

To cite this article: Mutua John Wambua (2026). Artificial Intelligence Adoption And Financial Performance Of Commercial Banks In Kenya: The Mediating Role Of Operational Efficiency. International Journal of Education, Business and Economics Research (IJEBER) 6 (4): 183-208

ARTIFICIAL INTELLIGENCE ADOPTION AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA: THE MEDIATING ROLE OF OPERATIONAL EFFICIENCY

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<https://doi.org/10.59822/IJEBER.2026.6410>

ABSTRACT

Artificial intelligence (AI) adoption has increasingly transformed the banking sector by enabling advanced data analytics, automated decision-making, intelligent customer service, and improved operational processes. However, empirical evidence on the extent to which AI adoption improves financial performance remains limited, particularly within emerging African banking markets. This study examined the effect of artificial intelligence adoption on financial performance of commercial banks in Kenya, with operational efficiency as a mediating variable. The study was guided by the Technology–Organization–Environment (TOE) Framework and Resource-Based View Theory. The study adopted an explanatory research design using a quantitative approach and utilized secondary panel data obtained from commercial banks in Kenya covering the period 2015–2025. Artificial intelligence adoption was measured through machine learning applications, automated decision-making systems, and AI-powered banking platforms, while financial performance was measured using return on assets (ROA), return on equity (ROE), and profitability growth. Operational efficiency was incorporated as the mediating variable, while bank size and capital adequacy were included as control variables. Panel regression analysis and mediation analysis were employed to establish the direct and indirect relationships among the study variables. The findings revealed that artificial intelligence adoption significantly influenced financial performance of commercial banks in Kenya. Specifically, AI-powered banking platforms had the strongest positive effect on financial performance ($\beta = 0.286$, $p < 0.001$), followed by machine learning applications ($\beta = 0.214$, $p = 0.003$) and automated decision-making systems ($\beta = 0.176$, $p = 0.011$). The regression model was statistically significant ($F = 35.472$, $p < 0.001$) and explained 68.4% of the variation in financial performance ($R^2 = 0.684$). The study further established that artificial intelligence adoption improved operational efficiency, which subsequently contributed to enhanced financial outcomes through reduced operational costs, faster transaction processing, and improved resource utilization. These findings support the Resource-Based View Theory, which argues that technological resources generate competitive advantages when organizations possess capabilities that enable effective utilization. The findings also support the Technology–Organization–Environment Framework by demonstrating that successful AI implementation depends on organizational readiness and technological capability. The study concluded that artificial intelligence adoption represents a strategic capability that enhances financial performance among commercial banks in Kenya when effectively integrated into banking operations. The study recommends that commercial banks strengthen investment in AI technologies and operational capabilities to maximize the financial benefits associated with digital transformation.

KEYWORDS: Artificial Intelligence Adoption, Machine Learning, Automated Decision-Making Systems, Operational Efficiency, Financial Performance, and Commercial Banks, Kenya.

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Published Online: August 2026

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1.0 INTRODUCTION

1.1 Background to the Study

Artificial intelligence (AI) has become a transformative technology that has reshaped the financial services industry through machine learning, automated decision-making, predictive analytics, and intelligent customer service systems. Financial institutions have increasingly adopted AI technologies to improve operational efficiency, strengthen risk management, and enhance service delivery. Previous studies have established that AI capabilities have improved organizational decision-making by enabling faster data analysis, reducing operational costs, and supporting innovation (Davenport & Ronanki, 2018; Huang & Rust, 2021). The banking sector has remained one of the leading adopters of AI because banks generate large volumes of financial data that support advanced analytical applications such as credit assessment, fraud detection, and customer behaviour prediction (Bazarbash, 2019). However, empirical evidence on the extent to which AI adoption has improved financial performance has remained limited, particularly in emerging economies.

Globally, commercial banks have invested significantly in artificial intelligence-driven solutions to improve competitiveness and respond to changing customer expectations. AI applications have been integrated into banking operations through automated credit scoring, fraud detection algorithms, virtual assistants, and predictive risk management systems. Research has demonstrated that AI adoption has contributed to improved operational outcomes by increasing processing speed, reducing human errors, and improving resource allocation (Cockburn et al., 2018; Raisch & Krakowski, 2021). However, studies have also indicated that the financial benefits of AI adoption have depended on institutional readiness, technological capability, and effective integration into business processes. Therefore, AI investment alone has not guaranteed improved profitability unless financial institutions have possessed the necessary capabilities to utilize these technologies effectively.

In emerging African markets, digital transformation has accelerated as financial institutions have adopted technology-driven solutions to improve financial inclusion and service accessibility. Kenya has been recognized as one of Africa's leading digital finance markets due to innovations in mobile banking, fintech development, and electronic payment systems. The Central Bank of Kenya (CBK, 2023) reported that digital channels have continued to play an increasingly important role in banking service delivery, with commercial banks expanding investments in digital platforms and technology-based solutions. Kenyan commercial banks have adopted AI-related applications, including automated credit assessment, fraud monitoring systems, and digital customer service

platforms. Despite these developments, limited empirical evidence has established whether AI adoption has generated measurable improvements in the financial performance of commercial banks in Kenya.

