obtained from the annual reports of the National Communication Authority and Bank of Ghana's reports on payment systems. The data cover a period of seven (7) years, (2012 to 2018).

1.7 Organization of the Study

Chapter one focuses on the introduction, which delves into the study's background, statement of problem, objectives, research questions, justification, and scope of the study. This chapter ends with the organization of the study. The second chapter focuses on the theoretical framework and the empirical studies that are relevant to the study. Chapter three explains the methodology used for the study with a clear focus on the methods used to analyse the data. The fourth chapter focuses on the empirical estimation and the discussion of the results. Chapter five deals with the summary, conclusion of the study, policy recommendations with regards to the empirical findings and delimitations of the research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The general aim of this chapter is to explore the pertinent literature on mobile money, its adoption, and its implications on financial inclusion and payment systems. The first section reviews the theoretical concepts of mobile financial services and some theories in financial inclusion. The second section discusses the overview of Ghana's mobile money services and the last section discusses the empirical evidence on the approaches employed to explore the impact that mobile money has on financial inclusion and the payment systems.

2.2 Theoretical Underpinning

Over the years, the literature review on the adoption of mobile money services and financial inclusion have heavily relied on the Theory of Diffusion of Innovation, the Transaction Cost Innovation Theory, Neoclassical theory, and Keynesian theory as its conceptualization. A review of these theories is essential to provide an in-depth understanding of the rigorous theoretical dimensions between mobile financial services and financial inclusion. All these theories are deliberated accordingly.

2.2.1 Theory of Diffusion of Innovation

This theory was put forth by Everett Rogers in 1983. Rogers (1983) defined diffusion “as the communication of innovation via certain channels over a period of time between the members of a social system”. The theory shows why, how, and at what rate new ideas and technology

disseminate. It explains the attitude of individuals towards the use of new technology. Also, Valente and Davis (1999) defined innovation “as an idea, practice or object that is alleged as new by an individual or another unit of adoption, whilst diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system”. According to Rogers (2003), there are four main constituents of the innovation process or technology diffusion:

- Innovation: this refers to introducing a tool, idea, platform, or object regarded as new by the potential user and should be easy to adjust. According to Rogers (2003), “the level and speed of adoption of an innovation by a person or a group is determined by the perceived relative advantage of the innovation. It could be financial or non-financial and could be measured in economic terms”. Thus, mobile money services can be regarded as an innovation employed by both the banked and unbanked.
- Channel of Communication: This is the process of introducing innovation to people engaged in the social system (Rogers, 2003). People enjoy financial services by using mobile phones, the availability of mobile communication and mobile financial services.
- Social system: This is a set of interconnected units that are solely involved in mutual problem solving to achieve a common goal (Rogers, 2003). The social system comprises individuals, organizations, informal groups, and subsystem, where the innovation is being diffused. With reference to the mobile financial service, Mobile Network Operators (MNOs), mobile money agents, banks and the whole financial sector form the social system.
- Time factor: There exists a time dimension in the rate of adoption of an innovation, which is sometimes measured as the time range within which members adopt the innovation (Rogers, 2003).

These four elements from the Diffusion of Innovation theory presents a basis for the financial sector's use of mobile technology. Thus, the rate at which people adopt the mobile financial services relates to the relative gain, convenience, and reliability the service offers with regards to the simplicity in transactions compared to the banking services (Dibra, 2015).

2.2.2 Theory of Transaction Cost Innovation

Many scholars over the years have put forth a lot of theories to define and elucidate financial innovation. Pertinent to this research is the “transaction cost innovation theory”, which was propounded by Hicks and Niehans (1983). “They believed that the main reason for adopting financial innovation is to decrease transaction costs and that technological improvement triggers financial innovation, which in turn aids in decreasing transaction costs”. Thus, advancements in financial services being caused by a decline in transaction costs triggered by financial innovation.

2.2.3 Theories of Financial Inclusion

Based on the various theories in economics, financial inclusion can be assessed by employing both the Keynesian theory and neoclassical economic theory. The later theory focuses on economic agents and puts the country in a secondary role.

➤ Neoclassical Theory

The first advocate for the free-market economy was elaborated in the “Classical 1776 wealth of nations” by Adam Smith. The theory stressed —” invincible hand” in the economic arrangement where the economy should be left on its own to run for equilibrium to be attained by forces of demand and supply. Adam Smith asserts that, “the classical economic theory is rooted in the

concept of a laissez-faire economic market, which is also known as free-market, requires little to no government intervention and that it allows individuals to act according to their own self-interest regarding economic decisions”. This, therefore, makes economic resources to be allocated properly to the requirements of individuals and firms in the open market.

According to the neoclassical theory, “the primary economic agents are firms and consumers whose behaviour are assumed to be rationally self-interested, well-informed and competitive, and that financial inclusion is the result of consumer choice and/or government policy”. Since consumers have the liberty to choose from varied options, it is possible for them to choose formal financial services for their daily transactions. It may also be possible that policies of the government can sanitize the credit markets that subsequently led to the inclusion of the favoured segment.

➤ **Keynesian theory**

Keynes (1930) stressed on the significance of the banking industry in economic growth. He opined that “bank credit — is the pavement along which production travels, and the bankers if they knew their duty, would provide the transport facilities to just the extent that is required in order that the productive powers of the community can be employed at their full capacity”. This is confirmed by Robinson (1952), who stated that “financial development follows growth, and where enterprise leads, finance follows”. However, both of them acknowledged that it is a function of the institutional structures present, which is not essentially provided. The Keynesian theory depends on government spending to trigger the economic growth of a country during slow economic recessions. Both the Classical economists and Keynesians consider that a country’s economy comprises consumer spending, government spending, and business investment.

According to the Keynesian theory, financial deepening or inclusion takes place because of an increase in government spending. Thus, in attaining full employment, the government needs to push more money into the economy through increased government spending. Using the method of McKinnon (1973) and Shaw (1973), developing countries' financial sectors are not only controlled but severely —repressed. Thus, efficiency and equity will trigger credit allocation by governments in developing countries. The theory concludes by stressing that, developing the financial sector and enhancing financial access stimulate economic growth and decrease income inequality and poverty.

2.2.4 Electronic (E)-Money, Mobile Money and Payment Systems

Kirchner (1996) states that “considerable attention has been drawn to the fact that, the introduction of electronic payment systems was changing ways in which routine financial and banking services were conducted.” Recently, mobile money and electronic money (E-money) “have replaced cash as the ideal medium of exchange. It makes it possible for the purchase and sale of goods and services using the mobile phone quickly and cheaply, which results in the reduction of costs in an economy. This in itself is a significant development, given the important role of transaction cost in determining the nature and extent of an economy’s production possibilities” (Kirchner, 1996). Hankel et al. (1999) opined that “the demand for high powered money as a percentage of GDP continued to decline over the years in most advanced countries because of advancements in payment technology and systems that have reduced the liquidity needs for daily transactions.” In some developing countries, mobile money services, which act as payment systems, tend to make the financial sector more comprehensive, leading to a high number of unbanked publics to be financially included, which would lead to greater liquidity demands.

