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Original Article

Analyzing the Impact of Electronic Banking on Financial Performance: A Case Study of BPR Rwanda PLC

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ABSTRACT

This study analyzes the impact of electronic banking on the financial performance of commercial banks in Rwanda, focusing on Bank Populaire du Rwanda (BPR) from 2019 to 2022. The objectives include identifying forms of electronic banking utilized by BPR, assessing the bank's financial performance, and examining the relationship between electronic banking and financial performance. A mixed methods research design was employed, using purposive and universal sampling techniques to gather data. Data collection involved questionnaires addressed to 16 BPR employees, interviews, and document reviews. Descriptive analysis (mean and standard deviation) and multiple linear regression were applied to test hypotheses. The findings revealed that BPR implemented various e-banking forms: electronic cards (mean: 3.75), ATMs (3.69), mobile banking (3.95), internet banking (3.89), and fund transfers (3.59). Regarding financial performance, return on assets showed fluctuations: 1.21% in 2019, declining to 0.94% in 2020, then rising to 1.74% in 2021, and reaching 2.98% in 2022. Return on equity followed a similar trend, with values of 9.3%, 7.97%, 11.83%, and 18.56% over the same period. Other metrics, like net interest margin and current ratio, also indicated variations in performance. The ANOVA results confirmed a significant relationship between electronic banking and financial performance, with a p-value of 0.000. The study concludes that e-banking positively impacts BPR's financial performance. Recommendations include improving ATM services, enhancing e-money transfer benefits, and ensuring financial solvency to sustain performance through effective e-banking practices.

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INTRODUCTION

The history of banking dates back to around 2000 BCE, with the earliest prototype banks emerging as merchants who provided grain loans to farmers and traders transporting goods between cities. These early banking practices were rooted in regions such as Assyria, India, and Sumeria. Over centuries, banking has evolved but often retained traditional methods, characterized by physical branches and face-to-face customer interactions. As we know it, traditional banking has typically been associated with trust, safety, and the security of transactions, making it a reliable option for consumers.

However, as technology advances, the banking industry is on the verge of a major transformation. Predictions suggest that within the next decade, banking will transition to a predominantly digital format. This shift implies that opening a traditional bank account today may soon lead to entirely online banking solutions provided by reputable global banks (Nielsen, 2020). The surge in electronic banking services in recent years can be attributed to increased internet access, technological advancements, and shifting consumer preferences. Digital channels such as mobile apps, internet banking, and electronic funds transfers have made banking services more accessible than ever. One crucial area of research focuses on how e-banking enhances operational efficiency. By automating routine banking tasks, electronic banking systems can streamline processes, reduce overhead costs, and improve resource allocation. This efficiency has the potential to boost profitability and overall financial performance for commercial banks. While customers enjoy the convenience and enhanced security of online banking, traditional banks offer personalized experiences, which some customers still value.

Commercial banks serve as essential components of the global financial system, promoting economic growth and financial inclusion. They mobilize savings, direct investments, and provide vital services to individuals and businesses alike (Okoth O, 2020). The impact of electronic banking extends across various levels, from global to local contexts. Internationally, the shift toward online banking is influenced by globalization and competition. In Africa, and particularly in Rwanda, electronic banking is key to delivering efficient financial services to diverse populations, ultimately fostering economic development.

As Rwanda seeks to position itself as an innovative hub in East Africa, e-banking offers opportunities to enhance operational efficiency, reduce costs, and improve financial inclusion. This transformation is not only inevitable but also essential for economic advancement. By conducting a systematic analysis of data from commercial banks that have adopted e-banking solutions, this research aims to illuminate the relationship between electronic banking and financial performance. The findings will enrich the existing literature and serve as a reference for banks aiming to optimize electronic banking for better financial outcomes (Nielsen, 2020).

Despite the wealth of literature surrounding the growth of electronic banking, a significant research gap remains in understanding its quantifiable effects on the financial performance of commercial banks, particularly in the Rwandan context (Okoth O, 2020). Few studies have thoroughly examined how services like online transactions, mobile banking, and digital payments influence financial performance. Therefore, exploring these aspects in Rwanda's banking sector is imperative. BPR, a leading bank in Rwanda, has faced notable challenges, including significant fraud incidents that resulted in losses of RWF 27,480,000 in 2020 and RWF 28,637,000 in 2022 (BPR Bank Annual Report, 2020). These challenges underscore the necessity for a comprehensive examination of electronic

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banking's impact on financial performance in Rwanda.

