

The Effect of Mobile Banking Accounts and Deposits on Operational Efficiency of Commercial Banks in Kenya

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ABSTRACT

This study's main objective was to examine the mobile banking's effect on commercial banks' operational efficiency. The study looked at mobile banking accounts and mobile banking deposits concerning commercial banks' operational efficiency in Kenya. The research was led by the unified theory of acceptance and use of technology model (UTAUT) and Technology acceptance model (TAM). A descriptive research design was used, targeting all the 41 commercial banks. The research adopted a census survey while utilizing secondary data from Central Bank of Kenya and the commercial banks' annual financial reports in Kenya. Data on the number of bank deposits mobilized as savings and the number of registered bank accounts. The study period is from 2010-2018. STATA software was used in data analysis, descriptive and statistical inferential. The independent variables were measured against the dependent variable to examine if they affected commercial banks' operational efficiency. Multiple regression equations estimated the relationship between the variables. Hausman Test was used to specify the adoption of Random effect or Fixed effect models in panel data. The Hausman tested and fixed effect model was selected. The diagnostic tests covering heteroscedasticity, autocorrelation, multicollinearity, and normality tests were also conducted. The findings were presented using graphs and tables. The results were as follows: mobile bank accounts ($\beta=0.0365$, $p>0.05$), and mobile deposits ($\beta=0.015$, $p>0.05$). The study concluded that mobile accounts and mobile deposit had no significant effect on commercial banks' operational efficiency in Kenya. The study recommended that commercial banks invest more in mobile deposits since it had a positive relationship with commercial banks' operational efficiency in Kenya. The study results would enhance the adoption of more efficient financial innovation products and services in the banking industry that would enhance the overall commercial banks operational efficiency.

Keywords: Mobile banking deposits, accounts, operational efficiency

1. Introduction

It is becoming increasingly crucial for all financial institutions to adopt financial innovations due to computer information technology advancement. The banking industry has continued to

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grow in terms of operational efficiency, financial inclusion, and stability. Kenya's central bank has come up with the legal and statutory framework to govern financial innovations like mobile banking. It will support the government of Kenya's efforts to ensure that the financial sector remains relevant, competitive, and in line with the technological innovations and vision 2030. The emergence of new economic changes has enabled organizations and institutions to raise their competitive edge, improve their operational efficiency, and better satisfy their clients' ever-changing needs and market demands (CBK,2016).

Mobile banking is a service offered by commercial banks or other monetary institutions that enables their clients to carry out transactions virtually any time of the day. It is possible to utilize a mobile device, including the feature phone, tablets, and smartphones. The customer can use USSD code, sim tool kit, or a smart bank app to carry out banking services provided they have internet connectivity (BBVA, 2012). Globally, the retail financial banking sector is changing due to computer technology's evolution, precisely the advances in mobile money transfer platforms. In Europe, Activo bank (Portugal) and Millennium BCP (Poland) have received awards as the best mobile banking institutions in the region. In Canada, we have Scotiabank with a global footprint in Latin America, the Caribbean, and Central America. Bank of America launched its mobile banking services in early 2007, Chase bank JP Morgan Chase has chase mobile. In China, there is the ICBC iPhone Financial App, which has extra features like forex exchange. Britain has Monetize plc, a company offering financial services using mobile devices in the USA, Africa, India, and the UK with a global partnership with Visa Inc. In the Philippines, G-Cash offers international mobile banking services. Banks provide these services through the USSD code or SMS, web browser, and mobile phone apps. These stem from the advancements in the telecommunication industry, which have led to the changes in retail banking from brick and mortar to the use of mobile Technology (BBVA, 2012)

Most European banks are developing mobile banking, and other financial innovations products developed and packaged in omnichannels to enable the customers to choose the services on their preferences. European banks are using advanced data analytics tools to analyze customer data. This will allow them to develop new products and offer customized products like mobile, internet, electronic funds transfer, mobile services access like cheque and mobile deposits, account balances check, bill payments, and investment products. These have led to increased bank sales revenues and reduced operational cost on the recent study on the Omni channel's excellence in retail mobile banking (Rizzi & Taraporevala, 2019).

