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Green Banking and Performance of Commercial Banks in Kenya: An Empirical Model Approach

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Abstract:
Green banking involves financing practices by commercial banks, which are environmentally compliant and sustainable. Empirical studies reveal that financial institutions have adopted green banking policies in Kenya, Africa, and other developing countries worldwide. However, the adoption of green financing policies is still shallow compared to their industrialized counterparts. Therefore, the main aim of this study is to establish the relationship between green banking and the performance of commercial banks in Kenya. The specific objective of this study is to determine the relationship between electronic transaction volumes and profit before tax of commercial banks in Kenya using quantitative research paradigm and longitudinal time series research design. The study is anchored on the CAMEL model, CAMPARI framework and 5Cs lending model. Results of the study reveal that electronic transaction volumes significantly influence profit before tax of commercial banks in Kenya ((β =.64, p =0.000<0.05). Therefore, it is concluded that green banking influences the performance of commercial banks in Kenya. This study is essential to scholars, regulators and commercial bank managers.

Keywords: *Green banking, environmentally sustainable, commercial bank's performance, electronic transaction, profit before tax*

1. Introduction

Commercial banking involves taking money from depositors and giving it to borrowers at a cost (Ananwude, Ibenta, Ezu & Okaro, 2021). This process is part of the intermediation function of commercial banks (Ananwude *et al.,*2021). The intermediation function of financial institutions involves bringing together surplus and deficit agents in the economy to help eliminate any existing imbalance among the economic agents (depositors and borrowers) (Ananwude *et al.,*2021). Commercial banks offer a variety of services despite lending being their main product. The products offered by commercial banks distinguish them from other types of financial institutions; the services include loans, acceptance of deposits, cards, mobile banking, trade finance, advisory services, opinion letters, safe custody of personal documents, conversion operations, money transfers, cash and settlement services, payment of public utilities, individual safes and cells, payment acceptance, property trust management, credit products, certificates of deposits, project financing, leasing, factoring, internet banking, international credit lines, agency banking among other products (Abdug'affor o'g'li, Asliddinovich, & Mahomadrizoevna, 2023).

1.1. Historical Development of Commercial Banking

Many things have changed financial institutions' business models since independence; many legislation governing commercial bank activities have been implemented. From a historical perspective, during the pre-colonial period, there were few commercial banks in Kenya, and one of the significant drawbacks of the commercial banking business was the lack of consistent legislation. Furthermore, the British government had their interest as opposed to the bank's interests (Velasco, 2022). The current challenges faced by commercial banks may not be the same challenges they faced a long time ago, especially during the pre-colonial period. Reviewed literature postulates that as of Kenyan independence, there were three major commercial banks in East Africa, which were The National Bank of India (NBI), The Standard Bank of South Africa (SBSA) and Barclays Bank (Dominion, Colonial and Overseas) (BDCO) (Velasco, 2022).

1.2. Performance of Commercial Banks in Kenya

Several factors may influence a commercial bank's performance. Such factors may include the general business environment, legislation, regulations, competition, commercial banking business model, general economic performance (GDP, foreign exchange, interest rates, inflation, etc.) and management. According to (Koskei, 2020), liquidity ratio, inflation rate and lending rate influence banking stability in Kenya. Dembel (2020) asserts that capacity of management, quality of assets, and earning quality significantly affect the performance of commercial banks in Ethiopia; also, the quality

of assets, earning quality, liquidity and age significantly influence the efficiency of commercial banks in Ethiopia; finally, GDP, capital adequacy and bank age have insignificant influence on ROA and capital adequacy, the capacity of management and GDP insignificantly influence commercial banks efficiency in Ethiopia (Dembel, 2020). Omware, Atheru and Jagongo (2020) assert that commercial banks are divided into two determinants: internal determinants and external determinants. Internal determinants include capital size, deposit size, size of the credit portfolio, interest rate policy, labour productivity, state of information technology, risk level, management quality, bank size and ownership. External factors affecting the performance of commercial banks in Kenya are macroeconomic policy and stability, GDP, inflation rate, interest rate and political stability. However, instances when green banking influences commercial bank performance are not explored, an area which this study established.

