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The Effect of demonetization and COVID-19 on mobile money transactions in Kenya.

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THE EFFECT OF DEMONETIZATION AND COVID-19 ON MOBILE MONEY TRANSACTIONS IN KENYA

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the project itself.

Gabin Nyamweya Omanga

October, 2021

Approval

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DEDICATION

This dissertation is dedicated to my Dad James Makori Omanga and my family to whom I owe everything that I am.

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LIST OF ABBBREVIATIONS

AMT	Average monthly growth
ATMs	Automatic Teller Machines
AT	Actual growth
CBK	Central Bank of Kenya
CMT	Cumulative Average Growth
EAC	East African Community
KAM	Kenya Association of Manufacturers
KEPSA	Kenya Private Sector Alliance
NACOSTI	National Commission for Science, Technology and Innovation
NFC	Near Field Communication
PEOU	Perceived Ease of Use
PIN	Personal Identification Number
PU	Perceived Usefulness
QR	Quick Response
RBI	Royal Bank of India
SMS	Short Message Service
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action

DEFINITION OF TERMS

Demonetization: The withdrawal or removal of a currency's legal tender rights, the currency units will no longer be treated as legitimate currency (Kumar, 2017).

Digitization: The increasing use of digital technologies for connecting people, systems, companies, products and services. (Coreynen et al, 2017).

Event study: An event study is an analysis that examines the impact of a significant catalyst occurrence or contingent event on a variable such as the value of a security, growth trends in a phenomenon etc. (Khotari,2006).

Fiat Money: A type paper or symbol with which one may buy or pay for most things by law. It bears no intrinsic value but immediately assumes a trading value when its shortage can prevent trades that would have been deemed profitable in a non-monetary competitive equilibrium system. (Shubik,1971)

Financial Inclusion: Access and use of formal financial services by households and businesses, such as opening a bank account with a registered financial institution (Sahay et al. 2015).

Electronic Money: Products with an information carrier, e.g., a microchip or a computer hard disk, containing prepaid value to be used as a multipurpose means of payment Van Hov (1999).

Mobile Money: An easy and secure transaction where a sender sends money from their bank, credit/debit card, or own mobile money account to another mobile money account. (Aron, 2018).

Mobile money agents: Mobile money service provider's retail arm, supporting cash-in/cash-out transactions. They are retail dealers networked across a geographical location to facilitate transactions (Obiero, 2016).

Narrow Money (M0): The central bank of Kenya defines narrow money as the currency outside the banking system as well as currency accounts but excluding commemorative coins. (Addom et al, 2017).

SARS Covid-19: Infectious disease caused by novel, highly pathogenic human coronavirus, SARS-CoV-2, was discovered in a seafood market in Wuhan, Hubei, China. Subsequently, infection quickly spread to China and around the world. (Shi et al, 2020).

Digitization of money: Digitization of money is the conversion of money from cash into non-cash yet usable electronic forms for payments and transfers such as digital wallets or mobile money transfers services.

ABSTRACT

Mobile money has been identified as having several advantages over cash. It has the potential to boost economic growth and financial inclusion while closing the related gender- and rural-gaps in the process. It has further been found that demonetization, through a money supply shock can enhance use of other non-cash forms of money. This study sought to determine the effect of demonetization on mobile money in Kenya. The focus of the study was Kenya which demonetized its largest denomination, the one-thousand-shilling note, in May 2019. This dissertation is motivated by the need to determine the efficacy of demonetization as a tool for digitization and expansion of non-cash transactions in an economy, specifically mobile money. The study employed an event study methodology using the Mean Adjusted Model. The timeframe under review was split into two between April 2017 and May 2019 (25 observations) and May 2019 and June 2021 (25 observations). The study found that there was a significant increase in mobile money transactions attributed to demonetization. Further, the study concluded that measures on mobile money taken by the Kenyan government to cushion its citizens against economic effects of SARS COVID-19 pandemic in early 2020 did not have a significant moderating effect on the association between demonetization and mobile money transactions. This study has contributed to existing literature that demonetization through a cash supply shock, leads to use of alternative non-cash forms of payments. Additionally, the study deduced that demonetization is a good policy tool for expansion of currency digitization.

Key words: demonetization, digitization, mobile money, event study

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Demonetization refers to an effort to stop the circulation of a specific currency and replace it with a new one (Jaiswal & Jagtap, 2017). Demonetization may also be defined as the withdrawal or removal of a currency's legal tender rights, the currency units will no longer be treated as legitimate currency (Kumar, 2017). Mobile money transactions are transfers of money issued by a bank or other financial institution to enable its clients to use a mobile device, such as a tablet or mobile phone, to carry out various forms of financial transactions. It utilizes applications provided by banks or financial institutions, typically called an app (Lule, Omwansa & Waema, 2012). Global System for Mobile Communications (GSMA) has defined mobile money as an easy and secure transaction where a sender sends money from their bank, credit/debit card, or own mobile money account to another mobile money account. GSMA further defines mobile money as a sustainable, scalable approach to providing convenient and affordable financial services to the underserved.

Central banks and governments across the globe have been attempting to replace paper currency with plastic and encourage the use of digital payment instruments including mobile money for several reasons (Neeraj, 2018). It has been argued by several scholars that mobile money can contribute to the economy through its impact on financial inclusion, food security, employment, and capital accumulation both financial, human as well as social. See, for example, Yang and Choi (2007); Andrianaivo and Kpodar (2012); Aker and Wilson (2013); Beck et al. (2015); Carlson et al. (2015); and Ky et al. (2018). According to a 2019 report by GSMA, mobile money has been one of fastest growing digital payment platforms due to its low cost and relative ease of use. Mobile payments have also opened up transparency in payments. According to a 2014 USAID report, back in 2009, Afghan police officers were surprised that, when the government started paying their salaries through mobile money rather than in cash, the amounts were significantly larger than before. It turned out that the new mobile payment systems exposed superior officers who had been skimming off some of the payroll cash passing through their offices. Through digitizing payments, The Afghan government discovered as much as 10 percent of the country's police force consisted of "ghost workers".(World Economic Forum 2014). Mawejje and Lakuma (2019) in their study of

macroeconomic effects of mobile money in Uganda showed that mobile money had positive effects on consumer price index, monetary aggregates, aggregate economic activity, and private-sector credit.

Mobile money can facilitate financial inclusion. Lwanga and Adong (2016) established that having a registered mobile money account increased both the amount of aggregate household savings in Uganda. This implies that in the presence of imperfections in financial markets, the increased adoption and use of mobile money could lead to increased formal savings. Chummun, (2014) used a survey to collect data in rural Zimbabwe and concluded that the usage of mobile money by the unbanked rural people was very high, especially for sending and receiving remittances. However, he further noted the saving and loan aspect of mobile money were not very popular. Users were still relying on their traditional methods of savings and borrowing. The study shows that an increase in mobile money will further enhance financial inclusion more so on remittances.

According to a 2017 report by Financial Sector Deepening (FSD), mobile money in Kenya has led to an expansion of both investments and borrowing. The Kenyan government pioneered the first bond issue via mobile money in 2017. According to the report, the aim of this bond dubbed M-Akiba was to enable the government access low-cost capital while at the same time giving low-income Kenyans an additional investment platform. Investing in M-Akiba involved a two-step process: first, the individual was required to register their mobile money account, and then they had to purchase the bond. The minimum purchase was pegged at US$30 while the bond earned 10% annual interest. Interest disbursements were made every six months directly into the individual's mobile money account.

According to a 2019 paper by audit firm Ernst & Young, mobile money schemes around the world have been growing fast, with developing countries at the epicenter of the growth. Sub-Saharan Africa is growing the fastest with mobile money deployments increasing by an average of 39% annually over the last decade. While this holds true, the report further states that the value of mobile money transactions was 6.4% of SSA's GDP in 2018, this is as compared to the 20.4% share of GDP currently held by credit cards in the European Union (EU) in 2018. In other words, there is a lot of room for growth of mobile money in Sub-Saharan Africa.

It has been argued that governments and regulators can increase digitalization and move towards a cashless economy through demonetization. Patnam and Yao (2020) while studying the real effects of mobile money found that in India, demonetization caused a spike in the short term in use of Paytm, one of the largest mobile money providers in India. The analysis showed a large spike in the level of transaction volumes immediately following the demonetization policy announcement, which contrasts with the relatively lower level of transaction activity in the days just before the announcement of demonetization. Further, a study by Chodorow-Reich et al. (2020) opines that there was a large increase in mobile money use following the demonetization policy announcement in India. Crouzet, Gupta, and Mezzanotti (2019) further show an increase both in the mobile money transactions as well the growth rate of the user base. Kaur (2016) analyzed the impact of demonetization on the cashless payment system in India and found that increased use of credit cards, debit cards, online banking, and mobile payment transactions was due to demonetization.

The relationship between demonetization and mobile money is further explained by the Adaptive Market theory. It theorizes that people are often rational, but can sometimes overreact especially during periods of increased market volatility (Lo, 2004). The Technology Acceptance Model also supports the relationship between demonetization and mobile money. It suggests that the acceptability of a good information system is mainly dependent on perceived usefulness as well as anticipated ease of use (Swanson, 1987). Studies on mobile money have taken a leading role in monetary economics research in the last decade, more so in the context of developing countries. Many researchers agree that demonetization has an impact on the digitization of the economy through electronic payments, mobile money, and card transactions. Based on existing theories, this study will build a model that will investigate the relationship between demonetization and mobile money growth in Kenya.

1.1.1 Mobile money

According to a report by FSD in 2019, electronic money, otherwise known as e-money, is an emerging monetary form that is rapidly becoming popular and adopted in modern economic systems. The initial adoption of e-money in developed countries happened in the 1980s through the introduction of debit cards that allowed the electronic transfer of money from one bank account to another. This allowed payment by a customer to a merchant electronically. These were the first

instances of electronic cashless transactions but the case was not the same in developing countries. Adoption of electronic cards was not heavy mainly due to relatively low levels of financial inclusion as well as low access to formal banking services by a majority of the population. However, since the mid-2000s, there have been rapid developments in the mobile telecommunication sector, which gave birth to mobile money financial services (Hughes and Lonie, 2007). Since mobile money account ownership did not require ownership of a bank account, mobile money was rapidly adopted by the unbanked. This served as an ideal platform for money transfer services for many low and middle-income households in developing countries, Kenya being one of the countries that experienced transformative growth in mobile money services (Mas and Morawczynski, 2009).

1.1.1.1 Mobile Money in Kenya

The first mobile money platform in Kenya was MPESA which was developed in 2007. The M in MPESA stands for mobile while PESA is the Swahili word for cash (Hughes and Lonie, 2007). Just a month after launching MPESA, Safaricom, the entity running the mobile payment system, enrolled more than 20,000 users on the platform. This customer base grew exponentially to over six million between the launch in March 2007 and 2009 (Mas and Morawczynski, 2009). Mobile money services have since grown to be used by over 95 percent of the adult population in Kenya, making Kenya a world leader in mobile money (Financial Sector Deepening Kenya, 2019). Today, MPESA has been recognized as the most noticeable success story (Omwansa & Sullivan 2012). According to the Communications Authority of Kenya (CAK), MPESA is used by about 20 million Kenyans, accounting for 96 percent of all households, and in Kenya, there are more mobile money accounts than there are bank accounts. Other mobile money players are Airtel money offered by Bharti Airtel, T-cash by Telkom Kenya, and Equitel offered by Equity bank (CAK, 2020).

In Kenya, mobile money is a service offered by mobile telecommunication companies such as Safaricom to their customers (Omwansa & Sullivan 2012). The user's registered SIM card acts as the wallet where the electronic funds are held. The telecommunication company providing the service will then partner with a financial institution almost always a commercial bank(s) to store the physical cash which will represent the electronic float in the SIM. The bank will store the money in a special demand deposit account managed by a trustee. It, therefore, follows that, the value stored in a user's SIM card wallet takes the form of claims on money held in a trust account

at the commercial bank(s) that the mobile telecommunication company chooses. (Omwansa & Sullivan 2012). The mobile money service enables the user to store electronic funds on their SIM cards, and they can use their mobile phone messaging service to send the electronic funds to other users or make payments. The transfer takes the form of a text message directed to the recipient's phone number, therefore not requiring an internet connection to facilitate the money transfer. The M-Pesa platform is also used for storing, withdrawing money electronically, topping up airtime, paying for goods, services, school fees, utility bills while at the same time offering savings and loan products. Companies can also use the scheme for disbursing employee salaries and collect bill payments (Safaricom, 2015). Further, Kenya was the first developing nation to launch a mobile-banking service based on text messaging (Shaikh, & Karjaluoto, 2014) The service is not restricted to local transfers or payments only. Safaricom's partnership with Western Union for example permits its mobile money service MPesa customers to receive money from 45 nations, including the United Kingdom, United States, Italy and Canada (CISCO, 2013). In summary, mobile money allows the users to use their SIM cards as a digital wallet to hold and use digital funds. (Omwansa & Sullivan 2012).

