Journal of Finance and Accounting



Blockchain Innovation and Central Bank Digital Currency Readiness Among Financial Technology Firms in Nairobi County, Kenya

Nixon Chweya & Dr. CPA Dolreen Murithi

ISSN: 2616-4965

Stratford Peer Reviewed Journals and Book Publishing
Journal of Finance and Accounting
Volume 10||Issue 8||Page 111-130 ||November||2026|
Email: info@stratfordjournals.org ISSN: 2616-4960

Blockchain Innovation and Central Bank Digital Currency Readiness Among Financial Technology Firms in Nairobi County, Kenya

*Nixon Chweya[1] and Dr. CPA Dolreen Murithi[2]
[1] Master of Science (Finance and Accounting) candidate, KCA University
Nairobi Kenya
nixonanini@gmail.com

[2] Finance Lecturer, School of Business, KCA University,
Nairobi Kenya
dmurithi@kcau.ac.ke

How to cite this article*: *Chweya N., R. & Muriithi D. (2026). Blockchain Innovation and Central Bank Digital Currency Readiness Among Financial Technology Firms in Nairobi County, Kenya. Journal of Finance and Accounting, 10(8), 111–130. https://doi.org/10.53819/10.53819/81018102t2628

Abstract

The rapid advancement of digital financial technologies has intensified global interest in Central Bank Digital Currency (CBDC) as a potential instrument for improving payment systems, financial inclusion and transaction security. However, the extent to which fintech firms are organizationally and technologically prepared to support a potential retail CBDC remains insufficiently established. This study examined the influence of blockchain innovation on CBDC readiness among financial technology firms in Nairobi County, Kenya. Specifically, the study examined the influence of blockchain-enabled process innovation and blockchain-enabled service innovation on CBDC readiness. The study was anchored on Systems Theory, Modern Portfolio Theory, Transaction Cost Theory, and Public Interest Theory of Regulation. An explanatory research design was adopted, targeting 144 licensed fintech firms in Nairobi County, from which 113 responses were obtained. Primary data were collected using structured questionnaires administered to relevant senior management personnel, and the data were analysed using descriptive statistics, correlation analysis and multiple regression analysis. The regression results showed that the four blockchain innovation dimensions jointly accounted for 83.6% of the variation in CBDC readiness (Adjusted R^2 = .836), and the overall regression model was statistically significant, ($F(2,109) = 290.039$, $p<0.001$). Individually, blockchain process innovation and service innovation were statistically significant predictors of CBDC readiness based on the reported regression results. The study concludes that blockchain innovation is significantly associated with the readiness of fintech firms to operate within a potential CBDC environment. The study recommends continued development of enabling policies for interoperability, investment in blockchain-enabled process and service innovation, and strengthening of security, transparency and internal controls among fintech firms.

Key terms: *blockchain innovation, process innovation, service innovation, CBDC readiness, fintech firms in Kenya*

Stratford Peer Reviewed Journals and Book Publishing
Journal of Finance and Accounting
Volume 10||Issue 8||Page 111-130 ||November||2026|
Email: info@stratfordjournals.org ISSN: 2616-4960

1. Introduction

Central Bank Digital Currency (CBDC) represents an emerging monetary innovation intended to modernize payment systems, strengthen financial infrastructure, and promote financial inclusion through digital representations of central bank liabilities within regulated financial systems (Boakye-Adjei et al., 2023; Walker, 2022). The growing application of blockchain technology has heightened its relevance by providing distributed ledger systems, smart contracts, cryptographic verification, and process automation that enhance transaction security, transparency, data integrity, and operational efficiency (Ajuwon, 2021; Tunzina et al., 2024; Celestin et al., 2025; Parhi, 2025). Nevertheless, successful CBDC implementation depends not only on technological innovation but also on appropriate regulatory frameworks, institutional capacity, stakeholder acceptance, and interoperability with existing financial infrastructure (Salvi & Bhagwati, 2025). Experiences in African countries, particularly Nigeria and Ghana, demonstrate the potential of CBDCs to advance financial inclusion, improve payment accessibility, and strengthen financial system resilience, although digital literacy, infrastructure limitations, institutional capacity, and public confidence remain significant preparedness challenges (Afadzinu & Dávid, 2024; Mobius, 2025; Lannquist & Tan, 2023; Yakubu et al., 2025). In Kenya, the expansion of mobile money and digital financial services has created opportunities for exploring CBDC adoption, with the Central Bank of Kenya identifying its potential to modernize the national payment system while safeguarding monetary and financial stability, making regulatory preparedness, technological capacity, institutional support, interoperability preparedness, and stakeholder willingness critical dimensions of readiness (CBK, 2022).

Nairobi County provides an appropriate context for examining blockchain innovation and CBDC readiness because of its concentration of fintech firms engaged in digital payments, lending, remittances, and other technology-enabled financial services (Moro-Visconti & Cesaretti, 2023). However, the expansion of digital financial services does not necessarily indicate that these firms possess the organizational and technological capabilities required to support a prospective CBDC ecosystem, particularly given challenges associated with cybersecurity, regulatory uncertainty, interoperability, implementation costs, and technical expertise (Kim, 2022; Wamalwa, 2024). Furthermore, organizational preparedness requires management commitment, institutional investment, regulatory compliance, and stakeholder collaboration to complement technological advancement. Despite growing scholarly interest in blockchain applications and CBDC development, the relationship between specific blockchain innovation capabilities and organizational readiness among fintech firms in countries that have not implemented retail CBDCs remains insufficiently established (Martinez et al., 2024; Hassan et al., 2025). Consequently, this study examines the relationship between blockchain innovation, measured through decentralization, transparency, security, and process automation, and CBDC readiness, assessed through regulatory preparedness, technological capacity, institutional support, interoperability preparedness, and stakeholder willingness, among fintech firms in Nairobi County, Kenya, with the intention of generating empirical evidence to inform organizational technological investments, institutional preparedness, and regulatory policy considerations concerning the potential introduction of a retail CBDC.