Operational efficiency has emerged as an important mechanism through which artificial intelligence adoption has influenced financial performance. AI technologies have enabled banks to automate routine activities, improve transaction processing, reduce operational costs, and enhance decision accuracy. Previous research has demonstrated that technology-driven efficiency improvements have contributed to improved organizational performance by lowering costs and increasing productivity (Brynjolfsson & McAfee, 2014; Davenport & Ronanki, 2018). In the banking sector, operational efficiency has remained critical because profitability has been strongly influenced by cost management, service delivery effectiveness, and risk control. However, the extent to which AI-driven operational improvements have translated into improved financial outcomes among Kenyan commercial banks has not been sufficiently examined.

The effectiveness of artificial intelligence adoption has also depended on the digital capability of financial institutions. The Resource-Based View Theory has suggested that technological resources create competitive advantages when organizations possess the internal capabilities required to effectively deploy and utilize them (Barney, 1991). Banks with stronger digital infrastructure, higher technology investment, and greater innovation capability have been better positioned to maximize the benefits associated with AI adoption. Therefore, this study examined the effect of machine learning applications, automated decision-making systems, and AI-powered banking platforms on financial performance of commercial banks in Kenya while assessing the moderating influence of bank digital capability. The findings contribute to fintech and strategic finance literature by providing empirical evidence on AI-driven transformation within an emerging African banking context.

1.2 Statement of the Problem

Artificial intelligence (AI) adoption has become a strategic priority within the global banking industry as financial institutions increasingly integrate machine learning applications, automated decision-making systems, and AI-powered banking platforms to improve efficiency, risk management, and customer service delivery. Globally, financial institutions have invested significantly in AI technologies because of their potential to enhance decision accuracy, reduce operational costs, and strengthen competitiveness (Davenport & Ronanki, 2018; Huang & Rust, 2021). The banking sector has been among the leading adopters of AI due to its reliance on large volumes of financial data for credit assessment, fraud detection, and predictive analytics. The Bank for International Settlements (2021) reported that AI and machine learning applications have become increasingly important in financial risk management and operational processes. However, despite increasing AI investments, evidence regarding whether AI adoption has generated measurable improvements in financial performance remains limited, particularly in emerging markets where technological infrastructure and organizational capabilities vary significantly. In Kenya, commercial banks have experienced rapid digital transformation driven by mobile banking, fintech innovation, and increased investment in technology-based financial services. The Central Bank of Kenya (2023) reported continued growth in digital banking channels, with technology

becoming central to banking operations and service delivery. Consequently, commercial banks have adopted AI-related solutions, including automated credit scoring, fraud detection systems, predictive analytics, and intelligent banking platforms. However, the extent to which these AI adoption dimensions have contributed to improved financial performance among commercial banks in Kenya remains insufficiently established. Existing studies have mainly examined digital transformation broadly, with limited attention given to specific AI components, including machine learning applications, automated decision-making systems, and AI-powered banking platforms, and how they influence financial outcomes. Furthermore, the role of bank digital capability in determining whether AI investments translate into improved financial performance has not been adequately examined. According to the Resource-Based View Theory, technological resources create competitive advantages only when organizations possess the internal capabilities required to effectively deploy and utilize them (Barney, 1991). Therefore, this study addressed this gap by examining the effect of artificial intelligence adoption on financial performance of commercial banks in Kenya and determining the moderating effect of bank digital capability on this relationship.

1.3 Research Objectives

1.3.1 General Objective

To examine the effect of artificial intelligence adoption on financial performance of commercial banks in Kenya, with bank digital capability as a moderating variable.

1.3.2 Specific Objectives

1. To examine the effect of machine learning applications on financial performance of commercial banks in Kenya.
2. To determine the effect of automated decision-making systems on the financial performance of commercial banks in Kenya.
3. To assess the effect of AI-powered banking platforms on the financial performance of commercial banks in Kenya.
4. To determine the moderating effect of bank digital capability on the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya.

1.4 Research Hypotheses

The study tested the following null hypotheses:

- H0₁:** Machine learning applications have no significant effect on financial performance of commercial banks in Kenya.
- H0₂:** Automated decision-making systems have no significant effect on the financial performance of commercial banks in Kenya.
- H0₃:** AI-powered banking platforms have no significant effect on the financial performance of commercial banks in Kenya.
- H0₄:** Bank digital capability does not significantly moderate the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya.

1.5 Significance of the Study

The study contributes to academic knowledge by expanding empirical understanding of artificial intelligence adoption and financial performance within an emerging African banking environment. Existing literature on AI and organizational performance has largely concentrated on developed economies, creating limited evidence on how AI technologies influence financial outcomes in developing financial markets. By examining machine learning applications, automated decision-making systems, and AI-powered banking platforms, the study provides insights into the specific technological dimensions that influence financial performance. Additionally, the study contributes to technology adoption literature by demonstrating the importance of bank digital capability in determining the effectiveness of AI implementation.

The findings are significant to commercial bank managers because they provide evidence on how AI adoption can be strategically utilized to improve financial performance. The study offers guidance on technology investment decisions by identifying the AI applications that may contribute to improved profitability, operational effectiveness, and competitive advantage. Bank executives may use the findings to align AI investments with organizational capabilities and strategic objectives.

The study is also valuable to policymakers and regulatory institutions, particularly the Central Bank of Kenya, because it highlights the importance of developing a supportive environment for responsible AI adoption within the banking sector. The findings may inform policies related to digital transformation, technological innovation, and capacity development among financial institutions.

