Volume and Issues Obtainable at Center for Sustainability Research and Consultancy

Journal of Accounting and Finance in Emerging Economies
ISSN: 2519-0318 & ISSN (E): 2518-8488
Volume 11: Issue 3 September 2025
Journal homepage: www.publishing.globalcsrc.org/jafee

Effect Open Banking Lending Services on the Financial Sustainability of Commercial Banks

***Patrick kivale Imbalo**, Masinde Muliro University of Science and Technology, Kenya
Charles Tibbs Yugi, Masinde Muliro University of Science and Technology, Kenya
Gerald Musiega Managi, Masinde Muliro University of Science and Technology, Kenya

*Corresponding author's email: patkivale@gmail.com

ARTICLE DETAILS

History
Revised format: Aug 2025
Available Online: Sep 2025

Keywords
Open Banking, Financial sustainability, Commercial banks in Kenya.

JEL Classification
G20, G21

Purpose: To assess the effect Open banking lending services on the financial sustainability of commercial banks

Design/Methodology/Approach: The research design used was a descriptive study that sought to capture the prevailing situation in lending innovations and its effect on financial sustainability. The sample was restricted to commercial banks in Kenya which are divided into Tier 1, Tier 2 and Tier 3 banks where the total population of the sample was 7 Tier 1 banks, 19 Tier 2 banks and 13 Tier 3 banks. The stratified random sampling method was employed to identify a representative sample, and this ensures that insights are captured in various bank types. Data were collected with a structured questionnaire, The reliability and validity of the instrument was assessed with a pilot study, using Cronbach's alpha as a measure of internal consistency, Keiser-Meryer -Olkin (KMO) was used to assess construct validity. Data Analysis: The assumptions of Classical Linear Regression Model (CLRM) such as linearity, normality, homoscedastic were tested. The findings were presented in form of descriptive and inferential analysis such as regression coefficients, significance levels and graphical analysis to represent major findings.

Findings: The findings of the study indicated a positive significance effect between open banking and financial sustainability (R=0.731, P=0.001)

Implications/Originality/Value: There was adequate evident to reject the null hypothesis that posits, Open banking has no significant positive effect on the financial sustainability of commercial banks in Kenya.

Recommended citation: Imbalo, P, K., Yugis, C, T., and Managi, G, M. (2025). Effect Open Banking Lending Services on the Financial Sustainability of Commercial Banks. *Journal of Accounting and Finance in Emerging Economies, 11* (3), 333-344.
DOI: https://doi.org/10.26710/jafee.v11i3.3383

Introduction

Globally there is growing attention towards sustainability, United Nation (2015), World Bank, (2021) reports shows that developing countries continue to formulate policies to support critical sectors in sustainable business practices. Locally the Central Bank of Kenya supervision report, (2020), address financial sustainability concerns due to volatile market environment, shifting customer experience and deteriorating asset quality The annual supervisory reports reveal mixed industry performance over the last decade and decline in capital adequacy of some banks hence need for re-capitalization. Accenture (2020). Existing research studies focused on the short term performance and profitability, ignoring the long-term effect on sustainability, the studies are consistent to Demiurgic-Kunt and Klapper, (2012)

World-wide research studies had been biased to isolated innovations studies like mobile banking in Kenya, Diniz et al.(2011), studies examined mobile money and digital lending in the third world countries The analysis has demonstrated that the innovations enhance access to credit and increased profitability in short-run, The study created a knowledge gap as prior studies were not able to assess the effect of innovations on the long term financial stability and resilience.(Muiruri and Ngari, (2014).

Existing study emphasizes specific lending innovations, such as digital or mobile banking, at the expense of other potentially emerging innovations, e.g., open banking (Gomber et al., 2017; Deloitte, 2019).Kaffenberger and Totolo, (2018), study reveal great bias towards financial inclusion ignoring the long-term impacts. The limitation in scope created a knowledge gap which the current study seeks to address by understanding the interaction of the various innovations to sustainability.

The paper aimed at addressing the market gaps in the studies through empirical study to get insight on how the open banking system support financial sustainability of commercial banks in Kenya.