1.2 Statement of the Problem

The increasing global exploration of Central Bank Digital Currencies (CBDCs) has heightened the need for financial institutions and FinTech firms to strengthen their technological, institutional, and regulatory capabilities in anticipation of potential implementation. The Bank for International Settlements (2024) indicates that over 90% of central banks worldwide are exploring CBDCs, with more than 60% having advanced to experimentation or pilot stages. However, developments in CBDC exploration do not necessarily reflect corresponding preparedness among FinTech firms expected to participate in the emerging digital financial ecosystem. In Kenya, although the Central Bank of Kenya (CBK, 2024) continues to assess the potential application of CBDCs, full-scale implementation remains unrealized, raising concerns about the readiness of Nairobi-based FinTech firms in terms of technological infrastructure, cybersecurity, interoperability, technical expertise, institutional capacity, and regulatory compliance. The World Bank (2024) identifies institutional and technological limitations as potential constraints to advanced digital financial ecosystems, while the CBK (2024) underscores the importance of technological and regulatory preparedness in strengthening digital financial services. Similarly, the International Monetary Fund (2023) highlights cybersecurity, scalability, and governance challenges associated with digital financial innovation. Although blockchain innovation presents opportunities to enhance transaction security, transparency, interoperability, and process automation, the World Economic Forum (2024) projects that global investment in blockchain technologies would exceed USD 19 billion by 2025, suggesting increasing interest in the technology without necessarily guaranteeing organizational preparedness. Moreover, since CBDCs may operate through centralized or distributed ledger architectures, blockchain adoption should not automatically be considered a prerequisite for CBDC readiness.

Despite growing interest in blockchain innovation and digital financial transformation, existing empirical studies provide insufficient evidence on how blockchain innovation relates to organizational CBDC readiness within Nairobi's FinTech sector. Mugamba (2024) established the significance of technological capability, cybersecurity, and digital infrastructure in influencing CBDC adoption among Kenyan financial intermediaries but did not specifically examine blockchain innovation as a determinant of CBDC readiness among FinTech firms. Similarly, Wakagwi and Mose (2024) investigated blockchain readiness among commercial banks, limiting the applicability of their findings to FinTech firms with different operational structures and technological capabilities. Wilter (2023) examined FinTech adoption and banking efficiency without directly addressing CBDC readiness, whereas Evite (2025) focused on blockchain-enabled community currencies rather than preparedness for central bank-issued digital currencies. These studies reveal conceptual, contextual, and empirical gaps regarding the relationship between blockchain innovation and measurable dimensions of CBDC readiness among Nairobi-based FinTech firms. Consequently, this study seeks to establish the relationship between blockchain innovation and CBDC readiness among FinTech firms in Nairobi County, Kenya. By generating firm-level empirical evidence, the study aims to advance understanding of how technological innovation relates to organizational preparedness for emerging digital financial infrastructure while providing insights to inform the CBK, relevant regulatory institutions, and FinTech practitioners in strengthening the technological, institutional, and regulatory foundations necessary for potential CBDC implementation.

1.3 Study Objective

The overall objective was to examine the relationship between blockchain innovation and Central Bank Digital Currency readiness among financial technology firms in Nairobi County, Kenya.

The two specific objectives were:

i. To evaluate the relationship between blockchain-enabled process innovation and CBDC readiness among financial technology firms in Nairobi County, Kenya.
ii. To analyse the relationship between blockchain-enabled service innovation and CBDC readiness among financial technology firms in Nairobi County, Kenya.

1.4 Hypotheses

The corresponding null hypotheses were:

H_{o1}: Blockchain-enabled process innovation has no statistically significant relationship with CBDC readiness among financial technology firms in Nairobi County, Kenya.

H_{o2}: Blockchain-enabled service innovation has no statistically significant relationship with CBDC readiness among financial technology firms in Nairobi County, Kenya.

2.1 Literature Review

2.1.1 Theoretical Review

The study is anchored on Systems Theory, developed by Bertalanffy (1951) and advanced by Boulding (1956), which explains how interconnected components interact and depend on one another to achieve common objectives. The theory posits that the effectiveness of individual components is shaped by their interactions within the wider system (Münch et al., 2022). In the context of blockchain innovation and Central Bank Digital Currency (CBDC) readiness, it provides a theoretical basis for understanding how interoperability supports seamless communication, information exchange, and integration across diverse digital payment platforms (Van Lier & Hardjono, 2011). However, the theory has been criticized for assuming harmonious interactions among system components, while overlooking conflicting interests, regulatory uncertainties, technological disruptions, and power imbalances within digital financial ecosystems (Greene, 2020). Despite these limitations, Systems Theory is relevant to this study because it explains how interoperability among blockchain-enabled platforms, FinTech firms, and existing payment infrastructures can promote an integrated digital payment ecosystem and strengthen preparedness for retail CBDC implementation in Kenya.

Modern Portfolio Theory, developed by Markowitz (1951), explains how diversification can be used to balance investment risks and anticipated returns through the selection of optimal investment combinations (Rani, 2012). The theory emphasizes the importance of reducing exposure to individual risks while maximizing potential returns, thereby positioning risk management as a fundamental consideration in investment decisions (Berk & Tutarli, 2020). Its application to blockchain innovation provides a basis for examining how security and

transparency can minimize technological vulnerabilities, enhance confidence in digital financial systems, and support the diversification of payment channels through the integration of CBDCs with existing digital payment solutions. Nevertheless, the theory has been criticized for its reliance on assumptions such as market efficiency, which may inadequately account for information asymmetries and unpredictable market conditions (Kahramonovich, 2023). Transaction Cost Theory, introduced by Coase (1937), explains how organizations seek to minimize the costs of transactions and economic coordination (Rindfleisch, 2020; Chen et al., 2022), including through efficient organizational boundaries and resource allocation (Audretsch & Belitski, 2023), although its emphasis on economic costs has been criticized for overlooking social relationships, trust, and institutional influences (Wu & Yu, 2023; Vivona et al., 2023); accordingly, it provides a relevant foundation for examining how blockchain innovation and CBDC readiness can streamline payment processes, reduce transaction costs, improve operational efficiency, and expand financial inclusion among FinTech firms in Nairobi County.

2.1.2 Empirical Literature Review

Blockchain-enabled process innovation is increasingly regarded as an important component of operational transformation in financial services, particularly through its capacity to enhance transaction processing, verification, recordkeeping and information exchange. Ahmed (2025), examining 17 national banks in the United Arab Emirates between 2017 and 2023 using a random forest approach, established that blockchain adoption was associated with reduced transaction processing, transfer and fraud-related costs. Similarly, Chen et al. (2022) demonstrated that blockchain technology improves information visibility, traceability and coordination across organizational value chains. However, Zhang and Huang (2022) observed that blockchain-based CBDC architectures must address scalability, transaction performance and interoperability to support effective implementation. Although these studies demonstrate the operational and technological benefits of blockchain, they provide limited evidence on whether blockchain-enabled process innovation enhances organizational readiness for CBDC adoption, particularly among fintech firms in emerging economies.

