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The Effect of Electronic Banking Tools on Operational Performance of Commercial Banks in Rwanda. A Case of Bank of Kigali (2017-2021)

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Abstract

The main objective of this research was to assess the effect of electronic banking tools on the operational performance of Bank of Kigali in Rwanda with the specific objectives to determine the effect of internet banking transactions on operational performance in Bank of Kigali , to examine the influence of electronic cards on the operational performance of Bank of Kigali , and to evaluate the impact of mobile banking on the operational performance of Bank of Kigali . The correlational research design was employed in this research. The sample was 72 from the population of 254 Bank of Kigali employees working in operations department, corporate and customer retail department, risk and compliance department and digital banking department at headquarters. The sampling techniques used was stratified sampling. The main instrument of data collection in the study were the questionnaires, interviews, and published reports. The study used Statistical Package for Social Scientists (SPSS. 23) to analyze data collected. The findings revealed The results show that there is a linear relationship between the two variables (independent and dependent) with correlation of height and weight (r= 0.409; 0.356; 0.578 respectively). Furthermore, correlational analysis showed that between electronic cards banking and Operational performance there is significance level indicated by 0.409; 0.356; 0.578 respectively) for a two-tailed test), as these values are all greater than 0.05. model summary showed that 81.9 % changes in operational performance levels of commercial bank could be accounted to changes in internet banking, mobile banking, and electronic cards transactions. The calculated value from ANOVA was greater than the critical value tabulated (48.638> 2.764) and this is an indication that internet banking, mobile banking, and electronic cards transactions significantly influence operational performance level of commercial banks. From the findings on the coefficient of determination, the study found that there was great variation in the operational performance of commercial banks in Rwanda could be accounted to changes in internet banking, mobile banking, and electronic cards transactions of the bank at 90% confidence interval. The researcher has found the electronic cards banking in Bank of Kigali Plc positively effects the operational performance. We have recommended for various players in the banking sectors to adopt electronic banking service as this will enable them to have a larger coverage, flexibility, interactivity, and greater accessibility compared to conventional banking.

Key words*:* *Electronic banking tools, Internet banking transactions, Electronic cards, Mobile banking and Operational performance.*

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1. Introduction

The world witnessed an information and technological revolution that has touched every aspect of people's life including banking. Such changes and development have impacts on services quality, future of banking activities, and consequently, it's continually competition ability in the world markets since going along with technology is one of the most important factors of economic organizations success in general and banks in particular (Bello & Dogarawa, 2019). This motivates banks to spend more on technology and information to achieve maximum returns and attracting large number of clients through electronic banking. Furthermore banks have to provide an excellent service to customers who are sophisticated and will not accept less than above average service. Thus, the issue of service marketing in general, and banking services in particular has become one of the most important and modern directions which have witnessed a substantial expansion during the last years in almost all societies (Yin & Zhengzheng, 2020).

Electronic banking refers to the use of information technology in banking activities (Adrian, 2019). Electronic banking is the use of electronic and telecommunication networks to deliver a wide range of value added products and services to bank customers (Oleka, 2019). According to Ugwueze (2016), e-commerce in the banking and financial services sector produces electronic banking. Additionally, banks provide payment services on behalf of their clients who make purchases from various online stores. It is a catch-all phrase for how a customer can do banking operations electronically without going to a physical location, (Carstens, 2018). The very dynamic business world of today is undergoing quick changes as a result of heightened awareness, technological advancements, and expectations for banks to provide consumers with electronic banking services.

According to Adewoyw, (2018), historically, banks have been in the forefront of utilizing technology to enhance their offerings. The 21st-century banking industry operates in a challenging and cutthroat environment characterized by these fluctuating circumstances and the wildly uncertain economic environment. "The global change curve of the electronic banking system is centered on Information and Communication Technology (ICT) in Africa today". Managers in the banking sector in Kenya cannot disregard information systems because they have a significant influence on the present banking system, as demonstrated by the fact that most banks' entire cash flow is dependent on information systems.

AL-Refaee (2018) stated that "E-payment systems are increasingly at the core of innovation in online business processes, as companies seek methods to deliver quicker and more cost-effective services to their customers". In complementarity with Alawiye (2017) who suggested that electronic payment systems are being used in air ticketing, insurance, banking, retail, health care, online markets and even governments - in fact, everywhere money needs to change hands.

There are many evident advantages of an electronic mode of transfer compared to the conventional clearing house, because banks are increasingly turning to technology for managing their payments. The value attributes include secure payments, cost cutting, payment on due date and easier cash management compared to conventional systems. They have invested huge amounts of money, in implementing the self-banking services with the objective of improving the quality of customer service. The development of e-banking services is expected to decongest banking halls and reduce the incidences of long queues in banking halls. Information Communication Technology based financial services have made a significant contribution in reducing the cost of offering financial services (Odior, 2018).