Statement of the Problem

Financial sustainability is a major concern and global challenge affecting all sectors of the economy, attributing to rapid technological revolution and transformation disruption services, as a result open banking is emerging and gain traction in banking sector as a service and practice mitigating the adverse effect on achievement of long-term financial stability of commercial banks in Kenya. The central bank report, (2023), shows that banks face a challenging business environment, rising levels of Non-performing loans and loss provision rating from 3.5% in 2010 to 15.25% in 2022,deterioriation of quality asset contributing to decline in return on asset, the deficit contribute to capital erosion .

According to Kaffenberger and Totolo, (2018),Ngugi, 2017). Study lending innovations targeted short-term despite the new threat of credit defaults, fraud and non-compliance with regulations, which poses threat to long-term sustainability (Accenture, 2020).The limited scope left a wider concept of financial sustainability such as, risk management, capital adequacy, asset quality and resilience on the financial viability of commercial banks. (Accenture, 2020).This study will help answer the question does open banking services provide pillar for achieving financial sustainability at Institutional level.

Therefore the gap between traditional banking and modern banking models on financial sustainability presents a significant problem that require study as banks play a critical role in economic growth, This paper attempted to address this gap by looking at how open banking lending services influenced the sustainability of commercial banks in Kenya.

Objectives of the Study

To assess the effect of open banking on the financial sustainability among commercial banks in Kenya.

Research Hypothesis

H_{01}: Open banking has no significant effect on the financial sustainability of commercial banks in Kenya.

Theoretical Framework

Transaction Cost Theory

Transaction Cost Theory was first authored by Ronald Coase (1937), Thereafter Oliver Williamson (1975). Enhanced the theory by introducing the cost of engaging in a market. The theory related to financial institutions involved in lending as transaction costs involved in lending and borrowing activities, such include costs of information search, negotiation, and monitor loans. The evolution of the open banking enabled access of the customer data by third party service providers, it made acquisition of customers and processing of loans cheaper. It however exposed banks to data security and privacy as well as regulatory compliance which affect financial sustainability.Masiak et al., (2020) and King and Nesbitt, (2022) found out that open banking has the ability to improve the financial sustainability of the sector as reduce the costs of transactions, dictate competition and bring customer centric financial services. Nevertheless, its success will be determined by how efficiently banks managing the risks and operating efficiently.

Conceptual Review

Open Banking

Open banking is a significant innovation in modern banking that facilitates the sharing of consumer data and financial information between financial service providers and third-party providers through application programming interfaces (APIs). This innovation enhances transparency in service delivery, positively impacting the financial sustainability and productivity of commercial banking organizations. By offering personalized financial services, open banking improves customer loyalty and reduces churn, allowing banks to tailor products and services more effectively to meet consumer needs, ultimately boosting long-term income and financial gains.

Research by Gomber et al. (2018) indicates that open banking fosters continuous innovation among banks, aligning their offerings with evolving customer expectations. It also enhances efficiency in transactions linked to credit referencing and customer acquisition, thus reducing costs. According to King and Nesbitt (2022), open banking can transform operational models by automating many processes, enabling banks to reallocate resources to strategic areas such as customer relationship management and new product development. Masiak et al. (2020) note that such innovation allows banking to be more responsive to market demands and regulatory changes.

However, the adoption of open banking is accompanied by data security and privacy concerns, which could undermine banks' efficiency. Kumar and Mishra (2021) highlight that the interplay between innovation and security is critical for enhancing banks' efficiency alongside achieving financial sustainability.

Financial Sustainability

Financial sustainability is the ability of a financial institution, to offer financial stability and performance at the long-term level. It implies that a bank must generate enough resources to survive an economic shock, and invest in future growth prospects, Gomber et al., (2018).According to Gatzert and Martin, (2015). The emergence of environmental sustainability

in their business models ,creates a property that would see banks attract more socially conscious investors and invest in sustainable business practices of their financial systems.