Ultimately, electronic banking is poised to be a transformative force in improving financial performance worldwide, including in Africa and specifically Rwanda. As banks increasingly embrace e-banking technologies, the potential for enhanced growth and financial outcomes becomes evident. This research aims to explore how e-banking contributes to the overall performance of commercial banks in Rwanda, emphasizing its vital role in shaping the financial landscape.

MATERIALS AND METHODS

Research Design

To conduct this study, a mixed methods research design was employed. This study research design combines both quantitative and qualitative research designs to investigate the impact of electronic banking on the financial performance of commercial banks in Rwanda. The same approach allowed the collection of both numerical data, such as survey responses, and qualitative data through interviews with more informed participants. By conducting the study using this comprehensive design, a more holistic understanding of the effects, identifying patterns, trends, and in-depth insights

Data Collection and Analysis

To assess the impact of Electronic Banking on the financial performance of BPR, Rwanda, a structured questionnaire was distributed to 16 employees, combining closed and open-ended questions for both quantitative and qualitative data. Interviews and document reviews were also used for data collection. Statistical analysis was performed using SPSS, calculating percentages, frequencies, means, and standard deviations. ANOVA was used to identify the electronic banking practices most impactful to financial performance. A multiple linear regression analysis was conducted to evaluate the significance of various predictor variables, such as electronic banking adoption, on BPR's financial outcomes. The regression model aimed to determine the extent to which these variables influence BPR's financial performance. The findings are expected to offer insights into the relationship between e-banking and financial success.

The model was expressed as follows:

$$Y = \beta 0 + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + \varepsilon$$

Where:

Y = Financial performance of BPR Bank

$\beta 0$ = Constant (coefficient of intercept)

$\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, and $\beta 5$ = Coefficients representing predictor variables related to electronic banking

x1, x2, x3, x4, and x5 = Values of the various independent (covariate) variables about electronic banking

ε = Error term assumed to be normally distributed with mean zero and constant variance. About qualitative data collected through interviews and existing documents, both content analysis and thematic analysis were used to provide valuable insights into the underlying meanings, perspectives, and experiences present in qualitative data.

RESULTS AND DISCUSSIONS OF FINDINGS

The findings of the research are based on specific objectives such as to identify different electronic banking forms applied by BPR; to assess the level of financial performance in BPR and to examine whether there is a significant relationship between electronic banking and financial performance in BPR.

Findings on e-banking

This section aims to present the findings related to the first research objective. It provides insights of respondents on different electronic banking forms applied by BPR (2019-2022). The results are presented in the following tables:

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Table 1: Respondents' Perceptions of Electronic Cards

Statement	N	Mean	St. Dev	Comment
The bank has speedy transaction operations for debits and credit cards	16	3.75	.931	Heterogeneity
The bank has safe and secured debits and credit cards	16	3.94	1.652	Homogeneity
The debit & credit card systems are always available to facilitate customers	16	3.44	1.031	Homogeneity
The debit & credit card systems are always available to facilitate customers	16	3.88	1.628	Homogeneity
Overall mean		**3.75**		

Source: Primary data, 2023

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 1 reveals that BPR's transaction operations for debit and credit cards are efficient. The survey results show that 62.5% of respondents agreed, and 12.5% strongly agreed, with a mean score of 3.75, indicating high satisfaction with the speed of transactions. The standard deviation of 0.931 reflects some variability in responses, but it suggests general agreement among participants. The data confirms that the bank offers fast debit and credit card transactions.

Regarding security, 62.5% of respondents strongly agreed, and 12.5% agreed that the bank's debit and credit cards are safe and secure, with a mean of 3.94. This result reflects strong positive sentiment towards the safety of electronic cards, although the standard deviation of 1.652 indicates variability in responses.

In terms of availability, 75% of respondents agreed that the debit and credit card systems are always accessible, with a mean of 3.44. This score indicates generally positive feedback, although the standard deviation of 1.031 suggests some heterogeneity in opinions.

The table also indicates that electronic cards significantly enhance cross-border payments, with 62.5% strongly agreeing and 6.2% agreeing that electronic cards improve international transactions. The mean score of 3.88 and a standard deviation of 1.628 suggest strong agreement with this statement, though with some diversity in responses.

The results highlight the increasing role of electronic cards in facilitating cross-border payments, supporting studies by Chong et al. (2013) and Mansour & Torkzadeh (2020), which confirm that electronic payment systems improve the efficiency, speed, and security of international financial transactions. With an overall mean score of 3.75, these findings emphasize the importance of e-banking in enhancing global financial operations and facilitating secure cross-border payments.