The most important advantage is every banking product and service is available with lower cost banking operation for 24 hours a day and 7 days a week. They contain ATM Machine, POS terminal; mobile and Internet banking, electronic fund transfer, direct bill payments and card banking (Vekya, 2017). Therefore, the dependency to branch is minimized. These features motivate banks to take advantage of E-banking services to clients that are moved dramatically day by day (Tunay, et al., 2015). The prevalence of Internet services along with the fascination of e-business which is on the increase globally has forced cash transactions movement to give way to pay via electronic platforms. Since accepting this steadily increasing digital way of life, substantial changes have occurred in customers' expectations from financial services providers (Matira et al., 2010).

According to Kaur (2013), more people worldwide shift from doing transactions on paper to electronic means of doing transactions due to the lower cost involved in doing transactions electronically. Furthermore, technology is currently regarded as the key contributing factor to the success of organizations in general and banks in particular. Hence, banks, either foreign or local are consistently investing more towards giving their customers access to new technologies via e-banking because of the response and actions exhibited by the customers towards technology acceptance. This is consistent with the social construction of technology theory where the actions exhibited and displayed by humans are what put technology in shape (Blazi & Awolusi, 2020).

Technological innovations in European countries have for long increased customer demand for services provided by the bank. This great revolution has set a motion in the banking industry for the provision of a payment system that is compatible with the demands of the electronic market (Akhisar, et al., 2015).

Accordingly, banks are the early users of technology and the main drivers of technological innovation and revolution. E-Banking has become popular because of its convenience, flexibility and simplicity. In addition, it creates transaction related benefit like speed, efficiency, simplicity, convenience and accessibility (Eze & Egoro, 2016). Payment cards are more secure and convenient for the consumers. More than 1.2 billion credit cards are now in use around the world, accepted at more than 23 million locations (Solat, 2017).

Numerous African markets have been building the foundation for electronicness for quite a while including moderate and comprehensively accessible money related items, a lively and aggressive vendor commercial center, a straightforward and beneficial “business condition (Agwu & Carter, 2019). Similarly, African governments and central banks are striving to improve financial inclusion and attract foreign investment, opening up fresh and promising opportunities for both traditional banks and fintech startups”. In the last decade, innovation in the financial services sector in Africa has seen the introduction of internet banking, multi-currency cards and mobile money transactions amongst other things.

Africa is steadily progressing, embracing technology more extensively in the realm of financial services (Agwu & Carter, 2019). In South Africa approximately 30-35% of retail payments are electronic and 60-65% are cash payments (Thomas &Angus, 2018). Kenya is ranked second in Africa among countries that have significantly adopted electronic payments system (Thomas & Angus, 2018).

Numerous African markets have been building the foundation for electronicness for quite a while including moderate and comprehensively accessible money related items, a lively and aggressive vendor commercial center, a straightforward and beneficial business condition. Africa is on a steady growth path with a more progressive approach in terms of financial

services adopting technology (Agwu & Carter, 2014). In South Africa approximately 30-35% of retail payments are electronic and 60-65% are cash payments (Thomas &Angus, 2013). Kenya is ranked second in Africa among countries that have significantly adopted electronic payments system (Thomas & Angus, 2013). They also observe that the electronic payment system, used for bill settlement, purchasing goods, and accessing various services, has been fully adopted by 27% of Kenyans, with this figure increasing significantly thanks to dependable mobile phone-based transactions.

The commercial banks in Ethiopia offer electronic banking services to enable them and to gain competitive advantage in the banking industry. Electronic banking in Ethiopia has emerged as a strategic resource for achieving higher efficiency, control of operations and reduction of cost, replacing paper based and labor-intensive methods with new automated process. This leads to higher productivity and profitability for banks. All Ethiopian commercial banks aggressively expand their channel to provide good service and increase profitability (Tesfaw, 2020).

Furthermore, the electronic policy was formulated by the central bank with the aim of transitioning Nigeria's economy from a cash-based system to an electronic one, primarily through electronic payment systems. This initiative seeks not only to align Nigeria's monetary system with global standards and reduce the reliance on manual cash handling but also to enhance the efficiency of Nigeria's payment system, consequently leading to an improved quality of services for the banking public (Adewoye, 2013).

Similarly, Martins et al., (2014) revealed that electronic economy aimed at reducing the amount of physical cash circulating in the Nigerian economy, encouraging more electronic–based transaction and expected to reduce cost incurred in maintaining cash-based economy by 90% upon its full implementation in Nigeria. electronic policy in Ugandan banks aims to curb some of the negative consequences associated with the high usage of physical cash in the economy, which includes high cost of cash, high risk of using cash, high subsidy, informal economy, inefficiency and corruption (Chizoba, 2020)

The advancement in Technology has played an important role in improving service delivery standards in the Banking industry. “In its simplest form, Automated Teller Machines (ATMs) and deposit machines now allow consumers carry out banking transactions beyond banking hours”. With online banking, individuals can check their account balances and make payments without having to go to the bank hall. This is gradually creating a electronic society where consumers no longer have to pay for all their purchases with hard cash hence improving customer relationship management system. “As most people now own mobile phones, banks have also introduced mobile banking to cater for customers who are always on the move”. This was popularized in Rwanda first by Bank of Kigali Plc (Muteteri, 2015) and it intends to keep leading in boosting cash less economy.