Empirical Review

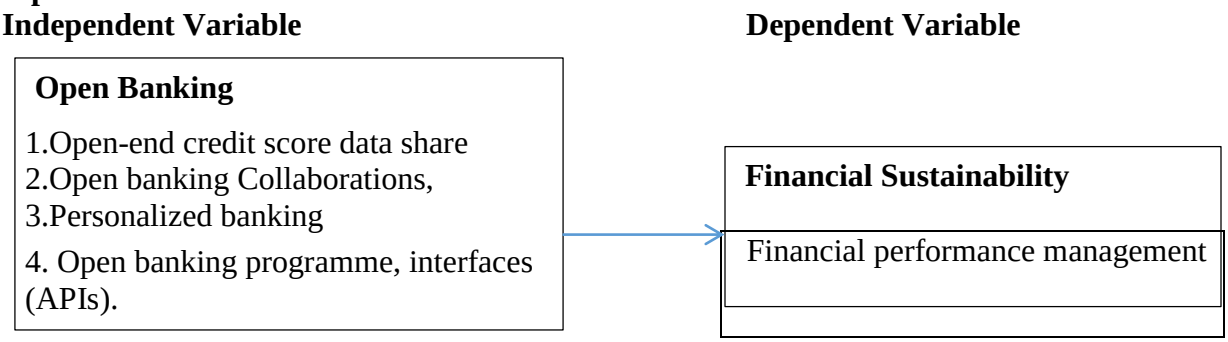
The open banking lending allows sharing of customer data, security of customer data transfers between banks and third-party providers being one of the main innovation aspects in contemporary finance. Maas, Fenwick, and Vermeulen, (2021) show that the effect of open banking on financial soundness is greatly dependent on the third party service integration capabilities of the bank.

Farrell and Wheatley (2019) studies state that the introduction of open banking in Europe has also triggered competition among financial institutions, resulting in innovations and better services offered by banks. Their analysis revealed that open banking platforms had a higher chance of improving the financial sustainability of banks by the virtue of the capacity to deliver personalized financial products that best satisfy customers, hence, leading to an improved retention rate and profitability.

A study by Drasch, Schweizer, and Urbach (2018) on open banking reveals that collaborations and third-party partnerships in data analytics enhanced financial institutions' ability to delivermore customized financial services, which increased customer satisfaction and efficiency in lending. Sia et al.'s (2020) study indicates the potential that open banking presents for the opportunities to scale up business and also exposure to investment through cybersecurity and adherence to regulations.

Mutua and Kihoro (2022) study reveals that banks pursuing open banking target the economies of scale that accrue from financial inclusion through tapping into the underbanked population. Wambua and Ndegwa (2021) argue that open banking increased access to credit facilities for most of the firms and bank customers operating in Kenya, thereby creating financial sustainability for businesses.

Conceptual Framework



Source: Researcher, (2025)

Figure 1: Conceptual Framework

Methodology

Research design: The descriptive research design and explanatory research design were employed. The descriptive enables actual depiction and the present actual condition of financial lending innovations by commercial banks and the explanatory design assists in identifying and explaining connections between the variables (Saunders, Lewis, and Thornhill, 2019). These designs are consistent with the works of Creswell and Creswell, (2017) who claim that descriptive and explanatory designs are viable in the conflict in the social science audience where it is important to comprehend complex relationships.

Study Area: The research was conducted in each of the commercial banks in Kenya at the headquarters on Nairobi Head offices, the research took consideration of the banks that have been in operation in the last five years, There were 39 licensed and registered under the Banking Act and regulated by the central bank of Kenya as at December 31, 2023, Critical respondents were senior managers, heads of lending departments, risk managers and IT lending and innovations.

Population: Target population is the whole group that the research aims to explore, Bell drynu and Henry (2020), which in the research case is all commercial banks in Kenya, which has been licensed and regulated by the Central Bank of Kenya (CBK). As of 2024, Kenya has 39 commercial banks, of which some are local banks and others are international banks (Central Bank of Kenya, 2024). The reason behind singling out commercial banks is that they have a large presence in the financial industry and they have embraced new methods of lending.