In Africa, mobile financial services are the number one preference for many mobile operators, commercial banks, microfinance, and other financial service providers, governments, and technology companies. In countries where financial services inclusion is limited, like sub-Saharan Africa, the mobile money transfers platforms pledge convenience, adequate reliability, faster, a lower-cost, and rapid, scalable option than traditional banking (Kendall, Schiff & Smadja, 2014). According to the study by Harelimana (2017), mobile banking services, processes, and products by Unguka Bank Ltd lead to an increase in revenue for the bank in the last three years, which is an indicator of the bank's operational efficiency. In South Africa, we have Wizzit, a secure and efficient mobile banking solution for the country's underbanked and unbanked customers. Mobile phones have been in use for the past thirteen years to provide banking and other financial related services (Aithal, 2016). Mobile banking has been defined by Barnes & Corbitt (2003) as a channel through which customers interact with a financial institution or a bank via a mobile device. Pousttchi and Schurig (2004) expound mobile banking as that kind of execution of financial services in which an electronic procedure is applied. The bank clients use

mobile communication techniques in conjunction with mobile gadgets, including a feature or smartphone. Mobile banking is a way through which a bank's customers utilize the institution's mobile banking service. Customers can access these services through the use of the USSD code, SMS, or banking app. They can enjoy bank services like account opening, and cash withdraw, deposit, funds transfer, pay bills, check balances, purchase airtime, and bank loan using their mobile phones.

Mobile banking in this study context is the integrated mobile banking, which is the integration of the mobile phone which has a sim card with the mobile network operator money transfer platform and the commercial banks' core banking platform (Deloitte, 2010). The integrated mobile banking gives commercial banks and other financial institutions more notable venues to increase their customer base using mobile and internet banking channels. They access a more comprehensive geographical location enabling the customers to access the bank products and services at their convenience while using the integrated mobile banking. The commercial banks' clients can get real-time financial services. Commercial banks and their customers can get the following benefits: commercial banks can offer safe, secure, convenient mobile banking services available for 24/7. increase in profit revenue for the banks which are generated through mobile banking channels which are generated from withdrawal charges, deposit, balance inquiry, pay bills, fees and other charges which are generated from the million transactions which are done through mobile banking. All these services are offered using automated mobile banking services that ensure the bank is reducing its operational cost in-office staff, paperwork, and office space rent.

Commercial banks can enable their customer to open their accounts remotely using the USSD code or the mobile sim tool kit or using the banks' mobile apps to integrate mobile banking services. This will enable them to boost customer satisfaction with the commercial banks' mobile banking services due to the perceived ease of use, convenience, fast, safe mobile banking, which is customer-centric. This is indicated by the exponential growth in the number of mobile banking subscribers. This enables customers to pay bills like school fees, utility payments like water, electricity, hospital bills, insurance premiums, and salary payments to their staff while using mobile banking at the click of their mobile phones instead of traveling the bank branches. This may lead to the reduction of branch operational cost, ATM operating cost which is substituted by the integrated mobile banking (Softwaregroup.com, 2020)

The mobile bank features that make them usable are that the phones are portable, convenient, easier to use, and offer personal real-time access to financial products. Mobile banking innovation has enhanced customer financial services access, where the customer can move to the nearest telecommunication network operator agent to access the money, enabled through agency banking (Aithal, 2016).

2 Literature Review

Venkatesh and others formed the (UTAUT) unified theory of acceptance and use of technology model in 2002 by combining the existing eight approaches on acceptance use of technology, the determinants of the purpose, and utilization of information technology. They compared these prototypes empirically, employing longitudinal data within-subjects from four institutions. The conceptual and actual similarities over the eight models devised the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris & Davis, 2003). This theory focuses on advancing more on user's objectives to use information systems in the future. The

approach holds on these key constructs: social influence, effort expectancy, performance expectancy, and direct determinants of consumption behavior (facilitating and conditions intention); the first three are the immediate determinants of the plan to use. User behavior's absolute determinants are age, gender experience, and voluntarism of use predicted to moderate the four essential constructs' effect on utilization behavior and intention.

UTAUT was advanced by Venkatesh and others to forecast user adoption of information technology. UTAUT blended eight theories, including the Technology accepted model (TAM), innovation diffusion theory (IDT), the method of reasoned action (TRA), the motivational model, the method of planned behavior (TPB), a model merging the TAM and TPB, the Model of PC utilization and social cognitive theory (SCT) with empirical analysis, (Venkatesh et al., 2003). These models and approaches have successfully been used as the basis for different innovation and information computer technology adoption branches, such as mobile commerce ecosystem, mobile apps, mobile banking, and electronic financial services adoption by both financial and non-financial institutions (Ukpabi et al., 2019).