2.3 Overview of Financial Services in Ghana

2.3.1 Payment Systems in Ghana

The payment system of Ghana can be defined simply as an arrangement of institutional infrastructure and procedures that help in the transfer of monetary claims mainly from financial institutions and the central bank. After the time of the micro ink character recognition (MICR) cheques in 1997, the payment system has substantially developed over the years. The rapid growth in the adoption of ICT both domestically and internationally has led to momentous enhancements and development in the payment system of Ghana. However, the improvements have been made possible based on a lot of reforms in the financial sector over the years. Other types of Ghana's payment instruments are increasingly gaining ground in the country which greatly depends on the non-cash payment instruments. An example is the mobile money service, which has become protruding in the economy, recorded about high growth in value and volume of transactions over the years. Ghana's payment and settlement system comprise the following:

- Mobile phone banking and internet banking
- “Ghana Interbank Payment and Settlement System” (GIPSS)
- National Switch – Gh-Link
- The “Cheque Codeline Clearing System” (CCC) and “Automated Clearing House” (ACH)
- “Credit cards, ezwich, debit cards, ATM/POS cards, smartcards and stored valued facilities”.

2.3.2 Mobile Financial Services in Ghana

The introduction of mobile financial services in Ghana is seen as a solution to diverse problems and challenges. One such problem was the sending of money domestically. “Though formal

transfer systems such as post offices and private institutions like Western Union were being used, they were very expensive” (Nyame-Mensah, 2013). Bank of Ghana (2017) demonstrates that “mobile money is increasingly becoming the most common means of payment for Ghana’s unbanked and underserved. The swift growth in the use of mobile money service in Ghana is mainly due to the increasing mobile phone penetration specifically in rural areas”. Thus, the extensive proliferation of mobile money among the unbanked and underserved is grounded on the recent developments in handset usage, improvement in “Point-Of-Sale” (POS) infrastructure, and chip and mobile technologies network. Mobile Money Operators (MMOs) issue of mobile money. The mobile money service has so far been launched by four operators in Ghana. The first telecom company was MTN, which was launched in 2009. This was followed by Tigo and Airtel in 2012, which have been merged recently and now called AitelTigo, and the last was Vodafone in 2015. Ghana has seen momentous growth since the launch of mobile money. According to a report by the Bank of Ghana (2017), “there were about 8 million active mobile money wallets by the close of 2016. Also, concerning the volume and value of transactions, approximately 550 million volume of transactions, and GHS78.5 billion (approximately \$18 billion) value of transactions were performed in 2016”.

➤ **MTN Ghana**

MTN mobile money, launched in July 2009, has been the first mobile payment system operated by MTN Ghana to aid in the drive towards a cashless economy in Ghana. This service has more than 12 million customers. The business recorded more than 500 million transactions in 2017. According to MTN Ghana (2013), “MTN mobile money is a cash management service available on the mobile phone or internet, and it is mainly about facilitating money transfer for the Ghanaian market. The service can also be used for reloading MTN airtime units and for payment, of utility

bills, goods & services. The service is available to both mobile and non-mobile users. MTN mobile money is provided by MTN in partnership with banks, and can also operate through authorized merchants who will facilitate the service on behalf of the partner banks”.

➤ **AirtelTigo Cash**

The then Tigo (Millicom) Ghana Limited, before the merger with Airtel in 2017, also introduced Tigo Cash, which was a mobile money transfer service. This service was launched in 2012. As of 2017, there were more than 3 million registered users. According to Tigo Ghana, “the Tigo Cash was a mobile financial service product that allowed the use of the mobile phone as a mobile bank account, and enables users to send and receive cash, buy airtime and pay bills”.

Also, in 2012, Airtel Ghana launched Airtel Money, a cutting-edge type of mobile banking that would give instant access to banking services via mobile phones. According to Airtel Ghana, “the unique feature of the Airtel Money proposition compared to other mobile money services, is the ability to link one’s bank account directly to one’s electronic wallet enabling the simple and secure transfer of money across accounts”. They also had a partnership with banks to facilitate the adoption of their “Automated Teller Machines” (ATMs) for cashing out by subscribers without necessarily having a bank account.

➤ **Vodafone Cash**

After staying out of the mobile money space for a number of years, “Vodafone Ghana started its own mobile money service dubbed Vodafone Cash in 2015. Vodafone Cash is therefore modeled strictly on the original world-acclaimed mobile money service, M-Pesa, which was started in Kenya by Safaricom, a Vodafone company in that country. Vodafone Cash currently offers basic

mobile money services such as money transfer, prepaid airtime top-up and the payment of Vodafone bills, namely mobile postpaid, fixed-line and broadband bills”.

2.4 Empirical Evidence

There has been a large and growing group of literature that sought to explore the sensitivity of financial inclusion to mobile financial services, however, little work has been done, especially in Ghana, on the role of mobile financial services in enhancing financial inclusion. Consequently, the research methodologies employed in these studies tend to vary substantially, which leads to different empirical results. For instance, Jenkins (2008) asserts that, “mobile money stimulates financial inclusion since it is used for payments for utilities, transfers of money, government revenue, among others. The study also opined that mobile money incorporates the unbanked into the formal financial system which is a crucial stepping stone for effective involvement and development in the market”.

In addition, Kimenyi and Ndung’u (2009) evaluated the growth of the financial services in Kenya and explored the lessons that can be learned from Kenyan mobile phone banking. They found that “mobile money transfers assist in payment for services of which labour is no exception. Per the study, prompt payment of weekly labour in remote parts of Kenya has led to a transformation of lives in Kenya, particularly in rural regions. This transformation is said to be in the right direction and suggests that the people of rural areas can now readily afford to pay for their needs on time and can increase their spending on goods and services”.

Also, Morawczynski (2009) investigated “the adoption, usage, and the outcomes of mobile money in Kenya. The study employed the socio-technical system's framework. The work reports that some users now have more time to work (save travel time to send money home). The study concludes

that the availability of mobile money agents in rural regions has also influenced the lives of mobile money users positively by making them financially included. To some degree, therefore, easy access to funds via mobile money increases spending among mobile money users”.

In Kenya, Jack and Suri (2011) analyzed data from a two-round survey on households in a study “that captured the economic use on mobile money service. The initial round of survey captured 3,000 households across Kenya while the following round of survey captured 2,016 of the initial 3,000. It was found that the mobile money service (M-Pesa) had become a saving instrument. There was an increase in the percentage of M-Pesa users who used the mobile money service as a saving instrument from 75 percent in the initial survey round to about 85 percent in the second round of the survey. The proportion of users who saved on M-Pesa increased between the two rounds among the banked and the unbanked”.

In Ghana, Aker and Wilson (2012) investigated “how mobile money can promote the financial inclusion of the poor, particularly those living in rural areas of northern Ghana. The survey is in two stages: a data collection and a follow-up. It used four different interventions (each one) designed to partially address some key barriers to mobile money adoption. Per their findings, rural populations are much interested in adopting mobile money. In 2 and a half months after the initial intervention, 26 percent more households started to use mobile money with 86 percent of users receiving money transfers via the medium. Moreover, 70 percent of users save on their mobile phones (on the mobile money platform)”.

In Uganda, Kamukama and Tumwine (2012) examined the “effect of mobile money services on the liquidity position of commercial banks in Uganda. Using an Ordinary Least Square (OLS) cross-sectional and quantitative research design on 345 respondents from 23 commercial banks,

they found out that, increased use of mobile money services was associated with lowered bank deposits by clients which negatively affected commercial bank's liquidity position. It was explained that the liquidity position of commercial banks was falling and mobile money services accounted for 36.7 percent of the variance in the liquidity of commercial banks".