It is important to emphasize that mobile money is a substitute but not a replacement for physical cash. The distribution and exchange of mobile electronic float for physical cash is facilitated by a vast network of "mobile money agents". When a mobile money user needs to load electronic funds on their mobile phones, they simply need to hand in physical cash (coins and notes) to a mobile money agent, and the agent will transfer an equal exact amount of mobile electronic float to the user's mobile phone (Hughes and Lonie, 2007). The mobile money agents therefore "sell" mobile electronic float to users who wish to load money into their SIM cards. The agents also "sell" cash to users who wish to re-convert their holdings of mobile electronic float back to physical coins and notes (Hughes and Lonie, 2007). In summary, mobile money agents act as the exchange points for physical cash and mobile e-money. Agents receive a commission for the transactions that they facilitate. Kenya has a vast network of mobile money agents spread across the country, which has been one of the reasons for the rapid success of mobile money services (Hughes and Lonie, 2007).

Due to the fact that mobile financial services in Kenya are offered by mobile telecommunication companies which are not financial companies, there was a need to partner with formal financial institutions for the purpose of cash storage and management (Omwansa & Sullivan 2012). The

mobile telecommunication companies that offer mobile money services usually contract a commercial bank(s) to handle the cash backing up the mobile electronic float. The mobile money agents, therefore, purchase digital funds by depositing physical cash in the contracted banks. The physical cash that is received by the commercial banks is stored in demand deposit accounts that are called trust accounts. The exchange is directly shilling-for-shilling, that is, for every shilling in physical cash received, the bank transfers one shilling of mobile electronic float to the agent's mobile phone. The agents then use their purchased electronic float to transact with final mobile money customers. (Omwansa & Sullivan 2012). Once the agents have purchased electronic float, they are ready to trade it with final customers. The transactions between agents and customers are either cash deposits or cash withdrawals.

A cash deposit transaction is carried out when a customer wants to buy mobile electronic float to use on their mobile phones. The customer pays (deposits) some physical cash to the agent in exchange for the digital cash. Upon receiving the physical funds, the agent transfers an equivalent amount of mobile electronic cash from their own mobile phone to the customer's mobile phone. The transfer is made via SMS text messaging services and takes about 10 seconds processing time. The customer is not charged for deposit transactions - the amount that the agent transfers to the customer's phone is exactly equal to the amount of physical cash that the customer deposited. Consequently, the agent does not earn any money to facilitate deposit transactions. A cash withdrawal is the opposite of a deposit transaction. A withdrawal transaction takes place when a customer wishes to convert their holdings of mobile electronic funds back to physical cash. The customer simply transfers the mobile electronic funds from their mobile phone to the agent's mobile phone via SMS text. The agent receives the electronic funds and then hands the customer the physical cash. Unlike deposit transactions, the customer is charged for withdrawal transactions. Part of the amount charged is earned by the facilitating agent while the other part is earned by the mobile telecommunications company. This is how agents make an operating profit. All the same, there are 3 main classes of transactions that can be carried out through mobile money platforms: Money transfers, payments and loans and savings. (Kusimba 2018), (Kusimba et al. 2016).

1.1.2 Demonetization

Demonetization has been defined as the process of eliminating or removing a specific currency unit from its status as a legal tender (Jaiswal & Jagtap, 2017). It is the mechanism by which specific currency forms cease to be produced and circulated. If a national currency change occurs, this is critical. It will remove the old currency unit and replace it with a new currency unit (Kumar, 2017). Ghosh (2017) noted that a legal tender is a form of payment considered to be valid for performing a financial obligation by a legal system. It can be something that extinguishes debt when provided in payments. Coins and banknotes are generally defined as legal bids, although personal checks, credit cards, and similar non-cash payment methods are not regarded as legal bids, as debt obligations are not relieved until a tender is received (Rajani, 2019). Removing the legal tender status of a unit of currency is a drastic intervention into an economy. This is because it directly affects the medium of exchange used in all economic transactions. It can help stabilize existing problems, or it can cause chaos in an economy, especially if undertaken suddenly or without warning (Bernier, 2021). That said, demonetization has been undertaken by nations for a number of reasons. Rajani (2019) lists inflation reduction, corruption, and cash discouragement as reasons for demonetizing a currency. Demonetization has been used as a remedy whenever there is hyperinflation or instability in a currency (Rajakumar & Shetty, 2016).

1.1.2.1 History of demonetization

The United States demonetized its currency twice in 1873 and again in1969. The Coinage Act of 1873 demanded that silver be withdrawn from use as currency, and that the gold standard as a legal tender be replaced. This led to a contraction in cash supply, followed by a five-year economic depression in the region (Friedman, 1990). The US declared all bills over $100 null and void under President Nixon in 1969. That was in an attempt to curb the county's black money and regain its look. This transition was successfully completed. Many scholars have termed it as the start of the prestigious growth of the bank system in the USA. To date, the $100 bill is the most widely traded currency in the world. (Friedman, 1990). According to a 2001 report from the International Crisis Group, in Myanmar in 1987, the military invalidated 80% of the value of currency in circulation in an attempt to curb the rising black economy. It led to student demonstrations followed by a government crackdown the very next year. Within a space of two decades, Burmese people in

Myanmar were subjected to three rounds of demonetization in 1964, 1985 and 1987. Each of which only helped to punish an already struggling economy (Karthikeyan, 2017).

In 1988, the Reserve Bank of Australia introduced polymer bank notes to replace the existing paper currency, aimed at curbing counterfeit currency, due to the former's high security features that made it difficult to counterfeit. In 1999, the Lira, Franc and German Mark was demonetized by Italy, France and Germany respectively to enhance trade with each other as well as facilitate their access to the European Union (Phillips, 2004). In 1982 and 1984, respectively, Ghana and Nigeria had demonetization exercises. Studies have found that these attempts to demonetize the economy have either had more negative economic consequences than have positive effects or have failed to achieve desired objectives. (Palanisamy 2017). In Ghana, the state banned the 50 Cedi note to reduce tax evasion and counter corruption. This resulted, however, in a loss of trust in the financial markets and the currency, where the black market functioned, money was converted into physical assets and foreign currency was used. General Muhammadu Buhari's Government released new currency notes in Nigeria that were quickly obsolete with new colors. The movement to reform an inflated and debt-ridden economy was terribly unsuccessful. The following year, Buhari was eventually expelled from his seat in a coup. (Palanisamy 2017). In 2015, Zimbabwe experienced demonetization in an effort to deal with hyperinflation. The Zimbabwe dollar, also known as ZWD, was the main currency in the country since it attained independence in 1980 to 2008. During the hyperinflation period of 2007 to 2008, daily prices doubled (Makochekanwa 2009). The ZWD was replaced by a variety of regional currencies through demonetization in an effort to deal with this crisis. On 8 November 2016, the Government of India announced the demonetization of all ₹500 and ₹1,000 banknotes of the Mahatma Gandhi Series. (Lahiri, 2020).

1.1.2.2 Objectives of demonetization

The objectives of demonetization have been achieved in many countries with varying success levels in the past. Trinidad and Tobago demonetized its largest currency note in December 2019 in an effort to address corruption, curb counterfeit currency and other financial crimes. The exercise was relatively well managed and appears to have had an impact on "black money". This appears so since over 5% of the demonetized notes were not presented for exchange (Mahabir & Hilaire, 2020). India demonetized in 2016 for more or less the same reason; to tackle crime and corruption (Abhani, 2017). Many researchers studying India's demonetization have said that it was

a mistake. The process was marred by confusion, according to Waknis (2017), where access to both the new and existing currencies were restricted in some areas. Singh, (2017) claims demonization in India did not fulfill the goal of curbing illegal money because a total of 98.9% of prohibited money was able to be reintegrated into the economy.

A major objective for demonetization has been digitization of the currency. The creation of a cash-less economy is an important milestone in reducing currency printing and circulation costs, enhancing transmission of monetary policy tools as well as financial inclusion and curbing black money and tax evasion (Rogoff, 2015). Many central banks and governments, in both developed and emerging economies, continue attempting to replace paper currency with plastic and propagate the usage of digital payment instruments. One of the objectives of the India demonetization was an attempt at establishing a cashless economy. (Prabhu et al, 2017). AmbalikaSinha and DivyaRai (2016) reported in their article that there was severe disruption in rural India more so in the informal sectors as there were very few cashless transactions in this market. The sudden lack of cash was brutal to the small businesses in rural India. This however led to a surge in enrolment in mobile money and mobile wallet platforms. but also listed among the objectives was to modernize its cash-dependent monetary system. Agarwal et al, (2018) concluded that the usage of mobile-wallets did experience a surge due to demonetization in both transaction volume and value.

Table 1.1 Demonetization in other countries

Country	Year	Objective	Results
Ghana	1982	To control black money	Failed
Myanmar	1987	To curb black money	Failed
North Korea	2010	To curb black money	Failed
Zimbabwe	2010	Sliding out from Hyperinflation	Failed
Australia	1996	To the curb	Successful
Zaire	1990	Withdraw obsolescent currency	Failed
Pakistan	2015	To get rid of black Money	Failed
Germany	1923	Due to high domestic prices	Successful
USA	1969	Due to black money	Failed
Philippines	2016	Preserve currency integrity	Failed

Source: Corporate Finance Institute

1.1.3 Demonetization in Kenya

On June 1st 2019, the central bank of Kenya, through its governor, announced that it would phase out the 1000 Kenya shilling notes and replace it with new notes. The old currency would be expected to remain in use alongside the new currency notes up to 30th September 2019. The old notes would not be accepted as legal tender from October 1st 2019. They would be rendered useless. According to the Central Bank, the goal of this exercise was to eliminate or at worst reduce the flow of counterfeit currency as well as to curb corruption and black money. The demonetization in Kenya was also supposed to achieve compliance with the 2010 Kenya Constitution. (Ratemo and Arbiol, 2018). The Kenyan Constitution in Section 231 (4) states in part…

''… (4) Notes and coins issued by the Central Bank of Kenya may bear images that depict or symbolize Kenya or an aspect of Kenya but shall not bear the portrait of any individual.''

The Kenyan currency in both notes and coins bore images of individuals including the currency in circulation before the year of demonetization. The central bank in Kenya was supposed to ensure that individual photos were not taken by the new currency in an attempt to use demonetization to comply with the constitution. The Kenyan central bank announced in June 2019 via its governor that it is gradually withdrawing the old Ksh 1000 notes. The old currency would continue to be in use alongside the new currency notes. The 1,000 note accounts for over 83% of the value of currency in circulation hence this study saw no need to control for the other denominations.

On October 1, 2019, the CBK issued a demonetization report stating that the CBK was able to collect a total of 209,661,000 from an initial total of 217,047,000 notes of Ksh 1000 at the end of the demonetization period ending on September 30, 2019. A total of 7,386,000 notes worth Ksh 7.386 billion were hence considered worthless. According to the CBK governor, 7.386 billion shillings is a significant amount. This was held by individuals or entities who did not want to be subjected to rigorous controls.

Table 1.2 Currency in Circulation in the Kenyan Economy

Denomination	Notes in Circulation (millions)	Value (millions)
1000	217.6	217,600.00
500	30.8	15,400.00
200	54.8	10,960.00
100	126.4	12,640.00
50	100.5	5,025.00
20	9.9	198.00
Total	**540**	**261,823.00**

Source. CBK (2019)

The success or failure of demonetization should be analyzed based on the various objectives set out by the CBK as its reasons for demonetization. First, demonetization in Kenya was successful in fulfilling Article 231 sections (2) and (4) of the Constitution of Kenya 2010. Additionally, the new notes came with features that enhanced inclusivity as the visually impaired can knowingly transact using them (Abrol, 2020). Secondly, according to the CBK, the new notes came with

enhanced security features which can effectively deter if not minimize illicit financial transactions in counterfeits and money laundering. Thirdly, and equally important was the move to purge "black money" from mainstream economy or demonetization of the Kenya shilling. According to the Central Bank of Kenya, the Sh1, 000 notes, which is the largest currency bill, are widely being used for illicit financial transactions and forgery.

The other short term effect is on illegal financial activities: Demonetization policies, if carried out within short timelines, are likely to greatly aid in curbing financial flows in the black market. However, a demonetization policy that gives a long transition period, as in Kenya's case, is likely to have little or no effect on the black market since the market has time to conform to the new currency (Neeraj, 2017). Despite this, according to the CBK post demonetization report, during the 4-month demonetization period, 3,172 suspicious transactions were flagged and were being investigated at the time.

1.2 Problem Statement

While Kenya has been a global leader in mobile money for the last two decades (Mbiti, 2011), a report by Financial Sector Deepening in 2019 noted that cash is still the most preferred mode of payment in the settlement of everyday transactions in Kenya. The report also showed cash being employed in the settlement of up to 92 percent of daily expenses ahead of mobile money accounts, bank transfers and pay bill solutions. About 89% of dependents got their money in cash, 33 per cent via mobile money while 10 per cent got thorough other modes of payment. The report further shows that 96 per cent of traders in the country received their payments in paper form while 19 per cent of other payments were done using mobile money and other forms of payment. Further, the report argued that while the uptake of mobile money accounts has increased between 2016 and 2019, the number of daily mobile money transactions has not. It can therefore be assumed that there is still room for improvement. Mobile money has been identified as having the potential to boost financial inclusion while closing the related gender- and rural-gaps in the process Bukari et al (2021). According to a 2019 report by McKinsey, increased use of mobile money could increase the GDPs of all developing economies by 6% by 2025. It is therefore paramount and in the interest of all to move away from cash to non-cash transactions.

