



CONTRIBUTION OF DIGITAL BANKING PROJECT OUTPUTS ON THE IMPLEMENTATION OF CASHLESS ECONOMY IN RWANDA

A CASE OF BK PLC

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ABSTRACT: *The aim of this research is to examine contribution of banking project outputs on the implementation of cashless economy in Rwanda; specific objectives to analyze the banking project outputs in cashless economy implementation, to assess the level of cashless economy implementation in Rwanda and to determine the relationship between banking project outputs and Rwandan cashless economy implementation. This research will verify the following hypothesis of the research: H0. There is no relationship between digital banking and cashless economy implementation in Rwanda and H1. There is a relationship between digital banking and cashless economy implementation in Rwanda. The research used a descriptive research design, the data collection instruments was questionnaire, interview and documentary and analyzed through regression analysis. Results revealed that there was a positive and significant relationship between ATMs & plastic card project outputs and cashless economy ($r= 0.923$, p value <0.05). This implies that a unit change in the ATMs & plastic card project outputs increase cashless economy by 92.3%. Secondly, there was a positive significant relationship between Telephone and M-Banking project outputs and cashless economy ($r= 0.960$, p value <0.05). This implies that a unit change in Telephone and M-Banking project outputs Projects increase cashless economy by 96.0%. Thirdly, there was a positive significant relationship between POS project outputs and cashless economy ($r= 0.945$, p value <0.05). This implies that a unit change in POS project outputs increases cashless economy by 94.5%. Lastly, there was a positive and significant relationship between Internet banking project outputs and cashless economy ($r= 0.981$, p value <0.05). This implies that a unit change in Internet banking project outputs increase cashless economy by 98.1%. In the research, the first hypothesis said that ATMs & plastic card project outputs has no significant effect on implementation of cashless economy, second hypothesis said that Telephone and M-Banking project outputs Projects has no a significant effect on implementation of cashless economy, the third hypothesis said that Internet banking project outputs has no significant effect on implementation of cashless economy; therefore since the t -values were greater than 0.05 the researcher rejected all hypothesis of the research as it has been revealed that ATMs & plastic card project outputs, Telephone and M-Banking project outputs Projects and internet banking project output contribute to implementation of cashless economy in Rwanda . The results revealed that BK Plc offers cashless system services to customers such as debit and credit cards, cashless system services fund transfer, mobile banking, internet banking and swift and indicated by respondents, the respondents also indicated that they are satisfied with the cashless system services offered by the BK Plc. This is supported by the fact that, research indicated that there is a strong relationship between cashless system services banking service and profitability in Bank of Kigali. Based on the result of the research researcher conclude that the objectives of the research were achieved because the research revealed that the digital projects output of Bank of Kigali contribute to the cashless economy implementation in Rwanda. Based on the findings of this research, the research suggests Bank of Kigali to improve its services as a number of respondents indicates that they are not satisfied with the use of ATM because of frequent time out.*

I. INTRODUCTION

A cashless economy is an environment in which money is spent without being physically carried from one place to another. Electronic devices as means of information that reveal how much a person has deposited and has spent are needed. Information technology plays an important role in bringing about sustainable development in every nation. Without an optimal use of information technology, no country can attain a speedy social- economic growth and development. The future of business lies in information technology, in fact, information technology has been changing the ways companies and banks compete (Arathi, 2019).

Information technology is more than computers, it encompasses the data a business creates and uses as well as a wide spectrum of increasing convergent and linked technologies that process such data. Information technology thus relates to the application of technical processes in the communication of data. It is no doubt that information technology can help to reduce transaction costs for banks, which will translate to lower prices for services to customers. Information technology for banks takes different forms which include: computerization of customers' accounts and information storage and retrieval, deposit and withdrawal through Automated Teller Machine and networking to facilitate access to accounts from any branch of the bank (Chitle, 2018).

The world is evolving every day. Gone are the days when communication was limited to face to face, signals or by postage. Today communication can take place between two or more people from any distance in the world through telecommunication or internet or other technological means. But the technological world is not stopping at that rather, new innovations are coming out, making life easier and of course more and more sophisticated.