Moreover, Ehrbeck et al. (2012) found that "an emerging collaboration between banks and mobile network operators (MNOs) in Sub-Saharan Africa (SSA) is a marked indication of a positive move towards financial inclusion for the 80 percent of Africa's unbanked population. The paper put Kenya as the leading country in terms of mobile money in SSA and indicated that the West Africa sub-region is forging ahead towards financial inclusion but remained behind the Eastern and South African regions".

Consequently, Merrouche and Nier (2012) assessed "the impact of the payment system on the amount of credit offered by the banking system using payment system reforms in 10 Eastern European countries over the 1995-2005 period. They found out that payment system reforms were associated with increasing trends in credits. It was also evident in their findings that payment system reforms resulted in decreases in the amount of cash used for transaction purposes in the economy relative to the use of bank deposits. Since deposits were well intermediated within the financial system, they posited that it could improve the creation of credit. They concluded that an effective payment system was a vital prerequisite for credit acceleration."

Furthermore, Thulani et al (2014) investigated "the level of financial inclusion among Zimbabweans. The study used both qualitative and quantitative methods to arrive at the results. A sample of 37 households is drawn from eight districts in the Midlands Province. Questionnaires and focus groups discussion were employed to collect the data. Exploratory factor analysis,

principal component analysis, Varimax rotation, and Kaiser Normalization were conducted. The work depicted very high mobile money usage among the unbanked rural inhabitants for transferring money. Yet, it further revealed the high usage of mobile money service does not change their saving habits. They still adhere to their primitive means of saving”.

Mago and Chitokwindo (2014) in Zimbabwe examined “the effect of mobile banking services on financial Inclusion. Qualitative research and survey design were employed to estimate the impact of the two variables in the Masvingo district on 270 respondents. It was found out that low-income people were willing to adopt mobile banking for several reasons. A convincing majority were eager to adopt mobile banking services because it was easy to use, easily accessible, cheaper in terms of cost, convenient and more secure. The low-income earners left in the informal sector could now enjoy similar formal financial services through mobile banking”.

In Kenya, Mbiti and Weil (2014) analyzed data from “national household survey (FinAccess) tailored to measure financial access in relation to the impact of mobile banking services. Estimates from a random fixed-effect model analysis portrayed a strong positive association between the adoption of M-Pesa services and the rate of sending and receiving money transfers. There was a huge negative relationship between M-Pesa usage and informal means of savings such as the Rotating Saving and Credit Association (ROSCA). The velocity of M-Pesa which was measured as the total value of a person to person transfer over the outstanding balance of e-float stood between 11 and 14.5. Their estimation showed that increased use of M-Pesa would increase patronage of financial service. With this, they realized M-Pesa adoption would decrease the unbanked populace by 28 percentage points. They concluded that increased usage of the mobile money service lowered the tendency to keep savings with informal saving machinery such as ROSCA.”

In Nigeria, Etim (2014) examined “the use of mobile phones for mobile money and mobile banking services. Specifically, the study analyzed whether users observed mobile phones as easy and convenient to use for numerous tasks comprising mobile money transfers and mobile banking and whether mobile money services are been widely used. The study found that mobile phones are widely used by people mainly for communication with family and friends, and are hardly used for mobile money transfers or mobile banking”.

Sung (2014) examined the market concentration of telecommunication companies in OECD countries. “Using annual panel data from 24 OECD member states for the 1998–2011 period, the study estimates regression equations for market concentration, mobile prices, and profits. The empirical results indicated that the more concentrated the mobile market, the higher the prices and profits, providing support for the market power hypothesis. Thus, market concentration is a useful indicator of market performance”.

Kisaka et al. (2015) observed “the relationship between mobile banking deepening and financial performance of the commercial banks in Kenya. The study applied a descriptive research design that covered 6 telecommunication service providers and 43 commercial banks in operating in Kenya as of June 2014. There was a direct positive link between the total number of mobile banking customers and the value of mobile banking transactions but the study revealed a weak insignificant positive relationship between mobile banking deepening and the financial performance of commercial banks. They concluded that the financial performance of the commercial banks in Kenya could have been affected by other indicators which were not considered in the study”.

Kasekende (2016) re-estimated the association between financial inclusion and mobile money employing the ARDL method of cointegration and the quarterly data for the period 2000 to 2014 for Kenya. They found that financial inclusion was stable and has a significantly positive relation with mobile money. They however concluded that the positive relationship can be based on the fact that mobile money is backed up as deposits in the commercial. Thus, since the mobile money service is a substitute for cash, upsurges in its usage will make the demand for money to increase since the unbanked populace will involve in a transaction using this service.

Ouma et al. (2017) investigated “whether the persistent use of mobile phones to provide financial services is beneficial for the mobilization of savings in selected Sub Saharan African countries. They found that the adoption of mobile phones to provide financial services stimulates the possibility of household-level savings. They stressed that mobile phone usage for financial services does not only enhance savings but also has a significant effect on the amounts saved, based on the fact that mobile phones can be used easily for transactions”.

Finally, Okello et al. (2018) examined “the moderating impact of social networks in the association between mobile financial service and financial inclusion in the rural areas of Uganda. They found that there is a significantly positive moderating impact of social networks in the association between mobile financial service and financial inclusion in Uganda. Also, social networks and mobile money usage were found to have direct and significant impacts on financial inclusion in the rural areas of Uganda. They concluded that the presence of social networks amongst the users of mobile money enhances financial inclusion in Uganda”.

2.5 Conclusion

It has been well established from the reviewed literature that various studies that explored the role of mobile financial services in an economy arrived at mixed conclusions. Based on the complexity of the effect of the mobile financial services on the lives of individuals, studies focusing on developing economies where the patronage of the mobile money technology is seen to be very high should be encouraged. This has motivated the research of these relationships in a developing country (Ghana).

CHAPTER THREE

METHODOLOGY AND DESCRIPTION OF DATA

3.1 Introduction

The chapter gives a detailed explanation of the methodology used in the study and deliberates how the study would be conducted to accomplish the objectives stated in the introductory chapter. The chapter explains how the research objectives and hypotheses were accomplished through a methodological framework used for the study.

3.2 Research Design

Research design is referred to as an approach used to carry out specific research work. Based on the fact that there are several strategies accessible to the researcher, every study must have a suitable strategy used. The research design that will be employed is the non- experimental design, specifically descriptive and correlation analysis. “Non- experimental designs do not involve the manipulation of a situation or circumstance but rather it is used to find the relationship between variables and in comparative studies. Also, simple correlation measures the degree of linear association between two variables without stating whether there are a cause and effect relationship”. Thus, Pearson's correlation is employed to examine the association between the study’s variables. Indeed, the goal of the research is to assess the market power of telcos and the role of mobile financial services in enhancing financial inclusion and deepening the payment systems in Ghana. This, therefore, requires that the study employed descriptive and correlational analysis.

3.3 The Target Population

The population of a study is referred to as “the total collection of elements that enables the researcher to make some valuable inferences”. This deals with a collection of all possible observations of a specific representation of interest. The population employed in this study is mainly concerned with all subscribers of the mobile financial service provided by the telco companies in Ghana. Therefore, it constituted the target population for the study.

3.4 Sampling Selection

The sample selection deals with a collection of observations demonstrating only a segment of the population. The sampling selection employed is the non-probability sampling technique. This chosen sampling technique is where individual sample units are selected with regards to the researcher's judgment or the convenience and the likelihood of any unit of the population being selected is unknown. Subscribers of the mobile financial service provided by the telco companies in Ghana were purposively selected for the study.