Demonetization can be used as an economic policy to enhance cashless transactions (Dinesh & Reddy, 2019). According to the CBK, demonetization in Kenya was done to curb illicit inflows of cash, deal with corruption and reduce circulation of counterfeit currency. While the objectives did not include digitization of the currency through mobile and electronic money, empirical and evidence and theory suggest that with the demonetization and subsequent absence of cash, alternative channels of payment check in. Agarwal et al (2018) argue that demonetization in the less structured sector leads to a rise in mobile money transactions. Kushwaha et al (2018) posits that the absence or decrease of cash in the economy results in a rise in the use of other sources of money or modes of payment during the demonetization of a currency. Bhatnaga (2017) argues that one of the main goals of demonetization is to foster the digital economy.

Money supply, M1 or the 'narrow' money, is made up largely of currency with the public and demand deposits with commercial banks net of inter-bank deposits. The currency with the public is not only in cash but also in digital form. It therefore follows that a voluntary reduction in the demand for and supply of 'currency' – in equilibrium – for example, through demonetization will not have a change in quantity of M1 but will only shift the balance from cash held with the public to demand deposits through banking or a shift from one form of cash to a digital one for instance, mobile money. Overall money stock remains the same, only that, other forms and denominations of money are used instead (Chattopadhyay 2019). Existing theoretical and empirical literature holds that demonetization leads to cash shortages in the country. This shortage leads to use of other forms of currency. In India, a reduction in cash compelled many people to use other modes of payment such as electronic and mobile payment platforms, (Bhatnagar, 2017). The other forms of currency come with various advantages. (Maiti 2017; Agarwal et al. 2018) showed that positive trends in the use of mobile payments, both in value and volume, have been observed following demonetization in India. According to Thirupathi (2019), the main advantage of mobile transactions is that these are digital transactions therefore they ensure recording of all transactions making it almost possible to control black money and tax evasion.

This dissertation therefore seeks to understand if during the 2019 demonetization in Kenya, where a significant amount of currency (83%) was gradually rendered illegal, there was a significant shift to other forms of money, specifically a shift to mobile money. The study seeks to confirm if there was a shift from cash to other forms of money during the period after demonetization or whether

there has been an increase in non-cash transactions after demonetization in Kenya. Further, while several studies have been done on demonetization, none of the reviewed studies focused on the effect of demonetization on digitization or mobile money transactions in Kenya. Therefore, this study seeks to bridge this gap by establishing the effect of demonetization on mobile money transactions in Kenya. Additionally, while Abrol (2020) picked a methodology based on secondary data from research papers, journals, and publications with observation and documentary analysis as the base of their study, this dissertation used actual numerical data from the regulators in analysis of trends. Further, at the tail end of the demonetization, the CBK director announced that demonetization ended well with the exercise having little impact on the economy—inflation and exchange. There was also little evidence of a rush to purchase high-value assets in cash. The CBK however did not disclose the effects of demonetization on other non-cash forms of payment. This study sought to bring that out.

1.3 Research Objectives

1.3.1 Main Objective of the Study

The main purpose of this study was to examine the effect of demonetization and Covid-19 on mobile money transactions in Kenya

1.3.2 Specific Objectives of the Study

This study was guided by the following objectives:

i. To determine the effect of demonetization announcement on the average monthly change in mobile money transactions (AMT) during the 25-month event window in Kenya
ii. To assess the effect of demonetization announcement on the cumulative change in mobile money transactions (CMT) during the 25-month event window in Kenya
iii. To find out the moderating effect of Covid-19 on the association between demonetization announcement and mobile money transactions in Kenya

1.4 Research Questions

The study used the research questions below;

i. Did demonetization announcement significantly affect the average monthly change in mobile money transactions (AMT) during the 25-month event window in Kenya?
ii. Did demonetization announcement significantly affect the cumulative change in mobile money transactions (CMT) during the 25-month event window in Kenya
iii. Did Covid-19 significantly moderate the association between demonetization announcement and mobile money transactions in Kenya?

1.5 Scope of the Study

The research was limited to establishing the effect of demonetization on mobile money. Specifically, the scope covered the effect of demonetization on the number of mobile money transactions, the value of transactions as well as the rate of growth of mobile money. The study was based in Kenya. The study collected data from the CBK between January 2018 and July 2021. The scope also reviewed mobile money transactions during a period where Covid-19 was declared a pandemic and the government of Kenya issued measures to protect consumers from harsh economic times occasioned by the pandemic. This was in an effort to control against distortion of data by measures that would ordinarily affect the data under review.

1.6 Significance of the Study

The findings of this dissertation will benefit different parts and aspects of society. These include policy makers, economists and planners. It would also benefit mobile money operators and regulators as well as academia and researchers. These are explained further below;

1.6.1 Policy Makers

This dissertation will inform policymakers on the impact of demonetization on cashless transactions and its success in advancing the digitization of financial systems in developing countries, such as Kenya as well as in developed countries with similar demographics and monetary trends to those in Kenya. One of the main objectives of demonetization across the globe is reduction or curbing of black money. This study would also advise policy makers on the importance of demonetization and mobile money in reducing black money. According to a study

by Ghosh (2017), increasing digital transactions can curb tax evasions through unrecorded transactions in the unorganized sector. Further, an analysis of spikes in mobile money deposits after announcement of demonetization could signify attempts to hide black money. Sabariga and Syamsundar (2017). Policy makers could learn from this and plan prevention measures with mobile money providers to ensure the objective of capturing black money is achieved on demonetization. Bhatnagar (2017) argues that digitization of the economy and reduction of cash transactions through mobile wallets and e-payment platforms will enhance monetary transparency in transactions. He adds that digital money as opposed to cash is low-cost maintenance more convenient, helps in reducing financial exclusion as well as weeding out counterfeit and black money from the economy. Information on the extent by which demonetization reduces cash or increases mobile use is paramount in policy making on reduction of black money, tax evasion and managing counterfeits.

1.6.2 Central Banks

Central banks and regulators will get invaluable insights into the effects of demonetization on mobile money and digitization in general. This will be paramount for regulators planning for similar policies more so if currency digitization is one of the objectives of the move. Additionally, the creation of a cash-less economy is an important milestone in reducing currency printing and circulation costs (Rogoff, 2015). Central banks will want to know the extent of this reduction in their planning through understanding from this study just how far demonetization goes in reduction of the mentioned costs.

1.6.3 Mobile money service providers

This study will be of value to players in the mobile money sector globally who will obtain insights on what impact demonetization has on mobile money transactions. In the event that a similar demonetization policy is implemented in any of the countries in which they operate in, they can plan around it based on the findings of this study.

1.6.4 Academia/Researchers

This study will add to the body of knowledge on demonetization since this specific area of study monetary economics has not been deeply researched in the country and in the continent. It will

serve as a point of reference and literature review source when conducting studies on the demonetization in Kenya or undertaking related research in subsequent periods.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section contains comprehensive literature and research on demonetization and cashless transactions. This literature review summarizes a broad range of views on the impact of demonetization on the amount of transactions involving mobile money, the rate of mobile payment transactions and the usage of mobile money platforms. The chapter therefore has literature review for all variables, conceptual framework, theoretical framework and summary of the literature as well the research gap.

2.2 Theoretical Literature

This is the basic structure that supports a theory of research study. This study relied on Technology Acceptance Model which is broken down further into three other models that relate to the study in different aspects. The theoretical framework not only introduces the research gap but also describes and explains why the research problem under study exists as well as the relevance of each theory to this study.

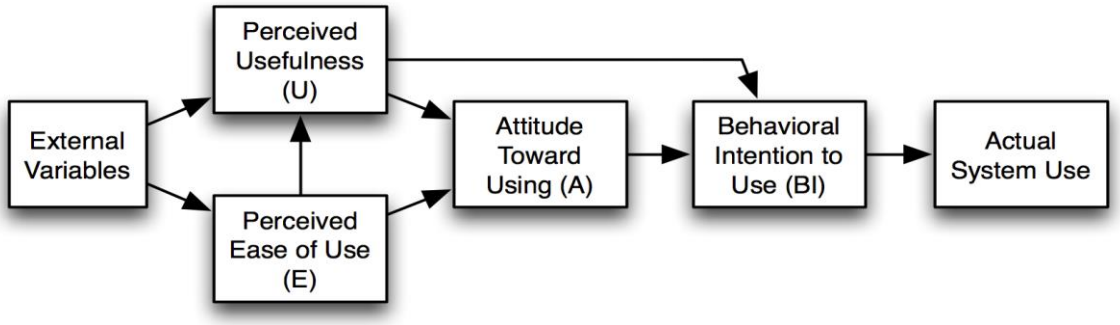
2.2.1 Technology Acceptance Model

The theoretical foundation of this research is derived primarily from the Technology Acceptance Model (TAM). In 1986, Fred Davis came up with the Technology Acceptance Model to try and explain when and how users decide to accept and use a technology. The major elements of this model are “perceived usefulness” and “perceived ease of use.” According to TAM, when users are presented with say a new software package, “perceived usefulness” and “perceived ease of use” influence their decisions about how and when they will use it. Recently, numerous studies have been conducted using the original TAM-or an extended version of TAM-to examine the usage of IT. Chuttur (2009) points out that the wide acceptance of this model is due to the fact that the model has a relatively clear and sound theoretical assumption as well as practical effectiveness. From the time is was proposed in 1985, the model has been improved and refined further, enabling it to incorporate variables and relationships obtained from the theory of reasoned action (TRA) of 1975 by Fishbein and Ajzen.

What came out of the adjustments was a more refined model that proved essential for anyone intending to review technology acceptance theory and its relation to novel technologies such as digital payments and transactions. The model was designed to show how users come round to accepting and using a technology. The theoretical basis is built around the premise that when users are presented with a new technology, their decision on whether to accept it or not and when to accept it is pegged on three major factors. The first determinant is the new technology's perceived usefulness (PU), the second is its perceived ease of use (PEOU), while the third determinant is 'the user's attitudes towards usage (ATU). According to Davis (1989), perceived usefulness (PU) is the degree to which a user of a new technology believes that use of that particular technology would enhance whatever the user aims to achieve in the said system. For instance, a user of a mobile money payment platform would perceive mobile money to be useful if it is faster than cash or any other method, or is available when or where others are not. Perceived ease-of-use (PEOU) on the other hand, is the level to which a user of a new technology believes that in using that particular system, he would do it with little or no effort. In other words, it is the degree to which consumers or users perceive a novel technology as being better than its substitutes. This assumes that the less time it takes to use cashless transactions, the greater the chance that they will embrace them. Chen et al. (2011) argue that perceived usefulness (PU) and perceived ease of use (PEOU) positively affect the attitudes toward usage (ATU) of a technology.

Although the TAM model has different advantages, such as outstanding calculation properties, conciseness, generic soundness for users and empirical soundness (Schierz, Schilke & Wirtz, 2010), the drawback of this model according to Assegaff (2015) is that it offers general details on ease of use and has also been criticized for its parsimony by many researchers. The relationship between these determinants can be illustrated by the model in Fig. 2.1 as suggested by Davis.

Figure 2. 1 Technology Acceptance Model (Adapted from: Venkatesh & Davis, 1996)



Fiat money is paper or symbol with which one can buy most things legally. It bears no intrinsic value but immediately assumes a trading value if its shortage can prevent trades that would have been deemed profitable in a non-monetary competitive equilibrium system Shubik (1971). With demonetization, there is a sudden shock in money supply (Chattopadhyay 2019). This shortage of cash creates a perceived usefulness in other forms of payments or measures or stores of value. This is where digital payments including mobile money become useful. With demonetization, other forms of payments will see an increase in perceived usefulness. Sobti (2019) comprehensively concluded that there was a forced adoption of mobile payment services by users in India through demonetization using perceived usefulness. These users found cashless options to transact during cash shortages quite useful. Chaurasia et al (2019) found a positive relationship between intention to use M-payment (a mobile payment system) and awareness about demonetization policy. With some knowledge on demonetization policy, these users either faced or anticipated a shortage in cash making the mobile payment system seem to have a perceived usefulness (PU) as outlined in the TAM. The papers by Chaurasia et al (2019) and that by Sobti (2019) both dwell on the premise that there was adoption of use of mobile money after a cash shortage was created through demonetization. This is consistent with the users seeing a perceived usefulness (PU) in other modes of payment other than cash which pushed them to have an attitude towards using the technology as well as a behavioral intention to use.

Further, with demonetization, other non-cash forms of payment may have appeared easier to access and use fulfilling the other fundamental arm of the TAM which is 'perceived ease of use. According to Patnam and Yao (2020), demonetization in India led to long queues at ATMs and

even stampedes. This additional effort in transacting using cash, pushes users to seek substitutes with more ease and less effort required to transact. One with a perceived ease of use (PEOU). Gupta and Arora (2020) investigated consumers' intention to accept mobile payment systems using TAM and found that performance expectancy (PU), effort expectancy (PEOU), habit and facilitating conditions significantly predicted behavioral intention, which in turn significantly predicted behavior to use mobile payment systems. Ahmed and Sur (2020) found that convenience (PU and PEOU), perceived self-efficacy, demonetization, performance expectancy and pandemic effect had a significant effect on the attitude to adopt digital banking. Chauhan (2015) studied the acceptance of mobile money by poor citizens of India by integrating trust into the Technology Acceptance Model. He found that the trust and the core constructs of TAM such as perceived usefulness (PU), trust and attitude towards usage (ATU) contribute in influencing the intention to accept m-money.

2.3 Empirical Review

This section entails empirical literature on the effect of demonetization on mobile money transactions. While demonetization is a fairly old phenomenon in monetary economics, the literature around it is not as wide as one would expect. This happens once or twice in a lifetime for an economy. While a number of studies have been conducted to study effects of demonetization on macroeconomic factors, not much has been done about its effects on modern phenomena such as digitalization. This study is an attempt to expand the literature by investigating the relationship between demonetization and mobile money.