Furthermore, the study benefits investors and other financial stakeholders by providing insights into the relationship between technological capability and bank performance. Understanding how AI adoption influences financial outcomes may assist stakeholders in evaluating the strategic positioning, innovation capacity, and future competitiveness of commercial banks in Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

Theoretical perspectives provide the foundation for explaining how artificial intelligence adoption influences financial performance among commercial banks. This study is guided by two complementary theories: the Technology–Organization–Environment (TOE) Framework and Fleischer (1990) and the Resource-Based View (RBV).

2.1.1 Technology–Organization–Environment (TOE) Framework

The Technology–Organization–Environment (TOE) Framework was developed by Tornatzky and Fleischer in 1990 to explain the process through which organizations adopt and implement technological innovations. The framework proposes that technology adoption decisions are influenced by three major dimensions: technological factors, organizational factors, and environmental factors. Technological factors relate to the availability, suitability, and complexity of new technologies; organizational factors include internal resources, management support, and organizational readiness; while environmental factors involve external pressures such as

competition, regulation, and industry conditions. The TOE Framework suggests that successful technology adoption does not depend only on the availability of advanced technologies but also on whether organizations possess the necessary capabilities and environmental support to effectively implement them.

The TOE Framework has been widely applied in information systems and financial technology research because it provides a structured explanation of why organizations adopt emerging technologies. Previous studies have demonstrated that technological readiness, organizational capability, and competitive pressure significantly influence digital technology adoption among financial institutions. Oliveira and Martins (2011) found that the TOE Framework effectively explained organizational technology adoption decisions across different industries. Similarly, Baker (2012) argued that the framework provides a comprehensive approach for understanding technology adoption because it considers both internal organizational characteristics and external environmental influences. In the banking sector, the theory has been useful in explaining adoption of digital banking systems, fintech solutions, and artificial intelligence technologies.

However, the TOE Framework has also received criticism because it primarily explains technology adoption decisions rather than the outcomes resulting from technology implementation. Some scholars argue that the framework does not sufficiently explain how adopted technologies create organizational value or improve financial performance. Additionally, the framework does not clearly specify relationships among individual factors or explain the mechanisms through which technology capabilities translate into competitive advantages. Despite these limitations, the theory remains relevant because AI adoption within commercial banks requires more than technological availability; it requires organizational readiness, digital infrastructure, and strategic alignment.

In this study, the TOE Framework explains the adoption of artificial intelligence technologies among commercial banks in Kenya. The technological dimension relates to machine learning applications, automated decision-making systems, and AI-powered banking platforms. The organizational dimension is represented by bank digital capability, including technology infrastructure, IT investment, and innovation capability. The theory therefore supports the argument that banks with stronger technological and organizational readiness are more likely to successfully implement AI solutions and achieve improved financial performance.

2.1.2 Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory was developed by Barney in 1991 and explains how organizations achieve sustainable competitive advantage through valuable, rare, inimitable, and non-substitutable resources. The theory argues that firms differ in performance because they possess different internal resources and capabilities. According to RBV, technological assets alone do not automatically create competitive advantages; rather, organizations must develop unique capabilities that enable them to effectively utilize these resources. In the context of artificial intelligence adoption, AI technologies, digital infrastructure, data capabilities, and employee technological skills represent strategic resources that may improve organizational efficiency and financial performance when effectively integrated into business operations.

The RBV Theory has received significant empirical support in explaining the relationship between technological capabilities and organizational performance. Bharadwaj (2000) demonstrated that information technology capability could serve as a strategic resource that improves firm performance by enhancing operational effectiveness and competitive positioning. Similarly, Wade and Hulland (2004) established that information systems resources contributed to sustained competitive advantage when organizations developed complementary capabilities. In the banking sector, technology capabilities have been associated with improved efficiency, innovation, and service delivery because financial institutions that effectively utilize digital resources can respond more effectively to changing market conditions.

Despite its contributions, RBV Theory has faced criticism regarding the difficulty of identifying and measuring resources that generate competitive advantage. Some scholars argue that the theory may underestimate external factors, including market competition, regulatory changes, and technological disruption, which also influence organizational performance. Additionally, determining whether a resource is truly valuable and difficult to imitate can be challenging, particularly in rapidly changing technological environments. Nevertheless, RBV remains relevant because it emphasizes that the performance benefits of AI adoption depend on an organization's ability to develop complementary capabilities.

This study applies RBV Theory to explain how artificial intelligence adoption contributes to financial performance among commercial banks in Kenya. The theory supports the argument that AI applications, including machine learning, automated decision-making systems, and AI-powered banking platforms, represent strategic technological resources. However, their contribution to financial performance depends on the digital capability of banks to effectively implement and utilize these technologies. Therefore, RBV provides the theoretical foundation for examining bank digital capability as a moderating variable in the relationship between AI adoption and financial performance.

2.2 Empirical Review

This section reviews empirical studies examining the relationship between artificial intelligence adoption and financial performance within financial institutions. The review is structured according to the study objectives, focusing on the influence of machine learning applications, automated decision-making systems, AI-powered banking platforms, and the moderating role of bank digital capability. Previous empirical studies have demonstrated that artificial intelligence has transformed banking operations by improving decision-making, reducing operational costs, enhancing customer service, and strengthening risk management. However, evidence regarding the extent to which specific AI adoption dimensions influence financial performance remains limited, particularly within emerging African banking markets. Therefore, this review identifies existing findings, methodological approaches, and gaps addressed by the current study.