Combining all these eight theories makes this theory applicable to implementing many financial innovation products, processes, and services. This has been done in the test if the customers will accept the products like mobile banking. Electronic funds transfer, electronic banking, internet banking like the application of equity mobile banking M-Kesho product by (Njenga, Litondo & Omwansa, 2016), also the replica of M-Shwari mobile bank banking service by Commercial Bank of Africa (Temenos, 2019). Technology acceptance, development in the telecommunication sector, and mobile technology and computer software innovation has led to customer financial services preference. This is due to the ease of use, convenience, speed, social status, change in customer preference behavior, which depends on the customer reasoning and acceptance of the bank products as indicated by the customer uptake of the equity bank model (Chironga et al., 2017) KCB and M-Pesa, Fuliza other mobile loan services, bill payments, mobile deposit, account balance checking (KCB, 2019).

Ngigi (2014) looked at mobile banking deposits and noted that since the inception of the mobile phone banking partnership between Africa and Safaricom's commercial bank. It has led to an increase in mobile customer deposits, hitting 24 million after one year of its inception. They noted that M-Shwari mobile banking product average receives KShs 200 million deposits daily from an average of six million M-Shwari customers. This product has enabled the Commercial Bank of Africa to increase its total deposits by 26.2%. The deposits are 86.8 billion, which was attributed to mobile banking products which the bank is offering both the short term and long term mobile banking saving products.

Alushula (2020) noted on the business daily that according to the 2019 Central Bank of Kenya data, he said that customers are shifting from the preference of ATM usage to other modern banking channels like internet banking, mobile banking, and agency banking. Customers can access their banking services through the use of mobile banking. Commercial banks need to adopt cost-effective financial service delivery products, processes, and services. The number of mobile deposit accounts is more than 16 million, around 28.9 % of the total deposit accounts of 55.27 million in the banking sector. These are attributed to financial innovation changes, stiff competition among the commercial banks, and the mobile money network providers, forcing commercial banks to develop integrated mobile banking platforms for easy access, deposit, and transfer of money to the deposit account. This study will fill the gap created by the number of mobile deposit accounts created due to the financial innovation and customer

preference for mobile banking. It will try to address whether mobile deposits have any impact on commercial banks' operational efficiency.

Ndirangu (2015) conducted a study on mobile banking on commercial banks' performance in Kenya. The study's primary objective was to establish the specific effect of increased mobile banking usage and adoption. The descriptive research design was applied, and a census survey for the 34 commercial banks out of the 44 was used. The study concluded that mobile banking significantly impacted commercial banks' performance when the study critically examined the variables, especially the total mobile banking deposit with total commercial bank deposits. It indicated that it had a 0.187% effect on the Return On Asset, which is a significant indication that customers are using mobile banking to make their commercial bank deposits. The current study will cover operational efficiency and how it is affected by mobile banking deposits covering all the commercial banks in Kenya compared to commercial banks' performance done by Ndirangu.

Tuyishime and Memba (2015) on their study concerning deposit mobilization on commercial banks in Rwanda, a case study of equity bank Rwanda. They used a census survey study utilizing both secondary and primary data targeting the bank managers. The study concluded that the marketing strategy of incorporating financial innovation had a positive relationship between deposit mobilization and the commercial bank's performance in Rwanda. Deposit mobilization was enhancing due to the agency and mobile banking, which enable the customers to make their bank deposits at a low cost. The researcher will fill the literature gap by finding out the effect of mobile banking deposits on operational efficiency while investigating if mobile savings enhance the banks' liquidity. This can be used for investments to generate more revenue for the commercial banks while increasing its operational efficiency.

2.1 Operational efficiency

Operational efficiency is the efficient utilization of financial capital and material resources or the efficient use of people, machines, computers, equipment, tools, and materials funds. Prudent consumption of any or an amalgamation can raise the output of goods and services and decrease operational costs. Improving efficiency has long been a challenge for the financial services industry. Still, cost management is about lowering expenses and creating more revenue per unit of cost (Alber et al., 2019). Operational efficiency means a firm or financial institution's ability to achieve its goal using the available resources at a minimal cost. Moreover, the operational efficiency of the bank simply means the capability of a bank to offer all the banking services using its available resources to achieve its objective or goals.