2.3.1 Demonetization and mobile money transactions

Bhatnaga (2017) in his study, Demonetization to Digitalization: A Step towards Progress, used regression models to argue that while demonetization in India in 2016 created lot of panic in the economy, it paved the way to digitalization. A cash crunch and availability of e-sources of transactions compelled many people to use alternative modes of payment including mobile wallets. Sachs et. al (2018) opined that India had long been a cash-based economy, but in recent years, the country has been in the process of transitioning towards a cashless society, in November 2016, this transition was accelerated when 87% of the country's paper currency by value was demonetized. They add that while mobile wallets were popular in the months and years preceding

demonetization, Unified Payments Interface (UPI) based systems have since become more prevalent, largely thanks to the convenience of being able to skip the intermediate step of adding money to a specific account in favor of sending money directly to recipients via one's own bank account. Nanda and Mohanty (2020) argued that card transactions and cashless payments posted healthy growth in the years subsequent to demonetization in India in 2016. The study was based in India using analyses of variances.

Nagdev et al (2018) analyzed the results of a questionnaire applied to 370 respondents and found that demonetization negatively affected traditional banking as persons increased the use of credit and debit cards, reactivated internet banking accounts, and increased use of payment portals and other bank apps for doing payments and other transactions. Using an interrupted time series model, Nithin et al (2018) concluded that demonetization did not assist in getting persons to use digital payment methods. The authors suggested that the findings were due to infrastructure impediments and habits; recommendations included government interventions such as incentives, greater financial literacy and financial inclusion. Bharadwaj et.al. (2017) using an event study methodology concluded that demonetization's impact on the Indian stock market was significant. The research employed 16 companies that actively trade on the National Stock Exchange India as its sample which ranged from 2012 to 2016 and for 5 months separately from November 2016 to March 2017.An optimum portfolio was constructed using SIM and the values for the risk and return were subjected to examination for both periods in the pre and post demonetization period. However, Chauhan and Kaushik (2017) did a similar event study on the impact of demonetization on stock market. The study analysed the stocks of S&P BSE 100 and analysis was similarly done for both the pre and post demonetization window and the results for both periods compared. They established that demonetization had no impact on stock market. In their study, a sample was drawn from Prowess IQ and the prices of closing stock of 100 companies under the S&P BSE 100 index were considered from October, 30th 2016 to November21st 2016. The study found that this short period downfall in the stock prices can be due to some other factors. The research was done in India and focused on the longitudinal research design.

Another event study was carried out by Sunil and Smitha (2017) to ascertain the demonetization impact on the stocks of selected sectors. Data on closing stock prices was collected for a period of 6 months, beginning 7th September 2016 to 8th March 2017. This consisted of 2 months' prices

recorded before demonetization and prices of stocks in the remaining 4 months after demonetization. A sample of 5 sectors was used with 5 companies being selected from each sector. Companies considered for this study included; Telecommunication, Banking, Real estate, Automobiles and Consumer durables. Analysis was carried out using ANOVA on the BHAR in the three windows. The study concluded that demonetization had no impact on stocks returns.

Uke (2017) researched demonetization in India and its consequences. The research concluded that the Indian demonization had both positive and negative effects. The research was based on secondary knowledge in journals, magazines, and articles. They specifically concluded that demonization has had a detrimental effect on Indian financial markets over a short period of time. The analysis showed the real effect in the future. The effects of demonetization on financial inclusion in India were sought by Mahajan and Singla (2017). Demonetization has explored the effects of the drive toward financial inclusion on many participants, including the ordinary citizens, informal industry, rural people, SMEs, NBFC MFIs and e-wallets firms. The study has shown that ordinary people are among the most adversely affected. Demonetization for a new type of deposit called benami deposits has also been developed. Efforts are required to allow technology to the bottom of the pyramid so that financial integration and India becoming a cashless digital economy are achieved.

In Kenya, Adika and Ochieng' (2020) looked at the effect of demonetization on Securities Market Performance in Kenya. The study employed an event study methodology which evaluated the performance of NSE 20 share index prices. The sample consisted of twenty firms listed and included under the NSE 20 share index and whose stocks traded in the entire period under consideration for this particular study. Results from the study were based on the comparison between performance of the NSE 20 share index prices during the pre-demonetization and post demonetization period. The comparison revealed that demonetization had a statistically significant effect on securities market performance in Kenya.

Bhat (2017) in his study analyzing the effects of demonetization on the economy in India, concluded that the monetary policy of demonetization negatively affected the Treasury bond market in India. The results show that average yields of treasury bonds were decreasing immediately after the announcement of demonetization and implementation of goods and services taxes in India. An event study methodology was used to measure how short and long-term Treasury

bond yield were affected by the announcement of the demonetization. The study contributed to literature that demonetization may have negative effects on the economy. It however did not touch on effects of demonetization on mobile money transactions. Akinyemi, Mushunje and Feng (2020) studied the growth of mobile money. Specifically, they investigated the determinants of mobile money adoption in rural areas of Africa. They analyzed data from Research ICT Africa Access Survey using the two-part model. They concluded that age, bank account ownership, and net monthly income determine both the adoption of mobile money and the amount of money received using mobile money technology.

Mahmoud (2019) studied the Determinants of mobile money adoption. He used panel data analysis for a sample of seven African countries for the period from 2013 to 2017. Data is analyzed using the linear regression model for each dependent variable of the mobile money adoption using nine explanatory variables. He concluded that mobile money policy such as distribution networks, regulations, financial regulatory limits and others such as GDP, crime index, literacy and banking penetration are the determinants of mobile money adoption. Mishra and Rathore (2019) examined the effect of demonetization on the Indian framework of digital payment. Using a survey, they concluded that demonetization led to an expansion of digital payment and web-based payment platforms. Thomas and Sebastian (2019) studied the extent of Influence of Demonetization on Digital Banking using a descriptive and analytical study methodology based on both primary and secondary data. They conclude that demonetization initiative seems to have influenced digital banking habit of people which in turn partially fulfilled motive behind it.

Prabhu et al (2017) argued that demonetization created greater demand to digital banking services where cashless transactions are prioritized. Dinesh and Reddy (2018) evaluated the impact of demonetization on digital payments using exploratory data analysis indicated that there was a significant effect of demonetization on digital payments. Madhukar (2018) in his paper Demonetization and cashless transactions: impact on retail business markets used an analytical study methodology and concluded that traders have faced many problems due to non-availability of cash in the market. This situation moved them towards cashless transactions. Consistent with the empirical reviews mentioned in the previous paragraphs as well as provided theoretical background, this study tested multiple hypotheses;

For the first objective, the hypothesis was,

Ho: Demonetization announcement did not significantly affect the average monthly change in mobile money transactions (AMT) during the event window in Kenya.

HA : Demonetization announcement significantly affected the average monthly change in mobile money transactions (AMT) during the event window in Kenya.

And for the second objective, the hypotheses used were;

Ho: Demonetization announcement did not significantly affect the cumulative change in mobile money transactions (CMT) during the event window in Kenya.

HA Demonetization announcement significantly affected the cumulative change in mobile money transactions (CMT) during the event window in Kenya.

As expected, there has not been much literature on Covid-19 and more socovid-19 and mobile money noting that the pandemic is a very recent and ongoing occurrence at the time of this study. According to the WHO, emergence of SARS-CoV-2 was first suspected when several cases of an unexplained pneumonia were noted in Wuhan city, China. There has not been much literature on Covid-19 and mobile money.

Katusiime (2021) while investigating the effects of macroeconomic policy and regulatory environment on mobile money usage and expansion in Uganda, found that in the long run, mobile money usage is positively affected by economic activity, inflation and the COVID-19 pandemic crisis while mobile money customer balances, interest rate, exchange rate, financial innovation and mobile money tax negatively affect mobile money usage. She used an autoregressive distributed lag model with data spanning the period March 2009 to September 2020. Tang and Ren (2020) argue that mobile payments can help individuals avoid coming in direct contact with any paper or coin money. They recommended the promotion of mobile payments during the COVID-19 epidemic. Tonuchi (2020) did a study on how to improve mobile money service usage and adoption in the era of Covid-19 in Nigeria. Using a sample of 300 targeted informal sector operators using questionnaires and 200 respondents online he concluded that poor mobile network (infrastructural deficiency), transaction costs security concerns, and poor complaints resolution top the biggest hindrance facing mobile money adoption and usage in Nigeria.

Gardan et al (2019) did a study on the impact of COVID-19 on consumer behavior in retail banking in Romania. The study was done through a field survey among consumers in retail banking using questionnaires with a sample size of 738 valid responses from the metropolitan area retail banking consumers. The research brought out insights on retail banking services consumption during the pandemic while validating uptake of internet and mobile banking services. The research' results highlighted, among others, that the variable concerning the perception of the COVID-19 pandemic effect on consumers' lifestyle has a direct and positive influence on the variable representing the attitude toward internet and mobile banking services. The study introduced mediating variables in safety of internet and mobile banking use as well as trust in banks. The study recommends that banks should create awareness through financial education courses and online tutorials to familiarize customers with the use of digital channels.

Toh and Tran (2020) did a study trying to find out if the COVID-19 pandemic would reshape the digital payments landscape. As the COVID-19 pandemic continues, more consumers are likely to adopt digital payments. Aided by various legislative and industry initiatives, consumers and businesses are adapting to the new realities of the COVID-19 world by going digital. Whether this trend will continue post-pandemic remains to be seen—much will depend on whether the initiatives and momentum arising from this pandemic lead to sustained improvements in the ability of financially or digitally underserved consumers to participate in. Bisong et al (2020) studied the effects of COVID-19 on remittances to Africa comparing it to past major events. Specifically, they compare the effect of the COVID-19 pandemic on remittances with effects of the 2008 financial crisis and the Ebola crisis of 2014. Using graphical analysis and comparison, they conclude that remittance flows proved to be relatively resilient during the 2008 financial crisis as well as the 2014 Ebola epidemic. However, due to lockdown measures implemented in host countries, many migrants lost their jobs, consequently reducing remittance flows to developing countries. They note a historical decline in global remittances of US$110 billion, with sub-Saharan Africa (SSA) declining by about 23.1%. They recommend that policy makers in countries that send remittances to relax stringent identification requirements demanded of migrants for them to remit. They additionally recommend incentives granted to encourage the use of digital platforms, and to finally protect migrants from job losses. They recommend that policymakers in remittance-receiving countries should ensure remittance-providing centers are in service despite lockdown measures

and to promote digital financial inclusion by expanding money operator networks, and to eliminate or reduce transaction fees on remittances.

A 2020 GSMA study on connections between the virus and mobile money concluded that many governments responded with fiscal and monetary stimulus measures to counteract the disruption caused by COVID-19. Mobile money has proven to be an invaluable tool for fostering resilience by facilitating safe and efficient money transfer and payments services. The COVID-19 pandemic has brought about unprecedented challenges for the global economy. It has affected global health systems, affected peoples' livelihoods and will, invariably, leave long lasting economic effects. (Muthiora, 2020).

The empirical reviews above assisted in developing the third hypothesis of the study. The hypothesis is

Ho: Covid-19 did not significantly moderate the association between demonetization announcement and mobile money transactions in Kenya.

HA:Covid-19 significantly moderated the association between demonetization announcement and mobile money transactions in Kenya

2.4 Summary of Reviewed Literature and Knowledge Gaps

Demonetization is a once in a generation event that affects various aspects of the society and economy wherever it is done. For this reason and more, empirical research on its impact on the financial sector and commercial environment needs to be continually updated. Abrol (2020) did a critical review of the impact of demonetization on Kenyan economy. The study was descriptive and tried to identify the meaning and reasons of demonetization along with the sector-wise impact of demonetization and positive and negative impacts of demonetization on Kenyan economy. The study used secondary data from Research Papers, Journals, & Publications. There however exists a growing research gap to empirically investigate the impact of demonetization on various aggregates as more and more demonetizations are announced. In addition to mobile money which is studied in this dissertation, studies should be conducted to test effect of demonetization on other forms of digital payments such as EFTs and plastic money. The 2019 demonetization should also be studied with an aim of reviewing its efficacy on its set objectives as well as its effects on

financial inclusion. However, none of the reviewed studies focused on the effect of demonetization on mobile money transactions in Kenya. Therefore, this study seeks to bridge this gap by establishing the effect of demonetization on cashless transactions in Kenya.