In Rwanda, according to Mukamana (2019), the payment industry has over the last few years been transformed with the new wave of IT advancements. Currently the use of cash has been replaced by digital cash and digital wallets. The advancement in technology has played an important role in improving service delivery standards in the banking industry. In its simplest form, Automated Teller Machines (ATMs), mobile banking and electronic machines now allow consumers carry out banking transactions beyond banking hours. The present study will be taken to see how electronic banking tools can efficiently contribute to the operational performance of Bank of Kigali in Rwanda.

Problem statement

The rapid advancement of electronic banking tools has revolutionized the financial services industry worldwide, offering both customers and financial institutions new avenues for conducting transactions and managing their finances. "The National Bank of Rwanda (BNR, 2019) revealed that in period between the year 2016- 2019, ATM transactions increased by 32% (from 7.3M to 9.7M in 2019), POS transactions increased 955% (from 0.21M to 2.2M in 2019), mobile financial transactions increased by 135% (from 142M to 333M in 2019) and internet banking transactions increased by 201%" (from 0.3M to 1.8M in 2019). This increase of e-banking tools usage is very significant leaving the researcher willing to understand what's behind the considerable rise of these digital platforms and how do they contribute to the performance of commercial banks to the extent that these banks have and are willing to heavily invest in them.

Many studies conducted have "established the benefits and challenges associated with the electronic banking in Africa" (Mieseigha & Ogbodo , 2013; Ayoola, 2013; Emengini & Alio, 2014;Taiwo et al., 2017, Okoye, 2018).

A review of extant literature shows that many studies assessing the relationship between electronic banking and performance of organizations (Ezeamama et al., 2014). intensive research on the effect of electronic banking on financial performance or profitability in terms of return of asserts, return on equity and net profit margins have been well elaborated, however the impact of the electronic banking on operational performance is not well documented and the results are not coherent to rely on.

While numerous studies have explored the effects of electronic banking tools on operational performance globally, limited empirical research has been conducted to evaluate the specific implications within the Rwandan banking sector. In Rwanda, the adoption of electronic banking tools has gained momentum in recent years, with institutions like the Bank of Kigali incorporating these tools into their service offerings. However, there exists a critical need to comprehensively assess the impact of these electronic banking tools on the operational performance of the Bank of Kigali , particularly within the Rwandan context.

This research seeks to address this gap by conducting a thorough analysis of the relationship between the adoption and utilization of electronic banking tools and the operational performance metrics of the Bank of Kigali . Operational performance indicators, such as efficiency, cost-effectiveness, customer satisfaction, and service delivery speed, are essential measures to determine the success and sustainability of these technological advancements. Therefore, this study aims to fill the existing research gap by providing a comprehensive understanding of the relationship between electronic banking tools and the operational performance of the Bank of Kigali in Rwanda. The findings of this research could have significant implications for the broader financial sector in Rwanda and potentially guide other financial institutions in effectively leveraging electronic banking tools to enhance their operational performance in a rapidly evolving technological landscape.

Research objectives

The main objective of this research is to assess the effect of electronic banking tools on the operational performance of Bank of Kigali in Rwanda. Specifically, the study aimed to:

- To determine the effect of internet banking transactions on operational performance in Bank of Kigali.
- To examine the influence of electronic cards on the operational performance of Bank of Kigali.

- To evaluate the impact of mobile banking on the operational performance of Bank of Kigali.

Research hypotheses

The present study adopted the following research hypotheses:

Ho1: Internet banking transactions have no significant effect on bank operational performance of Bank of Kigali ,

Ho2: Electronic card transactions have no significant effect on the operational performance of Bank of Kigali .

Ho3: Mobile banking transactions have no significant effect on operational performance of Bank of Kigali .

2. Literature Review

Various research has examined the effect of cashless banking on the profitability of banking industry across different continents in the world. Several studies indicate that online bankers are the most profitable and wealthiest segment to banks.

Rotimi (2014) examined the impact of electronic banking on satisfaction of corporate bank customers in Nigeria. A sample survey research design with a sample of 100 respondents consisting of corporate and individual customers of GTB Bank of Nigeria Plc was used. Data was collected with a structured questionnaire which was analyzed by descriptive statistics and the hypothesis formulated was tested using chi square test. The result shows a significant relationship between electronic banking and customers‟ satisfaction. In addition, E-banking was found to be popular because of its convenience and flexibility, and transaction related benefits like speed, efficiency and accessibility. Security and power were also found as major challenges. Rotimi recommended that critical infrastructure like power; security and telecommunication should be strengthened to ensure the application of electronic banking in Nigeria and optimum satisfaction on the part of customers.

Internet banking transactions

Cheruiyot (2010), in his study titled, “Impact of internet banking on Financial Performance of Commercial Banks in Kenya”, found that internet banks are larger banks and have better operating efficiency ratios and profitability as compared to non-internet banks. Internet banks rely more heavily on core deposits for funding than non-internet banks do. However, the multiple regression results reveal that profitability and offering internet banking does have a small significant association (less than 5%), larger significant and negative association with risk profile of the banks (more than 10%) meaning that internet-based banks become better off from risks such as non-performing loans. However, the advantage expected of internet banking is yet to show some significant positive financial gains but begs for future investigation beyond financial measures used in the study as technology continues to penetrate the market.