Table 2: Respondents' Perceptions of the ATM System

Statement	N	Mean	Std. Dev.	Comment
ATM avoided needlessly carrying cash	16	4.38	1.204	Homogeneity
ATM reduced queue at teller counters	16	3.19	1.276	Homogeneity
ATM is most of the time used and facilitated money transactions in the bank	16	3.69	1.778	Homogeneity
ATM service improved the bank's activities	16	3.69	.793	Homogeneity
Through ATM customers join the bank's services 24 hours/7 without any complications	16	3.50	.816	Homogeneity
ATM avoided needlessly carrying cash	16	4.38	1.204	Homogeneity
ATM reduced queue at teller counters	16	3.19	1.276	Homogeneity
Overall mean		**3.69**		

Source: Primary data, 2023

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean.

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Table 2 indicates that ATMs avoided needlessly carrying cash. 6.2% strongly disagreed, 18.8% were neutral while other 75% strongly agreed. Mean was at 4.38 interpreted as a strong mean and standard deviation of 1.204 which means variability in responses provided by respondents. As a result, ATMs avoided needlessly carrying cash. Also, respondents were neutral on whether ATMs reduced queues at teller counters. 18.8% of respondents strongly disagreed, 12.5% disagreed and the other 68.8% agreed with a mean of 3.19 interpreted as neutrality of respondents and a standard deviation of 1.276 which means variability in data provided. Based on the result of the mean, respondents were neutral on whether ATMs reduced queues at teller counters.

Besides, ATM is most of the time used and facilitates money transaction in the bank. 25% strongly disagree, 6.2% were neutral while other 12.5% agreed and 56.2% strongly agree. The Mean was 3.69 and the standard deviation of 1.778 which means that the fact appears or high mean where respondents shared a common understanding on whether ATM are most of the time used and facilitated money transactions in the bank. Also, ATM service improved banks' activities where 6.2% strongly disagreed, 12.5% were neutral while other 81.2% agreed with a mean of 3.69 interpreted as a high mean and standard deviation of .793 which means heterogeneity of responses. Thus, the ATM service improved the bank's activities. Besides, through ATM customers join the bank's services 24 hours/7 without any complications. 18.8% disagreed, 12.5% were neutral while the other 68.8% agreed. The Mean was 3.50 and a standard deviation of .816. The results of the mean resulted to confirm the existence of the fact. Hence, through ATM customers join the bank's services 24 hours/7 without any complications.

The overall mean of 3.69 shows that the ATM system is another form of e-banking used in the bank. Findings are similar to the literature review where Automated Teller Machines (ATMs) are commonly used by financial institutions to improve their performance. They are also used to manage various aspects of the banking industry (Smith & Johnson, 2021). The combined services of an ATM and a human teller can result in higher productivity for banks during business hours. It also saves customers time by allowing them to perform their transactions in a more efficient manner. In addition, having these types of machines can be a cost-effective way of increasing the bank's efficiency (Nguyen & Lee, 2022).

Table 3: Respondents' Perceptions of Mobile Banking

Statement	N	Mean	Std. Dev.	Comment
Mobile banking provides multiple bill payment options to customers	16	4.06	1.692	Heterogeneity
Mobile banking is often more cost effective than traditional methods	16	4.19	1.601	Heterogeneity
Per-transaction fee is charged effectively within the bank	16	3.69	.704	Homogeneity
Mobile banking improved cashless payment	16	4.12	.957	Homogeneity
The bank charges a reasonable cash withdrawal fee	16	3.38	1.204	Heterogeneity
Charge fees made via mobile banking are directly shown on the bank statement	16	4.25	1.183	Heterogeneity
Overall mean		**3.95**		

Source: Primary data, 2023

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 3 illustrates that mobile banking provides multiple bill payment options to customers. 18.8% strongly disagree, 6.2% disagree while the other 75% strongly agreed with a high mean of 4.06 and standard deviation of 1.692 interpreted as heterogeneity of responses. Hence mobile banking provides multiple bill payment options to the customers. Also, mobile banking is often more cost-effective than traditional methods. 18.8% of respondents strongly disagreed, 6.2% agreed

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while the other 75% strongly agreed on the statement with a high mean of 4.19 and standard deviation of 1.601 interpreted as heterogeneity of responses. Hence, mobile banking is often more cost-effective than traditional methods.