The research gap is presented in Table 2.1

Author	Topic	Methodology	Major Findings	Major contribution	Research gap	Filling the gap
Bhatnaga (2017)	Demonetization to Digitalization: A Step Toward Progress	Regression analysis	Demonetization increased alternative payment methods in India	Cash crunch pushed people to alternative payment modes	The study was based in India	This study will focus on demonetization in Kenya
Sachs et. Al (2018)	India; Towards Digitalization	Graphical data analysis	Digital transition was accelerated with demonetization	Unified Payments Interface (UPI) based systems have since become more prevalent than mobile money	The study was based in India	This study will focus on demonetization in Kenya
Nanda and Mohanty (2020)	Demonetization and its Effects on Digital Payment	Regression analysis	Cashless payments grew after demonetization in India in 2016	There was short-term shift to card payments on demonetization	The study was based in India and did not cover effects of demonetization on mobile money	his study will fill the gap by investigating the effect of demonetization on mobile money in Kenya
Nagdev et al (2018)	Sentimental analysis of demonetization on digital transactions	Survey of 370 respondents	Increased use of credit and debit cards, reactivated internet banking accounts, and increased use of payment portals after demonetization	Demonetization led to increased use of payment portals	The study was based in India and did not cover effects of demonetization on mobile money	his study will fill the gap by investigating the effect of demonetization on mobile money in Kenya

Bharadwaj (2017)	Impact of demonetization on the Indian stock market	Event study through a selected portfolio with an event period of 5 months approx. 150 trading days	Demonetization had a significant positive impact on the Indian stock market	Industries more dependent on cash affected more rather than those industries where dependence on cash is low	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Chauhan and Kaushik (2017)	Impact of demonetization on the Indian stock market	Event study on S&P BSE 100 for one month approx. 30 days	Demonetization had no impact on stock market	Short-term downfall in the stock prices can be due to some other factors	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Sunil and Smitha (2017)	Impact of demonetization on the stocks of selected sectors	Event study with a sample of 5 sectors with 5 companies from each sector	The study concluded that demonetization had no impact on stocks returns	Demonetization had little effect on the performance of heavy commercial industry such as Automobiles	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

Adika and Ochieng' (2020)	Effect of Demonetization on Securities Market Performance in Kenya	Event study of NSE 20 share index prices	Demonetization had a statistically significant effect on securities market performance in Kenya.	Demonetization in Kenya achieved its objective with minimum disruption to the economy	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Bhat (2017)	The effects of demonetization on the economy in India	Event study	Average yields of treasury bonds were decreasing immediately after the demonetization announcement	Demonetization negatively affected the Treasury bond market in India.	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Feng et at (2020)	Determinants of mobile money adoption in rural Africa	Two-part model analysis of a survey	Monthly income Age, account ownership determine the adoption of mobile money	Mobile money adoption is correlated with bank account ownership	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

Mahmoud (2019)	Determinants of mobile money adoption	Linear regression model	Mobile money policy such as distribution networks, regulations are the major determinants of adoption	Mobile money adoption is correlated with Regulation	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Mishra and Rathore (2019)	effect of demonetization on the Indian framework of digital payment.	Survey	demonetization led to an expansion of digital payment and web-based payment platforms	Demonetization led to a move away from cash	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Thomas and Sebastian (2019)	Influence of Demonetization on Digital Banking	descriptive and analytical study methodology	demonetization initiative seems to have influenced digital banking habit of people	Demonetization achieved the digitalization objective	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

Prabhu et al (2017)	Towards a cashless economy	Exploratory	that demonetization created greater demand to digital banking services	Demonetization pushed more digital banking	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Dinesh and Reddy (2018)	impact of demonetization on digital payments	exploratory data analysis	that there was a significant effect of demonetization on digital payments	that there was a significant effect of demonetization on digital payments	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Madhukar (2018)	Demonetization and cashless transactions: impact on retail business	analytical study methodology	traders have faced many problems due to non-availability of cash and moved digital	Demonetization moved the retail sector to digital payments	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Katusiime (2021)	effects of macroeconomic policy and	Regression with an autoregressive	mobile money usage is positively affected by		The study did not test the relationship	This study will fill the gap by investigating the moderating effect of

	regulatory environment on mobile money usage and expansion	distributed lag model	economic activity, inflation and the COVID-19 pandemic		betwee: Covid-19, demonetization and mobile money	covid 19 on the relationship between demonetization and mobile money transactions in Kenya
Tonuchi (2020)	improve mobile money service usage and adoption in the era of Covid-19 in Nigeria	Survey of 300 targeted operators	poor mobile network, transaction costs and security concerns, hinder mobile money adoption in Nigeria.		The study did not test the relationship between : Covid-19, demonetization and mobile money	This study will fill the gap by investigating the moderating effect of covid 19 on the relationship between demonetization and mobile money transactions in Kenya
GSMA (2019)	Impact of mobile money on monetary and financial stability in Sub-Saharan Africa	Regression analysis	Mobile money is linked with a higher money multiplier and linked with a decline in money velocity	Mobile money can enable more effective monetary policy by transferring currency and assets into the formal financial	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

				system enhancing financial depth		
Gardan et al (2019)	Impact of COVID-19 on consumer behavior in retail banking in Romania	Field survey using sampled questionnaires	COVID-19 pandemic effects on consumers' lifestyle has a direct and positive influence on attitudes toward internet and mobile banking	Banks should create awareness through financial education courses and online tutorials to familiarize customers with the use of digital channels	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money
Bisong et al (2020)	Effects of COVID-19 on remittances to Africa	Graphical data analysis	Covid-19 caused a decline in global remittances of US$110 billion, with sub-Saharan Africa (SSA) declining by about 23.1%.	Covid-19 had a bigger impact on remittances than Ebola and the 2008 economic crisis	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

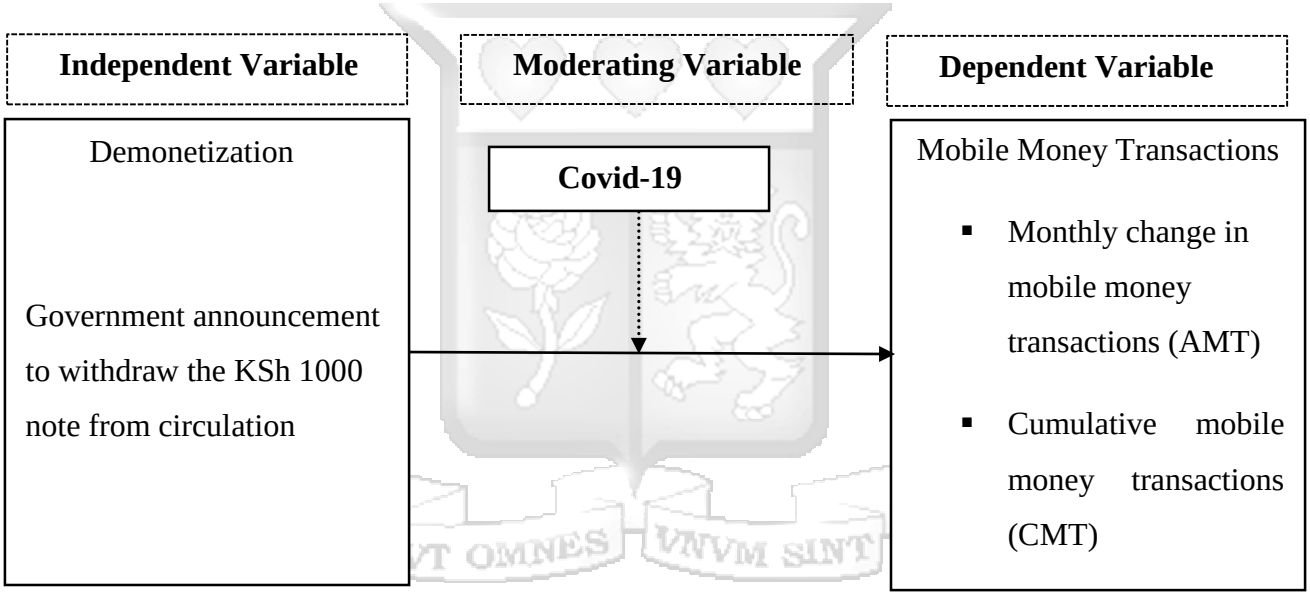
GSMA (2020)	Impact of Covid-19 on Mobile money		Governments responded with fiscal and monetary stimulus measures to counteract the disruption caused by COVID-19	Mobile money has proven to be an invaluable tool for fostering resilience by facilitating safe and efficient money transfer and payments services	The study did not cover effects of demonetization on mobile money	This study will fill the gap by investigating the effect of demonetization on mobile money

Table 2. 1 Research Gaps

2.5 Conceptual Framework

A conceptual framework is a diagram that illustrates the perceived relationships between the variables in the study. This study's conceptual framework is shown in Figure 2.2. In this dissertation, the independent variable is demonetization which is denoted by the announcement by government to withdraw the KShs. 1,000 note. The dependent variable is mobile money transactions. In the study, this variable is measured using monthly change in mobile money transactions (AMT) and cumulative mobile money transactions (CMT). Covid-19 was used as a moderating variable in the study.

Figure 2.2: Conceptual Framework



Source: Author conceptualization

2.6 Operationalization of the Variables

Table 2. 2 Operationalization of the Variables

Variable type	Variable name	Indicators	Source	Analysis tool
Independent	Demonetization	Date of announcement of demonetization was used as point of analysis	CBK	Descriptive statistics, trend analysis,
Dependent	Mobile money transactions	Volume of mobile money payment transactions by agents	CBK	Mean adjusted model, and T-statistics
Moderating	Covid-19	Dummy variable		

Source: Author conceptualization

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Research has been defined by (MacKenzie, 2012) as the systematic investigation or experiment targeted at a discovery or interpretation of the facts. The main purpose of research is to inform thought or action as well as to highlight issues and concepts that may have remained uncovered earlier. The purpose of this study is to examine the impact of the demonetization on mobile money. The researcher adopted different methods and techniques in an attempt to achieve the requisite rigor expected in this analysis. In this chapter, the researcher has discussed the methodology adopted for collecting, analyzing as well as reporting the necessary data for completing the study.

3.2 Research philosophy

The research philosophy is all about the way in which data about the research issue has been gathered, analyzed and used. The research philosophy can be positivism, interpretivism, realism, subjectivism, pragmatism, among others (Ahmed, 2016). In this dissertation, the researcher has adopted the positivism philosophy. As a philosophy, positivism relies on the argument that only facts and knowledge gained through the processes of observation like measurement is trustworthy. Positivists assume that reality is fixed, directly measurable, and knowable and that there is just one truth, one external reality. Positivists claim there is a single, objective reality that can be observed and measured without bias using standardized instruments. In contrast, naturalistic researchers assume that reality constantly changes and can be known only indirectly, through the interpretations of people; they accept the possibility that there are multiple versions of reality. For the positivists, the goal is a universal truth, a rule or explanation that is always true so long as specified conditions hold. This study relies on positivism philosophy as data will be collected and interpreted in an objective manner. Also, the expected research findings are both observable and measurable. The study will collect actual data on mobile money from the CBK website and analyze it before and after demonetization. The announcement date of 31st May 2019 will be used as the point of analysis. Positivism philosophy is also in line with deductive reasoning which is what will be applied in the study. Deductive reasoning aims at testing an existing theory or a theory-based

hypothesis. As a general rule, positivist researchers usually adopt deductive approach. (Crowther and Lancaster, 2008).

3.3 Research Design

David and Sutton (2004) noted that research design gives the framework and logical pathway upon which a research project is carried out. They went on to point out that a good research design enables the researcher to collect all the possible pieces of evidences to enable them to answer the research questions. The purpose of the research design is to ensure that all the data collected and evidence presented can answer the research questions as unambiguously as possible. In principle, the research design can use any type of data collection method quantitative or qualitative in nature (De Vaus, 2006). This research took a descriptive correlational research design based on time series analysis on the growth of mobile money in Kenya. The unit of analysis being Kenya. The event study methodology is designed to analyze the effects if any of an event on a specific dependent variable. Most event studies have used the stock price of a company as the dependent variable. In such a study, the definition will be 'a study of the changes in stock price beyond expectation (Abnormal returns) over a period of time (event window). In this study, the definition was a study of changes in the growth rate of mobile money in Kenya beyond expectation (Abnormal growth) after the event (Demonetization) over a period of time (event window). The study attributed the abnormal growth in mobile money to the effects of demonetization. From this, the researcher can infer the significance of the event. The research is quantitative and used monthly time series data.

3.4 Population and sampling

This research was a case study of Kenya. Therefore, Kenya as a country was the unit of analysis. This implies that there was no need of sampling because the target population was one unit namely Kenya.

3.5 Data

The data used in this dissertation was monthly time series data. The timeframe under review was between January 2016 and July 2021 (65 observations per data parameter). It is worth pointing out that the first 25-month period from April 2017 to April 2019 was used to compute the 'normal' or

'expected' growth while the subsequent 25 was analyzed for growth and compared to expected growth. The results were subsequently tested for significance. The study used monthly change in mobile payment transactions by mobile money agents in the country. All these data sets were obtained from the Central Bank of Kenya. For the independent variable, announcement of demonetization was the event and 31st May 2018 was identified as the event date.

3.6 Data Collection Methods

Data collection process involves the systematic way of gathering and measuring information from a wide variety of sources (Hoagwood, 2015). Musenge (2014) says that the data collection process involves both desk work and field work for collecting the necessary data required for the study. It can be distinguished into two broad categories that include quantitative and qualitative approaches. Quantitative approaches use numbers and numerical information whilst qualitative data lends itself to description and words. Data can also be collected in form of primary data or secondary data. Primary data is the original data or information collected first hand by the researcher (Payne, 2005). Secondary data is the existing data that has already been collected for some other purpose other than the research at hand (Gillespie and Hennessey, 2016). This dissertation used secondary data. Secondary data collection is primarily less costly and time saving for the researcher. However, it has been argued that secondary sources of data might suffer from compounding errors arising from how and why the data was originally collected. In addition to that, not all the secondary data can be relevant to the research questions. While collecting the secondary data is cost-effective as compared to primary data, some sources charge a cost in order for one to gain access. The secondary data used in this study was extracted from the CBK website.