The banking innovations projects as they come makes serious impacts on the way things are being done all over the world and whatever is dictated as the new trend by the technological power house becomes the target of every nation. Thus, the trend of e-payment that began in the United States of America decades ago has become the next big thing for developing countries. For many years, developed country like Canada, United Kingdom, Sweden, France among others, have run their economy through electronic payment without hitches.

Banks in collaboration of the Egyptian government are working on project that allow 50 million citizens to use a single mobile payments gateway. The gateway link citizens' national IDs to a digital system, which means all those in the financial mainstream, suppliers, distributions,

customers, government and so on transact with one another. Similarly, the Nigerian government and banks initiated a national ID program with biometric functionality that citizens can use to pay for goods and services and to receive salaries. That project, targeting 100 million citizens, was the largest of its kind on the continent (Kingsley, 2020).

In sub-Saharan African countries there has been a rapid rise of Pan-African banks (PABs). These bank subsidiaries headquartered in African countries have expanded their activities across the continent following the retrenchment of traditional European and US banking groups after the global financial crisis in 2007/2008. At present, major PABs have a more significant footprint in sub-Saharan Africa than banks from outside the region (Mathieu et al., 2019).

For instance, Ecobank, headquartered in Togo, has a presence in 33 sub-Saharan African countries,

serving almost 23 million clients. These PABs are becoming increasingly economically and systemically important in their host economies, bringing an average of \$376 million of investment

in subsidiaries annually, and holding over 10% of total deposits in 31 sub-Saharan African countries (ibid.). This trend indicates how potentially important PABs' projects contributions are to the continent's cashless economy, but empirical evidence remains scarce.

The Rwanda National Payment System (RNPS) Strategy 2018 – 2024 reaffirms the commitment of the National Bank of Rwanda (BNR) and the Ministry of Finance and Economic Planning's (MINECOFIN) commitment to encourage the use of electronic payments by all residents of Rwanda, to achieve a cashless society. The vision of the RNPS, its five strategic pillars and accompanying implementation metrics act as a strong guide towards accomplishing a cashless economy, and a financially included population (BNR, 2017). Therefore, this research will research seek to analyze the contribution of banking project on the implementation of cashless economy in Rwanda.

Payments using a card, app, or computer, conversely, are transparent, clean, and usually quite simple. No trips to the ATM are required, and there's no need to worry about carrying large amounts of cash in public. There is no cost of handling, although those savings are more than offset by card fees paid by merchants and indirectly by customers. And yet, despite the evidence, there is little sign the world will go cashless anytime soon. Cash remains the world's most widely used payment instrument. Perhaps surprisingly, the global ratio of cash to GDP rose to 9.6% in 2018, compared with 8.1% in 2011. In Europe, 80% of point-of-sale transactions are still conducted in cash. People have a strong emotional connection to notes, coins, and currency and a lingering distrust of digital alternatives.

Slow progress toward cashless economies may be a source of frustration to policymakers, merchants, and financial institutions, all of which stand to accrue benefits from digital. However, there are steps they can take. The right strategies, incentives, internet banking project output, and regulation can encourage innovation and boost public confidence in noncash systems. Partnerships, both public and private, can also be critical in marshaling expertise and creating momentum. The tools are in place. All that is required to move forward is the will to act.

In Rwanda, according Rwanda Utilities Regulatory Authority (RURA), in the first quarter of 2018, the rate of mobile telephone penetration in Rwanda climbed to 76.6 per cent while 4G LTE Technology has been rolled out countrywide with a 92.5 per cent geographic coverage reaching 95.1 per cent of the population. Internet penetration was at 47.8 per cent with 5,642,574 subscribers, a rise from 5,252,996 subscribers in the fourth quarter of 2017. Some players have even gone forward to switch vendors to give them an upper hand in gaining business agility, dramatically lower the costs and place digital at the heart of their mode of operation to allow a complete democratization of basic banking services (Brian, 2019).

However, despite that fact that the Central Bank of Rwanda and other indigenous banks are spearheading financial system reforms projects, we are yet to make a significant breakthrough in the acceptability, efficiency and reliability on non-cash payment system in Rwanda because, cash still remains the most popular transaction payment instrument, even cashless system is being contemplated. Therefore, this research seeks to analyze contribution of digital banking project outputs on the implementation of cashless economy in Rwanda and suggest what can be done to increase the level of adoption in order to meet government expectations.