Data Collection Instruments and Procedures: The study relied on primary data collected through structured questionnaires to gain an in-depth understanding of the lending situation.
A pilot study conducted to ensure the instrument's reliability and clarity. Participants were purposively selected based on professional relevance. Validity was established through content and construct validity checks.
Data Analysis: This study has applied the linear regression analysis to examine how open banking impacts financial sustainability of the commercial banks. A descriptive data analysis with means, standard deviation and frequency was used to indicate the major characteristics, and qualitative data were processed in SPSS (version 26) with the help of descriptive and inferential statistics. The inferential analysis involved regression to assess the strength, magnitude and direction of relationship between the independent and the dependent variable determined by the use of correlation analysis.

Results and Discussion

Response Rate

The study involved the administration of a total of 111 questionnaires to bank personnel using purposive sampling. Out of the 111 questionnaires sent, 103 were successfully completed by the respondents, resulting to rate of 92%. The response rate was good and provided useful data for further analysis,

Reliability and Validity

Cronbach alpha was used to access level of reliability of instrument. The alpha.904, results was above 0.7 threshold. This worked in favor of internal consistency of data (Mugenda and Mugenda, 2008). The KaiserMeyerOlkin (KMO) Measure of Sampling Adequacy and a Bartlett Test of Sphericity give the necessary data concerning whether the dataset is appropriate to be analyzed using the factor analysis.

Table 2: Response Rate

		Frequency	Percentage
Valid	Returned	103	92
	Not Returned	8	8
	Total	111	100

Source: (Researcher, 2025)

Descriptive Statistics

Open banking innovations practices on the financial sustainability of commercial banks

The study assesses the effect of open banking innovations on the financial sustainability of commercial banks in Kenya. The respondents were asked whether they agreed or disagreed with statements bearing on Open banking services on a scale of 1-5 with 1= Strongly disagree, 2=

Disagree, 3= Neutral, 4=Agree, 5=Strongly agree.

Table 2: Open banking innovations

	1		2		3		4		5		Total		SD
	f	%	f	%	f	%	f	%	f	%	N	M	
Training and job security of Staff has increased confidence level, moral, eliminated disruption resulting to wider banking services to customers	0	0%	0	0%	23	22%	57	55%	23	22%	103	4	1
Customers have embraced open banking services boosting customer Experience and loyalty.	0	0%	0	0%	14	14%	51	50%	38	37%	103	4	1
Open banking have reduced operational costs and increased value chain and products usage	0	0%	0	0%	16	16%	46	45%	41	40%	103	4	1
Stringent Bank regulation compliance prevents risks and protects consumers using opened banking services.	0	0%	0	0%	17	17%	38	37%	48	47%	103	4	1
Customer complains on erroneous credit score are resolved faster using open bank policy and decentralized services	0	0%	4	4%	25	24%	41	40%	33	32%	103	4	1

Source: Researcher, (2025)

The results of the study on the effect of financial lending innovations, particularly open banking, on financial sustainability and operational efficiency in commercial banks in Kenya. The responses indicate a positive perception.

The statement "Training and job security of staff has increased confidence level, morale, and the face-to-face disruption has widened open banking services to customers," the result (55%) agreed, suggesting that staff training and job security play a crucial role in increasing confidence and morale, This aligns to Dastgir et al. (2020), studies which highlight that well-trained staff are engage customers productively and embrace new technologies, contributing to the sustainability of financial institutions.

The statement that Customers have adopted the open banking services the results 50% of the respondents agreeing and 37% strongly agreeing. Finding a aligns to Fung et al. (2017) that the innovations of open banking are increasing customer experience through provision of custom services, increased transparency and financial inclusiveness.

The results on open banking has reduced the cost of operations of banks and value chain and product usage 45 percent agreed and 40 percent strongly agreed. This aligns to Milne and Parboteeah (2018), who realized the lower operation costs, which occur as a result of automation, increased efficiency, these growths in operating efficiency directly translate to financial sustainability.