3.7 Data Analysis

Event study methodology was used to capture the effect of demonetization announcement on mobile money transactions. The research adopted the models used to test the effect of announcements on security returns (Brown & Warner, 1980; Bowman, 1983; Brown & Warner, 1985). While doing an event study, Brown & Warner (1980, 1985) states the statistical power of three different return generating models (RGM). The principle objective of an event study on security returns is to detect whether the performance of a security is statistically different from what is expected. Abnormal return for firm i and on the event date t is given by,

ARit = Rit – E(Rit / Ωt-1) (1)

where,

ARit = abnormal return for firm i for day t

Rit= actual return for firm i for day t

E(Rit / Ωt-1) = normal or expected return for firm i for day t, Ω is conditional information set in the period t.

It is worth noting that methodology of event study assumes that security returns are generated by some RGM. Actual return of the firm (Rit) is calculated as the difference between the natural log of the closing price of a security at day t and natural log of the closing price of the security at day t-1. Abnormal return can be based on statistical relationship like OLS Market Model, Market-Adjusted Return Model, Mean-Adjusted Return Model and the Constant Return model or on theoretical economic models like Capital Asset Pricing Model and Arbitrage Pricing Model. This study used statistical relationship models to calculate abnormal changes in mobile money transactions. The four models used in securities analysis namely: OLS Market Model, Market-Adjusted Return Model, Mean-Adjusted Return Model and the Constant Return model. The first three models need data on market return or a proxy of the same. This study on demonetization and mobile money transactions does not have a proxy for market return, and will use the average growth in mobile money as the 'expected growth'. Therefore, the last model "Constant Return Model" will be adapted in this study.

3.7.1 Model Specification for objectives 1 and 2

The adapted model is generally specified as follows:

AMTit = ATit – E(Rt)

where E(Rt) is the simple mean of average monthly growth in mobile money transactions.

The AMT is the sample mean of abnormal change for each month of the event window

$$AMT=\sum_{i=1}^{N} ARit/N$$

To assess the cumulative effect of the event during the event window, CMTs are calculated for the period before the event date as well as the period after the event date. CMT is calculated as the sum of monthly average change over the pre-specified period starting from k1 to k2.

CMT = AMTt = $\sum_{i=k1}^{k2} AARt$

Test statistics are used to know the significance level of AMT and CMT during the event window caused by the announcement of demonetization. If the calculated t value of AMT or CMT exceeds the critical t-value at five percent of the level of significance (24 degrees of freedom), the null hypothesis is rejected indicating the significant impact of demonetization on the mobile money transactions.

Computation of t-statistics AMTt is given below (Asquith, 1983);

ϱ- AMTt/S.E

Where, S.E., standard error = $\sqrt{\sum ARit - AMTt)^2/N-1}$

t-statistics for CMT(K1,K2) is computed as (Brown and Warner, 1980)

t = CMT(K1,K2)/S.E

where, standard error = $\sqrt{\sum_{i-1}^{N}{}_i \ \sigma^2_{i,(k1,k2)}/N^2}$

$\sigma^2_{i,}$(k1,k2) = variance of the abnormal return of stock i for (k1, k2) period.

3.7.2 The Moderating Effect of SARS Covid-19 on the association between demonetization and mobile money

The following interactive regression model was used in measuring the moderating effect of Covid-19.

Y = β0+β1DA+β2CD+ β3 (DA*CD) + μ

Where:

Y = Mobile money transactions

DA = Demonetization announcement

This was measured using a dummy variable as follows:

0 = Estimation window period

1 = Post – event window period

CD = Covid-19

This was measured using dummy variable as follows:

0 = pre – covid 19 period

1 = post- covid 19 period

DA*CD = Interaction term

μ = error term

According to Grotenhuis & Thijs (2015) because any variable that has only codes 0 and 1 is a ratio variable, we can include them in regression models and obtain meaningful results. In fact, it is possible to have a regression model in which all the predictor variables are dummies, such regression models are known as analysis of variance (ANOVA) models.

In the equation we take the variable mobile money transactions as the dependent variable and use the variables demonetization announcement and Covid -19 period as predictors.

The intercept term $\beta 1$ gives the average or mean mobile money transactions attributable to demonetization announcement, while the slope coefficient $\beta 2$ tells us the mean mobile money transactions attributable to covid-19. The interaction term (DA*CD) shows the effect of demonetization announcement (DA) on mobile money transactions given Covid-19. A change in the coefficient of determination (R-squared) after introduction of the interaction term implies that Covid-19 played a moderating role. The F-test should also be done to determine the joint significance Covid -19 and the interaction term (DA *CD) on mobile money transactions

3.7.3 Procedure for Model Estimation

Six step standard event study methodology was used to analyze how demonetization and its announcement affected mobile money use. An Event Study is the best and easiest way to examine the effects of an economic event (MacKinlay, 1997)

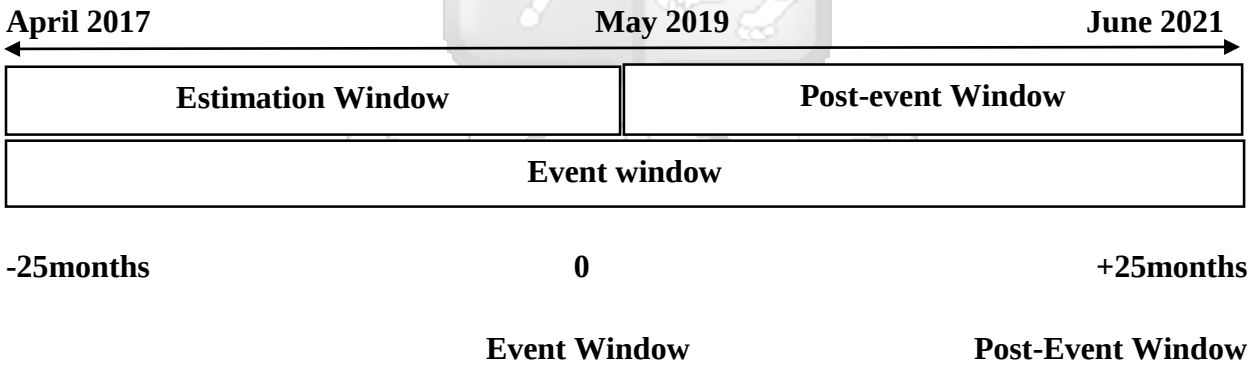
The procedure is as follows;

3.7.4 Event of Interest Identification

Demonetization announcement which was made on the 31st of May, 2019 is the event of interest

3.7.5 Identification of Estimation, Event and Post-event window

In order to conduct a proper event study, it is important for the study to identify and specify the event in question. Once the event is identified, the researcher is required to determine the event window. At this point, the researcher should note that an event window should be the time period in which the impact had taken place. It is important to select an event window that is greater than the event itself (MacKinlay, 1997). In this study, an event window of one day was enough as the event is nothing but release of information about a particular event, which happens instantaneously. 31st May, 2019 was defined as the event date i.e. day 0 and the estimation window is estimated to be 25 months before the event date while the event window will be 25 months after the event date (31st May, 2019).



3.8 Research Quality

To ensure that the research maintained high quality standards, the researcher was independent and did not alter any variables within the study. Every study should include a description of the population of interest, an explanation of the process used to select and gather data on study subjects, definitions of key variables and concepts, descriptive statistics for main variables, and a description of the analytic techniques. Further, a valid study should answer research questions in a scientifically rigorous manner and be devoid of validity and reliability threats. (Mugenda & Mugenda, 2003).

3.8.1 Validity

Validity is a measure of the degree to which data obtained from an instrument is meaningful and accurately reflects or represent a theoretical concept (Mugenda & Mugenda, 2003). The data collected for this thesis were secondary data from the CBK website. The validity of the data was further verified through a comparison with the Communication authority of Kenya's quarterly data and confirmed to be consistent.

3.8.2 Reliability

Reliability is the degree to which an assessment tool produces stable and consistent results (Kothari, 2008). To ensure that the data were reliable, there was need to determine validity of the data in so far as answering the research questions is concerned. The supervisor with relevant skills in the field of study assessed the content and face value of the data collected and gave guidance on handling of the data.

3.9 Ethical Issues in Research

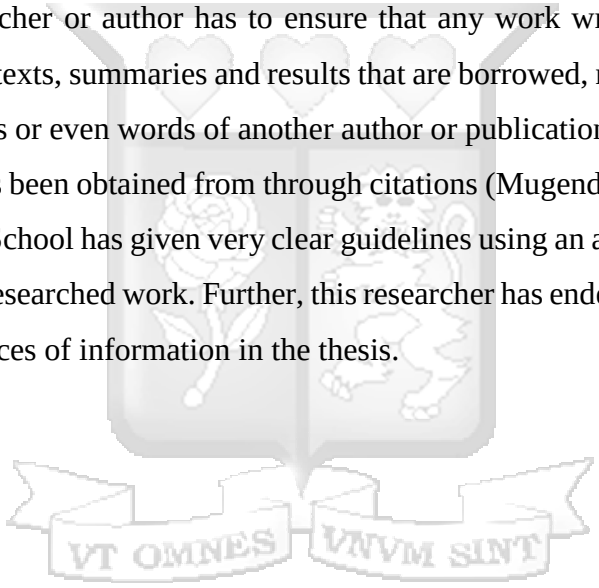
3.9.1. Ethical approval

Norms enhance the purpose of research which includes the dissemination of knowledge, reporting or saying the truth and finally the need to counteract errors. A researcher must further select the most appropriate methodology to employ, relevant ways of collecting data, present the research findings and interpret them accordingly which will ultimately lead to presentation of information in a logical manner. The data is then analyzed and reported well in form of an article, project

report, thesis or a book. It is vital that a researcher must observe appropriate values at all these stages while conducting research. If this is not observed, it could result into research misconduct. (Makau & Akaranga,2016). It is within this framework that this researcher followed that aforementioned procedure in presenting this thesis and sought institutional ethical approval from The Strathmore University Institutional Ethics Review Committee (SU-IERC). A research authorization permit was also applied for from The National Commission for Science Technology and Innovations (NACOSTI) to carry out the study.

3.9.2 Plagiarism

Plagiarism is a vital part of ethical considerations in institutions of higher learning. It is defined as the practice where researcher or author has to ensure that any work written by them should be original and be devoid of texts, summaries and results that are borrowed, manipulated or used such as ideas, processes, results or even words of another author or publication without acknowledging where the information has been obtained from through citations (Mugenda, 2003). For this reason, the Strathmore Business School has given very clear guidelines using an approved similarity index in the examination of its researched work. Further, this researcher has endeavored to make citations and acknowledge all sources of information in the thesis.



CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter contains the findings of the research study based on the analysis of secondary data collected using the research instruments described in Chapter Three. The findings are presented and interpreted in line with the objectives of the study. Specifically, measures of dispersion as well as central tendency are used to give more information on the character of the data. Additionally, inferential statistics are used to give a clearer view of both the direction and strength of the relationship between the variables used in the study. This study used time series data. Thus, it is important to have an approach to data analysis which collates data and then attempts to discover patterns, or trends, within that data for the purposes of understanding or predicting behaviors. It is for this reason that trend analysis formed part of the chapter and trend graphs are presented to enable visual view of the trend patterns. The chapter is organized into the following sub-sections: descriptive analysis; trend analyses, tests and analysis.

4.2 Descriptive Analysis

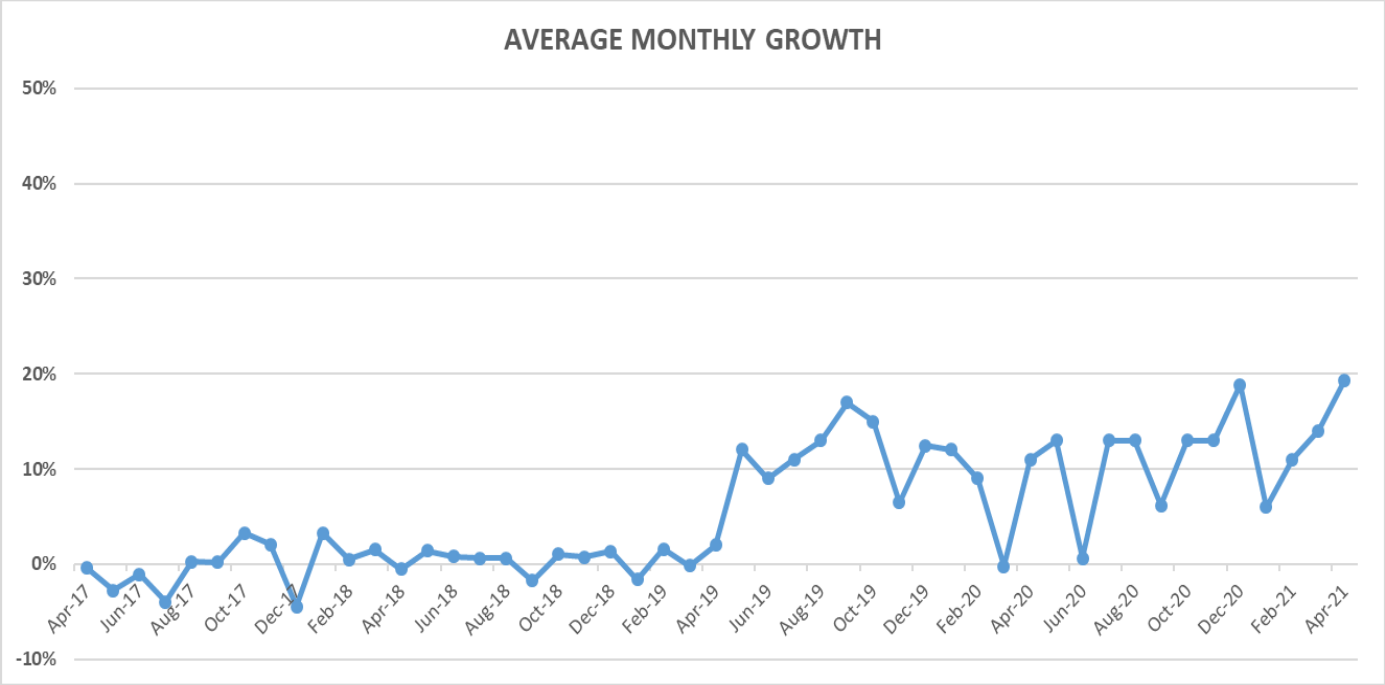
The paragraphs below summarize the descriptive statistics for the variables used in this study. These statistics relate to time series monthly observations from April 2017 to June 2021. This study employed time series analysis involving the following two variables: **Dependent Variable:** average monthly change in mobile money transactions during the event window in Kenya (labelled AMT) and Cumulative change in mobile money transactions during the event window in Kenya. **Independent Variable:** Demonetization. A moderating variable SARS Covid 19 measures was introduced labelled Covid. The dependent variable is expressed in form of percentage while the independent variables being denoted by the announcement date of demonetization which is May 1st or event date 0.