Asongu (2012) in the effects of cheaper internet costs on financial performance of commercial bank argued that the rapid development of the technology infrastructure, in particular the growth in the number of personal computers, the increased quality of Internet connections, the more widespread use of the Internet in both homes and businesses, and the significant reduction in both the fixed and variable costs of the Internet connections in Kenya, have made it possible for the Internet to play a more central role in banks´ business strategy (Delgado & Nieto, 2004).

Demombynes and Thegeya (2012) analyzed the effects of 24-hour e-banking on financial performance of commercial banks and found out that internet banking by its nature offers more convenience and flexibility to customers coupled with a virtually absolute control over their banking. Service delivery is informational (informing customers on bank’s products, etc) and

transactional (conducting retail banking services). As an alternative delivery conduit for retail banking, it has all the impact on productivity imputed to Telebanking and PC-Banking. Aside that it is the most cost-efficient technological means of yielding higher productivity. Furthermore, it eliminates the barriers of distance / time and provides continual productivity for the bank to unimaginable distant customers since it is accessible on a 24-hour basis

According to Maina (2012) on the effects of ICT competence of customers on financial performance of commercial banks, Information and Communication Technology (ICT) is fast becoming a dynamic channel that drives the Kenyan economy. ICT is becoming increasingly important for the growth of our economy as a whole. The availability and usage of adequate ICT skills are important factors, which influence the competitiveness among commercial banks in this era of e-Economy. Availability of skilled labor is a questionable resource requirement. There is a qualitative and quantitative imbalance in the supply of skilled labor and computer literacy amongst customers. It depends on the demographic factors, business cycles and rapid technological advancements taking place around us. Due to the vast development in the area of e-Banking it is essential that the policy makers should focus on the growing demand in ICT skills and take corrective steps to prepare the required numbers and quality beforehand. e-Banking enables to conduct banking business electronically over the Internet where the costs are minimal and it is no longer bound by time or geographical boundary. The target customers should as well equally be knowledgeable on the essential skills of applying Information Technology for the success of e-banking (Malden & Jayasena, 2009).

Adewoyw, (2018) studied the impact of mobile and internet banking on performance of financial institutions in Nigeria. The study investigated 30 financial institutions. The study revealed that among 66.7% of the respondents indicated that internet banking had a positive impact on performance commercial banks. The study found that the most prevalent internet banking service is balance inquiry while the least is online bill payment. Cash withdrawal was the most commonly used mobile banking service whereas purchasing commodities was the least commonly used.

Electronic card banking transactions

Ogutu and Fatoki (2019) examined the effect of electronic banking on financial performance of listed commercial banks in Kenya. The study employed quantitative research design using panel data analysis. The targeted population of the study was the 11 listed commercial banks in Kenya. Secondary data was extracted from CBK banking supervisory reports and published annual reports of banks. The data was recorded on data collection sheets. Both descriptive and inferential statistics were used. The findings were presented using tables with associated explanations. The study found that there was strong positive relationship between mobile banking, agency banking, ATM banking and online banking and financial performance of listed commercial banks in Kenya. Financial performance of commercial banks and banking were strongly and positively correlated.

Nader (2011) in his study on the profit efficiency of the Saudi Arabia Commercial banks sampled 6 Saudi commercial banks, out of 11 ones working in the Saudi banking market. Data collected covered the period 1998 to 2007 for each bank; the study indicated that availability of mobile banking had a positive effect on profit efficiency of Saudi banks. The results showed that the most important determinants of "profit efficiency" are the "availability of phone banking" and the "number of ATMs". Thus, this result was consistent with his idea that availability of mobile banking" is what determines profit efficiency rather than any other determinant in the study.

Ardizzi et al. (2019) examined the effect of innovation on cost efficiency of the banking industry in Italy using parametric and non-parametric estimation techniques. Their result provided empirical evidence that failed to support innovation-led bank efficiency. Employing a dataset for the period of 2006-2010, they could not find clear cost efficiency enhancing due

to diffusion of ATM. Similarly, diffusion of electronic payment we reported to exert significant effect on cost inefficiency reduction. Haynes and Thompson (2000) in a panel study of the UK building society find a positive effect of ATM adoption on the productivity effect using augmented production function. They suggested that ATM adoption has a larger productivity gains over non-adoption.

Mobile banking transactions

Mobile banking has increasingly been employed by many banks around the world to generate additional revenue, reduce costs or to increase customer satisfaction, often with very promising results. Unlike in the past where banks offering mobile services suffered a severe setback due to lack of customer interest and unripe technologies the time seems to be now for re-launching mobile services. Mobile banking is usually defined as carrying out banking services with the help of mobile phones or PDAs. The offered services may include transaction facilities as well as other related services that cater primarily for informational needs revolving around financial activities (Tiwari, 2006).