According to (Reimink 2019), banks can improve their operational effectiveness by taking a balanced approach that will improve operational efficiency and the one with the ability to respond to the current and future market needs, which keeps on changing as financial innovations emerge with the on-going development in technology. Commercial banks' operational efficiency examined in the following ways, one at the extent to which Banks improved in such operations to provide quality services to their clients and the ability of the bank to use the mobile banking innovations products and services to improve on their operational efficiencies (Rabiu et al., 2019)

The banking industry is drastically changing due to commercial banks' financial innovations, like the recent financial report for the year 2017/2018 statements (CBK 2017). Which is a clear indication that mobile banking innovation and agency model and E-banking are providing convenience, cost-effective, reliable and customer satisfaction services (Hammoud et al., 2018)

at a reduced cost leading to banks operational efficiency in Kenya hence attracting more customers and more mobile deposits account opened and loans issued according to the Central Bank of Kenya annual report (CBK, 2017)

. Most studies have been done on mobile banking's effect on commercial banks' performance but not on operational efficiency and commercial banks' mobile banking.

Previous studies have produced mixed results. Some conclude that mobile banking financial innovation has minimal effect on commercial bank operations, indicating a remarkable contribution to bank operations. It is at the centre of such mixed conclusions that it creates and entails the need to carry out a study from a Kenyan perspective to examine mobile banking's effect on commercial banks' operational efficiency in Kenya. Most commercial banks have introduced mobile banking innovations like mobile account opening, banking products like mobile deposits, withdrawal and pay bill financial services. They have invested in the digital innovation strategy to remain competent, maintain a customer base, and improve their operational efficiency. Will these innovations like mobile banking have any effect on commercial banks' operational efficiency?

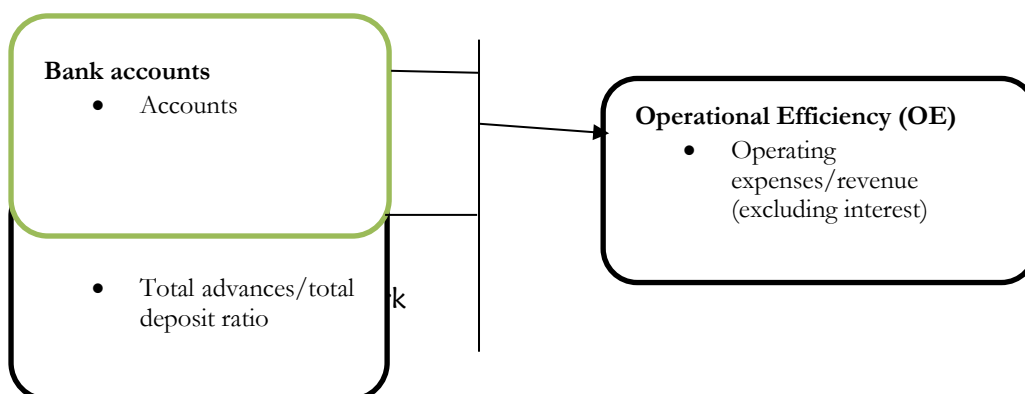
2.2 Conceptual Frame Work

Technology is helping commercial banks to automate their processes, and it allows banks to reduce operational cost. At the same time, they are optimizing technology to maximize their revenue generation. Electronic banking is one of the innovation banks use in offering their products, processes, and services like account opening using a mobile phone. The growth in the number of registered mobile banking accounts by commercial banks indicates that banks utilize their technological resources efficiently while reducing the time serving the customer and their operational cost. This can also be captured on the mobile loan accounts, which are opened to enable the customers to access the mobile loans which they borrow from the commercial banks.

The number of mobile deposits and the amount of money the customers can deposit to their bank accounts through mobile banking are better indicators of how banks employ technology to serve their customers using mobile banking. It can be done anywhere, without the limit of time like that of the brick and mortar model. The growth in the number of mobile deposit and amount of savings mobilized through mobile banking are the indicators of efficient operational efficiency by banks reducing operating cost in terms of human resources, paperwork, office space, time spent by the customer and the bank staff while serving these customers as compared to the self-service by mobile banking innovation employed by commercial banks. This study will focus on the number of mobile deposits made through mobile banking as a variable factor.