This work specifically aims at:

- To analyze the contribution of ATMs & Plastic cards projects outputs on the implementation of cashless economy in Rwanda,
- To analyze the contribution of Telephone, Mobile banking projects outputs on the implementation of cashless economy in Rwanda.
- To analyze the contribution of Internet banking project outputs on the implementation of cashless economy in Rwanda.

The research is aimed to test the following hypothesis(null):

- H₀1: ATMs & plastic card project outputs have no significant contribution to the implementation of cashless economy.
- H₀2. Telephone and M-banking project outputs has no significant contribution to the implementation of cashless economy.
- H₀3: POS project outputs has no significant contribution to implementation of cashless economy
- H₀4: Internet banking project outputs has no significant contribution to the implementation of cashless economy

II. LITERATURE REVIEW

A secured and convenient way of making payments is the cashless transaction. Cashless transactions are way of making payments without the use of physical cash, a gateway to technological advancement in the field of world economy. A cashless payment is a behavioral change in the people where people eliminate usage of money as a medium of exchange for goods and services by allowing electronic transfer payments or non-electronic payment via cheques (Tee and Ong, 2016).

It does not refer to an outright absence of cash transactions in the economic setting but one in which the amount of cash-based transactions is kept to the barest minimum. It is an economic system in which transactions are not done predominantly in exchange for actual cash. It is not also an economic system where goods and services are exchanged for goods and services (the barter system). It is an economic setting in which goods and services are bought and paid for through electronic media (Woodford, 2013).

III. THEORETICAL REVIEW

This is looked at the theories and models used by previous researchers to explain more on this research study, those are the following:

➤ **Theory of change**

Theory of change is a theory about how change happens, and how we, through our organization or program, intend to work to influence these changes. It takes the form of an ongoing process of reflection to allow iterative learning over time. The process involves bringing together stakeholders and encouraging them to think more critically about the change they want to see and the realities of the context in which the program works.

Theory of Change can be seen as an “on-going process of discussion-based analysis and learning that produces powerful insights to support program design, strategy, implementation, evaluation and impact assessment, communicated through diagrams and narratives which are updated at regular intervals” (Vogel, 2012)

Theories of change’ has strong linkages with other more well-known approaches to evaluation as well as complementing developments in the field that emphasize the conceptual and practical contribution of theory-driven approaches. There are three important aspects to evaluation practice that ‘theories of change’ can be aligned with: Process–outputs evaluation; Responsive/interactive evaluation; and Realistic evaluation (Funnel, 1997).

Process–Outputs Evaluation; these approaches have been common in evaluations of public policy, particularly since the significance of implementation was acknowledged (Robson, et al 1993). Understanding what happens and why in a program can be vital in examining why particular objectives were or were not achieved (Imrie and Thomas, 1995). ‘Theories of change’ adds value to this approach by requiring the link between process and outcome to be articulated at the beginning of the process.

Responsive/Interactive Evaluation; the involvement of particular stakeholders in the process of designing and undertaking evaluation is most obviously exemplified by action research or empowerment evaluation (Fetterman et al., 1996). However, there are a variety of other ways in which stakeholder perspectives can be included in evaluation. The purpose of evaluations of this type is to be flexible so as to ensure that factors important to the evaluation are not excluded by a predetermination of evaluation questions, approaches and methods. Increasingly popular in public policy as a way of building learning into the process of policy implementation, responsive evaluation has been used with staff groups as key stakeholders (Sullivan, 2000).

It is also increasingly common in UK and US regeneration programs as a means of ensuring that community perspectives are built into the purpose and process of evaluation (Sullivan and Potter, 2001). 'Theories of change' adds value to these approaches by linking the participation of all relevant stakeholders with a maximization of learning. It also makes explicit the different value bases that underpin the perspective of more or less powerful stakeholders.