1.3. Green Banking

Green banking refers to activities and practices that are environmentally sustainable (Akhter, Yasmin, & Faria, 2021). Green finance is channelling funds to environmentally friendly projects. The green finance ratio, which is the total financing of environmentally friendly projects dividend by the total amount used in financing projects, can be used as a proxy for green financing (Akhter, Yasmin, & Faria, 2021; Julia & Kassim, 2016; Zhou, Sun, Luo, & Liao, 2021). Many empirical studies have delved into this critical area of study. The main challenge is the use of varied measurements of green banking. While some studies use online transactions related to measuring green banking (Birzhanova & Nurgaliyeva, 2023; Kiran, Usman, Marium & Syed, 2020; Kiragu, Ngunyi & Shano, 2020), others measure green banking using Corporate Social Responsibility activities (Putri, Rahayu, Rahmayani & Siregar, 2022).

However, none of the studies reviewed justified the reason for choosing a proxy to measure green banking. While factor analysis may be recommended to develop the appropriate measure of green banking, the current study measured green banking using aggregate electronic transaction volumes reported by the Central Bank of Kenya. The data reported by the regulator is considered inclusive compared to individual firm data. Besides, the decision to use electronic transaction volumes is because the majority of the studies reviewed used mobile and online transactions as a proxy of green banking; however, many of such studies were done outside the jurisdiction of Kenya, and the studies also used varied methodologies. The relationship between profit before tax and electronic transaction volumes of commercial banks in Kenya is unknown.

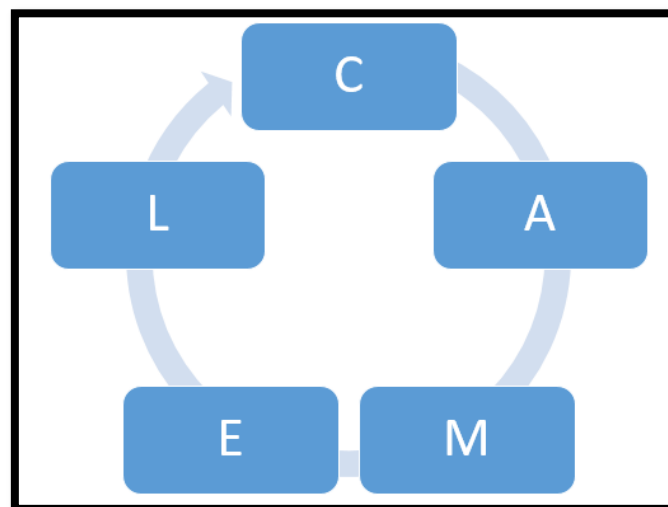### 1.4. Credit Evaluation Models

Figure 1: Capital, Assets, Management, Earnings and Liquidity

Figure 1 shows the five traditional elements used in measuring commercial bank performance: Capital, Asset, Management, Earnings, and Liquidity (CAMEL). There is a significant correlation between the components of CAMEL and liquidity in financial institutions (Bahadori, Talebnia & Imani, 2020). This robust model, however, did not give details about green financing in its components.
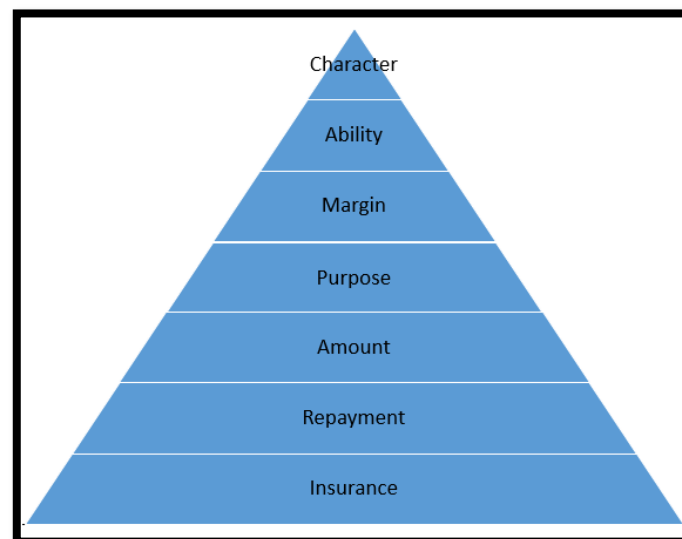
Figure 2: Character, Ability, Margin, Purpose,
Amount, Repayment and Insurance