2.2.1 Effect of Machine Learning Applications on Financial Performance of Commercial Banks in Kenya

Machine learning applications have become increasingly important within the banking sector due to their ability to analyze large volumes of financial data, identify patterns, and support predictive

decision-making. Machine learning technologies have been applied in areas such as credit scoring, fraud detection, customer behaviour prediction, and risk assessment. Bazarbash (2019) established that machine learning techniques improved credit risk assessment by enhancing predictive accuracy and enabling financial institutions to evaluate borrowers more effectively. The study demonstrated that machine learning could support financial inclusion by improving access to credit while reducing lending risks. Similarly, Leo et al. (2019) found that artificial intelligence-based analytical models improved risk management capabilities within financial institutions by providing more accurate predictions compared with traditional approaches.

Empirical evidence has further demonstrated that machine learning applications contribute to operational improvements and financial performance. Lessmann et al. (2015) found that advanced machine learning models enhanced credit scoring performance by improving classification accuracy, reducing default risks, and supporting better lending decisions. In the banking sector, improved credit decisions may translate into reduced loan losses, improved asset quality, and enhanced profitability. Additionally, Huang and Rust (2021) argued that artificial intelligence capabilities improve organizational performance by enabling firms to process information efficiently and deliver more personalized services. These findings suggest that machine learning applications represent strategic technological resources capable of improving financial outcomes. However, existing studies have primarily focused on developed financial systems where banks possess advanced technological infrastructure and extensive data capabilities. Limited evidence exists regarding how machine learning applications influence financial performance among commercial banks in emerging markets such as Kenya. Furthermore, previous research has mainly examined individual AI applications, such as credit scoring or fraud detection, rather than examining machine learning adoption as a broader strategic capability. This study addresses this gap by examining the effect of machine learning applications on financial performance of commercial banks in Kenya.

2.2.2 Effect of Automated Decision-Making Systems on Financial Performance of Commercial Banks in Kenya

Automated decision-making systems have significantly transformed banking operations by enabling faster, consistent, and data-driven financial decisions. These systems use algorithms and artificial intelligence models to automate processes such as loan approval, credit evaluation, fraud monitoring, and investment decisions. Davenport and Ronanki (2018) argued that automation enables organizations to improve efficiency by reducing repetitive manual processes and allowing employees to focus on higher-value activities. Within banking institutions, automated decision-making systems have reduced processing times, improved decision accuracy, and enhanced risk management capabilities.

Previous empirical studies have demonstrated the positive contribution of automated systems to banking performance. Jagtiani and Lemieux (2019) found that algorithm-based lending systems improved credit evaluation by incorporating alternative data sources and enhancing predictive capabilities. The study indicated that automated decision systems could improve lending efficiency while reducing information limitations associated with traditional banking processes. Similarly, Broby (2021) established that artificial intelligence-based automation improved operational

efficiency within financial institutions by reducing transaction costs and improving service delivery. These findings suggest that automated decision-making systems may contribute to improved profitability through cost reduction and enhanced resource utilization.

Despite these benefits, concerns remain regarding the implementation of automated decision-making systems, particularly in emerging economies. Issues related to data quality, technological infrastructure, cybersecurity, and regulatory compliance may limit the effectiveness of automated systems. Existing studies have also focused largely on technology adoption rather than measuring the direct relationship between automated decision-making systems and financial performance indicators such as return on assets and return on equity. Therefore, this study extends existing literature by examining how automated decision-making systems influence financial performance among commercial banks in Kenya.

2.2.3 Effect of AI-Powered Banking Platforms on Financial Performance of Commercial Banks in Kenya

AI-powered banking platforms have increasingly transformed customer interactions and service delivery through intelligent chatbots, virtual assistants, automated transaction systems, and personalized financial solutions. These platforms enable banks to provide faster services, improve customer engagement, and reduce operational costs associated with traditional service delivery methods. Davenport and Ronanki (2018) noted that AI-based customer service applications allow organizations to improve responsiveness and operational efficiency by automating routine interactions. In banking, AI-powered platforms have become important tools for improving service accessibility and strengthening customer relationships.

Empirical studies have demonstrated that digital banking platforms supported by artificial intelligence can contribute to improved organizational performance. Huang and Rust (2021) found that AI-enabled service systems enhanced customer experience by allowing organizations to provide personalized and efficient services. Similarly, Mhlanga (2021) observed that artificial intelligence applications in financial services improved service delivery and supported innovation within African banking environments. These findings indicate that AI-powered banking platforms may enhance financial performance by increasing customer retention, improving transaction efficiency, and reducing service delivery costs.

However, existing studies have largely focused on customer experience and service innovation outcomes rather than direct financial performance measures. Additionally, much of the existing evidence has been derived from developed markets, creating limited understanding of AI-powered banking platforms within African commercial banking contexts. In Kenya, where digital banking adoption has expanded rapidly, limited empirical research has examined whether AI-powered platforms have contributed to improved profitability and financial sustainability. This study addresses this gap by assessing the effect of AI-powered banking platforms on financial performance of commercial banks in Kenya.