Furthermore, the per-transaction fee is charged effectively within the bank. 12.5% of respondents disagreed, 50% agreed while the other 37.5% strongly agreed with a high mean of 3.69 and standard deviation of .704 interpreted as heterogeneity of responses. It was well indicated that the per-transaction fee is charged effectively within the bank. Besides, mobile banking improved cashless payment. 12% disagreed, 50% of respondents agreed while the other 37.5% strongly agreed with a high mean of 4.12 and a standard deviation of .957 which means that the fact appears more heterogeneity of responses. Hence, mobile banking improved cashless payment. Also, the bank charges a reasonable cash withdrawal fee. 18.8% of respondents strongly disagreed, 6.2% were neutral while other 75% agreed. The Mean was 3.38 and the standard deviation of 1.204. Thus the result of the mean shows that respondents were neutral on whether the bank charges a reasonable cash withdrawal fee.

In addition, charge fees made via mobile banking are directly shown on bank statements. 12.5% of respondents disagreed, 18.8% were neutral and the other 68.8% strongly agreed with a strong mean of 4.25 and a standard deviation of 1.183 which means strong evidence of the existence of the fact. Hence, charge fees made via mobile banking are directly shown on bank statements. The overall mean of 3.95 shows that mobile banking is another form of e-banking used in BPR. The literature revealed that mobile banking involves the use of mobile phones for settlement of financial transactions. It supports person-to-person transfers with immediate availability of funds for the beneficiary. Mobile payments use the card infrastructure for movement of payment instructions as well as secure Short Message Service (SMS) messaging for confirmation of receipt to the beneficiary. Mobile banking is increasingly used for low-value transactions where convenience and speed are prioritized (Ngugi & Ndungu, 2018).

Table 4: Respondents' Perceptions of Internet Banking

Statement	N	Mean	St. Dev	Comment
The bank understands the risks and security concerns that come with internet banking	16	4.19	1.471	Heterogeneity
Loan requests can be done via Internet banking in BPR	16	3.62	1.360	Heterogeneity
Customers can make money transfers using Internet banking	16	3.56	.964	Homogeneity
Internet banking within BPR is associated with a strong network	16	3.81	1.167	Heterogeneity
Internet banking improved cash movement within the bank	16	4.31	1.195	Heterogeneity
Overall mean		**3.89**		

Source: Primary data, 2023

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= moderate mean; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 4 shows that the bank understands the risks and security concerns that come with internet banking. 6.2% strongly disagree, 18.8% disagree while the other 75% strongly agreed with a mean of 4.19 and standard deviation of 1.471 which means high heterogeneity of responses. Hence, the bank understands the risks and security concerns that come with internet banking. Also, loan requests can be done via Internet banking in BPR. 18.8% strongly disagreed while other 62.5% agreed and 18.8% strongly agreed with a mean of 3.62 and standard deviation of 1.360 which means a high mean and heterogeneity of responses. As a result, loan requests can be done via Internet banking in BPR. Besides, customers can make money transfers using internet banking. 6.2% of respondents strongly disagreed, 12.5% disagreed and other 81.2% agreed. The Mean was 3.56 and

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the standard deviation of .964. Thus, based on the result of the high mean, customers can make money transfers using Internet banking.

Furthermore, a great number of respondents representing 68.8% agreed that Internet banking within BPR is associated with a strong network. 12.5% strongly disagreed and the other 18.8% agreed with a mean of 3.81 and a standard deviation of 1.167. Hence, internet banking within BPR is associated with a strong network. Also, in the same table as agreed by 62.5% of respondents' internet banking improved cash movement within the bank. 6.2% strongly disagreed; other 6.2% disagreed and 25% agreed. Mean was 4.31 and the standard deviation of 1.195 which means strong evidence of the existence of the fact. Hence, internet banking improved cash movement within the bank.

Overall, a mean of 3.89 interpreted as a high mean, revealed that Internet banking is another form of e-banking used in the bank. The literature revealed that Internet banking involves conducting banking transactions such as account enquiry, printing of statement of account; funds transfer payments for goods and services, etc. on the Internet (World Wide Web) using electronic tools such as the computer without visiting the banking hall (Kamande et al., 2018).

Table 5: Respondents' Perceptions of Funds Transfer

Statement	N	Mean	Std. Dev.	Comment
Through online accounts, money is transferred at any time and at any place	16	3.94	1.652	Heterogeneity
The bank benefits a lot from e-money transfer	16	3.31	1.250	Heterogeneity
E-money transfer is the fastest way to send and receive the money	16	3.50	1.096	Heterogeneity
E-money transfer is the easiest and most secure method used in BPR	16	3.62	.806	Homogeneity
Overall mean		**3.59**		

Source: Primary data, 2023

***Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= moderate mean; 3.41-4.20=high mean; 4.21-5=Very high mean*.**

Table 5 shows that through online accounts money is transferred at any time and at any place. 12.5% strongly disagreed, 18.8% disagreed and other 68.8% strongly agreed. Mean was 3.94 and standard deviation of 1.652 which means high mean and heterogeneity of responses. Hence, through online accounts money is transferred at any time and at any place. Also, respondents were neutral on whether the bank benefits a lot from e-money transfers. 18.8% strongly disagreed, 6.2% disagreed while the other 75% agreed with a mean of 3.31 and standard deviation of 1.250 which means neutrality of respondents and heterogeneity of responses. Moreover, 81.2% agreed that e-money transfer is the fastest way to send and receive money. 12.5% strongly disagreed and other 6.2% disagreed. The Mean was 3.50 and the standard deviation of 1.096 which means that e-money transfer is the fastest way to send and receive money.