Independent variables (mobile banking)

Dependent variable(operational efficiency)



Research methodology

3 Research Methodology

The study used a descriptive research design. According to (Kothari, 2004) which is the systematic plan on the set procedures for data collection and analysis of data collected to serve this research's purpose. Descriptive design is best suitable to describe the elements as they exist under this study, on the effects of mobile banking on commercial banks' operational efficiency. Census survey will be applied to collect the secondary data from the commercial banks in Kenya. Stata software will be used to analyse the panel data collected

The target population for this study will be the 41 commercial banks in Kenya excluding the ones under statutory management. The table 1 below shows the target population

Table 1: Target Population

Tier	Number of Banks (Population)
Tier I	6
Tier II	14
Tier III	21
Total	41

Source: CBK (2019)

3.1 Diagnostic test

The diagnostic tests will be carried out to test if this data met all the requirements.

Hausman test will be done to determine if Random Effect Model OR Fixed Effect Model will be used. Lagrange multiplier (LM) will be carried out to determine if Random effect model OR pool OLS, Wooldridge Drukker test will be done to test Autocorrelation Test, PP and QQ plots will be tested to test normality and Breusch Pagan Test to test Heteroskedasticity.

4 Results and Discussion

The result shows that the independent variable of accounts that were opened had a standard deviation of 27 on overall and mean of 8.4 accounts is a greater indicator of mobile banking's effect on the operational efficiency of commercial banks.

The number of bank deposits has a mean of 76.39% and a standard deviation of 21%, with a minimum of 13.57 % and a maximum of 147% being the variations on the total advances against the total deposits over the study period. Trend analysis for these variables indicates that they affect operational efficiency due to employing mobile banking's financial technology by commercial banks in Kenya.

4.1 Data Analysis Model

Upon carrying out the data analysis, we can fit the model $Y_i = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \epsilon$

$$Y_i = 59.41 + -0.0365 X_1 + 0.0152 X_2$$

Where 59.41 is the operational efficiency for commercial banks when all other variables are not present

-0.0365, which will be the decrease in operational efficiency with a unity increase in account numbers.

0.0152 is the increase in operational efficiency concerning a unity increase in the bank deposit

4.2 Hypothesis Test

The mobile bank accounts and commercial banks operational efficiency in Kenya

The P-value for the mobile bank accounts for this study is $0.644 > 0.05$ hence the null H_{01} : There is no significant relationship between mobile banking accounts and commercial banks' operational efficiency in Kenya. We accept the null hypothesis because the P-value of $0.644 > 0.05$ meaning there is no significant relationship between banks accounts and commercial banks operational efficiency

The mobile bank deposits and commercial banks operational efficiency in Kenya

The P-value for the mobile bank accounts for this study is $0.897 > 0.05$ hence the null. H_{02} : There is no significant relationship between mobile banking deposits and commercial banks' operational efficiency in Kenya. We accept the null hypothesis because the P-value of $0.897 > 0.05$ meaning there is no significant relationship between banks deposits and commercial banks operational efficiency.

5 Discussion of Findings

The study found out a negative relationship between the number of mobile banks accounts, which are -0.0365, and the operational efficiency of commercial banks in Kenya. The other variables have a positive relationship, which is indicated by the coefficient of mobile bank deposits: 0.0152.

The research study has established a negative relationship between bank accounts and operational efficiency with -0.0365. It has a P-value of $0.644 > 0.05$ hence not significant. The bank accounts enable the customer to get access to their commercial banks. The other factors affect the operational efficiency of commercial banks, which may not be explained by the study model because the model only accounts for an overall adjusted R squared of 14.1 % and a model rho of 61.8%. Rabiou et al., 2019 in their study on the Impact of E-banking on the Operational Efficiency of Banks in Nigeria they conclude that mobile banking was insignificant on the operational efficiency of commercial banks because it had a P-value of 0.0514, which was greater than 0.05