Realistic Evaluation; Pawson and Tilley's (1997) work in relation to this highlights the importance of context in determining how a policy intervention was played out in practice. Context may take a number of forms, e.g. policy, geography, socio-economic, political and institutional. In relation to 'Building Capacity for Collaboration' this feature is essential to explore as the perceptions and experience of policy makers and local institutions of working in partnership and/or working with communities will inform how they approach the requirements of HAZ. Previous experiences within communities, and amongst service users, of consultation or involvement are likely to affect their response to another invitation to 'take part' in policy making and implementation. The resources available to community organizations and user groups will affect their capacity to get involved (Weiss, 1995).

➤ **Developer-Based (Determinist) Theory**

The goal of developer-based theory is to increase diffusion by maximizing the efficiency, effectiveness and elegance of an innovation. Developer-based theories focus on the technical characteristics of an innovation in order to increase diffusion. The developer, or architect, of superior technology is seen as the primary force for change. The underlying assumption of developer-based theories is deterministic because they imply that technological products and systems will, by virtue of their superiority alone, replace inferior products and systems. Developer-based theories of diffusion see change as following directly from a technological revolution or quantum leap.

Developer-based theories in instructional technology assume that the best way to bring about change is to create a system or product that is significantly, quantifiably superior to existing products or systems. Potential adopters are viewed as being predisposed to adopt innovations that are quantifiably superior. Top down school reform efforts such as the Goals 2000 initiative are excellent examples of developer-based IT diffusion theories (Mehlinger, 1995). These top down reform efforts seek to diffuse educational change by proposing educational systems that are superior to existing systems. By specifying goals, organizational structures, managerial philosophies, instructional products, and fiscal strategies that have been proven to be, or at least theorized to be, superior to existing practice, top down school reformers are counting on

technological superiority to bring about change. The payment system could easily be adopted if it's viewed to be superior to the cash system.

➤ **Unified theory of acceptance and use of technology (UTAUT)**

This is a technology acceptance model formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view". The UTAUT aims to explain user intentions to use an information system and subsequent usage behavior. These theories would therefore help explain a number of factors that determines the adoption of the cashless payment system. The theory holds that four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions; the first three being direct determinants of usage intention and behavior, and the fourth a direct determinant of use behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior (Venkatesh & Morris, 2003).

IV. EMPIRICAL REVIEW

This section presents the empirical review on the digital banking project outputs and cashless economy through the ATMs, Internet, and Telephone banking project outputs.

ATM project outputs and cashless economy

Mohamed (2016) conducted a research on impact of Automated Teller Machines (ATMs) on customers' satisfaction in Ilorin metropolis, the capital city of Kwara state, Nigeria, using three purposively selected commercial banks in the city, that is; First Bank of Nigeria Plc., Guaranty Trust Bank Plc. and First City Monument Bank Plc. The objective is to ascertain the relationship between ATM usage and customers' satisfaction in Nigeria. The study employed primary data sourced through structured questionnaires as the data collection procedure. The questionnaires were administered to 180 customers (60 from each bank), selected randomly at the banks' ATM terminals during the course of transactions.

Descriptive and inferential statistical technique tools such as tables, percentages and charts were used to present and analyze the data, while the chi-square technique was applied to test for the hypothesis. The result revealed that there is a significant relationship between ATM usage and customers' satisfaction. The study thus recommended among others, that restriction on cash withdrawals by customers per day should be abolished by Monetary Authority in order to enhance

customer satisfaction and to promote financial inclusion in Nigeria.

Sophia (2019) conducted research on impact of Automated Teller Machine on Financial performance of commercial banks of Rwanda, case of Bank of Kigali. This study was being guided by the objectives which are to establish the effect of Automated Teller Machine transactions on financial performance of commercial Banks, find out the extent of commercial Banks performance influenced by Automated Teller Machine transactions, and establish the relationship between Automated Teller Machine transactions on financial performance of commercial Banks. The data collected from both primary and secondary sources was processed and analyzed so as to find out the hidden meaning that can be based on to draw conclusions.