The need for convenient ways of accessing financial resources beyond the conventional norms has seen the recurrent expansion and modernization of banking patterns. And given the huge demand for finance-oriented services, institutions beside the historical banks have joined the fray in an attempt to grab a piece of the perceived cake of opportunity within the banking industry. The pent-up demand for an affordable and reliable way of holding funds while ensuring that risk levels are consigned to a minimum is consistently unfolding. A system with the potential to obliterate the historical hurdles of cost and free access which have for a long time stood in the way of willing partakers of banking services evokes immediate attention and interest. The unprecedented uptake of mobile phone banking services in Kenya is a testament to this fact (Wambari, 2009).

Porteous (2006) distinguishes two aspects of mobile banking: Additive and transformational characteristics. Additive aspects are those in which the mobile phone is merely another channel to an existing bank account. Mobile banking is additive when it merely adds to the range of choices or enhances the convenience of existing customers of mainstream financial institutions. Transformational characteristics arise when the financial product linked to the use of the phone is targeted at persons who do not hold formal bank accounts with the conventional banking institutions.

Michael (2015) examined the effectiveness of mobile banking services in selected Deposit money Banks in Rwanda. Descriptive design involving both qualitative and quantitative approaches was employed. Sample size of 227 was computed from a total population of 524 employees from the selected banks and the selection of respondents was done through systematic random sampling. The instruments of data collection used in this study included both structured questionnaires and interview. In data analysis, quantitative data was analyzed through frequencies and percentages for respondents', mean values were used to determine the effectiveness of mobile banking services in the selected Deposit money Banks. Difference in effectiveness of mobile banking services was determined through One-Way-ANOVA. Research findings reveal that mobile banking services in the selected Deposit money Banks were generally effective.

Maina (2012) from her study on the contribution of mobile banking to financial performance of commercial banks in Kenya investigated the relativity between mobile banking and financial performance. The study also sought to find the financial strategies that had been adopted by the institutions to enhance growth and efficiency of mobile banking. From the findings of the study 70% of financial institutions in Kenya had adopted process innovation (mobile banking) which enabled them to serve more clients within a shorter time hence boosting the financial performance over time. She concludes that adoption of mobile banking by financial institutions

is very important in improvement of financial adequacy of commercial banks as well as improving operations and reduce costs in the long run hence increase in earnings.

Macharia, G. (2019) studied Commercial Banks' Perception of the Influence of Mobile Telephones of Growth of Banking Business in Kenya, He analyzed also the impact of ICT adoption on efficiency and financial sustainability of Microfinance Institutions in Kenya. The study utilized DEA model to estimate technical efficiency of Microfinance institutions in Tanzania. Financial self-sufficiency was estimated using operating self-sufficiency ratio while ICT usage level was measured using ICT usage index. Regression analysis model was used to test for association and cause and effect between ICT with efficiency and financial sustainability. The study found a positive though weak association and insignificant course and effect between ICT usage with efficiency and financial sustainability. ICT adoption was found to have a positive correlation with efficiency and financial sustainability in Microfinance Institutions The study concluded that Microfinance Institutions in kenya should increase their ICT ventures; grow their customer base and expand ICT use level in order to realize the benefit of ICT in their organizations.

Theoretical review

There are many theories and literature on the variables for the subject under study. This section discusses the micro-foundations of how electronic banking tools can affect bank operational performance

Technology Acceptance Theory

Technology acceptance theory is constructed by Davis (1989) on the foundations of perceived usefulness and perceived ease of use to explain the conceptual model that users' intention or acceptance degree towards information system or new technology. Perceived usefulness refers to individual belief to improve the degree of job performance through using particular new technology and information system. Perceived ease of use indicates how easy an individual learns how to operate or use new technology or information system. The model places more emphasis on how perceived ease of use would positively affect perceived usefulness. Exogenous variables such as environment are also the antecedent that induces perceived usefulness and perceived ease of use (Davis, 2018)

Thus, Technology Acceptance Theory is based on both important perceptive factors as perceived usefulness and perceived ease of use. Technology Acceptance Theory is widely applied on the research of information technology. The same author examined the significant variables to build a successful website based on Technology Acceptance Theory. As a result of the empirical study, scholars find that Technology Acceptance Theory does not only apply to examine new information technology accept intention or behavior, but also ensures that TAT is suitable for the explanation of online user behavior issues (Pavlou, 2013).

As well, this model proposes that "the acceptability of an information system is dependent on these two factors: the perceived usefulness and the perceived ease of use. Perceived usefulness in this case is the degree to which one believes that the usage of a system will enhance their performance in terms of job effectiveness, productivity and time saving while perceived ease of use is the degree to which one believes that the usage of a system will be easy requiring no effort in terms of physical effort, mental effort and personal expectation experience of the system's ease of use". On the other hand, perceived ease of use in relation to cashless banking is shown by the fact that there is an electronic device directly connected to the bank and the client is guided by the agent in using the device (Mwangi, 2011).