3.5 Sources of Data

In a quest to assess the market power of telcos as well as the role of the mobile financial service in enhancing financial inclusion and deepening the payment systems in Ghana, this study obtained data from secondary sources spanning the period 2012 to 2018. The selected period is centered on the availability of data. Secondary data were acquired from the World Development Indicators (2018) and annual reports of the National Communication Authority and payment systems reports of the Bank of Ghana.

3.6 Choice of Economic Variables

The study chooses three variables comprising the volume of mobile money transactions, the number of active users, and the value of mobile money transactions. The “volume of mobile money transactions” and the “number of active users” is used to measure financial inclusion whereas the “value of mobile money transactions” denotes the payment system. The expectation is that financial inclusion has a positive and significant effect on the payment system.

3.6.1 Payment System

➤ Value of Mobile Money Transactions

The “value of transactions” in this study is defined as the total amount of monies sent by individuals in the economy using the mobile financial service.

3.6.2 Financial Inclusion

➤ The Volume of Mobile Money Transactions

The volume of transactions in this study is defined as the total number of mobile financial service transactions performed by individuals in the economy.

➤ Number of Active Users of Mobile Money

The number of active users of mobile money in this study is defined as the total number of subscribers of the mobile financial service who are active in the service for 30 days.

3.6.3 Market Power

Market power in this study, which is also known as the market share of a telecommunication company, is defined as the total number of voice subscriptions of a telecommunication company.

3.6.4 Macroeconomic Variables

➤ Gross National Income (GNI)

The variable Gross National Income (GNI) relates to GNI at constant \$ 2011 prices and it is used to measure the total income earned by a nation's people and businesses, including investment income, regardless of where it was earned. Thus, it tracks the wealth of a nation from year to year. Data on Gross National Income was obtained from the World Development Indicators (2018).

➤ Literacy Rate (LITR)

The variable literacy rate is employed to measure the primary education completion rate, which is the total percentage of students who have completed the last year of primary school. Data on literacy rate was obtained from the World Development Indicators (2018).

➤ Population (POP)

The variable population is used to measure the total population of a country measured as the number of live births. Data on the total population was obtained from the World Development Indicators (2018).

3.7 Method of Analysis

The data employed for the study is analyzed with the aid of the STATA statistical software package. These comprise total scores, frequencies, means, and percentages. Microsoft Excel is used to produce suitable charts and tables for data analysis; thus, inferences are made based on the collected data. The study employed the Pearson's correlation, and trend analyses to meet the study objectives. By employing the Pearson correlation, the study follows the literature to assess how financial inclusion can be enhanced by mobile financial services. This indicates that mobile financial services can have a significant impact on financial inclusion. Again, the key assumptions (normality and linearity) underpinning correlational analyses were observed.

3.7.1 Pearson Moment Correlation Coefficients

A correlation coefficient “is a measure of the scatter of the data points around an underlying trend, interchanging variables will not change the value of the correlation coefficient”. The Pearson moment correlation coefficient “is a measure of the strength of a linear association between two variables and is denoted by r ”. It has a formula;

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

“The value of r does not depend on the unit of measurement for either variable and the associated hypothesis test for the correlation coefficient null hypothesis equal 0 i.e. $r = 0$), for this to be valid. The correlation coefficient formula is used to find how strong a relationship is between data”. According to Heron (2009), the formula returns a value between -1 and 1. “The t-test is used to establish if the correlation coefficient is significantly different from zero, and, hence that there is

evidence of an association between the two variables". Hence, the Pearson's correlation was employed to analyse whether there was a significant correlation between the study variables.

3.8 Ethical Considerations

The use of secondary data for this study meet some key ethical considerations: Data was de-identified before releasing to the researcher, the consent of the study matter was reasonably presumed and the outcomes of the analysis did not re-identify the participants.

3.9 Conclusion

The chapter outlines the critical stages employed in the collection of important data required to meet the key research objectives. An improper research methodology will surely have an impact on the results and integrity of the entire study. Barring any unforeseen limitations, the relevant data will, therefore, be collected along with these methods and results presented accordingly.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 Introduction

In this section of the study, the study presents and discusses issues concerning the data. The study analysis the secondary data in this section. Specifically, this part of the study portrays the empirical findings of the research regarding the specified objectives in chapter one. The study used the STATA statistical software package for the analysis. The study's results are presented in tabular form for clarity and to enhance understanding of the results.

4.2 Data Analysis and Presentation

The results and findings of the study are presented in this section. The assumptions supporting the techniques of analysis are also discussed accordingly to present the robustness of the findings and results. The role of “mobile money” (MM) in enhancing financial inclusion and deepening the payment systems for a cashless economy in Ghana is presented in this section. It is worthy of notice that the results and findings are presented regarding the objectives of the study.

4.2.1 Trends in Market Power of the Telecom Companies in Ghana from 2012 to 2018

The first research objective is to examine the market power of the telecom companies in Ghana from 2012 to 2018. Measuring the market power of the mobile telecommunications market involves using the total number of mobile voice subscriptions. Although it is possible to calculate market power using the revenue of Mobile Network Operators, the study chose the total number of mobile voice subscriptions as a more appropriate indicator of market conditions.

Firstly, at the end of December 2018, the total number of mobile voice subscriptions for all telcos was 40,934,875. Mobile voice subscriptions of Ghana increased from 25.6 million in 2012 to 40.9 million in 2018 growing at an average annual rate of 27.65%. “The annual growth in subscriber numbers in the country is a testimony to the efforts being made by the players to ensure that many more people access their services”. Figure 4.1 shows the trend in total mobile voice subscriptions for Ghana from 2012 to 2018.

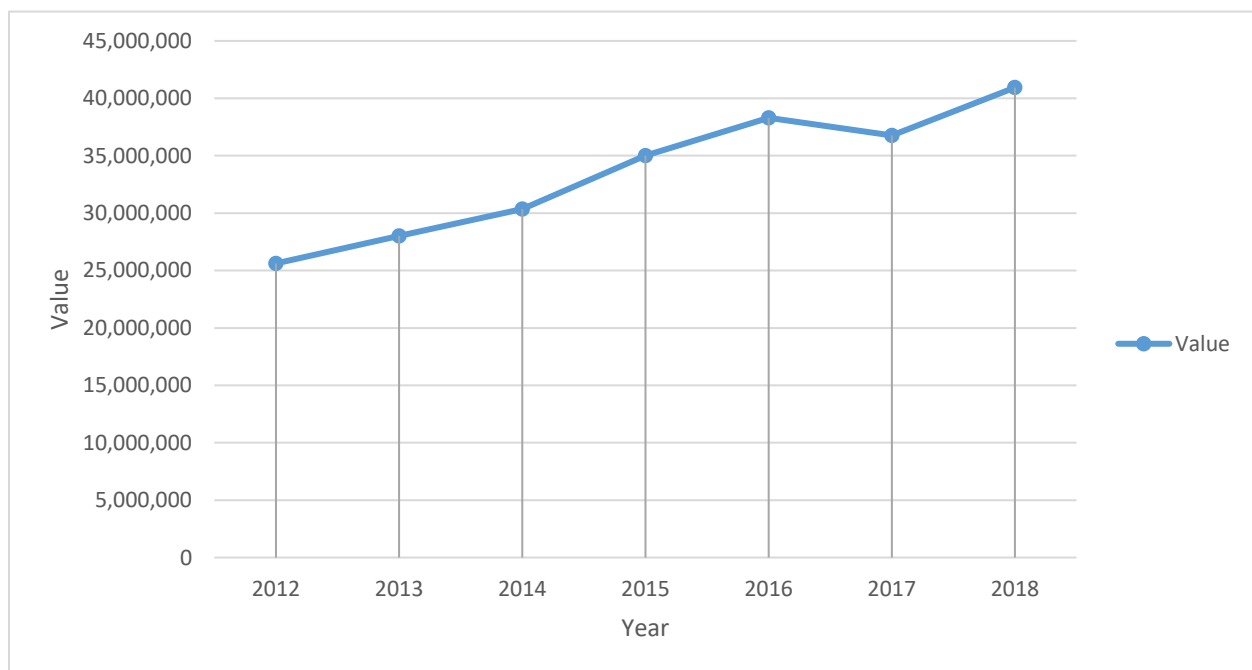


Fig. 4.1 Trend in total mobile voice subscriptions for Ghana from 2012 to 2018.