The study found a positive relationship between bank deposits and commercial banks' operational efficiency with a coefficient of 0.015. This indicates that mobile banking has some positive effect on commercial banks' operational efficiency in terms of financial access and financial deepening. Bank deposits enable commercial banks to increase their liquidity position, enabling them to have more liquid capital through the customers' mobile deposits. The implementation of mobile banking enables customers to deposit money, hence reducing time and transport costs. It reduces commercial banks' operational costs in terms of the human capital resources to attend the customers while making bank deposits. The cost of stationery is reduced since mobile banking enables banking to be done from the customer's comfort zone while using

a mobile phone. Commercial banks have also introduced long term and short term loan products to their customers hence attracting customer deposits. Tuyishime and Memba (2015), in their study on the effect of deposit mobilization on commercial banks' financial performance case study of Equity Bank Rwanda. They noted that technology in these case agencies and mobile banking positively impacted commercial banks deposit mobilization from the customer due to the reduction in the operational cost for the bank and the customers. This leads to an increase in the number of customer deposits.

5.1 Major Findings Summary

The research study found out that statistically, the R square was small, which means that the study can expound a small percentage of the study variables; mobile bank accounts, mobile loans and mobile deposits in commercial banks operational efficiency and that these research variables cannot explain a larger percentage of the variations. Further, we can say that a larger proportion can be explained by other factors not covered in this study, which affect commercial banks' operational efficiency in Kenya.

The study carried out multiple regression models. From the selected model, we established that the (OE) operational efficiency for commercial banks in Kenya would be significant when holding all other factors constant. The study also found out that the number of accounts will reduce commercial banks' operational efficiency with a unity increase in account numbers while always holding other factors. At the same time while other variables are constant bank deposits will increase commercial banks' operational efficiency concerning a unity increase in the bank (deposit) bank deposit ratio while holding other factors constant.

5.2 Mobile Bank Accounts and Commercial Banks Operational Efficiency

The mobile bank account integrates a mobile line or sim card with the customers' bank account. This is done by a customer opening the bank account access using the USSD code or a bank app or the sim card's embedded menu. Customers have the option of having a mobile phone number registered by the bank as an account without visiting the bank. From our study, we wanted to establish the effect of mobile bank accounts on commercial banks operational efficiency, and we found out that there is a negative relationship with a p-value which is greater than 0.05 hence accepting the null hypothesis that there is no significant relationship between mobile bank accounts and commercial banks operational efficiency. Although the study has noted from other studies that customers are opening more accounts and the number of account numbers has increased from 2010 to 2018, it helps customers deepen their financial access from commercial banks.

The research established a positive relationship between mobile deposits and the operational efficiency of commercial banks in Kenya. The study sought to determine whether mobile deposits affect the operational efficiency of commercial banks in Kenya. From the regression model coefficients, we noted that the p-value is more than 0.05 hence accepting the null hypothesis. This concludes that there is no relationship between mobile deposits and commercial banks' operational efficiency in Kenya. Mobile banking deposits, though it is enabling customers to save access to bank accounts, meet their long-term and short-term needs, are not statistically significant to commercial banks' operational efficiency. It is crucial to note that the operational efficiency of commercial banks is measure by other factors which are not

included in this study, which account for huger percentage because our adjusted R squared from our model is having a small percentage.

6 Conclusion and Recommendations

The study can conclude that mobile bank accounts have a negative relationship with commercial banks' operational efficiency. Mobile bank accounts have an insignificant effect on commercial banks' operational efficiency in Kenya for the period under study 2010-2018.

Bank deposit has a positive relationship with the operational efficiency of commercial banks in Kenya. This can be noted from the regression model. The mobile deposits have an insignificant effect on the operational efficiency of commercial banks in Kenya. Although it is helping customers to save and deposit their money while using their mobile banks, our study found out that it is not significant our adjusted R square can attribute this, which is a small percentage while the majority is attributed to other factors not covered by our study variables.