The result of 47 per cent that demonstrates compliance with bank regulation, averts risks and safeguards consumers who avail open bank services. Findings aligns to Bech and Garratt (2017), who pointed out the importance of strong regulatory frameworks as a way to reduce the

associated risks ,consumer protection practices, which will augment the banking sector sustainability.

Financial Sustainability

The research aimed at evaluating statements to do with financial sustainability. The respondents were asked to rank the statements associated with digital lending to a scale of 1 to 5 with 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly agree. Table 3 summarizes the results.

Table 3: Financial Sustainability

	1		2		3		4		5	
	f	%	f	%	f	%	f	%	f	%
The introduction of lending innovations improved your bank target lending segment in the market and business Growth.	2	2%	1	1%	18	17%	55	53%	27	26%
The bank performance and income growth rate has increased as a result of lending innovations and reduction in costs.	1	1%	3	3%	12	12%	47	46%	40	39%
The regulatory compliance and digital transformation contribute to the financial sustainability and profitability of your bank in Kenya	3	3%	0	0%	15	15%	41	40%	44	43%
The bank has adopted customer focused strategies to manage customer relation and improve experience which reduces bad credit, default and minimizes level of Non-performing loans?	2	2%	1	1%	18	17%	55	53%	27	26%
The bank ensures financial sustainability by diversification of revenue streams product lines and prudent lending for long term stability	3	3%	0	0%	12	12%	49	48%	39	38%

Source: Researcher (2025)

The results of the study on the financial sustainability, shows that "The introduction of lending innovations improved lending and business growth with 53% of respondents agreeing and 26% strongly agreeing. This is consistent to Beck et al. (2011), who found that financial innovations often enhance banks' ability to reach under-served market segments, thereby improving business growth.

The bank performance results shows that 46% respondents agreed and 39% strongly agreed with the statement The result affirm Berger and Udell (2006) and that lending innovations can directly contribute to the growth of incomes due to the reduction of the operation costs.

The regulatory compliance, capital adequacy, risk management frameworks, digital with 43% strongly agree and 40 percent agree. The findings are supported by Sahay et al. (2015). The stability of a financial institution in the long run is good when, risk management practices and compliance with the regulations are in place.

Customer-centered approaches shows that managing reduces bad credit and non-performing loans were agreed upon by 53 percent, strongly implied by 26 percent. The result suggests that customer retention efforts which have been backed by lending lending innovations, are highly essential in reducing the risk associated with non-performing loans (NPLs).the findings are consistent to Zhou (2012) studied which indicate that effective customer relationship management is necessary in ensuring that the loan repayment rate remains sustainable.

The bank ensures financial sustainability by diversifying sources of revenue; products, digital banking and lending prudently with 48% agreeing and 38 per cent strongly agreeing. This shows that the banks are beginning to widen their services by integrating hence hedging against the economic meltdown and ensure sustainability in the long-run. The results have validated the findings by Beck et al. (2011), about the need to diversify its revenue and digital banking to enhance financial resilience.

These kinds of innovations enable the company to enjoy profitability in the short run, as well as, long term stability in that they reduce the cost, increase market segments and ease retention of customers.

Hypothesis Testing

A hypothesis was established in which a linear regression was used to determine whether open banking has a significant impact on the financial sustainability of commercial banks in Kenya. The research used the following; hypothesis was tested using Regression analysis at alpha level of 0.05: which was tested at significance level of 0.05.

H_2: Open banking has a significant effect on the financial sustainability of commercial banks in Kenya.

Table 4: Model Summary of Open Banking effect on Financial Sustainability of Commercial Banks in Kenya
Source: Researcher, (2025)

					Change Statistics				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**
1	.731[a]	.535	.530	.50813	.535	116.048	1	101	.000

a. Predictors: (Constant), Open banking

According to the Model Summary, open banking and financial sustainability are strongly positively correlated (R = 0.731). The R Square that is 0.535 shows that open banking explains 53.5% of changes in financial sustainability. Adjusted R square (0.530) shows that the models are valid on predictors. The standard error (0.50813) indicates that there is moderate dispersion of the regression line. The model is statistically significant at the 0.05 level as it has a value of F-change of 116.048 and the significance (p-value) of 0.000. This helps in substantiating the hypothesis that open banking significantly affects financial sustainability.