The technical suitability of blockchain-enabled processes is therefore an important consideration in preparing financial technology firms for prospective CBDC implementation. Zhang and Huang (2022) established that the effectiveness of blockchain-based CBDC architectures depends on the capacity to process high transaction volumes, maintain system performance and facilitate interoperability with existing payment infrastructure. Additionally, Chen et al. (2022) emphasized the importance of system integration, technological capabilities and institutional coordination in realizing the benefits of blockchain governance. Across African financial markets, blockchain-enabled process innovation offers opportunities to strengthen transaction traceability, improve operational efficiency and enhance the reliability of digital financial services. Nevertheless, accommodating a retail CBDC may require fintech firms to modify transaction-processing systems, reconciliation procedures, internal controls and settlement arrangements, making existing digital payment capabilities insufficient evidence of actual CBDC preparedness.

Blockchain-enabled service innovation entails developing and improving digital financial services through distributed-ledger capabilities, including automated verification, transaction traceability, secure information exchange and payment integration. Claessens et al. (2024) examined the relationship between fintech development and CBDCs, highlighting the opportunities for financial innovation alongside the regulatory and operational considerations associated with their implementation. Their analysis indicates that CBDCs could transform interactions among financial institutions, payment service providers and technology firms, creating opportunities for innovative digital financial services. Similarly, Zhang and Huang (2022) emphasized that successful blockchain-based CBDC implementation requires scalable systems, reliable transaction processing and effective interoperability with existing financial infrastructure. These findings suggest that although blockchain-enabled service innovation can improve digital platform functionality and expand financial service offerings, its contribution to CBDC readiness depends on firms' capacity to align technological capabilities with regulatory, institutional and operational requirements.

A review of the empirical literature reveals conceptual, contextual and methodological gaps concerning the relationship between blockchain-enabled service innovation and CBDC readiness. Whereas Claessens et al. (2024) examined the broader opportunities and implementation considerations associated with fintech development and CBDCs, Zhang and Huang (2022) concentrated on the technical requirements of blockchain-based CBDC architectures, providing limited direct evidence on firm-level preparedness. Furthermore, the availability of verified empirical evidence linking blockchain-enabled service innovation to CBDC readiness remains limited, particularly within African financial markets. In Kenya, although fintech firms operate within an established digital financial services ecosystem, differences in technological infrastructure, service-development capabilities, platform architecture and system integration may influence their preparedness to accommodate prospective retail CBDC arrangements. Consequently, the present study seeks to address this contextual and empirical gap by examining the relationship between blockchain-enabled process innovation and blockchain-enabled service innovation, and central bank retail digital currency readiness among fintech firms in Nairobi County, Kenya.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Finance and Accounting
Volume 10||Issue 8||Page 111-130 ||November||2026|
Email: info@stratfordjournals.org ISSN: 2616-4960

2.2 Conceptual Framework

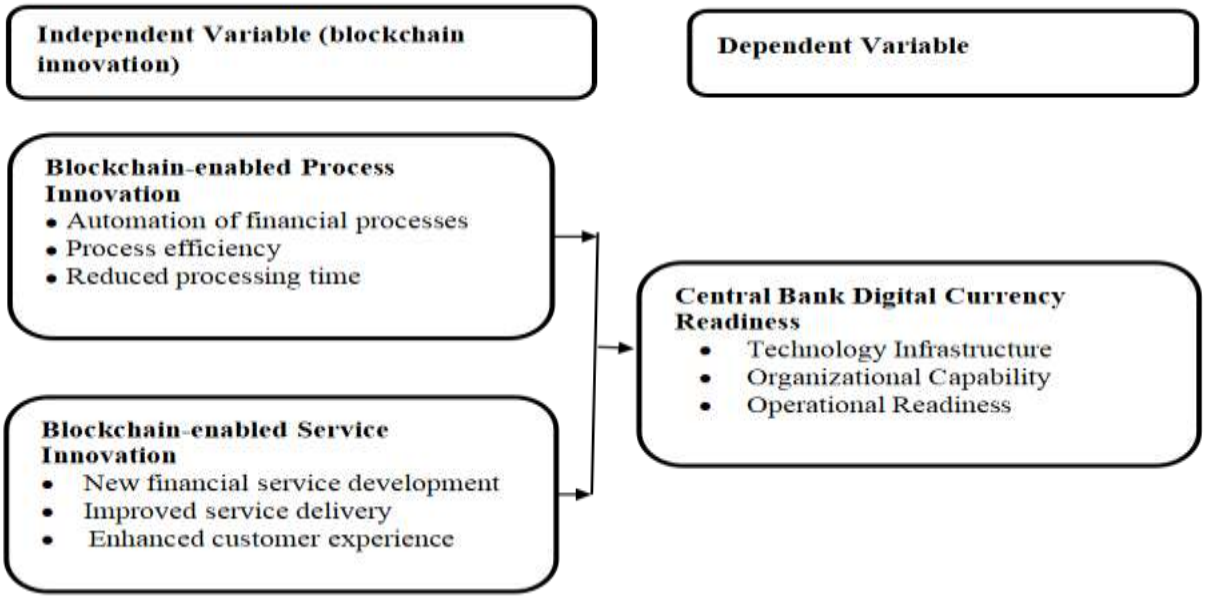


Figure 1: Conceptual Framework

3.0 Methodology

3.1 Research Design

The study adopted a quantitative research approach to examine the relationship between blockchain innovation and Central Bank Digital Currency (CBDC) readiness among FinTech firms in Nairobi County, Kenya. A cross-sectional explanatory survey design was employed to facilitate the collection of standardized data from eligible firms at a single point in time and establish the statistical associations between the study variables. The design was appropriate because it enabled the examination of blockchain innovation, namely blockchain-enabled process innovation and blockchain-enabled service innovation, in relation to prospective organizational CBDC readiness. Given the observational and cross-sectional nature of the study, the findings were interpreted in terms of statistical associations rather than definitive causal relationships.

3.2 Target Population

The target population comprised 144 licensed FinTech firms in Nairobi County, consisting of 18 money remittance providers (12.5%) and 126 digital credit providers (87.5%), based on the Central Bank of Kenya (CBK, 2025) sampling frame. A census approach was adopted because the population was relatively small and accessible, with all 144 firms targeted for participation. However, 113 valid questionnaires were received and included in the analysis, representing a response rate of 78.5%. The firm constituted the unit of analysis, while senior officers with relevant knowledge of organizational operations, digital innovation, information technology,

finance, compliance and risk management served as the units of observation. The use of knowledgeable organizational representatives was intended to obtain reliable information regarding the firms' blockchain innovation practices and preparedness for potential CBDC implementation.