Moreover, e-money transfer is the easiest and most secure method used in BPR. 18.8% disagreed and other 81.2% agreed. The Mean was 3.62 and the standard deviation of .806 which means a high mean and heterogeneity of responses. Consequently, e-money transfer is the easiest and most secure method used in BPR.

The overall mean of 3.59 indicated that fund transfer is one of the forms of e-banking used in BPR. The literature revealed that electronic fund transfer services include transfers through automated teller machines, point-of-sale terminals, automated clearinghouse systems, telephone bill-payment plans in which periodic or recurring transfers are contemplated, and remote banking programs. Cross-border payments can be made in several different ways. Bank transfers, credit card payments and alternative payment methods such as e-money wallets and mobile

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payments are currently the most prevalent ways of transferring funds across borders (Young, 2023)

Level of BPR Performance

Respondents were asked to show their views about Organization Performance, and the results are summarised in the following tables.

Table 6: Respondents' Perceptions of Return on Assets

Statement	N	Mean	Std. dev	Comment
Return on assets was improved in the past three years	16	3.81	1.167	Heterogeneity
Return on assets generated is perceived as increasing	16	3.31	1.109	Heterogeneity
The bank's assets were used to generate profit in BPR	16	3.19	.964	Homogeneity
Overall mean		**3.44**		

Source: Primary data, 2023

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 6 shows that 12.5% of respondents strongly disagreed return on assets had improved in the past three years. Other 68.8% agreed and 18.8% strongly agreed with a mean of 3.81 and a standard deviation of 1.167 which means that the fact appears more. Hence, the return on assets has improved in past three years. Also, the return on assets generated is perceived as increasing. 18.8% strongly disagreed, 6.2% disagreed and 75% agreed with a mean of 3.31 and a standard deviation of 1.250 which means neutrality of respondents. Hence, respondents were neutral on whether the return on assets generated is perceived as increasing.

Also, respondents were neutral on whether the banks' assets were used to generate profit in BPR. 6.2% strongly disagreed, 31.2% disagreed while the other 62.5% agreed with a mean of 3.19 and standard deviation of 1.109 which means neutrality of respondents. The overall mean of 3.44 shows that the bank was able to perform well in terms of return on assets. The result of the mean was categorized as a high mean. Based on the literature, a higher ROA means a bank is more efficient and productive at managing its balance sheet to generate profits while a lower ROA indicates there is room for improvement (Singh, 2019)

Table 7: Respondents' Perceptions of the Level of Return on Equity

Level of agreement	N	Mean	Std. Dev.	Comment
There is no loss occurred in return on equity	16	4.25	1.612	Heterogeneity
Value of shares boost in 3 years ago	16	3.56	.814	Homogeneity
The bank performed well in terms of return on assets	16	4.44	.892	Homogeneity
Overall mean		**4.08**		

Source: Primary data (2023)

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean.

As shown in Table 7, 81.2% agreed that there is no loss occurred in return on equity with a mean of 4.25 interpreted as a strong mean and a standard deviation of 1.612 which means heterogeneity of responses. Hence, there is no loss occurred in return on equity. Furthermore, 75% of respondents agreed that the value of shares boost in 3 years ago with a high mean of 3.56 and a standard deviation of .814 which means heterogeneity of responses. Thus, the value of shares was boosted 3 years ago. Other 68.8% strongly agreed that the bank performed well in terms of return on assets with a strong mean of 4.44 and a standard deviation of .892. As a result, the bank performed well in terms of return on equity.

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Table 8: Respondent's Perceptions of the Level of Net Interest Margin

Level of Agreement	N	Mean	Std. Dev.	Interpretation
The bank's net interest income boost during the period under study	16	3.56	1.315	Heterogeneity
The performance of the net interest margin is perceived as effective	16	3.50	1.095	Heterogeneity
Net interest income was greater than net interest expenses	16	3.56	.964	Homogeneity
The bank's net interest income boost during the period under study	16	3.56	1.315	Homogeneity
Overall mean		**3.54**		

Source: Primary data (2023).