Table 5: Analysis of Variance of Open Banking effect on Financial Sustainability of Commercial Banks in Kenya

Model		**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
1	Regression	29.963	1	29.963	116.048	.000[b]
	Residual	26.078	101	.258		
	Total	56.041	102			

a. Dependent Variable: Financial Sustainability

b. Predictors: (Constant), Open banking

Source: Researcher (2025)

The ANOVA table measures the total statistical significance of regression model. The regression sum of squares (29.963) is very high compared to the residual sum of squares (26.078) implying that a considerable number of the changes in financial sustainability can be attributed to open banking. The regression has 1 degree of freedom and the residual has 101 which gives the F-

value 116.048. The p-value that goes with it is 0.000, which is much less than the 0.05 standard which indicates that the model is very significant. Open banking therefore implies a statistically significant predictor of financial sustainability in Kenyan commercial banks.

Table 6: Coefficients of Open Banking effect on Financial Sustainability of Commercial Banks in Kenya

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	.087	.387		.226	.822
	Open Banking	1.012	.094	.731	10.773	.000

a. Dependent Variable: Financial Sustainability

Source: Researcher (2025)

Table 6 The regression equation was formulated: $Y=0.087+1.012OB_{2,}$ The Coefficients shows the strength and direction of the impact of the open banking on the financial sustainability. The coefficient (B = 1.012) is not standard, which indicates that one-unit rise in open banking is associated with a 1.012-unit rise in financial sustainability. The standardized Beta coefficient equals to 0.731 and it has a strong positive effect. The t-value of 10.773 and the p-value of 0.000 show that the relationship is statistically significant. The constant term (B = 0.087, p = 0.822) is not significant, meaning open banking is the key influencing factor. These results support Hypothesis H2, affirming a significant positive effect.

These findings are consistent with empirical studies. Farrell and Wheatley (2019) and Drasch et al. (2018) confirm that open banking enhances customer experiences, lowers customer acquisition costs, and enables banks to offer tailored products that improve retention and profitability, Mutua and Kihoro (2022),Wambua and Ndegwa (2021), affirm that open banking fosters financial inclusion, thereby improving business funding and supporting sustainable growth. Similar to Bajic et al. (2019) and Shinder et al. (2019), Njoroge and Kamau (2020) also note that open banking enhances efficiency in operations and market coverage thereby increasing the financial stability of the banks.

Contradicting studies point to potentially weakness on effect of open banking. Sia et al. (2020) express concerns on data privacy, regulatory cost and a threat of cybersecurity breach, which may restrain the profitability. Maas et al. (2021), cites breach in integration of third parties. Ochieng, Aduda, and Omwoyo (2023) warn that laws and regulations can restrict delivery of services, Omondi and Ngetich (2021) and Kamau and Nyambura (2022). Hence, although open banking possesses great potential, its success will be limited by strategic implementation, its technological preparedness, and its policy frameworks.

Conclusions

The objective of the study was to assess the effect of open banking on financial sustainability among commercial banks in Kenya. The results reveal that there was a statistically significant influence of open banking on financial sustainability. The results help conclude that open banking will lead to improvement of customer experiences and loyalty, enhance operational efficiency, and decrease operation costs. The study added an important dimension to the influence of open banking on financial sustainability. There are also other variables supporting the study, like digital banking, blockchain-based lending, and credit card lending practices, that should add value to the empirical research. The results provide sufficient evidence to support the study proposition on the combined effect. The study contributes to the growing knowledge on modern banking innovations in the banking sector.

Recommendations

The study hypothesizes that open banking innovations ought to be strategic in their application by

commercial banks in Kenya, in an effort to advance efficiency and financial sustainability in their business activities. To achieve sustainability Banks should invest in building quality digital infrastructure and continuous professional development.