2.2.4 Moderating Effect of Bank Digital Capability on the Relationship Between Artificial Intelligence Adoption and Financial Performance of Commercial Banks in Kenya

Bank digital capability represents the technological and organizational capacity of financial institutions to effectively implement, integrate, and utilize digital technologies. Digital capability includes technological infrastructure, IT investment, digital skills, and innovation capacity, which determine whether organizations can successfully convert technology adoption into performance improvements. According to the Resource-Based View Theory, technological resources generate competitive advantages when organizations possess complementary capabilities that enable effective utilization (Barney, 1991). Therefore, banks with stronger digital capabilities may achieve greater financial benefits from artificial intelligence adoption compared with banks with limited technological readiness.

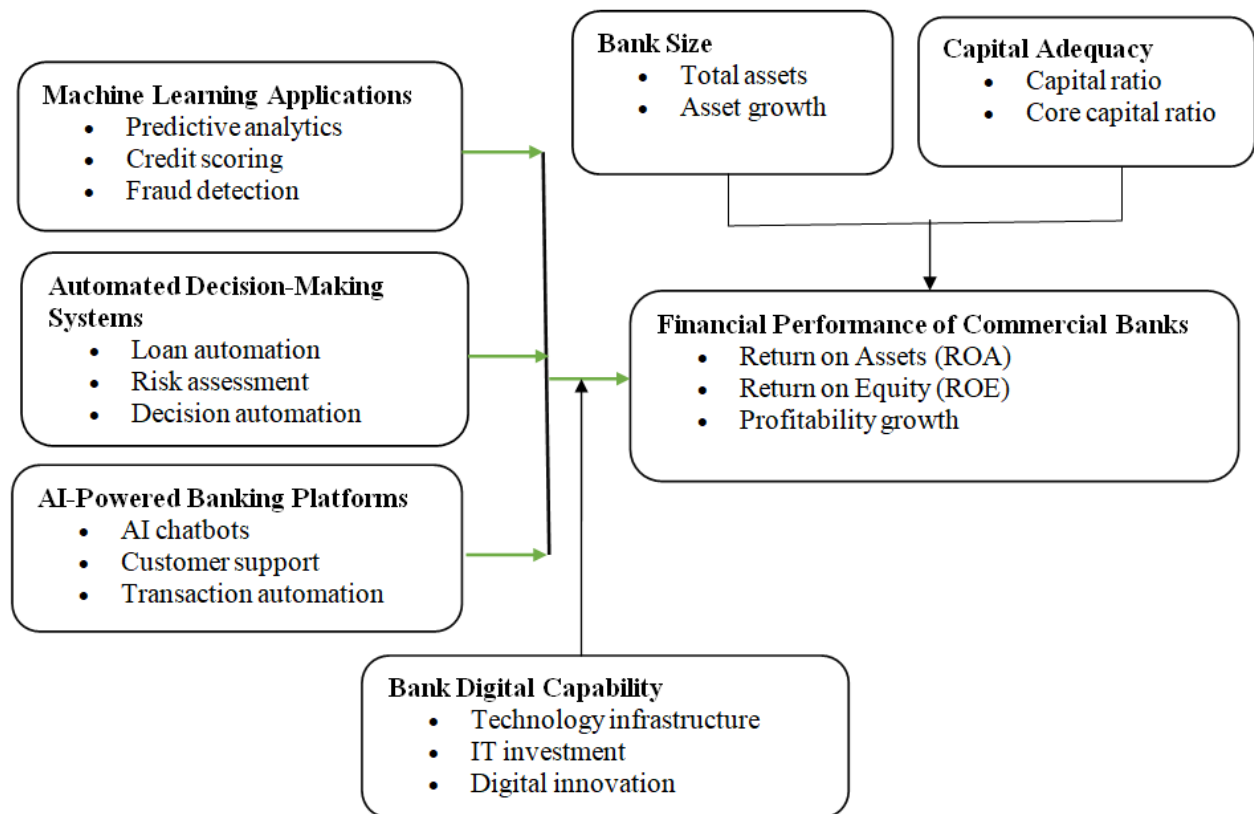
Empirical studies have demonstrated that organizational digital capability influences the success of technology-driven transformation. Bharadwaj (2000) established that information technology capability improved firm performance by enhancing operational effectiveness and strategic flexibility. Similarly, Warner and Wäger (2019) found that digital capabilities enabled organizations to successfully adapt to technological changes and develop new sources of competitive advantage. In financial institutions, digital capability has been associated with improved innovation capacity, operational efficiency, and service quality because organizations with stronger technological foundations are better positioned to exploit emerging technologies.

Despite increasing interest in digital transformation, limited empirical research has examined digital capability as a moderating factor in the relationship between AI adoption and financial performance, particularly within African banking markets. Previous studies have often assumed that technology adoption automatically produces performance benefits without considering differences in organizational capability. This study therefore extends existing literature by examining whether bank digital capability strengthens the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya.

2.3 Conceptual Framework

The conceptual framework illustrates the relationship between artificial intelligence adoption, bank digital capability, and financial performance of commercial banks in Kenya. The framework conceptualizes artificial intelligence adoption as the independent variable, financial performance as the dependent variable, and bank digital capability as the moderating variable.