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= neutral; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 8 shows that the bank's net interest income boosted during the period under study as agreed by 68.8% of respondents with a high mean of 3.56 and a standard deviation of 1.315. Hence, the bank's net interest income boost during the period under study. Besides, most of the respondents 81.2% agreed that the performance of the net interest margin is perceived as effective with a high mean of 3.50 and a standard deviation of 1.095. Also, other represented 81.2% agreed net interest income was greater than net interest expenses with a high mean of 3.56 and a standard deviation of .964. The overall mean of 3.54 shows that the bank performed well in terms of net interest margin. Net interest margin (NIM) reveals the amount of money that a bank is earning in interest on loans compared to the amount it is paying in interest on deposits. NIM is one indicator of a bank's profitability and growth. In finance, net interest margin is a measure of the difference between interest paid and interest received, adjusted for the total amount of interest-generating assets held by the bank (Bloomenthal, 2023).

Table 9: Respondents' Perceptions of the Level of Solvency

Level of agreement	N	Mean	Std. Dev.	Interpretation
Long-term debts have been paid regularly in BPR	16	3.94	.574	Homogeneity
The performance of solvency is perceived as improving	16	3.50	1.095	Heterogeneity
The probability of risk default decreased in the past three years	16	3.88	1.746	Heterogeneity
Overall mean		**3.77**		

Source: Primary data (2023)

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= moderate mean; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 9 shows that 68.8% of respondents agreed that long-term debt has been paid regularly in BPR. Mean was 3.94 and the standard deviation of .574. Which means high mean and heterogeneity of responses. Thus, long-term debt has been paid regularly in BPR. Also, 81.2% of respondents agreed that the performance of solvency is perceived as improving with a high mean of 3.50 and a standard deviation of 1.095. Hence, the performance of solvency is perceived as improving. Finally, the probability of risk default decreased in the past three years. 68.8% with a mean of 3.88 and standard deviation of 1.746 which means high mean and heterogeneity of responses, thus the probability of risk default decreased in past three years. An overall mean of 3.77 revealed that the bank performed well in terms of solvency. Solvency is an important indicator of a bank's long-term financial health. Measuring solvency ratios gives professionals insight into how efficiently banks pay off debt and interest and use assets to fund operations. If banks are interested in developing cost-reduction strategies and achieving profitable outcomes, it

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might be helpful to learn more about solvency ratios and how to measure them .

Table 10: Respondents' Perceptions of the Level of Liquidity

Statement	N	Mean	Std. Dev	Interpretation
Personnel costs have been paid on time required in the past three years	16	4.56	1.031	Heterogeneity
Rent fees have been paid regularly since 3 years ago	16	3.44	1.031	Heterogeneity
Short-term expenses have been made without any complication	16	3.62	.500	Homogeneity
Overall mean		**3.87**		

Source: Primary data (2023)

Mean range: 1.00-1.80= Very low mean; 1.81-2.60=Low mean 2.61-3.40= moderate mean; 3.41-4.20=high mean; 4.21-5=Very high mean

Table 10, shows that 75% of respondents strongly agreed that personnel cost has been paid on time required in the past three years with a high mean of 4.56 and a standard deviation of 1.031. Also, rent fees were paid regularly 3 years ago as agreed by 75% of respondents with a high mean of 3.44 and a standard deviation of 1.031. Finally, 62.5% agreed short-term expenses have been made without any complication with a mean of 3.62 and a standard deviation of .500 which means homogeneity of responses.

Data were provided consistently. The overall mean of 3.87 revealed that the bank was good in terms of liquidity. Liquidity can affect the value of the company, the higher the level of company liquidity, the better the company's position in the eyes of creditors because the company is considered to be able to pay obligations to creditors on time, (Mendez & Kumar, 2020).

As revealed by top managers in the interview, they said… the bank's performance was found to be good. For instance, the profitability continued to soar with a staggering 181 billion Rwf realized as profits before taxes in 2021 compared to 120 billion Rwf in 2020 driven mainly by a 17.2% growth in interest income from loans and advances. The Bank's total assets grew by 3% from Rwf 404.8 billion in 2020 to Rwf 417.5 billion in 2021.

Growth of loans and advances was 5.8% in 2021 standing at Rwf f194.5 billion up from Rwf 183.8 billion in 2020. Customer Deposits also grew by 4.6% in 2021 from 236.5 billion Rwf in 2020 to 247.4 billion Rwf. Non-performing loans increased by 5.5 billion Rwf during the period which resulted in an NPL ratio of 7.29% signalling the aftermath of Covid 19 pandemic on the businesses they support and the economy at large.