The logistic regression was used to analyze and interpret binary logistic was also used to analyze logistic regression. The process of data analysis was beginning after that data is collected, and then the data was entered into the SPSS software and therefore analyses. To interpret the responses of the respondents, the values of interpretation was used. The level of performance of commercial banks by observed response of respondents which are 84% of total number of respondents who agreed with Yes and 16% of total number of respondents who disagreed with NO. Exponentiation of the B coefficient which is an odds ratio indicates odds ratio is given by odds: $8/42$ which gives 0.190 and is less than 0.5, Score test that is used to predict whether or not an independent variable would be significant in the model.

Internet banking project outputs and cashless economy

Felix (2015) assessed the impact of e-banking and cashless society in the Nigerian economy. The study explores various aspects of e-banking and cashless economy using the banking sector of the Nigerian economy as a focal point. Specifically, the paper articulates empirical opinions that highlight the possible ways these policy measures have direct links to beneficiaries and the weighted outcomes when divergence is noticed and how to bring back the soundness, sustainable and rebranding policy that ensures economic growth. The paper holds that for a sustainable cashless society to emerge all hands must be on desk; banks should de-emphasize all odds and ensure that efficiencies of e-banking mechanisms are of utmost priority. It, therefore, recommends that adequate plans be in place to sensitize the general public about the effects and lay down procedures to check possible drawbacks. It, however, concludes by imploring all avenues and reports that relevant agency, service providers, operators, and those who have direct access to information to advocate as timely as when necessary about the implicit needs and benefits behind the cashless economy.

Eze (2018) examined the effect of internet banking on cashless economy of Nigeria. The aim of this paper is to ascertain the extent to which electronic payment affect cashless economy of Nigeria. Descriptive research design was used to carry out this study. The study indicates that the electronic system of payment has a great implication in cashless economy of Nigerian but it will led to significant decrease in deposit mobilization and credit extension by Nigerian deposit money banks. Consequently, the authors concluded that cashless system of payment was examined and develop the e-payment system first, so that people was used to it before talking of cashless economy. This is because; bulk of the Nigerian economy is driven by SME and petty traders.

To retain this policy of cashless economy in Nigeria, the authors recommended that the migration of our payments system towards a cashless society would require some reforms and a lot of effort and sensitization especially for low income group, who are currently deeply rooted in using cash and see it as a convenient and easy way of receiving and making payments. The sensitization exercise would require the combined effort of various stakeholders, including government, financial institutions, clergy and non-bank providers of payment services. There should be improvement in infrastructural development so as to enhance e-payment system.

Point of sales project output and cashless economy

In his paper Sai (2017) undertook to establish the correlation between the Point of Sale configurations (setup) employed by Small and Medium Enterprises and the security controls and measures implemented for the prevention and detection of possible security threats. Quantitative data was collected from 30 Small and Medium Enterprises in the retail sector using a self-administered questionnaire. The participants were selected using purposive sampling. The data was analyzed using descriptive statistics and the Chi square test was used to test for correlation between the variables. The research showed that only three of the recommended security measures for Small and Medium Enterprises are directly affected by the Point of Sale configuration in use and these are: Password Policy; Physical Security and Antivirus.

Ravi (2010) pointed out that manual sales systems are time consuming, it is very tedious, lots of paper work, slow data processing, it is not user-friendly environment and it is difficult to found records due file management system. In an early age when the most of the company are still using the manual system in the sales and inventory most of the company encountered so many problems and this is because of the process of the existing system is too slow and too long.

Mathew (2015) conducted a project of the power of point of sale: improving growth, profit, and customer service in a retail business. The project is a case study designed to evaluate and select a Point of Sale (POS) system and Inventory Management (IM) system for a small business based upon its specific industry needs. The project creates a three step framework leading up to the real world implementation of these systems and uses the Rhode Island based company - Wildwood Inc. - as the subject of the study. Wildwood Inc. is a garden center and nursery that uses manual processes for both its checkout and inventory management practices, but due to its growth is experiencing difficulties in serving its customers effectively. The project looks at specific challenges facing Wildwood and creates a roadmap for POS and IM implementation that can be generalized for businesses looking to upgrade their systems.