Source: Author's computation using data from NCA (2018)

Secondly, the relative positions of the Mobile Network Operators (MNOs) during the period under consideration has not changed (see Figure 4.2). According to the total number of mobile voice subscriptions, MTN has the largest market power in the entire period. Vodafone held the second position, Tigo held the third position, Airtel held the fourth position, while Glo has the lowest market power in every observed year. This implies that there exists an oligopolistic market

structure which is featured by a leading position of two MNOs (MTN and Vodafone) by the amount of voice subscribers-based market power in the period under consideration. The values of the market power indicate that the highest degree of market concentration was reached in 2016, and the lowest in 2012, however, the data indicates that the divergence between the market power of operators during the period under consideration 2012-2017 increased continuously (except in 2016 for MTN), that is, the distribution of the total number of mobile voice subscriptions was becoming more and more unequable from year to year. The upward trend of market power shows a permanent increase of intensity in competition in the mobile telecommunications market in Ghana. Figure 4.2 shows the power of Mobile Network Operators (MNOs) in Ghana based on mobile voice subscriptions from 2012-2017. This period was selected because of the merger of Airtel and Tigo in 2017.

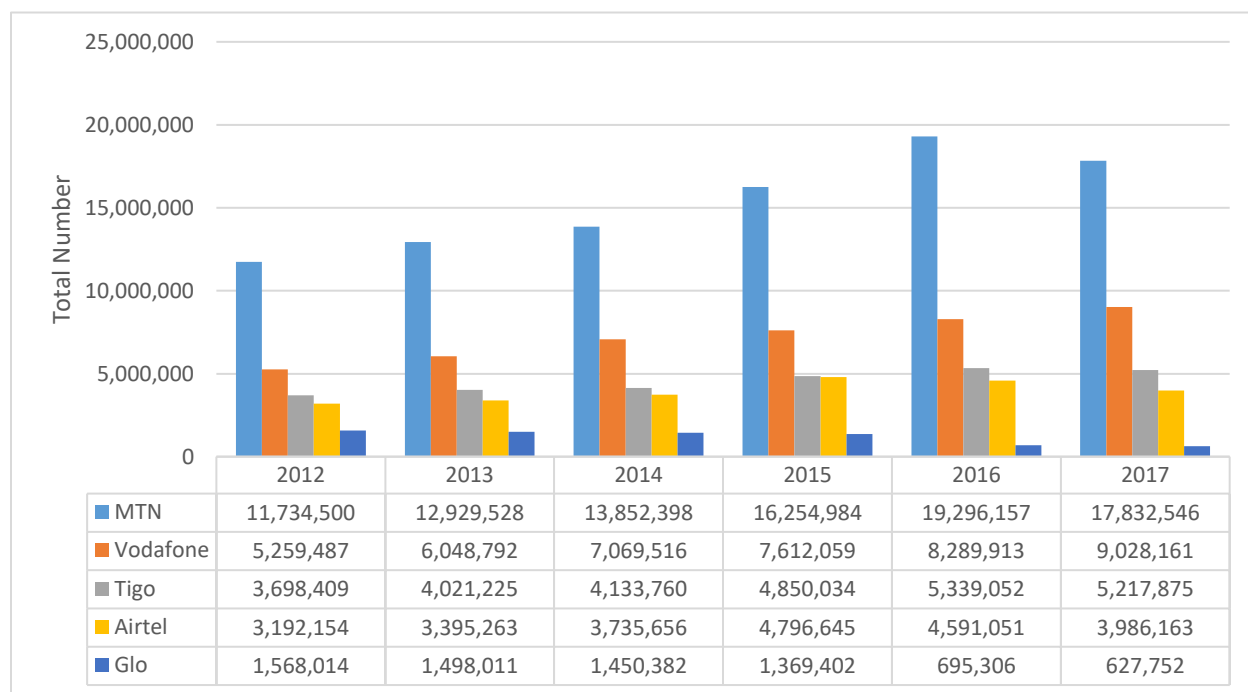


Fig. 4.2 Market power of Mobile Network Operators (MNOs) in Ghana from 2012-2017

Source: Author's computation using data from NCA (2018)

Lastly, after the merger of Airtel and Tigo in 2017, “the industry giant, MTN, maintained its dominance in the market, having ended the year 2018 with mobile voice subscriptions pegged at 20,092,798. This represents a subscriber base of 49.08%. The second was AirtelTigo with mobile voice subscriptions pegged at 10,289,491 as at the end of December 2018. This puts the company’s total market share for the period under review at 25.14%. Vodafone also closed the year in third place with 9,813,234 subscribers on its mobile voice network. The company’s share of the market, based on the figures, stood at 23.97% at the close of December. Glo remained in the fourth position with a mobile voice subscriber base of just 739,352 at the end of December 2018. That represented a total market share of 1.81% at the close of December”. Figure 4.3 shows the market power (mobile voice) – at the close of December 2018