The unit of analysis in the dissertation was Kenya. Kenya was the target population as a single unit. The period ranged from April, 2017 to June, 2021. Event window was selected to be 25 months prior to the event and 25 months after the event i.e. -25 and +25 of 1st May, 2019. Pre and post demonetization period transactions-were analyzed using comparison approach. To compute

AMT, the study took transactions in the current month, subtracted transactions in the previous month and divided the result by the number of transactions in the previous month. To comprehend the real impact of the event during the demonetization period and beyond, CMT were obtained by adding up the AMT for the period from month -25 (April 2017) to month -1 (April 2019, and again from May 2019 to June 2021. To observe the trend of CMT and AMT over the event window, graphs were plotted. The computed expected return was highlighted in the graph as well in order to compare the monthly change against the expected growth during the event window.

A graphical analysis was employed in investigation of mobile money growth around the demonetization announcement date. Graphical analysis showing the trend in mobile money transactions is as follows; the graph shows the AMT mobile during the event window.

Figure 4.1: Average monthly growth during the Event Window



Source: Author computation

Figure 4.1 shows the growth curve movement over the entire period (estimation period and event period). On month 0 (May 2019), the curve moves upwards sharply and continues to fluctuate thereafter though with a positive trajectory. While the trends of average monthly change in mobile money transactions were unsteady with short increasing and short decreasing trends,

comparatively the rates were visibly higher than before the event date. The highest change was recorded between March and February in the year 2020. There was a sharp increase of transactions between November and December 2020 followed by a sharp decrease between January and February 2021. Generally, the trend was fairly flat before demonetization, sharp spike on announcement and then generally flat with minor fluctuations. The question of whether the changes in transactions were inspired by the announcement of demonetization was tested statistically using the mean adjusted model.

4.3 The Effect of Demonetization Announcement on Mobile Money Transactions

To accomplish the objective of the study, the following hypotheses were tested:

H1: Demonetization announcement did not significantly affect the average monthly change in mobile money transactions (AMT) during the 25-month event window in Kenya
H2: Demonetization announcement did not significantly affect the cumulative change in mobile money transactions (CMT) during the 25-month event window in Kenya
H3: Covid-19 did not significantly moderate the association between demonetization announcement and mobile money transactions in Kenya

Acceptance of the null hypotheses suggests that the announcement of demonetization of all Sh. 1000 notes did not influence the levels of mobile money transactions.

4.3.1 Effect of Demonetization Announcement on the average monthly change in mobile money transactions (AMT) during the event window in Kenya

The first objective of this study was to determine the effect of demonetization announcement on the average monthly change in mobile money transactions (AMT) during the event window in Kenya. The study sought to test the hypothesis: *Demonetization announcement did not significantly affect the average monthly change in mobile money transactions (AMT) during the event window in Kenya.*

The Mean Adjusted Model was applied in the measurement of this relationship. Table 4.1 reports the results of the event study accompanied to inspect the effect of demonetization announcement on mobile money transactions. It shows AMT and its respective t-statistics of the Mean Adjusted Model for each month of the event window.

Table 4.1 Average monthly growth during the Event Window and Computed t-statistics

Mean Adjusted Model					
Month	**AMT**	**T-stat**	**Month**	**AMT**	**T-stat**
-25	-0.0043	-0.0078	**0**	0.2726	**2.2979***
-24	-0.0277	-0.0501	**1**	0.2643	**2.2828***
-23	-0.0107	-0.0194	**2**	0.2561	**2.2681***
-22	-0.0401	-0.0724	**3**	0.1544	**2.0845***
-21	0.0023	0.0042	**4**	0.2136	**2.1914***
-20	0.1703	**2.0030***	**5**	0.202	**2.1705***
-19	0.0327	0.0591	**6**	0.0644	1.9219
-18	0.0208	0.0375	**7**	0.1244	**2.0303***
-17	-0.045	-0.0813	**8**	0.1744	**2.1206***
-16	0.0328	0.0592	**9**	0.2405	**2.2399***
-15	0.005	0.0091	**10**	-0.0025	-0.0045
-14	0.015	0.0271	**11**	0.1915	**2.1515***
-13	-0.1552	**-2.0094***	**12**	0.1869	**2.1431***
-12	0.0141	0.0254	**13**	0.0058	0.0104
-11	0.0079	0.0143	**14**	0.2072	**2.1798***
-10	0.006	0.0108	**15**	0.1864	**2.1422***
-9	0.0162	1.0112	**16**	0.0615	0.111
-8	-0.0175	-0.0316	**17**	0.2024	2.1711*
-7	0.01	0.018	**18**	0.2101	2.1850*
-6	0.0072	0.0129	**19**	0.1886	2.1461*
-5	0.1309	2.0235*	**20**	0.0082	0.0147
-4	-0.0166	-0.0299	**21**	0.1752	2.1220*
-3	0.0159	0.0286	**22**	0.1914	2.1513*
-2	-0.0016	-0.0028	**23**	0.1933	2.1546*
-1	-0.0218	-0.0394	**24**	-0.037	-0.066
			25	-0.043	-0.0781

Source: Author computation

Notes: * indicates significance at 5 % significance level

In table 4.1, the mean adjusted model was used to estimate the AMT coefficients whose significance was tested at $\alpha = 5\%$ level of significance. The two tailed value of significance for every period in the window is as shown in table 4.1 with 24 degrees of freedom. Also shown in table 4.1 are the monthly expected growth rates were computed using the adjusted market model and compared against the actual growth rates. These were then tested for significance. From the research findings, it was observed that there were significant changes in mobile money after demonetization as was seen in the significant coefficients. After demonetization, month on month growth in mobile money was significant as compared to the expected growth. The study therefore fails to reject the null hypothesis that: Demonetization announcement did not significantly affect the average monthly change in mobile money transactions (AMT) during the event window in Kenya.

With demonetization being a recent event in Kenya, there has been a shortage of studies to corroborate the findings of this objective as far as Kenya is concerned. However, in India, Dinesh and Reddy (2018) in their study Demonetization and its Effects on Digital Payments concluded that the usage of mobile payments were seen to be increasing in the first two years after demonetization. They also found that after the two years, mobile money grew in terms of volume but not in value. Schueth and Moler (2017) in a survey study using individual interviews with a representative sample of 45,000 adults noted that mobile money was used by a greater number of panelists after demonetization in India. They concluded that while demonetization created a cash shortage which led to increased mobile money use, the shift did not get to the degree approaching the envisioned “cashless society’’ as phrased by Indian prime minister Narendra Modi.

This finding is also in line with Mishra and Rathore (2019) who studied the effects of demonetization on the Indian framework of digital payment. They concluded that demonetization in India led to a move away from cash. Bhatnaga (2017) also had a similar conclusion. He argued that demonetization in India created lot of panic in the economy but also paved the way to digitalization. Cash crunch combined with the availability of e-sources of transactions compelled many people to use electronic modes of payment

4.3.2 Effect of Demonetization Announcement on the cumulative change in mobile money transactions (CMT) during the 25- month event window in Kenya

The second objective of this study was to determine the effect of demonetization announcement on the cumulative change in mobile money transactions (CMT) during the event window in Kenya. The study sought to test the hypothesis: Demonetization announcement did not significantly affect the cumulative change in mobile money transactions (CMT) during the event window in Kenya.

The Mean Adjusted Model was applied in the measurement of this relationship. The results are presented in Table 4.2.

Table 4.2 Test of Significance for cumulative change in mobile money transactions

TIME INTERVAL	CMT	T-value	P) value
- 25 to -1	1.5265	2.7563	0.0109
+1 to +25	3.9357	7.1066	0.0000

Source: Author computation.

The two data points in CMT before the event date (-25 to 0) and after the event date (1 to 25) is portrayed in the **Table 4.2**. Significance of the coefficients was tested at α= 5 The P value of 0.0109 indicates significance of the CMT in the period after the event widow confirming the results of the parametric tests and thus accepting the null hypothesis since the P value is less than 5% significance level.

The tests of significance carried out for the CMT posits that one cannot accept the null hypothesis. The t-test value for CMT before and after the event date was found to be 2.7563 and 7.1066 respectively. P-values were 0.0109 for CMT before the event and 0.000 for CMT after the event. Since the two values are less than the 5% significance level, the null hypothesis that demonetization announcement has no significant effect on the cumulative mobile money growth in Kenya is rejected. This indicates that demonetization had a significant effect on the cumulative mobile money transactions in Kenya.

This finding is in line with studies by Joshi and Desai (2017) who, in their study; Digital Payment System: Before, During and After Demonetization, concluded that, with one of the objectives of Demonetization in India in 2016 being promotion of the digital payment system and a cashless economy, the exercise was a success and the objective was achieved. Using Average and Standard Deviation of total amounts of various modes of digital payments, they deduce that the real effect on digital transactions including mobile money payments was realized after the demonetization action. They go on to argue that demonetization made it compulsory to use other forms of payment as an alternate system to cash but also after demonetization, use of these alternative methods continuously increased. They concluded that demonetization gave a positive boost to digital payments and increased cashless transactions in India.

A 2017 report by The State Bank of India's research department found that Demonetization had helped India leapfrog three years ahead in digitization. According to the report, mobile wallet, PPI cards, and paper vouchers and mobile banking rose 122% in the same period. Likewise, Bhakta (2017) had similar conclusions. He noted that digital payments had grown 57% year-on-year one fiscal year after demonetization with mobile wallets more than doubling. However, Nithin et al, (2018) analyzed the effect of demonetization on digital payments. Specifically, they reviewed effect of demonetization on debit cards, point of sale transactions, and mobile money transactions using an intervention analysis of time series. They found that while the usage of cards for transactions as a percentage of total transactions has increased, the share of point of sale transactions (PoS) and mobile transactions has registered a decline after demonetization the impact of demonetization on digitalization of the Indian economy

4.3.3 The Moderating Effect of Covid-19 on the association between Demonetization announcement and Mobile money transactions

The third objective of this study was to determine the moderating effect of Covid-19 on the relationship between demonetization announcement and mobile money transactions during the event window in Kenya. The study sought to test the hypothesis*: Covid-19 did not significantly moderate the association between demonetization announcement and mobile money transactions in Kenya.*

The two regression models below were ran. The results are summarized in Table 4.3.

Model 1: $Y = \beta 0+\beta 1DA+\beta 2CD+ \mu$

Model 2: $Y = \beta 0+\beta 1DA+\beta 2CD+ \beta 3 (DA*CD) + \mu$

Table 4.3 Testing moderating effect of SARS Covid-19

	Model 1	Model 2
Constant	0.288266 (0.0001)	0.291399 (0.0001)
DA	0.717943 (0.0041)	0.708601 (0.0061)
CD	-0.474356 (0.0446)	-1.056824 (0.0493)
AD*CD		1.056824 (0.6122)
Adjusted R-Squared	0.406974	0.377494
F – Statistic	17.81357 (0.00324)	9.77567 (0.12907)

P - Values are in parentheses

Source: Author computation.

Model 1 shows that both demonetization announcement (DA) and Covid 19 (CD) had a significant effect on the mobile money transactions during the event window period. This is as supported by the significant coefficients at $\alpha = 5\%$ (that is, the P values for both coefficients were less than 5%). The adjusted R squared statistic indicates that 40.70% of changes in mobile money transactions during the event window was explained by demonetization announcement and Covid 19. Furthermore, the significant F-statistic (P value = 0.00324 at $\alpha=0.05$) shows that demonetization announcement and Covid 19 had a joint significant effect on mobile money transactions during the event window.

Model 2 shows the effect of demonetization announcement and Covid 19 on mobile money transactions after introducing an interaction term (moderator). The coefficient of the interaction

term was found not to be significant (P value = 0.6122 at α=0.05). This implies that Covid 19 did not have a moderating effect on the association between demonetization announcement and mobile money transactions. This is further supported by the F –statistic which was not significant (P value = 0.12907at α=0.05). The interpretation of this is that demonetization announcement, Covid 19 and the interaction term do not have a joint significant effect on mobile money transaction. The results further indicate that after introduction of the interaction term, the model explanatory reduced by 2.95%, that is the adjusted R squared reduced from 40.70% to 37.75%. However, this change is not relevant since the interaction term coefficient and the F –statistic were found not to be significant in model 2.