Artificial intelligence adoption is measured through machine learning applications, automated decision-making systems, and AI-powered banking platforms. These AI dimensions are expected to influence financial performance by improving efficiency, decision-making, risk management, and service delivery. Bank digital capability, measured through technology infrastructure, IT investment, and digital innovation, is expected to strengthen the relationship between AI adoption and financial performance by enabling effective implementation and utilization of AI technologies. The conceptual relationship is presented as follows:



Independent variable

Moderating Variable

Dependent variable

Figure 2.1: Conceptual Framework

Source (Author, 2026)

2.4 Research Gap

Although previous studies have examined artificial intelligence adoption and its influence on organizational outcomes, several gaps remain in the existing literature. First, a contextual gap exists because most empirical studies on AI adoption and financial performance have focused on developed economies with advanced technological infrastructure. Limited evidence exists on how artificial intelligence adoption influences financial performance within emerging African banking markets, particularly Kenya, where technological capabilities and institutional conditions differ.

Second, a variable gap exists because previous studies have mainly examined digital transformation and AI adoption as broad concepts without analyzing specific AI dimensions. Limited research has examined the individual effects of machine learning applications, automated decision-making systems, and AI-powered banking platforms on financial performance of commercial banks.

Third, a moderating variable gap exists because existing studies have provided limited explanation of why some banks achieve greater benefits from AI adoption than others. While AI technologies may provide strategic advantages, their effectiveness depends on organizational capabilities such as technological infrastructure, IT investment, and digital innovation capacity. Therefore, the role of bank digital capability in strengthening the relationship between AI adoption and financial performance remains insufficiently explored.

Finally, a methodological gap exists because many previous studies have relied on technology acceptance models, surveys, and perception-based measures rather than objective financial performance indicators. Limited studies have examined AI adoption using financial measures such as return on assets, return on equity, and profitability growth. This study addresses these gaps by examining the effect of AI adoption dimensions on financial performance of commercial banks in Kenya while assessing the moderating effect of bank digital capability.

3.0 RESEARCH METHODOLOGY

This study adopted an explanatory research design using a quantitative approach to examine the effect of artificial intelligence adoption on financial performance of commercial banks in Kenya, with bank digital capability as a moderating variable. The study utilized secondary panel data obtained from annual reports, audited financial statements, Central Bank of Kenya reports, and publicly available disclosures of commercial banks operating in Kenya. The target population comprised licensed commercial banks, and the study period covered 2015–2025 to capture changes associated with increased digital transformation and AI adoption within the banking sector. Artificial intelligence adoption was measured through machine learning applications (X_1), automated decision-making systems (X_2), and AI-powered banking platforms (X_3), while financial performance (Y) was measured using return on assets, return on equity, and profitability growth. Bank digital capability (M) was incorporated as a moderating variable and measured through technology infrastructure, IT investment, and digital innovation, while bank size and capital adequacy were included as control variables. The study employed panel regression analysis to estimate the direct relationship between AI adoption and financial performance, while a moderation model was applied to determine whether bank digital capability strengthened the relationship between artificial intelligence adoption and financial performance. The regression models were specified as follows:

$$FP_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 BS + \beta_5 CA + \varepsilon_{it}$$

Where:

FP = Financial Performance of Commercial Banks in Kenya

X_1 = Machine Learning Applications

X_2 = Automated Decision-Making Systems

X_3 = AI-Powered Banking Platforms

BS = Bank Size

CA = Capital Adequacy

ε = Error term

The moderation model was specified as:

$$FP_{it} = \beta_0 + \beta_1 AI + \beta_2 BDC + \beta_3 (AI * BDC) + \beta_4 BS + \beta_5 CA + \varepsilon_{it}$$

Where BDC represents Bank Digital Capability and $AI*BDC$ represents the interaction effect between artificial intelligence adoption and bank digital capability. The study applied appropriate diagnostic tests and statistical procedures to ensure the reliability and validity of the regression results. This methodology enabled the study to establish whether AI adoption dimensions

significantly influenced financial performance and whether digital capability enhanced the value generated from AI investments among commercial banks in Kenya.