3.3 Data Collection and Procedure

Primary data were collected using a structured questionnaire developed from the research objectives, conceptual framework and relevant empirical literature. The instrument employed a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5) to measure the four independent variables and the dependent variable. CBDC readiness was conceptualized as prospective organizational preparedness to support, integrate with or participate in a potential retail CBDC ecosystem rather than actual adoption of an operational digital currency. Content validity was established through expert assessment involving the research supervisor and specialists in relevant fields, whose recommendations informed improvements in item relevance, clarity and construct coverage. Additionally, a pilot study involving 14 FinTech firms in Machakos County, representing approximately 10% of the target population, was undertaken to assess the clarity, suitability and reliability of the questionnaire. Data collection commenced after obtaining an introductory letter from KCA University and the requisite research authorization from the National Commission for Science, Technology and Innovation (NACOSTI). Permission was also sought from the management of the participating FinTech firms before administering the questionnaires. A drop-and-pick approach was used to allow respondents sufficient time to complete the instruments.

3.4 Data Analysis Model

The collected data were coded, cleaned and analysed using the Statistical Package for the Social Sciences (SPSS), version 29. Descriptive statistics, including frequencies, percentages, means and standard deviations, were used to summarize respondent characteristics and responses to the study constructs. Multiple regression analysis was subsequently employed to examine the relationships between the two dimensions of blockchain innovation and CBDC readiness. The regression model was specified as follows:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+e$$

Where:

Y = CBDC Readiness

β_0=Constant

β_1, β_2 are coefficients

e=Error term.

X_1= Blockchain-enabled process innovation

X_2= Blockchain-enabled service Innovation

The adequacy of the regression model was evaluated through diagnostic tests covering normality, linearity, multicollinearity and heteroscedasticity. Normality was assessed using residual histograms, Q–Q plots and the Shapiro–Wilk test, while linearity was examined through scatterplots, residual-versus-fitted plots and partial regression plots. Multicollinearity

was evaluated using Variance Inflation Factor (VIF) and tolerance statistics, with particular attention to potential conceptual overlap among the blockchain innovation dimensions. The Breusch–Pagan test and residual plots were used to assess heteroscedasticity. Additional residual and influence diagnostics were considered to identify potential outliers and influential observations. Where necessary, appropriate corrective procedures, including heteroscedasticity-consistent standard errors, were considered to improve the reliability of statistical inference. Regression coefficients, confidence intervals, p-values, the overall F-statistic and the coefficient of determination (R^2) were used to interpret the findings, with statistical significance evaluated at the 5% level.

4.1 Key Results and Findings

4.1.1 Descriptive Statistics for Blockchain-Enabled Process Innovation

The study examined descriptive statistics relating to blockchain-enabled process innovation and blockchain-enabled service innovation to establish their perceived contribution to Central Bank Digital Currency (CBDC) readiness among financial technology firms in Nairobi County, Kenya. The findings are presented in the following sections.

Table 1: Descriptive Statistics for Blockchain-Enabled Process Innovation

Statement	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)	Mean	SD*
Development of new financial services using blockchain	0 (0.0%)	16 (14.2%)	11 (9.7%)	70 (61.9%)	16 (14.2%)	3.7611	0.86885
Introduction of innovative digital financial products	0 (0.0%)	0 (0.0%)	27 (23.9%)	75 (66.4%)	11 (9.7%)	3.8584	0.56485
Improved delivery of financial services to customers	0 (0.0%)	21 (18.6%)	21 (18.6%)	71 (62.8%)	0 (0.0%)	3.4425	0.78987
Improved speed and convenience of service delivery	11 (9.7%)	22 (19.5%)	10 (8.8%)	70 (61.9%)	0 (0.0%)	3.2301	1.07744
Enhanced customer experience with financial services	0 (0.0%)	10 (8.8%)	11 (9.7%)	71 (62.8%)	21 (18.6%)	3.9115	0.79684

The statement concerning enhanced customer experience with financial services recorded the highest mean (M = 3.9115, SD = 0.79684), followed by the introduction of innovative digital financial products (M = 3.8584, SD = 0.56485). The development of new financial services using blockchain technology also recorded a relatively high mean (M = 3.7611, SD = 0.86885). Improved delivery of financial services to customers registered a mean of 3.4425 (SD = 0.78987), while improved speed and convenience of service delivery recorded the lowest mean (M = 3.2301, SD = 1.07744). Overall, the findings indicate that respondents generally expressed positive perceptions regarding blockchain-enabled service innovation, particularly in enhancing customer experience and introducing innovative digital financial products. However, the comparatively lower ratings for service delivery speed and convenience suggest that the perceived benefits of blockchain adoption may not be equally evident across all dimensions of financial service delivery.

The findings are consistent with Hudáková et al. (2023), who highlighted the importance of effective operational processes and risk management in enhancing organisational performance. Similarly, Ahmed (2025) established that blockchain adoption was associated with reductions in transaction-processing, transfer and fraud-related costs among banks in the United Arab Emirates. These findings demonstrate the potential contribution of blockchain-enabled process improvements to operational efficiency and organisational preparedness. From the perspective of Transaction Cost Theory, automation and streamlined transaction procedures can reduce the resources required to coordinate, process and monitor financial transactions. Consequently, fintech firms with improved blockchain-enabled operational processes may be better positioned to adapt their internal systems and procedures to the requirements of a potential CBDC environment.

4.1.2 Descriptive Statistics for Blockchain-Enabled Service Innovation

Below is descriptive statistics for blockchain-enabled service innovation. The statements assessed the development of new financial services, introduction of innovative digital products, improvement in financial service delivery, speed and convenience of service delivery, and enhancement of customer experience.

Table 2: Descriptive Statistics for Blockchain-Enabled Service Innovation

Statement	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)	Mean	SD*
Development of new financial services using blockchain	0 (0.0)	16 (14.2)	11 (9.7)	70 (61.9)	16 (14.2)	3.7611	0.86885
Introduction of innovative digital financial products	0 (0.0)	0 (0.0)	27 (23.9)	75 (66.4)	11 (9.7)	3.8584	0.56485
Improved delivery of financial services to customers	0 (0.0)	21 (18.6)	21 (18.6)	71 (62.8)	0 (0.0)	3.4425	0.78987
Improved speed and convenience of service delivery	11 (9.7)	22 (19.5)	10 (8.8)	70 (61.9)	0 (0.0)	3.2301	1.07744
Enhanced customer experience with financial services	0 (0.0)	10 (8.8)	11 (9.7)	71 (62.8)	21 (18.6)	3.9115	0.79684

The findings indicate generally favourable perceptions of blockchain-enabled service innovation among the respondents. Enhancement of customer experience recorded the highest mean (M = 3.9115, SD = 0.79684), with 81.4% of respondents agreeing or strongly agreeing with the statement. This was followed by the introduction of innovative digital financial products (M = 3.8584, SD = 0.56485), for which 76.1% expressed agreement. Similarly, the development of new financial services using blockchain recorded a mean of 3.7611 (SD = 0.86885), with 76.1% of respondents indicating agreement or strong agreement. Improved delivery of financial services to customers recorded a mean of 3.4425 (SD = 0.78987), with 62.8% of respondents agreeing with the statement, while 37.2% were either neutral or disagreed. Improved speed and convenience of service delivery recorded the lowest mean (M = 3.2301, SD = 1.07744). Although 61.9% of respondents agreed with this statement, 29.2%

disagreed or strongly disagreed, suggesting comparatively mixed perceptions regarding the contribution of blockchain to service delivery speed and convenience.