It can therefore be concluded that measures taken during the Covid-19 period did not have a significant effect on the association between demonetization and mobile money transactions. Therefore, the researcher failed to reject the null hypothesis that Covid-19 did not significantly moderate the association between demonetization announcement and mobile money transactions in Kenya. With SARS Covid-19 being a relatively recent phenomenon, there aren't any corroborating study. However, according to Rahul et al (2020), the Covid-19 pandemic led to a surge in digital technologies. This is mostly due to the social distancing norms, nationwide lockdowns as well as legislative measures to enhance use of digital transactions.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the conclusions derived from the findings of this study on the effects of the demonetization in Kenya on mobile money are given. The conclusions were based on the purpose, research questions and results of the study. The implications of these findings and the resultant recommendations are explained. Recommendations were also based on the conclusions and purpose of the study.

5.2 Summary of the study

This study sought to pursue one main objective and three specific objectives. The broad objective of the study was to establish the effect of demonetization on mobile money in Kenya. In the study, mobile money growth is the dependent variable while demonetization is the independent variable. Covid-19 measures form a moderating variable in the study. It was expected that demonetization, by creating a shortage of cash would lead to an increase in mobile money transactions as a secondary mode of payment replacing cash. The study first analyzed the growth in mobile money transactions for a period of 25 months before the demonetization event. It then obtained an average growth and compared it to growth analyzed after the demonetization event. After that, this growth compared to the average growth was tested for statistical significance. It was determined that growth in mobile money after demonetization was statistically significant. The study then went on to analyze the relationship between that growth and demonetization.

5.2.1 Effect of demonetization announcement on the average monthly change in mobile money transactions (AMT) during the 25-month event window in Kenya

The first objective of the study was to evaluate the effect of demonetization on the number of transactions by mobile money agents in Kenya. The study used an event study methodology that analyzed the existence of increased average growth in mobile money transactions occasioned by the event; demonetization. This was followed by tests for significance using T-tests. The tests obtained statistically significant coefficients to conclude that monthly growth in mobile money brought about by demonetization was significant. It can therefore be concluded that demonetization expanded the growth rate of mobile money transactions in Kenya. Similar findings were obtained by (Bhatnaga (2017). In his study on Demonetization to digitalization, examining the effect of demonetization on digitization of payments, he found that after the demonetization in India in 2016, a cash crunch pushed people to alternative payment modes. One of the alternative

payment modes was mobile payments. Sachs et al, (2019) point out that India has long been a cash-based economy and the process of transitioning towards a cashless society was accelerated through demonetization. Paramahamsa (2016) also points out that the digital transactions amongst new users' of mobile money increased sharply after demonetization in India while existing users' transactions increased in line with the historical trend since people found it to be a more convenient way to transact. He further concluded that demonetization had a network effect among all who insisted to digitalize their transactions. Nithin et al, (2018) argued that while the initial objective of the Indian government to demonetize was to curb black money, terror funding and counterfeiting, pushing India towards a cashless economy seems to be the prime objective. However, he concluded that mobile transactions registered a decline after demonetization.

5.2.2 The effect of demonetization announcement on the cumulative change in mobile money transactions (CMT) during the 25-month event window in Kenya

The second objective of the study was to evaluate the effect of demonetization on the cumulative monthly change in mobile money transactions (CMT) in Kenya. The study used a similar approach to the one used in the first objective. AMT was obtained then summed up in the months before and after demonetization date. This gave a sum growth of 25 months in both sets. Cumulative growth from April 2017 to May 2019 and cumulative growth from May 2019 to April 20201. Paired T-tests for CMT comparing the pre and post event CMT amounts. The results showed that demonetization had had a significant effect on cumulative growth in number of mobile money transactions. It can then be concluded that demonetization had positive impact on the cumulative periodic growth of mobile money transactions. This finding holds true in the studies by other scholars such as Mishra and Rathore (2019). They argue that demonetization led to an expansion of digital payment and web-based payment platforms. They go on to infer that demonetization led to a move away from cash.

The findings in both the first and second objectives of this dissertation agree in principle with quantity theory as pointed out by Chattopadhyay (2019). In his analysis of the macroeconomics of demonetization he argues that the role of 'fiat' money is to support transactions, and money has different forms not just cash. He goes on to say that in India, M1 or the 'narrow' money, is largely made up of two components; currency with the public and demand deposits at commercial banks

net of inter-bank deposits. A voluntary reduction in the demand for and supply of'currency' – in equilibrium – in strict sense is not demonetization as overall money stock remains the same. It is just that the other forms and denominations of money are used instead. He argues that removal of currency in cash say the KES 1,000 not does not reduce quantity of money supply but only shifts it to other forms. These other forms include mobile money. As it has been seen from the analysis, when demonetization happened in Kenya, there was an increase in the growth in number of mobile money transactions. This was growth was not only attributed to to the forced shift from cash to mobile through demonetization but was also tested and found to be statistically significant.

5.2.2 The moderating effect of Covid-19 on the association between demonetization announcement and mobile money transactions in Kenya

The third objective was to determine if Covid-19 measures moderate the relationship between demonetization and mobile money transactions. A hierarchical regression was used to test the moderating effect. The results showed that in the period under study, measures taken by the Kenyan government to deal with negative effects of the Covid-19 pandemic did not have a significant moderating effect on the association between demonetization and mobile money transactions. This means that the introduction of Covid-19 measures had little effect on how demonetization affected mobile money.

5.3 Conclusion

The study makes the conclusions below as deduced from the study. There is a statistically significant positive relationship between demonetization and mobile money. That is, the demonetization event in Kenya in 2019 led to an increase in mobile money as measured by transactions by mobile money agents. The study also concludes that Covid-19 measures taken by the government of Kenya did not have a significant moderating effect on the association between mobile money and demonetization.

5.4 Contribution of the Study

This study has in both its findings on the objectives as well as the methodology used, made contributions to theory, body of knowledge as well as contributed to literature in mobile money and demonetization. In demonetizing the currency in Kenya, the objective of the Central Bank of

Kenya was to maintain a stable economy while at the same time mopping out illicit cash. The gradual approach used was suitable as it reduced any potential collateral damages to the real economy while at the same time ensuring that there was sufficient time to reach out to its people with relevant information on demonetization. In this analysis, the researcher concludes that while the CBK's objective did not include expanding non-cash payments and enhance digitalization, it has been an objective in demonetizations in different economies in the past. It is also assumed to be a positive outcome if non-cash transactions are expanded because of the relatively low cost of mobile and digital transactions to the central bank.

The study deduces that the effect of demonetization on mobile payments can be replicated in other countries and have a bigger impact on mobile money than Kenya. This is because of the relative maturity and deep penetration of mobile money in Kenya. It is therefore a well advised assumption to conclude that countries like Tanzania, Uganda and South Africa that have deep mobile phone penetration but with less developed mobile money sectors might see an expansion of the same in case of demonetization. The CBK however needs to be firm with its regulatory rules to protect the country against money laundering and counterfeiting of the new currencies to maintain a stable economy in the long run.

5.4.2 Contribution to theory

Technology Acceptance Model (TAM) was developed by Fred Davis in 1986 to try and explain when and how users decide to accept and use a technology. The major elements of the model are "perceived usefulness" and "perceived ease of use." According to TAM, when users are presented with say a new software package, "perceived usefulness" and "perceived ease of use" influence their decisions about how and when they will use it. The model is primarily used to predict the adoption of information systems by users and to consider the motivations and possible issues facing system users. The determinants of whether or not a user will a new system is the new technology's perceived usefulness (PU), the second is its perceived ease of use (PEOU), while the third determinant is 'the user's attitudes towards usage (ATU). After demonetization, there was a shock to the economy leading to a shortage of cash. The findings of this study show that there was a subsequent shift to use other forms of payment such as mobile Perceived usefulness (PU) is the degree to which a user of a new technology believes that use of that particular technology would enhance whatever the user aims to achieve in the said system. The study noted that mobile money

payment platform users saw perceived usefulness in mobile money because of its relative availability after a cash supply shock due to demonetization. Perceived ease-of-use (PEOU) on the other hand, is the level to which a user of a new technology believes that in using that particular system, he would do it with little or no effort. In the case of demonetization, consumers perceived mobile money as being better than its substitutes cash since it took less time to use cashless transaction as opposed to cash which was in short supply and due to that took more effort to use it. According to Chen et al. (2011), perceived usefulness (PU) and perceived ease of use (PEOU) positively affect the attitudes toward usage (ATU) of a technology. This led to an increase in the use of mobile money after demonetization.

5.4.3 Contribution to practice

The study found that a demonetization did lead to an increase in mobile money transactions. This is in line with the objectives set out by the RBI during demonetization in India in 2016. Prime minister Narendra Modi stated that one of the objectives of the exercise was to reduce reliance on cash, digitalize the economy and move towards a 'cashless economy'.

In the field of statistical modelling, the study added to the knowledge that in order to have a good regression model in analysis of time series data, it is paramount to do all the requisite tests for heteroscedasticity, autocorrelation, multicollinearity and normality in order to validate the model. Stationarity tests should also be done to ensure the results are not spurious. Failure to have a good model that has been subjected to all these tests may yield unreliable results.

5.5 Policy Recommendations

From the trend analysis in the study, a lack of spikes in mobile money following the announcement of demonetization shows there were little or no attempts by black money holders to try and use mobile money to get money into the banking system and avoid 'cash seizure'. Srivastana and Bisaria (2017). Policy makers can use this to show that the demonetization exercise was a success in as far as reducing black money in the economy is concerned as there is little evidence of the black money getting into the financial system. Other central banks should monitor mobile transactions during and after demonetization for spikes. In case of spikes in mobile and other digital transactions after demonetization, the concerned regulators can review these transactions, identify any suspicious ones and investigate them.

The study further revealed that demonetization may not be a sufficient policy tool for expansion of mobile money if mobile money in that economy is as mature as it is in Kenya. According to Mallikarjuna et al (2021), who studied the impact of demonetization on the digital payment channels in the Indian economy, for demonetization to lead to a shift from cash to alternative payment modes like mobile money, the demonetization must result in squeezing of the existing currency from the economy creating a currency circulation shortage on one side and introduction of alternative digital payment channels on the other side. In the case for Kenya, while demonetization may have created a squeeze in currency through withdrawal of the KShs. 1,000 note, it may have not introduced an alternative channel in mobile payment due to high penetration levels of mobile money in Kenya. A study done by Lott and Sinha (2019), revealed that the significant growth of mobile money in India due to demonetization was attributed to its low mobile money penetration. The study further shows that over 90% of transactions in India are cash-based largely due to lack of access to bank accounts and low penetration and use of credit/debit cards and mobile money. On the contrary in Kenya, the high penetration of mobile money may not be ideal for this policy. According to a 2021 GSMA report, mobile money growth has been relatively stable in the last five years in Kenya due its already high penetration rate.

5.6 Limitations of the Study

In this study, the variable that was used to represent mobile money is the number of transactions by mobile money agents. However, in order to control for the exogenous factors that may limit the accuracy of our analysis, the results would have been more robust if this researcher used the actual stock of mobile electronic money rather than using the transaction numbers of mobile money transactions. However, this data is not publicly available, but can be granted upon special requests.

Due to use of the event study methodology and demonetization being a recent phenomenon, the study window was limited in period to only 60 months. A longer study period would create a better understanding of trends. This could have been resolved had the data been daily as opposed to monthly data. The CBK collects mobile money data in monthly sequences, i.e. the only data available is monthly. The study would have been more robust with a more rigorous approach had the data been daily as it is in stock prices etc. Warner (1985) posits that daily data generally present less difficulties when conducting event studies. He goes on to argue that standard procedures are typically well-specified even when special daily data characteristics are ignored.

The demonetization event as well as the study period coincided with the Covid-19 pandemic. There were lockdowns across the world including night to dawn curfews in Kenya that affected economic activity which had effects on mobile money. Government and regulators also made decisions and took measures to protect the public from both economic and physical harm. In Kenya, costs for transactions below Kshs. 1,000 were removed while the government also encouraged citizens to try and use non-cash forms of payment. This may have affected the study but was partially addressed by having Covid-19 as a moderating variable in the model.

5.7 Areas for further research

Given that this research has focused on how demonetization affects mobile money, supplementary research can be done to investigate how demonetization affected other forms of non-cash payments such as cards and e-wallets in Kenya.

This dissertation was only limited to mobile money. However, more studies should be done extending to other sectors that could be affected by demonetization as advised by theory and past experiences. These include macroeconomic factors such as money supply, fiscal factors the economy.

This study was done using an event study methodology. However, more studies need to be done using other various statistical techniques in data analysis such as; ANOVA analysis, GARCH model among others. Also, methodologies such as a survey could be used to get sentiments from a sample of the population affected by demonetization.

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APPENDICES

Appendix I: Research Work Plan 2020/2021

Months / Activity	Nov	Dec	Jan	Feb	Mar	April
Topic conceptualization and literature review						

Research proposal development and writing						
Proposal presentation and defense						
Proposal Corrections						
Data collection						
Data analysis						
Report writing						
Presentation of Report						
Corrections						
Compilation and submission of final Report						