Telephone banking project outputs and cashless economy

Richard (2020) conducted a research on an empirical evaluation of cashless systems implementation in Ghana. The study aimed to evaluate cashless systems as a means of payment and receipt in Ghana. Specifically, the study sought to identify the modes of cashless systems in use and evaluate the level of implementation. A quantitative approach was adopted and primary data was gathered from 345 respondents knowledgeable in cashless systems using a structured questionnaire. Secondary data on cashless systems transactions between 2013 and 2017 were obtained from the Bank of Ghana. Data were analysed quantitatively using SPSS and presented using tables and charts. The findings reveal that the value of transactions made through cashless systems is on the rise. The use of cheques continues to be the dominant system in place at the end of 2017.

The study found that mobile money services are penetrating the market at a pace faster than all other cashless payment and receipt modes. Internet banking is another emerging area that is also fast gaining ground. Debit/credit cards, E-zwich and Electronic funds transfers are not fully used in day to day transactions. Point of Sale terminals are rarely available at local shops to promote the use of cards in making purchases. The study found convenience, time savings and security from physical attacks to be the key benefits of cashless systems. Low literacy serves as major challenge to cashless system implementation. Based on these findings, it is recommended that local shops and supermarkets be assisted to adopt cashless receipt systems. The ease of finding shops that accept e-payments for items will reduce the desire in carrying cash for transactions.

Newstead (2012) in his study he explored the relationship between mobile banking and economic growth as a means of reviewing current transition to cashless economy in Nigeria.

Data was analyzed using Ordinary Least Square and Two Stage Least Square methods covering period of 7years (2005-2012). The result indicates a significant positive relationship between mobile banking system and economic growth in terms of real Gross Domestic Product (GDP) per capita and trade per capita. Only Automated Teller Machines was found to positively contribute to economic growth while other e-payment channels contribute negatively. Hence, current cashless policy should be tailored towards effective e-payment system and other factors which bear much relevance on successful transition to cashless economy should be prioritized. Similarly, World Payments Reports (2012) explored the state and evolution of global non-cash payments. The purpose of this study was to find out the reasons for adopting the cashless payment system among businesses in the developed economies. The study used purposeful sampling to pick different businesses in developed economies that had adopted the cashless payment system and found that non-cash payments made it easier and quicker for people and businesses to buy goods and services, pumping money into the system faster and contributing to GDP.

The result of the study was similar to Hasan, Renzis and Schmiedel (2012) who explored fundamental relationship between electronic retail payment and overall economic growth using data from across 27 European markets over the period 1995-2009 and found that migration to efficient electronic retail payment was related to overall economic growth, consumption and trade. Their study was relevant in determining the factors in developed economies that have favored the implementation and operation of the cashless system.

Research gap:

Magutu (2009) in the study titled Modeling the Effects of E-Commerce Adoption on Business Process Management found out the bank image was one of the main factor that encouraged adoption of technology besides profit making. Newstead (2012) in his study explored the relationship between e-payment system and economic growth, and demonstrated that the cashless payment system has contributed towards economic growth in different countries, reduced cash related crimes and attracted more foreign investors.

However, other than the challenges cited by different researchers, there are other factors such as security concerns brought about by lack of knowledge by users, technology and competition that contribute to adoption of the cashless payment system in different sectors of the Rwandan economy. This study therefore provided rich information on technology, security concerns and competition among other factors affecting the adoption of cashless payment systems.

V. CONCEPTUAL FRAMEWORK

Digital banking project outputs (IV)