Overall, the findings suggest that blockchain-enabled service innovation is perceived more favourably in relation to the development of innovative financial products and enhancement of customer experience than in relation to improvements in service delivery efficiency. This implies that while blockchain technology may support the introduction of new financial solutions and improve customer interactions, its contribution to the speed and convenience of financial service delivery remains comparatively less pronounced. These findings can be discussed alongside the Central Bank of Kenya (CBK, 2022), as cited in the original study, regarding technological capabilities and innovation in financial services. They also provide a basis for comparison with Owino (2023), who examined digital payment attributes and revenue collection in Nairobi supermarkets. However, differences in organisational contexts and outcome measures should be considered when interpreting the findings.

4.2 Correlation Analysis

Pearson correlation analysis was undertaken to establish the direction and strength of the relationships between blockchain-enabled process innovation, blockchain-enabled service innovation and CBDC readiness. The results showed strong, positive and statistically significant relationships for both dimensions.

Table 3: Correlation between Process Innovation, Service Innovation and CBDC Readiness

Variable	CBDC readiness (r)	Sig. (2-tailed)	N
Blockchain-enabled process innovation	0.836	< 0.001	113
Blockchain-enabled service innovation	0.846	< 0.001	113

Blockchain-enabled process innovation had a strong positive relationship with CBDC readiness ($r = 0.836$, $p < 0.001$). Similarly, blockchain-enabled service innovation recorded a strong positive correlation with CBDC readiness ($r = 0.846$, $p < 0.001$). These results indicate that fintech firms reports stronger process and service innovation also tended to report higher levels of readiness for a potential CBDC environment.

4.3 Multiple Regression Results

Multiple regression analysis was undertaken to assess the contribution of the blockchain innovation dimensions to CBDC readiness. The model summary and ANOVA results relate to two predictors; the coefficient results below focus on blockchain-enabled process innovation and blockchain-enabled service innovation.

Table 4: Overall Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.918	0.842	0.836	1.31991

The overall model produced an adjusted R^2 of 0.836, indicating that blockchain innovation dimensions jointly explained 83.6% of the variation in CBDC readiness among the fintech firms. The remaining 16.4% represents variation associated with factors outside the model and unexplained error. This result describes the explanatory power of the full model and should not be attributed to process and service innovation alone.

Table 5: Analysis of Variance for the Overall Regression Model

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	992.079	2	496.040	290.039	< 0.001
Residual	186.412	109	1.710		
Total	1,178.491	111			

Dependent variable: CBDC readiness

The ANOVA results indicate that the overall regression model comprising blockchain-enabled process innovation and blockchain-enabled service innovation was statistically significant, ($F(2,109)=290.039$, $p<0.001$). This suggests that the two independent variables jointly provide statistically significant explanatory power in predicting CBDC readiness among FinTech firms in Nairobi County, Kenya.

Table 6: Regression Coefficients for Process and Service Innovation

Predictor	B	Std. Error	Standardized Beta	t	Sig.
Blockchain-enabled process innovation	0.700	0.092	0.516	7.650	< 0.001
Blockchain-enabled service innovation	0.489	0.207	0.260	2.368	0.020

Blockchain-enabled process innovation had an unstandardised coefficient of $B = 0.700$ and a standardized beta coefficient of $\beta = 0.516$, with $p < 0.001$. Holding the other predictors constant, a one-unit increase in process innovation was associated with a 0.700-unit increase in the predicted CBDC readiness score. The null hypothesis (H02), which stated that blockchain-

enabled process innovation has no significant influence on CBDC readiness, was therefore rejected.

Blockchain-enabled service innovation recorded an unstandardised coefficient of B = 0.489 and a standardized beta coefficient of β = 0.260, with p = 0.020. Holding the other predictors constant, a one-unit increase in service innovation was associated with a 0.489-unit increase in the predicted CBDC readiness score. The null hypothesis (H03), which stated that blockchain-enabled service innovation has no significant influence on CBDC readiness, was therefore rejected.

4.4 Discussion of Findings

The findings established that blockchain-enabled process innovation was positively and significantly associated with CBDC readiness among fintech firms in Nairobi County, Kenya, as demonstrated by a strong positive correlation ($r = 0.836$, $p < 0.001$) and a statistically significant regression coefficient ($B = 0.700$, $p < 0.001$). Respondents acknowledged that blockchain technology facilitates transaction processing, automates manual procedures and reduces transaction completion time, thereby strengthening organisational operational efficiency. These results are consistent with Hudáková et al. (2023), who emphasised the contribution of efficient operational processes and risk management to organisational performance, and Ahmed (2025), who associated blockchain adoption with reduced transaction-processing, transfer and fraud-related costs among banks in the United Arab Emirates. The findings further support Transaction Cost Theory, which underscores the importance of minimising the costs and resources associated with coordinating, processing and monitoring transactions. Consequently, improved automation, streamlined workflows and efficient transaction systems may enhance fintech firms' operational capabilities and preparedness to accommodate potential CBDC requirements, leading to the rejection of the second null hypothesis (H02).

Similarly, the findings demonstrated that blockchain-enabled service innovation was positively and significantly associated with CBDC readiness, as reflected by a strong positive correlation ($r = 0.846$, $p < 0.001$) and a statistically significant regression coefficient ($B = 0.489$, $p = 0.020$). Respondents recognised the potential of blockchain technology to facilitate innovative digital financial products, improve service delivery and enhance customer experiences. These findings are consistent with Li et al. (2023) and Momo and Behr (2021), who highlighted the importance of blockchain-related capabilities and transaction efficiencies in digital financial environments, as well as Claessens et al. (2024), who emphasized opportunities for financial service innovation arising from fintech developments and CBDCs. From a systems perspective, service innovation depends on the integration of technological infrastructure, organisational processes and customer requirements to facilitate responsive and adaptable financial services. Therefore, fintech firms capable of developing innovative blockchain-enabled products and services may be better positioned to adapt to emerging digital currency requirements and explore opportunities within a prospective CBDC ecosystem, thereby supporting the rejection of the second null hypothesis (H02).