7. References

- Central Bank of Kenya. (2016). *Bank Annual Supervision Report 2016 Supervisory Framework Regional and International Developments and Initiatives Macroeconomic Conditions and Banking Sector Performance*. Central Bank of Kenya. Nairobi: Central Bank of Kenya. Retrieved May 31, 2020, from 1. https://www.centralbank.go.ke/uploads/banking_sector_annual_reports/831171133_2016%20Annual%20Report.pdf
- BBVA. (2012). Mobile banking: New experience in the post pc era. *Innovative Edge*, (2), 1-69.
- Rizzi, W., & Taraporevala, Z. (2019, January). The balancing act: Ominchannels excellence in retail banking. *McKinsey & Company*, 1-10.
- Kendall, J., Schiff, R., & Smadja, E. (2014). Sub-Saharan Africa: A major potential revenue opportunity for digital payments. *McKinsey & Company*, 1-6
- Harelimana, J. B. (2017). Impact of mobile banking on the financial performance of Unguka microfinance bank ltd, Rwanda. *Global Journal of Management and Business Research*, 17(4), 1-13.
- Aitha, P. S. (2016). A comparison of an ideal banking model with the mobile banking system. *International Journal of Current Research and Modern Education* 1(2), 206-219.
- Pousttchi, K., & Schurig, M. (2004). Assessment of today's mobile banking applications from the view of customer requirements. *Proceedings of the Hawaii International Conference on System Sciences*. Hawaii: IEEE.
- Deloitte. (2010). Mobile banking A catalyst for improving bank performance. *Deloitte*, 1-25.
- Softwaregroup.com. (2020). <https://www.softwaregroup.com/digital-banking-platform-digiwave>. (softwaregroup.com, Producer, & softwaregroup.com) Retrieved August 30, 20 20, from softwaregroup.com: <https://www.softwaregroup.com/>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003, September). User acceptance of information; toward a unified view 1. *MIS Quarterly*, 27(3), 425-478.
- Ukpabi, D. C., Karjaluoto, H., Olaleye, S. A., & Abass, S. M. (2019). Factors influencing mobile banking continuous use in Sub-Sahara Africa a study of mobile banking users in Nigeria. *A Global Perspective on Digital Banking Consumer Behaviour*, 3(5), 92-115.
- Njenga, A. K., Litondo, K., & Omwansa, T. (2016). A theoretical review of mobile commerce success determinants. *Journal of Information Engineering and Applications*, 6(5), 12-23.
- Temenos. (2019, July 19). Case study commercial bank of Africa: Empowering low-income citizens through one of the most successful African banking initiatives in recent times. (Temenos, Producer, & Temenos).
- Chironga, M., Grandis, H. D., & Zouaoui, Y. (2017, September 1). Mobile financial services in Africa: Winning the battle for the customer. *McKinsey & Company*.
- KCB (2020). *Integrated Report & 2019 Financial statements*. Kenya commercial bank. Nairobi: www.kcbgroup.com. Retrieved April 11, 2020, from <https://kcbgroup.com/wp-content/uploads/2020/05/KCB-Group-Plc-2019-Integrated-Report-and-Financial-Statements.pdf>

- Davis, F. D. (1989, September). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Mwangi, J. K., & Wanyoike, D. M. (2012). The convenience of agency banking on financial service delivery to rural-based customers in Rongai-Sub County, Kenya. *International Journal of Science and Research*, 3(10), 2208-2211.
- Ngigi, G. (2014). M-Shwari deposits hit Sh24bn in one year. *Business Daily*, 42(4), 1. <https://doi.org/10.1017/CBO9781107415324.004>.
- Alushula, P. (2020). Mobile banking , agents cut ATMs in Kenya to six-year low. *Business Daily*.
- Ndirangu, B. N. (2015). The effect of mobile banking on the financial performance of commercial banks in Kenya. *Unpublished MBA Project-University of Nairobi*
- Tuyishime, R., Memba, F., & Mbera, Z. (2015, November). The effect of deposits Mobilization on the financial performance of commercial banks in Rwanda: A case study of Equity Bank Rwanda. *International Journal of Small Business and Entrepreneurship Research*, 3(6), 44-71.
- CBK. (2017). *Bank Supervision Annual Report 2017. Central Bank of Kenya, Bank supervision*. Nairobi: Central Bank of Kenya. Retrieved March 22, 2020, from https://www.centralbank.go.ke/uploads/banking_sector_annual_reports/849246690_2017%20Annual%20Report.pdf
- Hammoud, J., Bizri, R. M., & Baba, I. E. (2018, July 27). The impact of e-banking service quality on customer satisfaction: Evidence from the Lebanese banking sector. *SAGE Open*, 8(3), 1-8.
- Kothari, C. R., & Garg, G. (2014). *Research methodology: Methods and techniques*. 2014-New Age International (P) Ltd. *New Delhi*.