Figure 2 is related to commercial banks' performance and is mostly used during loan appraisal. When banks, Sacco's and microfinance are doing loan appraisals, they assess character, ability to pay, margin, the purpose of the loan, loan amount, expected repayment rate and insurance (CAMPARI). These factors help the banks assess the quality and ability of the appraised client and the possibility of default. Empirical studies such as (Abdul Aziz, Abdul Rasid and Aziz (2021), which investigated credit appraisal by small and medium-sized businesses (SMEs), underscored that SMEs in Malaysia use CAMPARI in credit evaluation. Thorough credit appraisal ensures that Non-Performing loans(NPL) are minimized; when NPLs are minimized, the implication is that provision for bad loans will also be minimal, enhancing profit. Besides CAMPARI, another standard tool which credit evaluation officers use to curb default risk is the 5 Cs credit model; the Cs means character, conditions, capacity (ability), capital, and collateral (Gachanja & Githama, 2020). This traditional loan appraisal framework failed to factor in green banking in its components, a case that this study investigated.
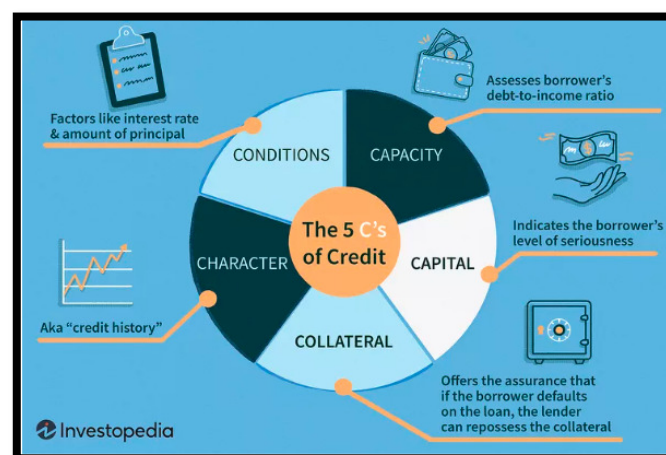

Figure 3: The 5C Credit Evaluation Model
Source: Investopedia

1.5. Statement of the Problem

The study began with the historical background of commercial banking in Kenya, especially during the post-independent period. The study then introduced factors affecting the performance of commercial banks, with the focus being Kenya. Finally, the study explored three major credit appraisal models: CAMEL, CAMPARI, and the 5C model. However, none of the factors and the credit appraisal models incorporated green financing as a factor which affects or has the potential to influence commercial bank's performance, especially when the performance of commercial banks is traced from ancient times before technology advanced, despite the evidence revealed in the recent literature reviewed. Given the global concern about climatic change and the green economy, studying the effect of green banking on the performance of commercial banks remains imperative.

1.6. Objectives of the Study

- The main objective of this study is to establish the effect of green banking on the performance of commercial banks in Kenya.

- The specific objective of this study is to determine the relationship between electronic money transaction volumes and profit before tax of commercial banks in Kenya.

2. Literature Review

Akhter, Yasmin and Faria (2021) studied green banking and the performance of commercial banks in Bangladesh using annual secondary data spanning 2016 and 2018. Results of the study revealed that 90% of commercial banks have implemented the majority (60%) of green banking policies and guidelines. In conclusion, results showed that green banking policies positively and significantly influenced the performance of commercial banks in Bangladesh. The study underscored that green banking entails the inclusion of green banking in all banking activities in the process of decisions involving projects to finance; in Bangladesh, for instance, The Central Bank of Bangladesh insists that all commercial banks must implement green banking policies.