5.0 Summary and Conclusion

The first objective of the study sought to establish the influence of blockchain-enabled process innovation on CBDC readiness among fintech firms in Nairobi County, Kenya. Based on the descriptive and regression findings, it can be concluded that blockchain-enabled process innovation was significantly associated with CBDC readiness. The findings demonstrated that the adoption of innovative blockchain-based processes, including automation, process simplification and improved transaction handling, was relevant in strengthening organisational preparedness for potential CBDC implementation. The study therefore established that fintech firms with enhanced process innovation capabilities were better positioned in terms of operational preparedness for the anticipated changes in the digital financial ecosystem.

The second objective of the study sought to determine the influence of blockchain-enabled service innovation on CBDC readiness among fintech firms in Nairobi County, Kenya. In view of the findings, blockchain-enabled service innovation was found to be significantly associated with CBDC readiness. The findings indicated that the development, improvement and adaptation of digital financial services were important considerations in preparing fintech firms for potential CBDC implementation. Specifically, the ability to develop innovative digital financial solutions and integrate financial services across existing platforms represented an important organisational capability. The study therefore concluded that blockchain-enabled service innovation was relevant in enhancing fintech firms' preparedness for the possible introduction of a retail Central Bank Digital Currency in Kenya.

5.1 Recommendations of the Study

The study established that blockchain-enabled process innovation, particularly automation, process simplification and improved transaction handling, was significantly associated with CBDC readiness. Based on this finding, operations managers and information technology teams in fintech firms should strengthen their internal processes through appropriate blockchain-enabled automation and digital process integration. Particular attention should be directed towards automating routine transaction processing, reconciliation and verification activities while maintaining adequate human oversight and operational controls. Furthermore, fintech firms should regularly evaluate their transaction-processing procedures to identify inefficiencies and opportunities for process improvement. Progress should be monitored using indicators such as the proportion of eligible processes automated, transaction-processing time, processing error rates and the effectiveness of business continuity procedures. These initiatives would strengthen organisational preparedness for potential CBDC implementation while improving the efficiency of existing digital financial operations.

The findings further established that blockchain-enabled service innovation was significantly associated with CBDC readiness. Hence, business development managers and product development teams in fintech firms should continuously develop and improve blockchain-enabled digital financial services to respond to emerging technological developments and changing customer requirements. Fintech firms should prioritise the development of accessible, reliable and secure digital financial solutions that can integrate with existing payment platforms. In addition, collaboration with relevant financial-sector stakeholders should be encouraged to support service integration and responsible financial innovation. The Central Bank of Kenya,

in collaboration with relevant regulatory authorities, should provide appropriate regulatory guidance to support the development and testing of innovative digital financial services. Implementation should be assessed through indicators such as the number of new or improved digital services developed, the proportion of services successfully integrated with existing platforms, service reliability and customer satisfaction. Such measures would enhance the capacity of fintech firms to respond to future developments in digital currency systems.

Areas for Further Research

The present study examined blockchain-enabled process innovation and blockchain-enabled service innovation as independent variables associated with CBDC readiness among fintech firms in Nairobi County, Kenya. Future studies could incorporate other organisational and technological variables, such as regulatory preparedness, institutional capacity, technological infrastructure, organisational resources and stakeholder acceptance, to establish their association with CBDC readiness. This would provide a broader understanding of the organisational and environmental conditions that may influence preparedness for potential CBDC implementation.

The study was also limited to fintech firms operating in Nairobi County, Kenya. Future research should therefore extend the investigation to fintech firms in other counties and other financial institutions, including commercial banks, microfinance institutions and payment service providers, to establish whether similar relationships exist across different institutional and geographical contexts. Furthermore, the study adopted a cross-sectional research design and relied on respondents' assessments. Future studies could adopt longitudinal or mixed-methods approaches involving surveys and interviews with fintech managers, technology specialists and financial-sector regulators. Researchers could also incorporate independently verified organisational indicators, including process automation records, transaction-processing efficiency, service integration tests and technology investment records, to complement perceptual assessments. Such investigations would provide a more comprehensive understanding of how blockchain-enabled process and service innovations relate to organisational preparedness for potential CBDC implementation in Kenya.

References

Abdul-Wahab, A. H., Yakubu, I. N., & Iddrisu, A. (2025). The role of central bank digital currencies in promoting financial stability and inclusion. In *Financial Regulation, Governance, and Stability* (143-161). Routledge.

Abor, J. Y., Abugre, J. A., & Green, C. J. (2025). Central bank digital currency and monetary policy. In *the Elgar Companion to Financial Economics* (430-454). Edward Elgar Publishing.

Adelaja, A. O., Umeorah, S. C., Abikoye, B. E., & Nezianya, M. C. (2024). Advancing financial inclusion through fintech: Solutions for unbanked and underbanked populations. *World Journal of Advanced Research and Reviews*, *23*(01), 427-438.

Afadzinu, S. K., & Dávid, L. (2024). Navigating Ghana's monetary policy evolution and the potential of central bank digital currencies. *Journal of Infrastructure Policy and Development*, 8(13), 8236.

Agama, D. E. (2025). Central bank digital currencies: navigating opportunities and challenges in Sub-Saharan Africa. *Available at SSRN 5094850*.

Al. Ghanmi, H., Ahmadjee, S., Bahsoon, R., & Adeyemo, H. B. (2026). Exploring human-centric dimensions in blockchain smart contracts. *ACM Computing Surveys*, *58*(7), 1-43.

Allen, F., Gu, X., & Jagtiani, J. (2022). Fintech, cryptocurrencies, and CBDC: Financial structural transformation in China. *Journal of International Money and Finance*, *124*, 102625.

Ansari, M. R., Rahim, K., Bhoje, R., & Bhosale, S. (2022). A study on research design and its types. *International Research Journal of Engineering and Technology (IRJET)*, *9*(7), 1132-1135.

Audretsch, B. D., & Belitski, M. (2023). The limits to open innovation and its impact on innovation performance. *Technovation*, *119*, 102519.

Auer, R., & Böhme, R. (2020). The technology of retail central bank digital currency. *BIS Quarterly Review*, 2(2),104-112

Azevedo, R. R. D., Lino, A. F., Carrara, L. G. C., Aquino, A. C. B. D., & Cardoso, R. L. (2025). Interoperability of financial management systems in local governments and opportunities for digital transformation. *Revista de Administração Pública*, *59*, e2024-0249.