References

Accenture. (2020). Open Banking: Revolutionizing the Financial Sector**.** *Accenture.*

Bech, M. L., and Garratt, R. (2017). *Central bank digital currencies: A framework for assessing the benefits and risks of digital currencies*. Bank for International Settlements.

Beck, T., Degryse, H., and Kneer, C. (2013). Is more finance better? Disentangling intermediation and size effects of financial systems. *Journal of Financial Stability*, 9(4), 399-409.

Butt, I., Murtaza, A., Lodhi, R., and Irfan, M. (2020). The impact of digital financial services on financial sustainability in developing economies. *Journal of Banking and Financial Services*, 45(3), 203-215.

Central Bank of Kenya (CBK). (2023). *Bank Supervision Annual Report 2022*. Nairobi: CBK.

Central Bank of Kenya. (2020). Bank Supervision Annual Report**.** Central Bank of Kenya.

Coase, R. (1937). The nature of the firm. *Economica*, 4(16), 386-405.

Dastgir, M., Arif, F., and Anwar, M. (2020). *Role of human capital and technological innovation in bank's performance: A case study of commercial banks in Pakistan*. *International Journal of Management Science and Business Administration, 6*(3), 20–30.

Deloitte. (2019). Blockchain and the Future of Lending. *Deloitte Insights*.

Demirgüç-Kunt, A., and Klapper, L. (2012). Measuring Financial Inclusion: The Global Findex Database. *World Bank Policy Research Paper*.

Deng, X., Doll, W. J., and Truong, D. (2021). Operational efficiency and financial performance of commercial banks: A data envelopment analysis. *Journal of Banking and Finance*, 126, 106148.

Diniz, E., de Albuquerque, J. P., and Cernev, A. K. (2011). Mobile Money and Payment: A Literature Review Based on Academic and Practitioner-Oriented Publications. *The Electronic Journal of Information Systems in Developing Countries*, 48(1), 1-23.

Drasch, B. J., Schweizer, A., and Urbach, N. (2018). Integrating the 'Troublemakers': A taxonomy for cooperation between banks and fintechs. *Journal of Economics and Business*, 100, 26-42.

Drasch, B. J., Schweizer, A., and Urbach, N. (2018). Integrating the 'Troublemakers': A taxonomy for cooperation between banks and fintechs. *Journal of Economics and Business*, 100, 26-42.

Farrell, S., and Wheatley, P. (2019). Open banking: An industry perspective on the implications of PSD2. *Journal of Financial Regulation and Compliance*, 27(1), 16-29.

Farrell, S., and Wheatley, P. (2019). Open banking: An industry perspective on the implications of PSD2. *Journal of Financial Regulation and Compliance*, 27(1), 16-29.

FSD Kenya. (2021). The Growth and Risks of Digital Lending in Kenya. *Financial Sector Deepening Kenya.*

Fung, B., Hinson, R., and Cho, Y. (2017). *Customer experience management in the age of digital banking*. Journal of Digital Banking, 1(3), 216-227.

Gatzert, N., and Martin, M. (2015). Determinants and value of enterprise risk management: Empirical evidence from the literature. *Risk Management and Insurance Review*, 18(1), 29-53.

Ghosh, A., and Ghosh, D. (2014). *The impact of digital technologies on customer service in the banking sector: Evidence from India*. International Journal of Business and Social Science, 5(7), 78-89.

Gomber, P., Koch, J.-A., and Siering, M. (2018). Digital Finance and FinTech: Current Research and Future Research Directions. *Journal of Business Economics*, 87(5), 537–580.

Iman, N. (2019). The rise and rise of financial technology: The good, the bad, and the legal. *Journal of Financial Regulation and Compliance*, 27(4), 437-450.

Kaffenberger, M., and Totolo, E. (2018). Digital Credit in Kenya: Time for a New Policy Framework? *CGAP*.

Kamau, M., and Oluoch, J. (2020). *Effect of digital lending on financial performance of commercial banks in Kenya*. International Journal of Finance and Accounting, 5(2), 21–29.