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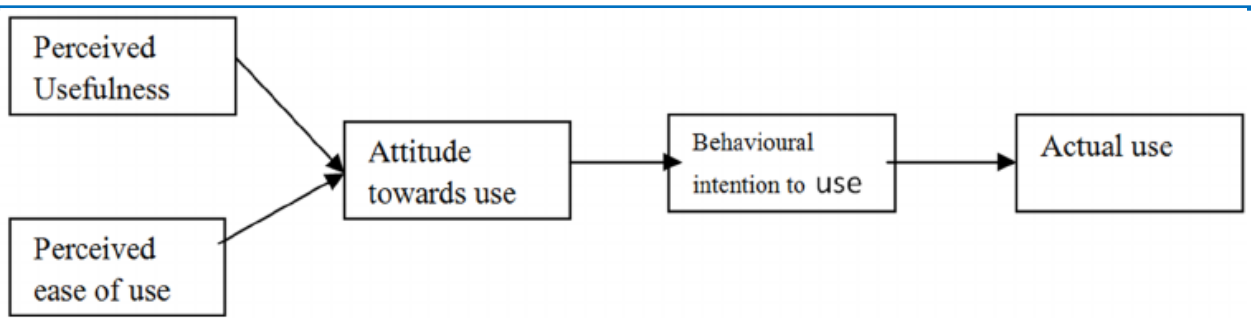

Figure 1: The technology acceptance model TAM

According to Davis (1989), Perceived usefulness shows the degree to which user's expectation to the system that enhances good job performance. Perceived ease of use is the degree to which user's perception for minimizing loads and effort using the new system. Both influence the user's attitude to use, which in turn influence user intention to adopt the application. Technology acceptance model is used to explain how banks adopt electronic banking.
Many studies have been conducted concerning users' intentions of mobile services, most of which have been based on This theory some of them are, Evaluating the impact of online banking factors on motivating the process of E-banking (Akram,2011) another one is the critical factors influencing E-banking service adoption in Jordan commercial banks (Ihab Ali El-Qirem, 2012) and internet banking adoption in emerging economy: Indian consumer's perspective (Rahmath, 2011) but also its major weakness as, it has limited use in explaining uses behavioural intention to adopt complex mobile services. Consequently, when studying their adoption, many authors have extended TAM with additional constructs, such as subjective norm, perceived expressiveness, enjoyment and behavioural and perceived flexibility.
Perceived easiness and importance positively influence the attitude for information system and it also, positively affect the intention to use and the way of acceptance for information system (Davis, 1989). In addition, "perceived ease of use positively affects the perceived usefulness and both of perceived ease of use and perceived usefulness are influenced by other factors. This theory utilized in this study for the explanation of electronic banking adoption and by what means it influenced Bank of Kigali 's operational performance".

Innovation Diffusion Theory
According to Rogers, in developing the diffusion of innovation theory, endeavours to investigate the factors that influence an individual or organization to adopt a new technology. Th same author identified several traits of an innovation that are key influences on adoption behavior. These traits are relative advantage, complexity, compatibility, trialability, and observability. For our research, Banks will embrace a new technological development of which they perceived to be providing more benefits than its predecessor (Traditional baking). The theory confirms that organizations will participate in the diffusion of a new innovation in order to gain competitive advantage, lessen costs and protect their strategic positions. Along these lines, it is hypothesized that, when banks perceive distinct advantages offered by E-banking, they are more likely to adopt it (Al-Jabri *et al*, 2016).

However, within a given social framework, the acceptance of a novel concept, behavior, or product (referred to as an "innovation") does not occur simultaneously. Instead, it unfolds as a process where certain individuals are more inclined to embrace the innovation sooner than others. Research indicates that those who swiftly adopt innovations possess distinct traits from those who adopt them at a later stage (Lanzolla & Suarez, 2012; Chiesa & Frattini, 2011; Whalley & Curwen, 2015). This theory assumes that when a company is introducing an innovation to a target audience, comprehending the specific characteristics of that audience is vital as these traits can either facilitate or hinder the adoption of the new innovation.

The theory identifies five categories of adopters and emphasizes that while the majority of the population typically falls into the middle category, it's crucial to grasp the traits of the target audience. The five adopter categories consist of Innovators, Early Adopters, Early Majority, Late Majority, and Laggards. Innovators represent the individuals who eagerly embrace any fresh innovation. They possess a spirit of adventure and a penchant for new concepts. These individuals are unafraid of taking risks and are often the ones who generate novel ideas themselves. Early Adopters encompass opinion leaders who naturally assume leadership roles and are comfortable adopting new ideas since they are aware of their impending arrival. These individuals don't necessarily require extensive information to convince them to adopt an innovation.

Conversely, the Early Majority comprises those who are not usually leaders but do adopt new ideas before the average person. They require substantial evidence to persuade them to embrace an innovation. Effective strategies for this group include showcasing success stories of the innovative product and presenting evidence of its efficacy. The subsequent category is the Late Majority, individuals who are skeptical about change and only adopt a new innovation after it has been widely embraced. Strategies effective for this group involve providing information about how many others have already tried and successfully adopted the innovation.

Lastly, the Laggards are individuals firmly rooted in tradition, exhibiting strong conservatism. They approach any change with skepticism and are the most resistant to adopting innovations. However, a close look at the trend of growth of financial innovation in Rwanda reveals that the diffusion theory is upheld. The level of acceptance of this innovative product have continued to grow every year suggesting that more of late majority adopters are dragged into the net of digital payment system.