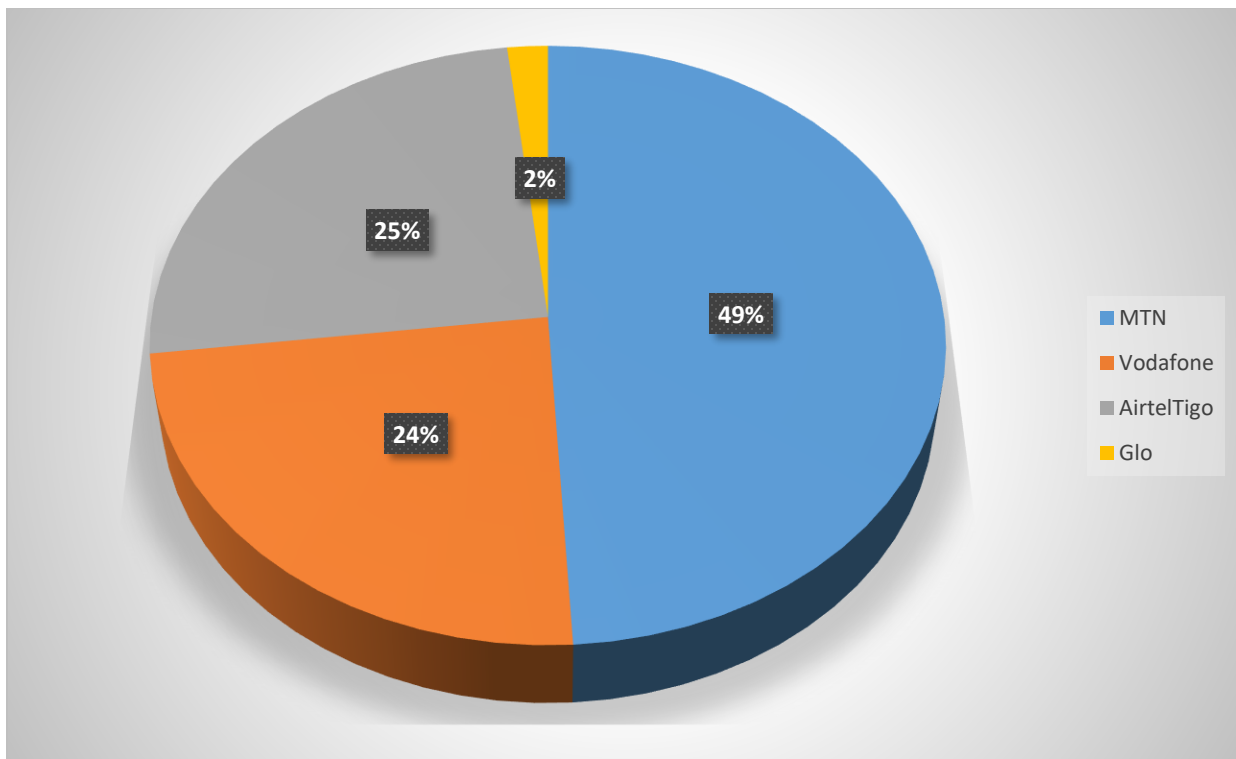


Fig. 4.3 Market power of Mobile Network Operators (MNOs) in Ghana as at the close of December 2018

Source: Author’s computation using data from NCA (2018)

4.2.1 Trends in Financial Inclusion (volume of MM transactions and number of MM active users) and Payment Systems (value of MM transactions) in Ghana from 2012 to 2018.

The second objective of the study is to examine trends in financial inclusion (volume of MM transactions and number of MM active users) and payment systems (value of MM transactions) in Ghana from 2012 to 2018. Financial inclusion and payment systems measures are acquired from the Bank of Ghana annual reports on the Ghana payment systems from 2012 to 2018. From Figure 4.1 the trend shows a consistent increase in the number of active subscribers of MM since 2012. In particular, the active MM users as of 31st December 2018 rose by about 16.84% that is, in 2017 it rose from 11,230,423 to 13,122,043 in 2018. During the study period, the number of active MM users has grown annually at a rate of about 528.38%. Thus, from 2012 to 2018 a growth of 345,434 to 13,122,043 was recorded. It is seen that Ghana has witnessed a sharp increase in its use of the MM service from 2012 to 2018. This result signifies that a lot of the populace is now financially included which can be a step leading to achieving a cashless economy. Figure 4.4 illustrates the active MM users from 2012 to 2018.

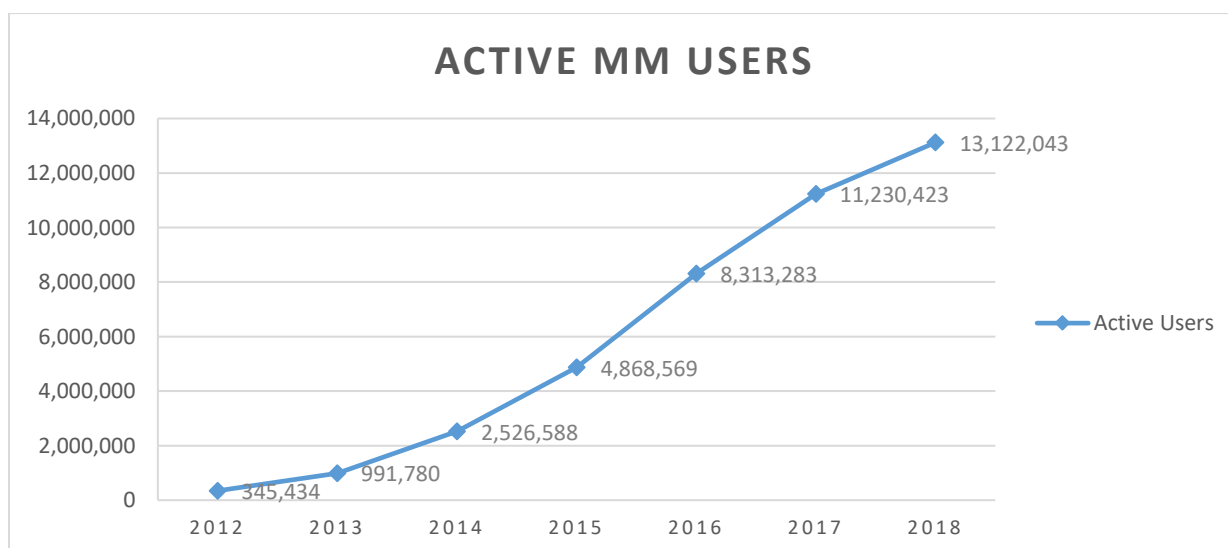


Figure 4.4 the active MM users from 2012 to 2018.

Source: Author's computation using data from BOG (2018)

Also, Figure 4.5 illustrates the trend in the volume of MM transactions from 2012 to 2018. It is seen that volume of transactions have consistently increased since 2012. Specifically, the volume of MM transactions as of 31st December 2018 rose by about 10.36% that is, in 2017 it rose from 594,044,459 to 655,558,435 in 2018. During the study period, the total volume of MM transactions has grown annually at a rate of 504.8%. Thus, from 2012 to 2018 a growth of 18,042,241 to 655,558,435 was recorded. The penetration of MM services in Ghana has immensely risen in recent years. This result signifies that a lot of the populace is now financially included and they perform a lot of mobile transactions, which is progress towards achieving a cashless economy.