Putri, Rahayu, Rahmayani, and Siregar (2022) studied green banking, banking performance and profitability of commercial banks in Indonesia. The study used a quantitative research paradigm; Return on Assets was used as the dependent variable. Besides, financial performance was proxied as Cash Asset Ratio (CAR), None Performing Loans (NPL) and Loan Deposit Ratio (LDR), which were the dependent variables. Green Banking facts were a number of Automated Teller Machines (ATMs) and Corporate Social Responsibility (CSR) funds. The study employed both time series and cross-sectional data from commercial banks. Results Revealed that CSR funds, CAR, NPL and LDR significantly influence commercial banks' ROA. However, ATM numbers do not have a significant effect on the ROA of commercial banks. The study recommends the utilization of more advanced technology, which will reduce expenses and increase profits.

Hadi, Hasan, Flayyih and Hussein (2023) studied green banking, profitability and sustainability implications using the literature review method in Iraq. The study underpinned that the financial sector should not be left behind in matters concerning climatic change due to the necessity of sustainable development. Therefore, commercial banks have developed a strategic response to assist in understanding growing worries of climatic change. Furthermore, the study opines that green banking can lessen the devastating environmental effects that are occasioned by the consequences of banking activities. The study, therefore, emphasizes the influence of green banking in enhancing a conducive environment. In conclusion, the study asserts that commercial banks and financial institutions should adopt green banking practices to realize sustainable profitability.

Birzhanova and Nurgaliyeva (2023) studied green banking and profitability using a multiple linear regression model in Kazakhstan. Independent variables were time and cashless payments, which were used as proxies for green banking. Results revealed that pairwise correlations between time and Return on Asset (ROA) and between cashless and payments and ROA are high. However, there was no strong positive association between green banking and profitability. The study, however, opined that several empirical studies reviewed revealed a strong relationship between green banking and the performance of commercial banks. Besides, the study recommends testing the relationship using other proxies of green banking.

Lepczyński, Siemionek-Ruskan and Fanea-Ivanovici (2023) investigated the implementation of green banking in the largest Polish and Romanian commercial banks. The investigation focused on progress, strengths and weaknesses. The study underscores that the green finance deal is expected to transform Europe. The study used data from reports and the official website and revealed that steps have been taken towards green banking. However, the magnitude is still meagre, and the adoption of green banking is still in the early stages in Poland and Romania.

Kiran, Usman, Marium and Syed (2020) investigated green banking practices and financial performance of commercial banks in Pakistan. First, the study underscored the importance of environmental sustainability and the aspect of every sector being aware of climatic change issues and their consequences. The study used secondary data from 1st January 2014 to 31st December 2020 to investigate the relationship between green banking practices and the financial performance of commercial banks in Pakistan. The secondary data was sourced from financial reports of commercial banks in Pakistan. The study used online banking and mobile banking to measure green banking practices. The study revealed a significant positive relationship between green banking practices and the financial performance of commercial banks in Pakistan.

Mulandi and Mwania (2022) studied green products offered by commercial banks in Kenya. The study used a case study method. The study randomly selected and used a sample of 39 commercial bank branches in the Nairobi metropolitan. Questionnaires were used to collect the data in the study. The results of the study revealed a significant relationship between the effectiveness of green banking products and banks' profitable environmental sustainability (p=0.031). The study concluded that Corporate Governance practices significantly influence green financing. The study recommends that there should be coordination and cohesion between government policies and commercial banks' green banking policies to enhance the flow of green finances, which supports green financing activities.

Nyamasege and Maina (2024) studied financial technology and financial inclusion in the Kenyan banking industry. The study employed a desktop research method. The study was anchored on financial intermediation theory, information asymmetry and adverse selection theory. The study revealed that mobile money improves financial inclusion by removing various gaps for disadvantaged groups and increases accessibility, mostly in rural areas with poor banking infrastructure and logistics. The study recommends a joint effort among financial stakeholders such as regulators, financial institutions, and mobile service providers to provide robust, competitive, and reliable mobile services that support the need for inclusion.

Kiragu, Ngunyi and Shano (2020) investigated mobile banking and the performance of Microfinance Banks in Kenya. The study employed a positivist research philosophy; a descriptive research design was used. The study also employed a census survey. The study population was the thirteen microfinance institutions regulated by the Central Bank

of Kenya. The study used primary data from self-administered questionnaires. The study revealed that mobile banking and the performance of microfinance banks are significantly related. The study recommends that microfinance institutions partner with telecommunication service providers to develop more efficient and robust mobile products and user-friendly services.