Berk, C., & Tutarli, B. (2020). Dead or alive: Modern portfolio theory based on financial analysis. *Universal Journal of Accounting and Finance*, *8*(4), 83-91.

Berman, A., Cano-Kollmann, M., & Mudambi, R. (2022). Innovation and entrepreneurial ecosystems: fintech in the financial services industry. *Review of Managerial Science*, *16*(1), 45-64.

Boakye-Adjei, N. Y., Auer, R., Banka, H., Faragallah, A., Frost, J., Natarajan, H., & Prenio, J. (2023). Can central bank digital currencies help advance financial inclusion? Journal *of Payments Strategy & Systems*, *17*(4), 433-447.

Brummer, C., Yadav, Y., & Zaring, D. (2022). Regulation by Enforcement. *S. Cal. L. Rev.*, *96*, 1297.

Brunner Meier, M. K., Limodio, N., & Spadavecchia, L. (2023). *Mobile money, interoperability, and financial inclusion* (No. w31696). National Bureau of Economic Research.

Cao, H. H., Huang, Y., Huang, Y., Yeung, B., & Zhang, X. (2023). Fintech, financial inclusion, digital currency, and CBDC. *The Journal of Finance and Data Science*, *9*, 100115.

Carlos Ferreira, J., Elvas, L. B., Correia, R., & Mascarenhas, M. (2024). Enhancing EHR interoperability and security through distributed ledger technology: A review. In *Healthcare*, 12(19),1967

Celestin, M., Vasuki, M., Kumar, A. D., & Alghazali, T. A. H. (2025). The synergy between blockchain technology and fintech in reinventing global financial system. *International Journal of Engineering Research and Modern Education*, *10*(2), 97-109.

Chen, W., Botchie, D., Braganza, A., & Han, H. (2022). A transaction cost perspective on blockchain governance in global value chains. *Strategic Change*, *31*(1), 75-87.

Chowdhury, M. U., Suchana, K., Alam, S. M. E., & Khan, M. M. (2021). Blockchain application in banking system. *Journal of Software Engineering and Applications*, *14*(7), 298-311.

Christopher, T. (2025). Regulatory compliance and its financial implications.

Corner, D., Mayes, D. G., & Woodward, R. (2023). Modern portfolio theory and investment management. In *Modern Portfolio Theory and Financial Institutions* (pp. 1-20). London: Palgrave Macmillan UK.

Cuypers, I. R., Hennart, J. F., Silverman, B. S., & Ertug, G. (2021). Transaction cost theory: Past progress, current challenges, and suggestions for the future. *Academy of Management Annals*, *15*(1), 111-150.

Dasilas, A., & Karanović, G. (2025). The impact of FinTech firms on bank performance: evidence from the UK. *EuroMed journal of business*, *20*(1), 244-258.

Dong, S., Abbas, K., Li, M., & Kamruzzaman, J. (2023). Blockchain technology and application: an overview. *PeerJ Computer Science*, *9*, e1705.

Doran, J., Kirby, A., & Bourke, J. (2026). *Survey & questionnaire design: Collecting primary data to answer research questions*. Axel NEEFS.

Evite, P. M. (2025). Affordances of digital and blockchain-based community currencies: the case of sarafu network in Kenya. *arXiv preprint arXiv:2512.04030*.

Fidow, A. N., Odoyo, S., & Wambalaba, F. (2022). The effect of transaction cost on the performance of SMEs in Kenya. *International Journal of Accounting, Finance and Risk Management*, *12*(2), 11-19.

Greene, R. R. (2017). General systems theory. In *Human behavior theory and social work practice*, 215-249. Routledge.

Hantke-Domas, M. (2003). The public interest theory of regulation: non-existence or misinterpretation. *European journal of law and economics*, *15*(2), 165-194.

Hassan, A., Hassan, M. A., & Khan, M. A. (2025). Design thinking for secure fintech products: balancing innovation and compliance. *Econova*, *2*(1), 1-16.

Hennart, J. F. (2010). Transaction cost theory and international business. *Journal of Retailing*, *86*(3), 257-269.

Herold, D. M., Saberi, S., Kouhizadeh, M., & Wilde, S. (2022). Categorizing transaction costs outcomes under uncertainty: a blockchain perspective for government organizations. *Journal of Global Operations and Strategic Sourcing*, *15*(3), 431-448.

Hudáková, M., Kardoš, P., Dvorský, J., Afful, C. R., & Kloudova, J. (2023). Management of operational risk in the context of financial performance of SMEs. *Systems*, *11*(8), 408.

Ikram, H., & Amani, A. (2025). *The Role of Central Banks Digital Currencies (CBDCs) in Promoting Financial Inclusion in the Economies of Developing Countries* (Doctoral dissertation, univercity centre of abdelhafid boussouf mila).

Ishmail, D. M., Memba, F., & Muriithi, J. (2022). Operational risk and financial performance of microfinance banks in Kenya.

Izah, S. C., Sylva, L., & Hait, M. (2023). Cronbach's alpha: A cornerstone in ensuring reliability and validity in environmental health assessment. *ES Energy and Environment*, *23*, 1057.

Jabbar, A., & Dani, S. (2020). Investigating the link between transaction and computational costs in a blockchain environment. *International Journal of Production Research*, *58*(11), 3423-3436.

Kahramonovich, S. F. (2023). Analysis of efficient portfolio based on modern portfolio theory. *World bulletin of management and law*, *24*, 47-51.

Kangethe, J. (2022). Digital Currencies: A Conceptual Framework for Its Regulation & Feasibility as Legal Tender. *Available at SSRN 4704906*.

Khaing, P. S. (2024). Role of central bank digital currencies in bridging the formal-informal economy divide in developing countries. Charles University Digital Repository

Kim, M. (2022). *The Myth of Financial Inclusion through FinTech: Focusing on the Digital Credit Industry in Kenya* (Doctoral Dissertation, University of East Anglia).

Kimari, A., Lio, S. & Ogada, A. (2022). The effect of transaction costs of mobile credit on the financial prosperity of micro and small entrepreneurs in Nairobi County, Kenya. *The University Journal*, 5(1), 117-130.

Kukman, T., & Gričar, S. (2025). Blockchain for quality: Advancing security, efficiency, and transparency in financial systems. *FinTech*, *4*(1), 7.

Lannquist, A., & Tan, B. (2023). *Central bank digital currency's role in promoting financial inclusion*. International Monetary Fund.