The Reasoned action theory

Developed in 1975 by Fishbein and Ajzen and noted by Oleka (2019), the reasoned action theory has been utilized broadly as a part of marketing research. The theory has been designed to clarify the conduct beyond the acceptance of an innovation and incorporates four general concepts: subjective norms, behavioural attitudes, intention to use and actual use. It contends that people assess the outcomes of a specific conduct and make intentions to act that are consistent with their evaluations. More specifically, reasoned action theory states that people's conduct can be anticipated from their intentions, which can be predicted from their attitudes and subjective norms.

According to the same author, following the chain of prediction further back, attitudes can be anticipated from an individual's beliefs about the outcomes of the conduct. Subjective norms can be anticipated by knowing how critical other people think the conduct should or should not be done. A particularly supportive part of reasoned action theory from a technology point of view is its affirmation that any other factors that impact conduct do so only indirectly by influencing attitude and subjective norms. Such variables would incorporate, amongst others things, the framework plan characteristics, client attributes and task characteristics. Subsequently, is entirely proper with regards to foreseeing the conduct of using multimedia innovation. In spite of the fact that the reasoned action theory, is an extremely broad theory and as such does not determine what particular beliefs would be pertinent in particular circumstances. Nevertheless, the consideration of subjective norm represents an important variable, which is not in any case incorporated into other popular models. Additionally, it can be depicted as a standout amongst the most compelling theory to clarify human conduct's disposition toward adoption of technology (Davis *et al*, 2018). This reasoned action theory is related to the study as it focus on how financial institution like bank deliver their financial services through a retail agent, where the bank develops financial products and services, but

distributes them through retail agents who handle all or most customer interaction, in our case the use mobile money transactions, point of sales terminals and internet settings are considered to provide banking services with branch less operations through cashless transactions though the customers norms impact the effectiveness, in this study, these impediments were considered.

3. Research methodology

The study adopted a correlation design in order to interpret data. Therefore, both quantitative (questionnaire) and qualitative (interview) research techniques were used by the researcher in order to collect data (information) related to the objectives of the study and for data analysis.

The target population for this study was the set of personnel in Bank of Kigali Plc ; the total target population was 254 workers who are working in operations department, corporate and customer retail department, risk and compliance department and digital banking department at headquarters. The Slovine's formula used to get the sample size of 72 from the total target population of 254 individuals, Operations department, Corporate and customer retail department, Risk and compliance department and Digital banking department. This saved time and cost of undertaking the study.

Both primary and secondary data sources were utilized, with primary data collected through questionnaires and key informant interviews. Secondary data were obtained through a documentary review process.

The research instruments were tested for validity and reliability. Questionnaires, as a primary data collection method, were designed to align with the research objectives, utilizing a mix of close-ended and open-ended questions, primarily based on a Likert scale. Documentary review supplemented the primary data collection process, enhancing the depth of information acquired. For reliability, the Cronbach's alpha values for various variables were calculated, all surpassing the acceptable threshold of 0.7, indicating strong internal consistency. Editing, coding, and tabulation processes were employed to ensure data quality, consistency, and organization.

Data analysis involved Statistical Package for Social Science (SPSS V 21.0) for quantitative analysis. Descriptive statistics like frequencies, percentages, mean scores, and standard deviation were employed. Inferential statistics, including Pearson correlation analysis and multiple regression analysis, were conducted to establish relationships between Electronic Banking Tools and Operational performance of banks in Rwanda. Ethical considerations were a priority, ensuring confidentiality by avoiding the disclosure of respondents' identities and maintaining strict confidentiality of sensitive information throughout the study.

4. Findings

This section shows the findings of this research by presenting it from analysis. Where this is required, interpretations are provided after each table, always taking into consideration the initial research questions. This section thus establishes the ground up on the research questions were answered before drawing conclusion. The analysis was made on the responses obtained from 72 respondents from Bank of Kigali Plc.

Correlation analysis Results

The correlation matrix presented below provides valuable insights into the complex interrelationships among Internet banking, Electronic cards banking, Mobile banking and

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Operational performance. This matrix quantifies both the strength and direction of the connections between these crucial variables, offering a clearer understanding of their interconnected nature.

Table 1: Correlation coefficient between electronic cards banking and operational performance

		Internet banking	Electronic cards banking	Mobile banking	Operational performance
Internet banking	Pearson Correlation	1	.409**	.356**	.578**
	Sig. (2-tailed)		0.000	0.000	0.000
	N		72	72	72
Electronic cards banking	Pearson Correlation		1	.498**	.568**
	Sig. (2-tailed)			0.000	0.000
	N			72	72
Mobile banking	Pearson Correlation			1	.311*
	Sig. (2-tailed)				0.028
	N				72
Operational performance	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

**** correlation is significant at the 0.01 level (2-tailed).**

*** correlation is significant at the 0.05 level (2-tailed).**

Source: **Primary data, 2023**

With IB (internet Banking), ECM (Electronic Cards Banking), MB (Mobile Banking) and OP (Operational performance). The previous findings of table 1 indicate the Pearson correlation drawn from SPSS on seventy-two (72) cases observed as the number of complete observations as pair wise no missing values (n=72). The results show that there is a linear relationship between the two variables (independent and dependent) with correlation of height and weight (r= 0.409; 0.356; 0.578 respectively), its p-value, and the numbers of complete pair wise observations that the calculation was based on. The results show that between electronic cards banking and Operational performance there is significance level indicated by 0.409; 0.356; 0.578 respectively) for a two-tailed test), as these values are all greater than 0.05.