Olubusola, Falaiye, Ajayi-Nifise, Daraojimba and Mhlongo (2024) studied IT practices and banking in Nigeria from an environmental perspective. The study employed a literature review method. The study investigated the extent to which banks in Nigeria have integrated IT practices and how these practices influence environmental sustainability. The study revealed that Nigerian banks are already adopting green IT practices. These practices include paperless operations, energy-efficient data centres, and electronic banking services. The study, however, underscores that IT adoption is low in Nigeria compared to international standards. The study also identifies barriers to IT adoption as inadequate awareness, limited regulatory frameworks and inadequate infrastructure. The paper, however, highlights the benefits of green IT practices: reduced carbon footprints, operational cost savings, and enhanced corporate reputation.

3. Methods

3.1. Research Design and Research Philosophy

Research design is the plan for the study. Broadly put, research design may include philosophical assumptions, inquiry strategies and specific research methods (Creswell, 2009). The three major research designs are quantitative research design, qualitative research design and mixed method (Creswell, 2009). According to Cooper (2014), research design is the blueprint used to fulfil research objectives and unwavering research questions; research design consists of the blueprint for data collection, measurement and analysis (Kothari, 2004). The present study employed a quantitative research design; specifically, the study used secondary data and longitudinal time series analysis as the research design. This research design was considered appropriate in the study because the study used quarterly time series data between 2009 and 2023.

3.2. Study Area

The study area is Kenya, a country in East Africa. Tanzania borders Kenya in the South, Uganda in the West, Somalia in the East, Ethiopia in the North, Sudan in the North West, and the Indian Ocean in the East. Kenya's latitude is 1° 00' N and 38° 00' E. The reason for choosing Kenya as the study area stems from its being among the leading countries in mobile money transfer penetration.

3.3. Target Population

Population is the entire universe from which the sample to be studied is drawn (Crewell, 2009; Kothari, 2004; Cooper and Schindler (2014). Practically, the population is like a water body; time, resources, conceptualization and other complexities are significant constraints in studying the entire universe. However, when the population is slim, the investigator may decide to study the whole population in a census study. The study is a time series study; the study was carried out between 2009 and 2023 with a total of 56 quarters. The study data were from commercial banks' profit before tax (PBT) and electronic transaction volumes for the years under consideration. Therefore, the total data points in the study are 112 data points.

3.4. Data Collection Methods

The study data were sourced from the Central Bank of Kenya's official website. The Central Bank of Kenya is the regulator of all commercial banks, so it collects and stores most of the data reported by commercial banks in Kenya.

3.5. Data Analysis and Presentations

In this study, data is analyzed using PSPP statistical software. PSPP is a statistical software that functions in the same way as SPSS. The data is analyzed and presented using figures and tables.

3.6. Model Specification

$$Y_t = \beta_0 + \beta_1 X_{1t} + e_t \dots\dots\dots\dots Eq1$$

Where:

Y_t = Profit Before Tax at quarter t.

β_0 = Constant coefficients.

β_1 = coefficient of electronic transaction volumes.
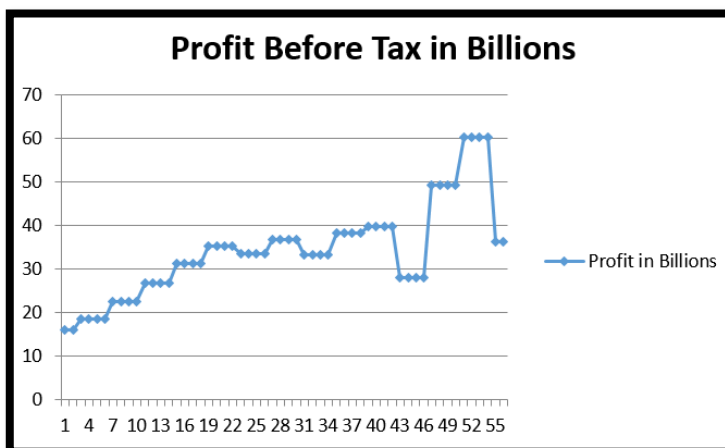
4. Results