Li, C., Khaliq, N., Chinove, L., Khaliq, U., Ullah, M., Lakner, Z., & Popp, J. (2023). Perceived transaction cost and its antecedents associated with fintech users' intention: Evidence from Pakistan. *Heliyon*, *9*(4).

Luhmann, N., Baecker, D., & Gilgen, P. (2013). *Introduction to systems theory* (p. 63). Cambridge: Polity.

Martinez, D., Magdalena, L. & Savitri, A. N. (2024). AI and blockchain integration: Enhancing security and transparency in financial transactions. *International Transactions on Artificial Intelligence*, *3*(1), 11-20.

Momo, F. D. S., & Behr, A. (2021). Blockchain: effects in transactions costs from information governance. *BAR-Brazilian Administration Review*, *18*(spe), e200047.

Morelli, M. (2023). Managing Relative Regulatory Inefficiencies in Complex Financial Systems. *U. Pa. J. Bus. L.*, *25*, 705.

Moro-Visconti, R., & Cesaretti, A. (2023). FinTech and digital payment systems valuation. In *Digital Token Valuation: Cryptocurrencies, NFTs, Decentralized Finance, and Blockchains* (pp. 411-458). Cham: Springer Nature Switzerland.

Mrindoko, A. E., Macha, S., & Gwahula, R. (2020). Effect of operational risk on the financial performance of banks in Tanzania. *International journal of business management and economic review*, *3*(6), 115-151.

Mugamba, E. (2024). Leveraging central bank digital currencies, fin-tech, and cryptocurrencies to foster financial inclusion and economic stability in Uganda. *Fin-Tech, and Cryptocurrencies to Foster Financial Inclusion and Economic Stability in Uganda (February 16, 2024)*.

Münch, C., Marx, E., Benz, L., Hartmann, E. & Matzner, M. (2022). Capabilities of digital servitization: Evidence from the socio-technical systems theory. *Technological Forecasting and Social Change*, *176*, 121361.

Musamali, R., Jugurnath, B., Maalu, J., & Mahuni, K. (2024). Fintech regulation in Kenya: Global practises and lessons learnt. *Journal of smart economic growth*, *9*(2), 32-66.

Musau, S. M., Muathe, S., & Mwangi, L. W. (2022). Financial literacy and consumer protection: A road map to digital financial access by SMEs in Kenya. *The Journal of Entrepreneurial Finance (JEF)*, *24*(2), 1-25.

Mwanja, S. K. (2021). Effect of operational and market risk exposures on financial performance of DT-Saccos in Kenya. *International Journal of Research in Business and Social Science*, *10*(5), 107-118.

Mwaura, M. N., Kimani, M., & Mukanzi, C. (2025). Capital regulation compliance on financial performance of deposit-taking savings and credit cooperative societies. A panel analysis approach. *Social Science Research Network*, *4*(2), 24-56.

Nagle, F., Seamans, R., & Tadelis, S. (2025). Transaction cost economics in the digital economy: A research agenda. *Strategic Organization*, *23*(2), 351-365.

Ndung'u, N. (2025). Fintech, savings, and financial inclusion. *The Domestic Savings Shortfall in Sub-Saharan Africa: What Can Be Done About It* (Oxford, 2025; online Edition, Oxford Academic)

Neave, E. H. (2009). *Modern financial systems: Theory and applications*. John Wiley & Sons.

Owino, P. O. (2023). *Effect of digital payments interoperability on revenue collection for supermarkets in Nairobi, Kenya* (Doctoral dissertation, Strathmore University).

Ozili, P. K. (2026). Systems theory of financial inclusion. *Sustainability Practices in Finance, Economics and Technology, Wiley-Scrivener*.

Parhi, A. (2025). Blockchain in finance: Applications, platforms, and global trends in a decentralizing ecosystem. *Platforms, and Global Trends in a Decentralizing Ecosystem.*

Pfister, C. (2024). Monetary sovereignty in the digital currency era. In *Digital Assets and the Law* (pp. 35-66). Routledge.

Prihandini, W., & Safaria, S. (2025). Digital resilience and financial stability: Rethinking the strategic role of FinTech, AI, and CBDC in Indonesia and emerging economies. *Journal of Business, Finance, and Banking*, *1*(1), 50-70.

Rachmad, Y. E. (2025). CBDC as a Global Payment Tool: Opportunities and Challenges in International Trade. *The United Nations and the Nobel Peace Prize Awards*.

Rani, A. (2012). The modern portfolio theory as an investment decision tool. *International Journal of*

Rindfleisch, A. (2020). Transaction cost theory: past, present and future. *AMS Review*, *10*(1), 85-97.

Senoga, W. A. (2023). Effectiveness of regulatory compliance, audition, physical assets control practices on financial performance in churches. *International Journal of Research and Innovation in Social Science*, *7*, 1354-1375.

Takona, J. P. (2024). Research design: qualitative, quantitative, and mixed methods approach. *Quality & Quantity*, *58*(1), 1011-1013.

Tunzina, T., Chayon, M. A. K., Jitu, P. G., Ankon, M. U., Joy, S. N., Shaha, R. K., ... & Pham, P. H. (2024). Blockchain-based central bank digital currency: Empowering centralized oversight with decentralized transactions. *IEEE Access*, *12*, 192689-192709.

Velez, S. B. (2024). Regulatory Compliance in Global Banks. In *Compliance and Financial Crime Risk in Banks: A Practitioners Guide* (pp. 15-25). Emerald Publishing Limited.

Wakagwi, M. W., & Mose, T. (2024). Blockchain technology adoption and performance of commercial banks in Nairobi city county, Kenya. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *8*(4).

Walker, G. A. (2022). Digital money & central bank digital currency (cbdc)–new opportunity, new challenge. *The International Lawyer*, *55*(3), 409-504.

Wamalwa, W. W. (2024). Leveraging community-driven fintech innovations for resilience and inclusive growth in emerging economies: Insights from Kenya. *Journal of Research, Innovation and Implications in Education 9*(4), 497–506

Wilter, M. M. (2023). *Effect of financial technology adoption on performance of commercial Banks in Meru County, Kenya* (Doctoral dissertation, KeMU).

Wu, J., & Yu, J. (2023). Blockchain's impact on platform supply chains: Transaction cost and information transparency perspectives. *International Journal of Production Research*, *61*(11), 3703-3716.

Zeiß, C., Straub, L., Greiner, M., Neis, M., Neis, N., Winkelmann, A., & Lechner, U. (2025). Exploring trust in decentralized finance intermediaries: a taxonomy and archetypes for guiding blockchain-based investment decisions on the web. *Internet Research*, *35*(7), 133-152.