Relationship between E-banking and Financial Performance of BPR

This section introduced the correlation between Employee engagement and organisational performance.

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Table 11: Correlation between Employee Engagement and Organization Performance

			Electronic cards	ATM systems	Mobile banking	Internet banking	Money Transfer	Financial performance of BPR
Spearman's rho	Electronic cards	Correlation Coefficient	1.000	.902**	.880**	.962**	.878**	.947**
		Sig. (2-tailed)	.	.000	.000	.000	.000	.000
		N	16	16	16	16	16	16
	ATM systems	Correlation Coefficient	.902**	1.000	.887**	.891**	.904**	.854**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000
		N	16	16	16	16	16	16
	Mobile banking	Correlation Coefficient	.880**	.887**	1.000	.893**	.858**	.889**
		Sig. (2-tailed)	.000	.000	.	.000	.000	.000
		N	16	16	16	16	16	16
	Internet banking	Correlation Coefficient	.962**	.891**	.893**	1.000	.850**	.968**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000
		N	16	16	16	16	16	16
	Money Transfer	Correlation Coefficient	.878**	.904**	.858**	.850**	1.000	.878**
		Sig. (2-tailed)	.000	.000	.000	.000	.	.000
		N	16	16	16	16	16	16
	Financial performance of BPR	Correlation Coefficient	.947**	.854**	.889**	.968**	.878**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.
		N	16	16	16	16	16	16

Table 11 shows the relationship between electronic cards and the financial performance of BPR whereby The respondents N is 16 and the significant level is 0.00, the results indicate that electronic cards had a positive and very high correlation to the dependent variable equal to .947* and the p-value is 0.00 which is less than 0.01. When the p-value is less than a significant level, therefore researcher concludes that variables are correlated. This means that there is a significant relationship between electronic cards and the financial performance of BPR, as electronic payment systems have been shown to positively impact financial performance by improving transaction efficiency and customer satisfaction (Aladwani, 2001; Lee & Xia, 2010). Studies have consistently indicated that the adoption of electronic cards can lead to increased customer engagement and revenue growth for financial institutions (Chong et al., 2013)

Besides, the same table shows the relationship between ATM systems and the financial performance of BPR whereby the respondent N is 16 and the significant level is 0.00, the results indicate that the ATM system had a positive and high correlation to the dependent variable equal to .854* and the p-value is 0.00 which is less than 0.01. When the p-value is less than a significant level, therefore researcher concludes that variables are correlated. This indicates a significant relationship between ATM systems and BPR's financial performance, with ATM

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adoption enhancing customer access, transaction volume, profitability, service delivery, and operational efficiency (Chong et al., 2013; Lee & Xia, 2010)

Also, the same table shows the relationship between mobile banking and the financial performance of BPR whereby the respondent N is 16 and the significant level is 0.00, the results indicate that mobile banking had a positive and high correlation to the dependent variable equal to .889* and the p-value is 0.00, which is less than 0.01. When the p-value is less than a significant level, therefore researcher concludes that variables are correlated. This means that there is a significant relationship between mobile banking and the financial performance of BPR, as mobile banking has been shown to enhance financial performance by increasing customer reach, transaction volume, and reducing operational costs (Ayo et al., 2016; Chong et al., 2013).

In addition, the same table gives the relationship between internet banking and the financial performance of BPR whereby the respondent N is 16 and the significant level is 0.00, the results indicate that internet banking had a positive and very high correlation to the dependent variable equal to .968* and the p-value is 0.00 which is less than 0.01. When the p-value is less than a significant level, therefore researcher concludes that variables are correlated. This means that there is a significant relationship between Internet banking and the financial performance of BPR (Chong et al., 2013).

Also, the same table gives the relationship between money transfer and financial performance of BPR whereby the respondents N is 16 and the significant level is 0.00, the results indicate that money transfer had a positive and high correlation to the dependent variable equal to .878* and the p-value is 0.00 which is less than 0.01. When the p-value is less than a significant level, therefore researcher concludes that variables are correlated. This means that there is a significant relationship between money transfers and the financial performance of BPR.

In conclusion, there is a significant relationship between e-banking and the financial performance of BPR, with studies indicating that e-banking services, including money transfers, contribute to improved service delivery, reduced operational costs, and increased revenue (Aladwani, 2001; Pikkarainen et al., 2004).