Figure 4: Trend Analysis of Profit Before Tax in
Source: Analysis of Data from the Central Bank of Kenya

Figure 4 shows a trend analysis of commercial banks' Profit Before Tax in Kenya. As shown in the figure, profit before tax steadily increased in 2009 before sharply decreasing in 2020, possibly due to the COVID-19 pandemic and also in 2024 due to the general global business environment.
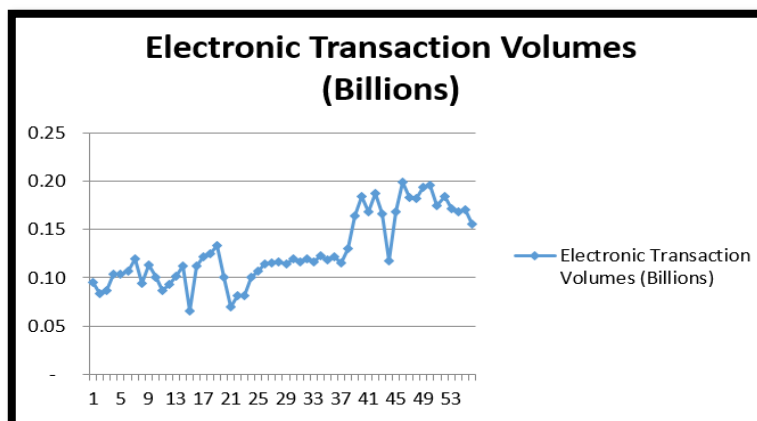

Figure 5: Electronic Transaction Volumes

The trend assumes almost the same trend as the one shown in the Profit Before Tax trend. Again, it can be noticed that around 2020 (quarter 45), the total accumulated profit for all commercial banks dropped due to COVID-19. Consequently, as of 2024, there is a decrease in electronic money transfers, which the general global business environment may occasion.
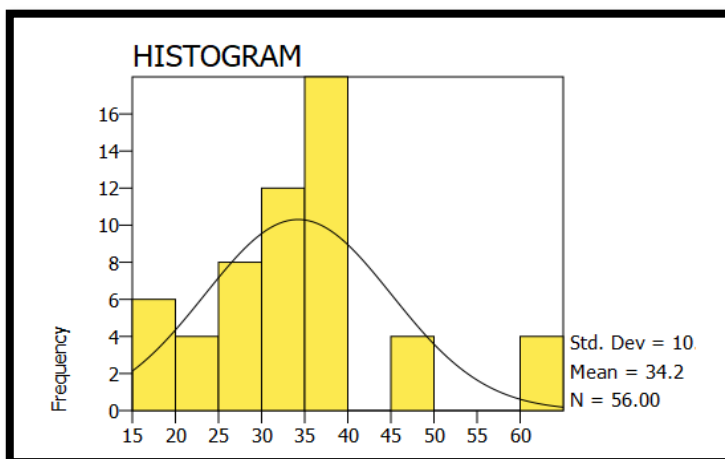

Figure 6: Histogram of Profit Before Tax Volumes of Commercial Banks in Kenya
Source: Analysis of Data from the Central Bank of Kenya

The histogram in figure 6 shows that the time series data for accumulated Profit Before Tax of commercial banks in Kenya are normally distributed.
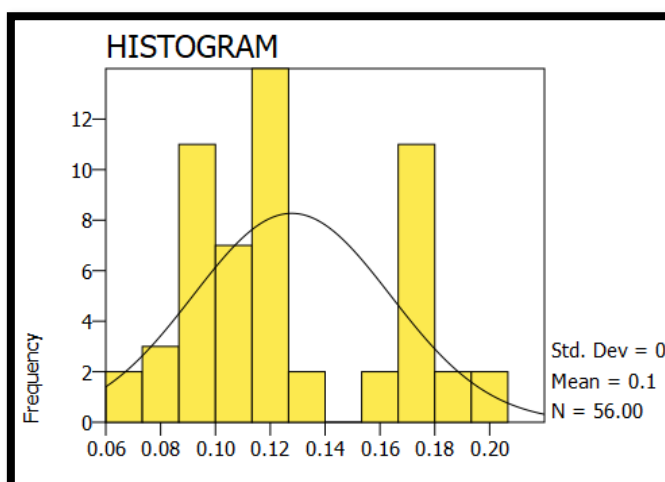

Figure 7: Histogram of Electronic Transaction Volumes of Commercial Banks in Kenya

The histogram in figure 7 shows that the time series data for electronic transaction volumes are typically distributed.