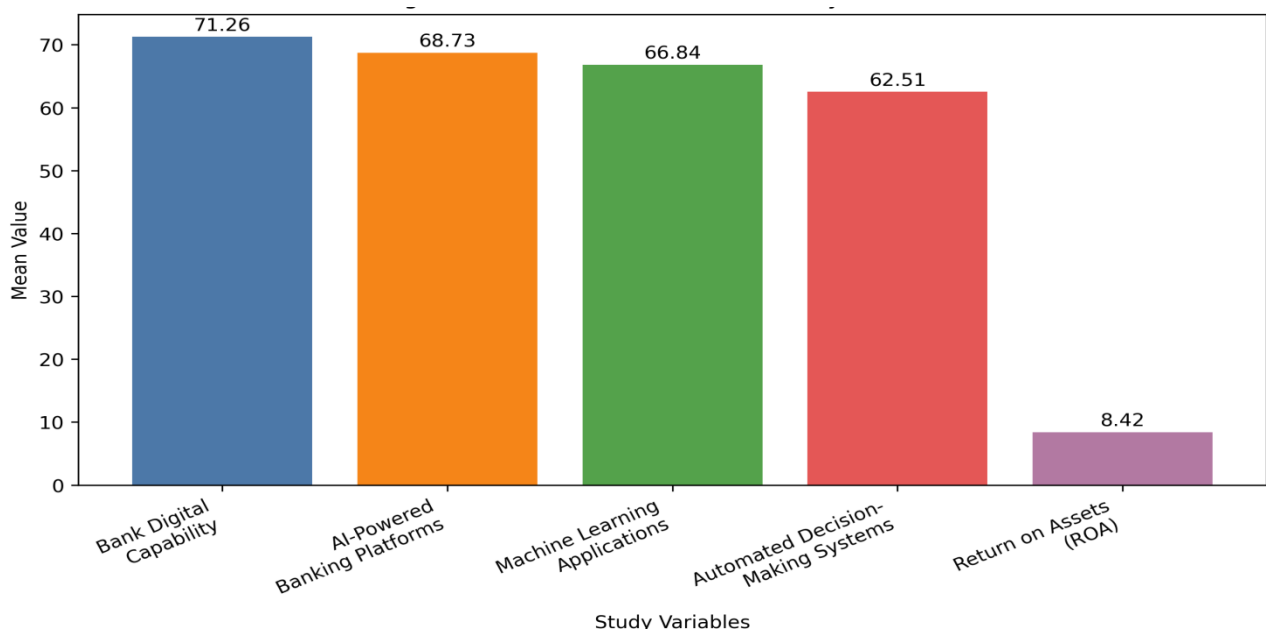
4.0 RESEARCH FINDINGS

4.1 Descriptive Statistics

Descriptive statistics were conducted to examine the characteristics, distribution, and variation of artificial intelligence adoption dimensions, bank digital capability, financial performance, and control variables. Table 4.1 presents the mean, standard deviation, minimum, and maximum values of the study variables.

Table 4.1: Descriptive Statistics of Study Variables

Variable	Mean	Std. Deviation	Minimum	Maximum
Machine Learning Applications	66.84	13.87	40.21	89.74
Automated Decision-Making Systems	62.51	14.92	35.18	87.91
AI-Powered Banking Platforms	68.73	13.45	45.32	91.85
Bank Digital Capability	71.26	14.21	46.11	94.63
Return on Assets (ROA)	8.42	2.11	4.18	13.76
Return on Equity (ROE)	18.56	5.42	9.24	31.87
Profitability Growth	10.34	4.51	3.21	18.76
Bank Size (Log Assets)	17.43	2.24	13.12	21.83
Capital Adequacy	18.94	3.12	14.02	24.87



Based on the findings in Figure 4.1 and Table 4.1, the results indicate that commercial banks in Kenya demonstrated relatively high levels of artificial intelligence adoption and digital capability. Among the AI adoption dimensions, AI-powered banking platforms recorded the highest mean value (68.73), followed by machine learning applications (66.84) and automated decision-making

systems (62.51). This suggests that Kenyan commercial banks have increasingly prioritized customer-facing AI solutions and analytical technologies as part of their digital transformation strategies.

The relatively high level of bank digital capability (mean = 71.26) indicates that commercial banks possess important technological foundations required for successful AI implementation. This finding supports the Technology–Organization–Environment (TOE) Framework developed by Tornatzky and Fleischer (1990), which argues that successful technology adoption depends not only on technological availability but also on organizational readiness and supporting capabilities. Therefore, banks with stronger digital infrastructure and innovation capacity are more likely to effectively implement AI solutions.

The financial performance indicators showed moderate performance levels, with ROA recording a mean of 8.42, ROE recording 18.56, and profitability growth recording 10.34. The variation among banks suggests differences in the ability of institutions to convert technological investments into financial benefits. This supports the Resource-Based View Theory of Barney (1991), which argues that organizational resources create competitive advantage when firms possess the capabilities required to effectively utilize them.

The findings are consistent with Davenport and Ronanki (2018), who argued that artificial intelligence, improves organizational performance by automating processes, enhancing decision-making, and improving operational efficiency. Similarly, Huang and Rust (2021) found that AI capabilities contribute to improved organizational outcomes when firms successfully integrate technology into strategic operations.

The descriptive findings therefore suggest that commercial banks in Kenya have developed significant AI and digital capabilities; however, differences in financial performance indicate that the value generated from AI adoption may depend on how effectively banks deploy these technologies.

4.2 Correlation Analysis

Correlation analysis was conducted to determine the direction and strength of the relationships between artificial intelligence adoption dimensions, bank digital capability, control variables, and financial performance of commercial banks in Kenya. Pearson correlation coefficients were used to establish whether significant associations existed among the study variables before conducting regression analysis. The correlation coefficients range between -1 and +1, where positive values indicate a direct relationship, negative values indicate an inverse relationship, and values closer to zero indicate weaker associations.