Table 12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
5	.999[e]	.999	.998	.14286

e. Predictors: (Constant), Electronic cards, ATM systems, Mobile banking, Internet banking, money transfer

Adjusted R squared is the coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable. From the findings in Table 12, the value of adjusted R squared was .998, an indication that there was a variation of 99.8% in the financial performance of BPR due to e-banking. This shows that 99.8% changes of financial performance of BPR could be accounted for by e-banking. A strong positive relationship between the study of e-banking and the financial performance of BPR is marked by R= .999.

Table 13: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
5	Regression	187.280	5	37.456	1.835E3	.000e
	Residual	.204	10	.020		
	Total	187.484	15			

a. Predictors: (Constant). Electronic cards, ATM systems, Mobile banking, Money transfer

b. Dependent Variable: Financial performance of BPR

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In Table 13 the F-test is 1.835E3 and is significant at 0.000 therefore it means that e-banking has a positive and significant effect on the financial performance of BPR. In this study, ANOVA was used to establish whether there exists a significant relationship between the independent variable and the Dependent variable. Looking at the p-value equal to 0.00 in the table above, it is less than alpha (5%). This means that the model is suitable for the data (the regression model is a good fit for the data). From the analysis, the financial performance value of 0.000 indicates that the regression relationship was highly significant to the effect of e-banking on the financial performance of BPR. This implies that the model can be used for prediction purposes.

Table 14: Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**T**	**Sig.**
5	(Constant)	.406	.208		1.953	.079
	Electronic cards	-.040	.071	-.044	-.560	.588
	ATM systems	-.052	.073	-.071	-.709	.495
	Mobile banking	-.053	.063	-.090	-.835	.423
	Internet banking	.600	.043	.825	13.813	.000
	Money Transfer	.340	.105	.384	3.245	.009

a. Dependent Variable: Financial performance of BPR

Table 14 indicates that electronic cards have a negative coefficient (β1 = -0.044) and a non-significant effect on the financial performance of BPR (t-test = -0.560, sig. = 0.588). This suggests that a 1% increase in electronic cards correlates with a -0.044 change in financial performance, though this relationship is not statistically significant as the p-value exceeds 0.05. In contrast, ATM systems also show a negative coefficient (β1 = -0.071) with a t-test value of -0.709 and a significance level of 0.495, indicating a similarly insignificant impact on financial performance. Here, a 1% increase in ATM systems results in a -0.071 change, again not statistically significant. Mobile banking follows suit with a coefficient of β1 = -0.090 (t-test = -0.835, sig. = 0.423), reflecting a non-significant negative effect on financial performance. The pattern of insignificance continues, showing no strong contribution to financial performance from these electronic banking forms.

However, internet banking stands out with a significant positive effect (β1 = 0.825, t-test = 13.813, sig. = 0.000). This indicates that a 1% increase in Internet banking results in a 0.825 improvement in financial performance, clearly statistically significant. Money transfer services also demonstrate a positive and significant effect (β1 = 0.384, t-test = 3.245, sig. = 0.009), indicating a 1% increase in money transfer results in a 0.384 enhancement in financial performance. Interviews with managers highlighted that e-banking facilitates remote transactions and access to banking services, enhancing operational efficiency. By minimizing the reliance on physical branches and manual processes, e-banking generates cost savings in staffing and infrastructure, positively influencing BPR's financial performance. (Chong et al., 2013; Ojo, 2011).

The study tests the hypothesis that electronic banking significantly impacts operational efficiency, with findings supporting the alternative hypothesis (H1).

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CONCLUSION AND RECOMMENDATIONS

Conclusion

This research assessed the impact of electronic banking on the financial performance of commercial banks in Rwanda, specifically focusing on BPR. The study found a positive effect of e-banking on the bank's performance, with various forms utilized, including electronic cards, ATMs, mobile banking, internet banking, and funds transfer. The ANOVA analysis indicated a highly significant relationship (p-value: 0.000) between e-banking and financial performance, suggesting the model's predictive capability.

Despite these positive findings, respondents indicated neutral opinions regarding the effectiveness of ATMs in reducing queue lengths, highlighting a need for improved queue management, such as the introduction of deposit ATMs. Additionally, the bank should consider adjusting cash withdrawal fees, as neutrality was observed in responses related to fee perceptions. The study also revealed potential in e-money transfers, which respondents felt were not fully optimized. Finally, attention to solvency is crucial, given its decline from 2019 to 2022.

Recommendations

Based on these findings, it is recommended that:

- BPR enhances its e-banking services,
- BPR implements effective queue management strategies,
- BPR adjusts withdrawal fees and focuses on maximizing benefits from e-money transfers to ensure sustainable financial performance.
- BPR keeps dealing with financial services based on effective forms of e-banking systems.

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