Kamau, T., and Nyambura, G. (2022). Government policy and open banking: Implications for financial sustainability in Kenya. *Kenya Financial Review*, 11(3), 152-165. https://doi.org/10.1007/kfr.2022.03

Karanja, R., and Kimani, M. (2021). Block chain and transparency in Kenyan banking: The potential impact of block chain-based lending. *African Journal of Banking and Financial Innovation, 10*(2), 54-69.

King, M., and Nesbitt, R. (2022). Banking and FinTech: The road ahead. *Journal of Financial Perspectives*, 9(2), 12-26.

Maas, J., Fenwick, M., and Vermeulen, E. (2021). Open banking and PSD2: The promise and perils of bank-fintech collaboration. *European Business Review*, 34(2), 195-210.

Masiak, C., Block, J. H., Moritz, A., Lang, F., and Kraemer-Eis, H. (2020). Financing micro-enterprises and small businesses in Europe: How can digital innovations address their financing needs? *Journal of Banking and Finance*, 113(1), 105-145.

Milne, A., and Parboteeah, D. (2018). *Financial technology and the future of banking*. Journal of Financial Technology, 3(4), 145–156.

Mugenda, A., and Mwachiro, P. (2020). Barriers to block chain adoption in Kenya's banking sector: Financial and operational challenges. *Journal of Financial Management, 15*(3), 35-50.

Muiruri, P., and Ngari, J. (2014). Effects of Financial Innovations on the Financial Performance of Commercial Banks in Kenya. *International Journal of Humanities and Social Science*, 4(7), 56-67.

Mutua, J., and Kihoro, J. (2022). Open banking and financial inclusion in Kenya: Opportunities and challenges. *Journal of Financial Innovation*, 8(3), 45-58. https://doi.org/10.1007/jfi.2022.03

Ngugi, B. K., Mwirigi, J. M., and Mwangi, M. (2017). FinTech and Financial Inclusion in Kenya. *Research Journal of Finance and Accounting*, 8(4), 54-62.

Njoroge, D., and Kamau, E. (2020). Open banking and its impact on the financial efficiency of firms in Kenya. *Journal of Financial Sustainability*, 7(2), 98-112. https://doi.org/10.1016/jfs.2020.02

Ochieng, O., Aduda, J., and Omwoyo, J. (2023). Challenges of open banking adoption in Kenya: Regulatory, security, and technological concerns. *International Journal of Digital Finance*, 10(1), 30-47. https://doi.org/10.2139/ijd.2023.01

Olson, D., Zoubi, T. A., and Al-Hashimi, T. (2014). Sustainability and Risk in Commercial Banking. *The Quarterly Review of Economics and Finance*, 54(3), 312-324.

Omondi, R., and Ngetich, K. (2021). The role of digital banking platforms in facilitating open banking adoption in Kenya. *Journal of Digital Banking*, 6(4), 205-218. https://doi.org/10.1016/jdb.2021.08.

Rajan, R. G. (2019). *Decentralized finance: What can be learned from open banking*. *Journal of Finance and Banking, 6*(2), 12-28.

Republic of Kenya (2012e). Data Protection Act No. 24 of 2012. , Government Printer, Nairobi.

Shapiro, S. S., and Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika, 52*(3/4), 591-611. https://doi.org/10.1093/biomet/52.3-4.591

Sia, S. K., Soh, C., Weill, P., and Zhang, N. (2020). How open banking reshapes competition and strategy in financial services: Insights from banking experts. *MIS Quarterly Executive*, 19(1), 45-60.

TechnoVista (2021). *The Role of Blockchain in Kenya's Financial Regulation and Innovation*. Nairobi: TechnoVista Publishing.

Wambua, M., and Ndegwa, L. (2021). The role of open banking in improving access to credit for SMEs in Kenya. *African Journal of Finance and Management*, 22(4), 125-140. https://doi.org/10.1016/ajfm.2021.04

Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press.

Zhang, L., He, Y., and Wei, X. (2017). *The Effects of Flexible Repayment Options on Customer Retention and Profitability in Financial Institutions*. Journal of Banking and Finance, 51(1), 101-115.