Regression Analysis

The study also wanted to establish the relationship between internet banking transactions and Operational performance of Bank of Kigali. Multiple regression analysis was used to identify the coefficient of model, the analysis of variance (ANOVA) of the model, The section also presents the coefficient of correlation and the coefficient of determination.

Table 2: Regression model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.914[a]	.835	.819	.17823

Source: Primary data, 2023

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[a] Predictors: (Constant), mobile banking, internet banking, electronic cards transactions.

From the findings in the table 2 the value of adjusted R squared was 0.819 an indication that there was variation of 81.9% on operational performance level of commercial banks in Rwanda due to changes in internet banking, mobile banking transactions and electronic cards banking transactions at 90% confidence interval. This shows that 81.9 % changes in operational performance levels of commercial bank could be accounted to changes in internet banking, mobile banking, and electronic cards transactions.

Table 3: ANOVA Table

Model		Sum of Squares	df	Mean Squares	F	Sig.
1	Regression	24.515	2	12.257	48.638	.000b
	Residual	17.649	70	0.252		
	Total	42.164	72			

Source: Primary data, 2023

The table 3 provides analysis of variance, the processed data which is the population parameters, had a significance level of 0% which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value) is less than 5%. The calculated value was greater than the critical value tabulated (48.638> 2.764) and this is an indication that internet banking, mobile banking, and electronic cards transactions significantly influence operational performance level of commercial banks.

Table 4: Regression model on Bank of Kigali operational performance

Source: Primary data, 2023

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	1.569	.226		6.952	.000b
	Mobile banking	.107	.003	.210	2.567	.012
	Internet banking	.216	.071	.016	.219	.000
	Electronic cards	.180	.048	.270	3.720	.050

The table 4 give the individual regression model coefficients on extent to which dependent variable as operational performance level of Bank of Kigali Ltd is influenced by the elements of electronic cards banking namely internet banking, mobile banking, and electronic cards transactions.

The established regression equation was $Y= \beta_0 + \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \varepsilon_i$

Where Y = dependent variables, β_0 = a constant; $\beta_1,\beta_2,\beta_3,\beta_4$ = coefficients

X_1, X_2, X_3, X_4 = independent variables and ε_i= error term

$Y=1.569 + 0.107x_1+ 0.216x_2+ 0.18x_3 + \varepsilon_i$.

Where: X_1: Mobile banking, X_2: internet banking, X_3: Electronic cards transactions, and ε_i= error term.

This clearly shows that there is a positive relationship between operational performance of commercial banks and internet banking, mobile banking, and electronic cards transactions of

the commercial banks. The study further revealed that the P-value were less than 0.05 in all the variables, which shows that all the independent variables were statistically significant and thus in position to make conclusion for the study. From the findings on the coefficient of determination, the study found that there was great variation in the operational performance of commercial banks in Rwanda could be accounted to changes in internet banking, mobile banking, and electronic cards transactions of the bank at 90% confidence interval. To this end banks are fast developing branchless banking such as internet banking, mobile banking, and electronic cards transactions, among others..

5. Conclusion

The researcher has assessed the electronic cards banking in Bank of Kigali Plc and its effect on operational performance. The components of electronic cards banking included internet banking, mobile banking transactions and electronic cards banking transactions and the study had shown that these components were statistically significant and impacted the operational performance of Bank of Kigali Plc . The extracts from published financial reports of Bank of Kigali Plc Rwanda Ltd for the period 2017, 2018, 2019,2020, 2021 and 2022 and the results are indicating that the total assets changed from 638.3 billion in 2017 to 1,590.4 billion in 2021. the net income also increased from 23 billion in 2027 to 52 billion in 2021. These results imply that the operational and financial performance indicators in Bank of Kigali Plc have depicted improving trends in last five years under consideration. Bisides, the value of adjusted R squared was 0.608 an indication that there was variation of 60.8% on operational performance of Bank of Kigali Plc due to changes in internet banking transactions, mobile banking transactions and electronic cards banking transactions at 90% confidence interval.

6. Recommendations

In the data analysis and interpretation as shown in above discussion, the study sought to come up with the following recommendations in line with the research objectives as given below.

From the finding there is need for various players in the banking sectors to adopt electronic banking service as this will enable them to have a ubiquity in coverage, flexibility, interactivity, and greater accessibility compared to conventional banking. It is recommended that commercial banks continue to create sustainable business linkages and collaborations with mobile phone service providers as well as the internet service providers. Furthermore, banks should leverage on mobile phones in order to grow their business and customer base. The Government should continue to offer more incentives for technologies that use mobile phones as their delivery platforms. Also, banks should embark on educating and creating awareness among their customers on the benefits if electronic banking and the charges involved. Moreover, Rwandan banks should invest more on electronic banking to reach more customers electronically.

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