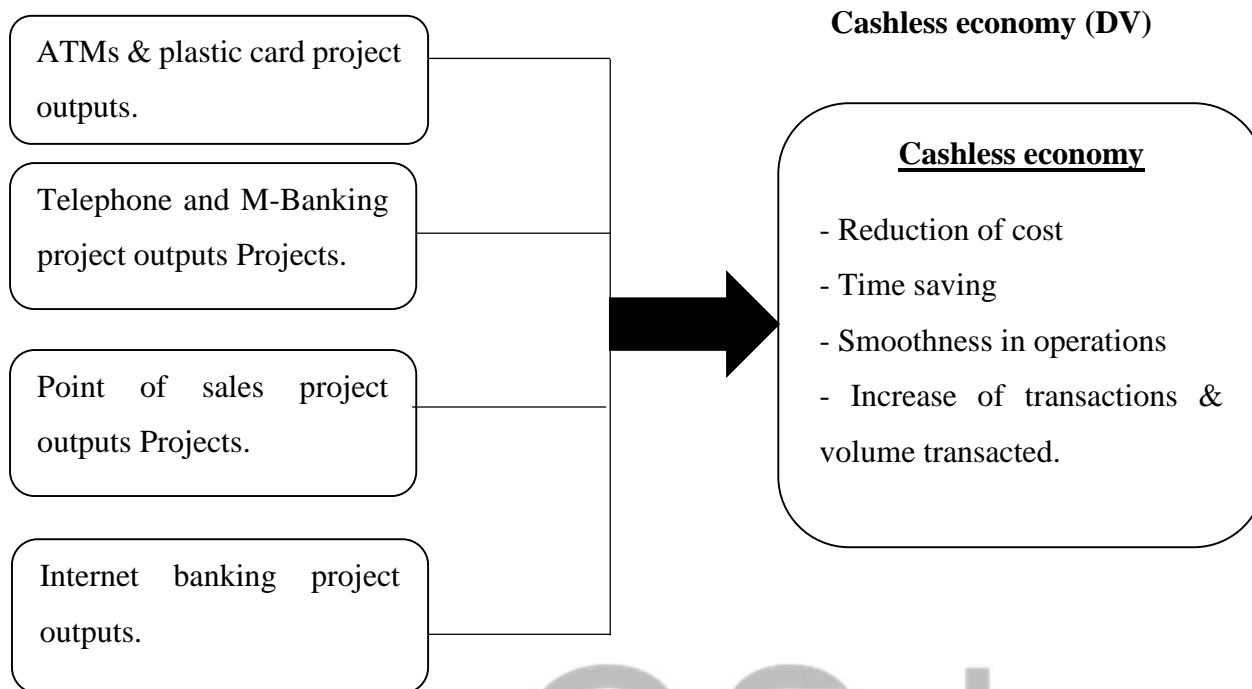


Figure 1.1: Relationship between digital banking project outputs and cashless economy

Source: Researcher own compilation, 2021

VI. METHODOLOGY

➤ Research design, population, sample size and data collection instruments

Research design: Devos and Fouche (1998) defines a research design as the blue print or detailed plan of how a research study was conducted. It guides with the logical arrangements for the collection and analysis of data so that conclusion may be drawn. The descriptive research design approach was employed; Kothari (2007) defines descriptive research studies by describing the nature of a particular individual or of group.

This approach was appropriate for this study since the research sought to describe the characteristics of digital banking project outputs and cashless economy implementation. A survey was administered to customers of Bank of Kigali. A questionnaire containing the questions relate to the independent and dependent variables of this research was dispatched to selected sample from Bank of Kigali employees. A survey obtains information from a sample

using self-report, that people responds to questions from the investigator (Polit 2012). The independent variable was result digital banking project outputs while the dependent was cashless economy.

- **Population of the study**

The population for this study are the customers of Bank of Kigali; totaled 331,221 (BK, 2019), while the target population is 12,670 persons who are customers of BK Plc NYARUGENGE (BK, 2019).

3.3. Simple size determination

In this research as the population is composed with the big number of respondents, there for the researcher used the formula of Cochran to determine the sample size of the research.

$$n = \frac{N \times N_0}{N + N_0}; \text{ Where } N_0 = \frac{z_{\alpha}^2 \cdot q \cdot p}{e^2}$$

N: population size; N^o: Sample size of unknown population; e: error term that is estimated at 10%; p: probability of success, q: probability of fail.

Therefore, basing on the above formula, we decided to use 90% as confidence level of which COCHRAN says is more reliable.

Thus, p=0.5; q = 0.5; N=12,670; e=10%; Z_α=1.65

$$N_0 = \frac{(1.65)^2 \cdot (0.5)(0.5)}{(0.1)^2} = 68.0625; \quad n = \frac{68 \times 12,670}{68 + 12,670} = 68$$

68 respondents were selected among the customers of BK plc to give the information relate to the function of digital banking projects outputs and cashless economy.