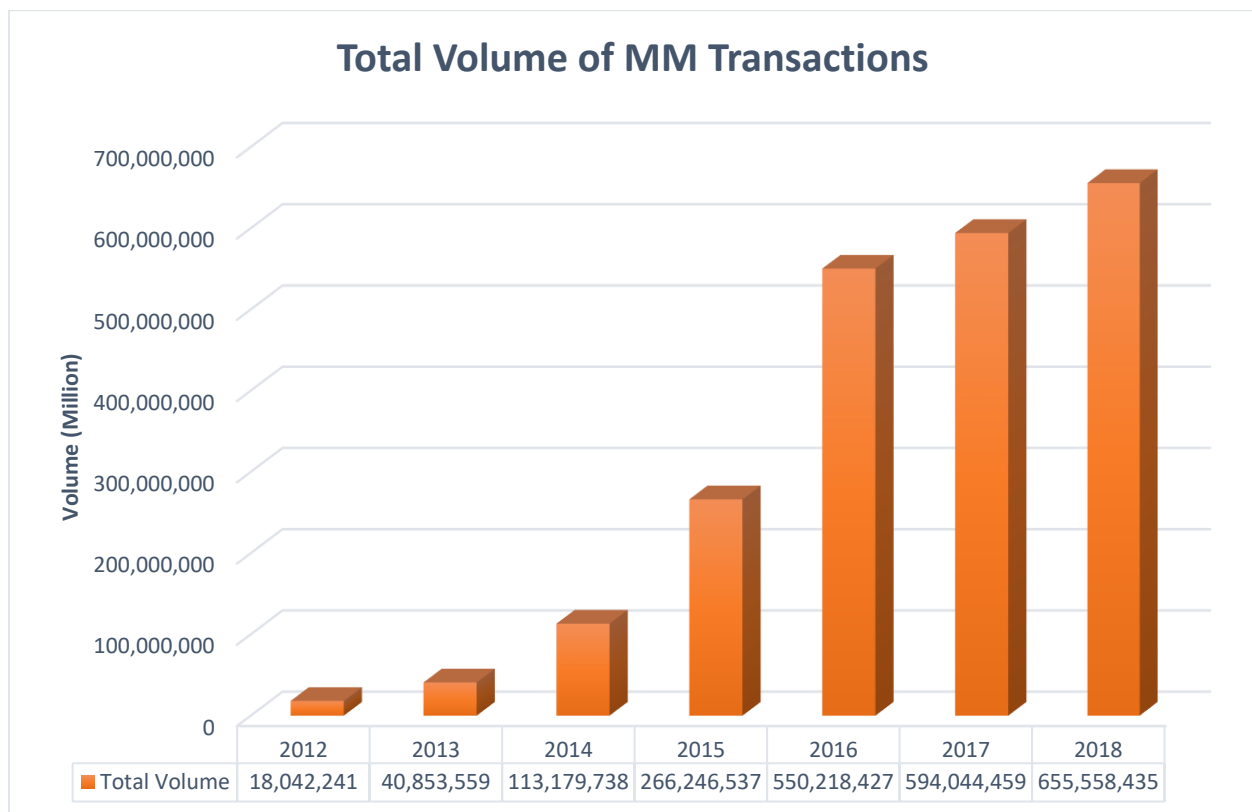


Figure 4.5 Total volume of MM transactions from 2012 to 2018.

Source: Author's computation using data from BOG (2018)

Lastly, the value of MM transactions has also increased significantly, with more than 655 million transactions performed in 2018 for a total value of GHS 212.9 billion. From Figure 4.3 the trend shows a steady rise in the total value of MM transactions since 2012. In particular, the total value of MM transactions as of 31st December 2018 rose by about 37.2% that is, in 2017 it rose from 155,135 to 212,885 in 2018. During the study period, the total value of MM transactions has grown annually. Thus, from 2012 to 2018 a growth of 594.12 to 212,885 was recorded. It is shown that the MM has penetrated the Ghanaian economy showing how a large number of the populace are financially included, and a prospect for achieving a cashless economy. Figure 4.6 presents the total value of MM transactions from 2012 to 2018.

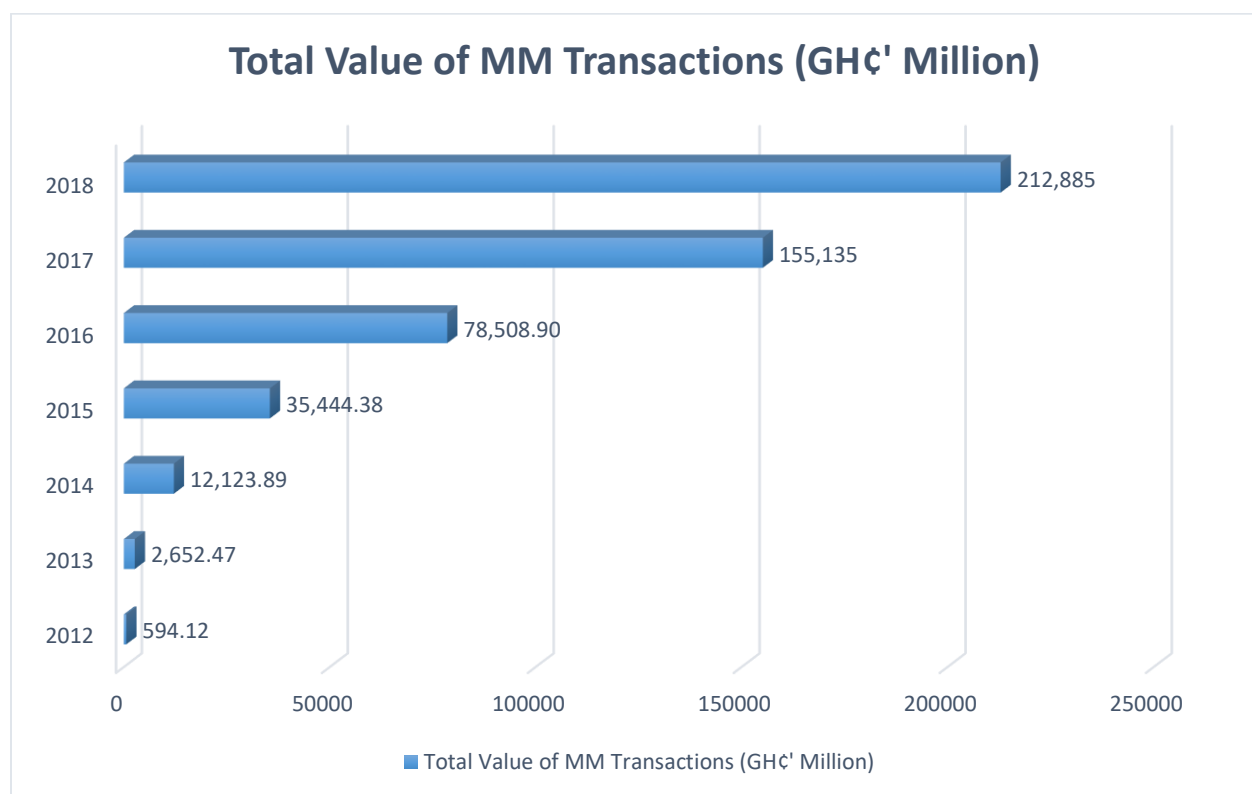


Figure 4.6 Total value of MM transactions from 2012 to 2018.

Source: Source: Author's computation using data from BOG (2018)

4.2.2 The Impact of Financial Inclusion on Progress towards Cashless Economy in Ghana

The second objective seeks to examine the effect of financial inclusion on progress towards a cashless economy in Ghana. As indicated earlier, the “volume of mobile money transactions” and the number of active users is used to measure financial inclusion whereas the “value of mobile money transactions” (payment system) denotes the progress towards a cashless economy. The macroeconomic variables controlled for are, Gross National Income, population, and literacy rate. The study employed the Pearson’s correlation analysis. Table 4.1 illustrates the Pearson’s Moment Correlation Coefficients of the variables used in the study.

Table 4.1: Pearson’s Moment Correlation Coefficients

	VAMMT	VOMMT	ACMMT	POP	LITR	GNI
VAMMT	1					
VOMMT	0.571**	1				
ACMMT	0.6325*	0.974*	1			
POP	-0.5851	-0.9392*	-0.9701*	1		
LITR	0.6972	0.9706	0.9930	-0.9468*	1	
GNI	0.5413	0.8468*	0.9125*	-0.9550*	0.8912*	1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Correlation is significant.

Source: Author's computation using the data

From the results in Table 4.1, the “volume of mobile money transactions” (VOMMT) is positively and significantly correlated with the value of mobile money transactions (VAMMT) with a coefficient of about 0.57 showing a strong relationship. Also, a similar and robust significant link is observed between “active users of mobile money” (ACMM) and the “value of mobile money transactions” (VAMMT) (0.64). Also, “active users of mobile money” (ACMM) is positively correlated with the “volume of mobile money transactions” (VOMMT) with a coefficient of 0.97.

Based on the macroeconomic variables, the correlation coefficient of population growth (POP) is negative and statistically significant on the financial inclusion measures (“volume of mobile money transactions” and active users of mobile money). This result is intuitive since population turn to decrease financial inclusion level in Ghana, which shows that rapid growth in population put serious pressure on the income of household leaving them with little or no income to enable them to have an account with formal financial institutions or mobile-money-service providers (see Chithra & Selvam, 2013).