Model Summary (Profit before Tax)						
R	R Square	Adjusted R Square		Std. Error of the Estimate		
.64	.41	.39		8.43		
ANOVA (Profit before Tax)						
	Sum of Squares		Df	Mean Square	F	Sig.
Regression	2618.90		1	2618.90	36.82	.000
Residual	3841.22		54	71.13		
Coefficients (Profit before Tax)						
	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta		t	Sig.
(Constant)	9.74	4.19	.00		2.32	.024
Electronic Transaction Volumes	191.59	31.58	.64		6.07	.000

Table 1: Regression Model Results of Electronic Transaction
Volumes and Profit Before Tax of Commercial Banks in Kenya

Table 1 reveals that R^2 is 0.41, F (36.82), p=0.000. This shows that the probability of variance in profit before tax explained by electronic transaction volumes is 41%. However, electronic transaction volumes could explain 39% variations in profit before tax. Regression results in table 1 reveal that profit before tax significantly and positively relates to electronic transaction volumes (β =.64, p =0.000<0.05). The final equation for the model in table 1 is given by Equation 1 (p-values in parentheses):

$$PBT = 9.74 + 191.59(ETV)t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..\dots..1$$
$$0.000$$

This study confirms a number of reviewed studies. To begin with, Akhter, Yasmin and Faria (2021) opined that green banking positively influences commercial bank performance in Bangladesh. Green banking was also realized to be important in ensuring environmental sustainability (Hadi, Hasan, Flayyih & Hussein, 2023). Putri, Rahayu, Rahmayani, and Siregar (2022) also confirmed that CSR is related to the performance of commercial banks in Kenya. Consequently, Birzhanova and Nurgaliyeva (2023), Kiran, Usman, Marium, and Syed (2020), Mulandi & Mwania (2022), Kiragu, Ngunyi & Shano (2020), Nyamasege and Maina (2024), and Olubusola, Falaiye, Ajayi-Nifise, Daraojimba, and Mhlongo (2024) confirmed relationship between green banking and performance of commercial banks and microfinance banks. The majority of the studies were done outside Kenya; given the different regulatory frameworks and economic situation, such studies, though necessary, may not be used to generalize their results. Besides, the current study differs from the empirical studies reviewed since it used the overall aggregate industry data reported by the CBK instead of a micro study at the firm level. Therefore, this study is broad.

5. Conclusion

The study's objective was to establish the effect of electronic transaction volumes on the profit before tax of commercial banks in Kenya. Results revealed a positive relationship between electronic transaction volumes and profit before tax of commercial banks in Kenya. The study concludes that electronic transactions determine the performance of commercial banks in Kenya; that is, green banking positively influences the financial performance of commercial banks in Kenya.

5.1. Implications of the Study

The current study results suggest that commercial banks' performance will decline when they do not adopt green banking practices. Given the global and national emphasis on climatic change and environmental sustainability, noncompliant commercial banks may have a problem with policy enforcers such as the government through regulators such as the CBK.

5.2. Recommendations

The study recommends that all commercial banks should practise green financing, including all types and aspects of green financing practices. During this process, stakeholders, including bank clients, regulators, and mobile money service providers, should also be aware of green banking to help achieve an environmentally friendly environment.

5.3. Limitations of the Study

The study was limited by the fact that it did not include all the green banking practices; however, through the literature review, a trend was realized, where a majority of the studies reviewed used mobile money transactions as the main proxy of green banking practices. These reviewed studies seemed to have homogeneous results despite the differences in conceptualization and methodology adopted. Therefore, the current study chose to use electronic transaction volumes in billions and at an aggregate level just to have a look at how green banking affects the performance of the entire industry.

5.4. Suggestions for Further Studies

The study suggests that the same research may be replicated using other proxies of green banking practices. Furthermore, factor analysis is suggested to help future researchers identify the most appropriate factors to be used as proxies of green banking practices.

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