- **Sampling technique**

In this research the researcher used the convenient sampling technique to select the respondents where all employees legible to participate in this research, were asked questions relate to this topic in order to analyze the contribution of banking project outputs on the implementation of cashless economy in Rwanda.

- **Data collection procedures**

The study used both data, the researcher reviewed books, articles and documents from university library and other libraries in Kigali relate to the study; secondly the researcher used questionnaire as a major tool of primary data collection. The questionnaire had 3 major parts section and each section contained concerning each objective.

- **Questionnaire**

The structured questionnaires were divided into three sections. The first section covered the bio-data and will require them to provide data on the respondent type; management, senior

non-management and junior staff. The respondents age was required, sex and their level of education.

The second section will address the objectives of the research. The questionnaire used Likert scale because it requires respondents' statements by indicating whether he or she agreed to a great extent or no extent as shown in Appendix I. Likert scale, since it is straight forward to comprehend and responses are simply experimental and subjective to computation of mathematical analysis (Allen et al., 2011).

- **Documentary**

According to Bailey (1982) state that documents refer to any written materials on information about the subject. In this respect, data was revealed from documentary review especially textbooks, magazines, internet source, and any other documents that was deemed necessary to see what other authors, scholars and academicians have written concerning the topic. These techniques allowed us to get information from different books, reports, texts and dissertations as well other documents regarding human resource domain.

The main measures for that is proper documentation and transparency of procedures, this was ensured by outlining the theoretical framework for analysis, describing why choosing the sample and by providing the questionnaire and primary sources using structured close ended questions are the first occurrence as a point of departure for investigation.

The entire population of the study who are supposed to provide the information (data) that are related to the objectives of the research study is based on 185 employees of RRA who have duties (responsibilities) related to the implementation of electronic billing project.

Sample size: Before identifying the respondents to this research, it is necessary to indicate how the sample size is determined. The sample size of the study is calculated by using the formula invented by Taro Yamen formula (1967); the used formula to calculate the sample size, is:

$$n = \frac{N}{1 + N(e)^2}; \text{ where } n \text{ is the sample size, } N \text{ is the population size, and } e \text{ is the marginal error}$$

of 5% through level of confidence of 95%. Thus, this formula is applied to get sample size. Based on the formula researcher calculated a sample size of 126 respondents who participate in the research.

Data collection instrument:

Questionnaire: According to (Kerlinger, 2017), the questionnaire helped the researcher as main means of communication between researchers and respondents. Questionnaire included the series of closed questions about issues that are expected of the respondent information, where these types of questions was distributed by the researchers among respondents in order to collect the written and quantitative data (information) related to the objectives of the study.

VII. CONCLUSION AND RECOMMENDATION

- **Conclusion**

The research aimed to analyze the contribution of digital banking project outputs on the implementation of cashless economy in Rwanda. The specific objectives were to analyze the contribution of ATMs & Plastic cards projects outputs on the implementation of cashless economy in Rwanda, to analyze the contribution of Telephone, Mobile banking projects outputs on the implementation of cashless economy in Rwanda and to analyze the contribution of Internet banking project outputs on the implementation of cashless economy in Rwanda. The researcher used descriptive research design and the data were collected from the customers of BK Plc using questionnaire.

The results revealed that BK Plc offers cashless system services to customers such as debit and credit cards, cashless system services fund transfer, mobile banking, internet banking and swift and indicated by respondents, the respondents also indicated that they are satisfied with the cashless system services offered by the BK Plc. This is supported by the fact that, research indicated that there is a strong relationship between cashless system services banking service and profitability in Bank of Kigali. Based on the result of the research researcher conclude that the objectives of the research were achieved because the research revealed that the digital projects output of Bank of Kigali contribute to the cashless economy implementation in Rwanda.

- **Recommendation**

Based on the findings of this research, the research suggests Bank of Kigali should improve its services by upgrading systems in order to reduce time outs as a number of respondents indicates that they are not fully satisfied with the use of ATMs as well as POSs because of frequent time out.

Another recommendation, this research suggest is to increase awareness on digital banking project outputs in order to increase its usage as a number of respondents indicated that they are not aware of some digital banking project outputs.

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