In addition, the correlation coefficient of Gross National Income (GNI) is significantly positive on the financial inclusion measures (“volume of mobile money transactions” and “active users of mobile money”). This shows that GNI per capita has a positive effect means that household accounts with formal mobile-money-service providers depend largely on their level of income (Babatunde & Olaniyi, 2016). Finally, in line with the findings of Honohan (2008), literacy rate (LITR), that is primary school education completion has no significant effect (albeit positive) on the level of financial inclusion and payment system in Ghana.

The result from the variables shows that financial inclusion, measured by the “volume of mobile money transactions” and “active users of mobile money”, has a significantly positive effect on the

payment system (progress towards a cashless economy) in Ghana. This shows that “factors that encourage the adoption of mobile money enhance financial inclusion and expedite progress towards a cashless economy”.

According to Balakrishnan (2015), “an efficient, secure and reliable payment system reduces the cost of exchange of goods and services, enhances the stability of the financial sector and expands access to financial services”. A cohesive and interoperable payment system (including mobile financial services) in the country makes the banks to keep less money for settlement and use the deposits of customers for more productive purposes such as lending and investment. Therefore, mobile money sub-sector is one of the major determinants of the payment systems in Ghana, and the number of mobile money transactions successfully executed enables users to carry out future transactions.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Introduction

In this section of the study presents the summary, conclusion, and recommendation as well as some of the limitations, with regards to the outcome of the research.

5.2 Summary and Conclusion

The mobile money service has been one of the innovative products available to users of mobile phones. It comprises electronic money accounts that an individual can gain access to using a mobile phone. “This service provides fast and reliable transaction of financial services such as the cash withdrawal, transferring of the cash deposit, transferring of bills, transacting other related activities especially in the developing countries, and it can integrate the poor population with the financial transaction” (Aker & Mbiti, 2010). Individuals in developing countries find joy in using mobile phones based on the fact that it is useful when retrieving information, and recently, the mobile money usage among them has been common. Access to funds at any time through mobile money technology tends to impact on the financial development of the country. Also, mobile money services as a payment system have some implications as to how cash is held and used during economic transactions, hence contributing to the drive towards a cashless economy.

Against this background, this study, therefore, focused on the role of the market power in the telecommunication industry in enhancing financial inclusion and deepening the payment systems for a cashless economy in Ghana. The three specific objectives are; to examine trends in the market power of the telecom companies in Ghana from 2012 to 2018, to examine trends in financial

inclusion (“volume of mobile money transactions” and the “number of active users”) and payment systems in Ghana from 2012 to 2018 and to examine the impact of financial inclusion on the payment system in Ghana. The study obtained data solely from secondary sources to achieve these three objectives. Secondary data were acquired from the World Development Indicators (2018) and annual reports of the National Communication Authority and payment systems reports of the Bank of Ghana. STATA statistical software package and Microsoft Excel were used to perform the descriptive analysis and correlation analysis to examine the relationships. To make the presentation clear to follow, the findings from each specific objective is presented.

Firstly, the relative positions of the telcos during the period under review did not change. Based on the total number of mobile voice subscriptions, MTN had the largest market power in the entire period. Vodafone came second, Tigo held the third position, Airtel held the fourth position, while Glo trailed with the lowest market power in every observed year. The trend showed that there exists an oligopolistic market structure which is featured by a leading position of two MNOs (MTN and Vodafone) by the amount of voice subscribers-based market power in the period under consideration.

Secondly, the findings from the analysis suggest that Ghana has witnessed a sharp increase in its use of the mobile money service 2012 and 2018. This result signifies that a lot of the populace is now financially included which can be a step leading to achieving a cashless economy. Also, there was a consistent increase in the volume of transactions since 2012. The penetration of the mobile money service in Ghana has immensely risen in recent years. The study further suggests that the value of mobile money transactions has increased significantly, with more than 655 million transactions performed in 2018 for a total value of GHS 212.9 billion.

Thirdly, the findings from the analysis revealed that the volume of mobile money transactions is positively and significantly correlated with the value of mobile money transactions. Also, significantly positive relationship between “active users of mobile money” and the “value of mobile money transactions” is observed. Also, active users of mobile money is positively related to the “volume of mobile money transactions”. The result, therefore, shows that financial inclusion, measured by the “volume of mobile money transactions” and “active users of mobile money”, has a significantly positive effect on the payment system (progress towards a cashless economy) in Ghana.

Furthermore, controlling for macroeconomic variables, population growth (POP) has a significantly negative effect on the financial inclusion measures (“volume of mobile money transactions’ and “active users of mobile money”), Gross National Income (GNI) has a significantly negative effect on the financial inclusion measures (“volume of mobile money transactions’ and “active users of mobile money”), whilst literacy rate (LITR) has an insignificant effect (albeit positive) on Ghana’s financial inclusion and payment systems.

In light of the findings, “it can be concluded that mobile money services have positively impacted the financial inclusion and payment system of Ghana. The relative ease, convenience, and speed by which monetary transactions are carried out through the mobile money service have significantly prejudiced the delivery of financial services in Ghana. Mobile money services for some time now have seen to be of great support to the financial sector and economic lives of Ghanaians. Also, the adoption of mobile network services and financial services through the mobile phone has positively influenced the way cash is held and used in business transactions, which has improved the payment system and cashless buying of goods and services”.

5.3 Recommendations

Following the results obtained from the study, some recommendations are suggested as follows:

To begin with, the growth in technology should not be overlooked as it comes with a lot of benefits to users across the world. Therefore, based on the influence of technology on individuals' lives, the study recommends that “the use of mobile money service should be encouraged. The regulators (the Central Bank and National Communication Authority) should put in place holistic and sustainable mobile money/payment policy actions. These policy actions should be made to revise the e-money issuer guidelines by Bank of Ghana into a comprehensive mobile money/payment policy that further incorporates mobile money services into all financial operations and sectors within Ghana. This policy would ensure and further promote the use of mobile money services in the country to deepen the financial sector.”

Secondly, the study recommends that network service providers need to sensitize their public education activities on how mobile money technology operates and its usefulness rather than focusing on improving access to it. The study also comments that mobile network operators make more investments to improve the service rendered to their subscribers. Some subscribers usually complain that from time to time they face network challenges that prevent them from accessing their money and using the mobile money service. This presents a great inconvenience to them. A system upgrade would ensure that their mobile money system is reliable for subscribers and makes using the system conveniently. Through this approach, many people will be financially included. Lastly, in the macroeconomic level front, “electronic (money) credit generated by the mobile money technology should not be overlooked by policymakers when making monetary policies as it also influences individual user's spending. It is about time policymakers strategize on how to

manage economic shocks that could emanate from the use of the technology. Strict regulations and laws should be put in place to ensure the efficiency and effectiveness of mobile money services are always guaranteed to users at all times. Monetary policy measures should take into consideration the mobile money phenomenon as it could influence the currency in circulation which could affect the effectiveness of its policy. The central bank should ensure that mobile money transactions are monitored to prevent large sums of cash balances outside the banking system which has liquidity threats on the economy.”

5.4 Limitation of the Study

This study concentrates on the mobile money technology using a specific country, Ghana. For further studies, it would be much more interesting to explore this relationship focusing on a lot of countries in Africa. Therefore, the study recommends that future work in this area should take this into account as much as possible, and such a study could give this study new impetus.

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