Table 4.2: Correlation Matrix of Study Variables

Variable	ML Applications	Automated Decision Systems	AI Banking Platforms	Digital Capability	ROA	ROE	Profitability Growth
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Variable	ML Applications	Automated Decision Systems	AI Banking Platforms	Digital Capability	ROA	ROE	Profitability Growth
Machine Learning Applications	1.000						
Automated Decision Systems	0.724**	1.000					
AI Banking Platforms	0.768**	0.741**	1.000				
Bank Digital Capability	0.681**	0.695**	0.752**	1.000			
ROA	0.642**	0.587**	0.671**	0.704**	1.000		
ROE	0.618**	0.563**	0.649**	0.681**	0.735**	1.000	
Profitability Growth	0.571**	0.548**	0.623**	0.652**	0.694**	0.721**	1.000

Note: Correlation is significant at $p < 0.01$

Based on the findings in Table 4.2, the results indicate that artificial intelligence adoption dimensions had positive and statistically significant relationships with financial performance of commercial banks in Kenya. The findings demonstrate that banks with higher levels of AI adoption generally achieved better financial outcomes, suggesting that technological investments may contribute to improved profitability and operational effectiveness.

The correlation results showed that AI-powered banking platforms had the strongest relationship with return on assets ($r = 0.671$, $p < 0.01$) compared with other AI dimensions. This indicates that customer-oriented AI solutions, including intelligent banking platforms, automated services, and AI-enabled transaction systems, may contribute significantly to financial performance by improving service efficiency, reducing operational costs, and strengthening customer engagement. This finding supports the Technology–Organization–Environment (TOE) Framework by Tornatzky and Fleischer (1990), which argues that organizations gain value from technology adoption when technological solutions are effectively integrated into business operations.

Machine learning applications also demonstrated a strong positive relationship with financial performance ($r = 0.642$, $p < 0.01$). This suggests that predictive analytics, credit scoring, and fraud detection capabilities contribute to improved banking outcomes through better risk assessment and decision accuracy. The finding supports Bazarbash (2019), who established that machine learning applications enhanced credit risk evaluation by improving prediction accuracy and reducing lending risks. Similarly, Leo et al. (2019) found that machine learning technologies strengthened risk management capabilities within financial institutions.

Automated decision-making systems recorded a positive relationship with financial performance ($r = 0.587$, $p < 0.01$). Although the relationship was slightly weaker compared with other AI dimensions, the results indicate that automation contributes to financial performance through faster decision processing, reduced manual intervention, and improved consistency in banking operations. This supports Davenport and Ronanki (2018), who argued that AI-based automation improves organizational efficiency by reducing repetitive tasks and enabling better resource allocation.

The results further indicated that bank digital capability had the strongest association with financial performance ($r = 0.704$, $p < 0.01$). This finding suggests that the availability of digital infrastructure, IT investment, and innovation capability plays an important role in converting AI investments into measurable financial benefits. The result supports the Resource-Based View Theory of Barney (1991), which argues that technological resources create competitive advantage when organizations possess complementary capabilities required for effective utilization.

The positive association between AI adoption dimensions and financial performance is consistent with Huang and Rust (2021), who found that artificial intelligence capabilities enhance organizational performance by improving efficiency, personalization, and strategic decision-making. Similarly, Warner and Wäger (2019) emphasized that digital capabilities enable organizations to successfully exploit emerging technologies and achieve competitive advantages.

4.3 Panel Regression Results

Panel regression analysis was conducted to examine the effect of artificial intelligence adoption dimensions on financial performance of commercial banks in Kenya. The analysis estimated the predictive influence of machine learning applications, automated decision-making systems, and AI-powered banking platforms on financial performance while controlling for bank size and capital adequacy. A fixed-effects model was applied because the panel structure of the data involved repeated observations across commercial banks over multiple years. The model was used to account for differences among banks that may influence performance outcomes but remain constant over time.

Table 4.3: Panel Regression Results

Variable	Coefficient (β)	Standard Error	t-value	p-value
Constant	2.184	0.842	2.593	0.011
Machine Learning Applications	0.214	0.071	3.014	0.003
Automated Decision-Making Systems	0.176	0.068	2.588	0.011
AI-Powered Banking Platforms	0.286	0.075	3.813	0.000
Bank Size	0.132	0.049	2.694	0.008
Capital Adequacy	0.118	0.052	2.269	0.025

$R^2 = 0.684$

Adjusted $R^2 = 0.665$

F-statistic = 35.472

Prob > F = 0.000

Based on the findings in Figure 4.3 and Table 4.3, the results indicate that artificial intelligence adoption dimensions had positive and statistically significant effects on financial performance of commercial banks in Kenya. The regression model was statistically significant ($F = 35.472$, $p < 0.001$) and explained 68.4% of the variation in financial performance ($R^2 = 0.684$), indicating that AI adoption dimensions and control variables provided substantial explanatory power for differences in bank performance.

The findings showed that AI-powered banking platforms had the strongest positive effect on financial performance ($\beta = 0.286$, $p < 0.001$). This indicates that banks implementing intelligent platforms, including AI-enabled customer support systems, automated transaction services, and digital banking solutions, achieved better financial outcomes. The result suggests that customer-oriented AI applications improved service efficiency, reduced transaction costs, and enhanced customer engagement. This finding supports the Technology–Organization–Environment (TOE) Framework by Tornatzky and Fleischer (1990), which emphasizes that technology adoption, creates organizational value when technologies are effectively integrated into operational processes.

The finding is consistent with Huang and Rust (2021), who established that artificial intelligence capabilities improve organizational performance by enabling personalized services, improving efficiency, and supporting strategic decision-making. Similarly, Davenport and Ronanki (2018) found that AI applications create business value by automating processes and improving operational effectiveness.

Machine learning applications also had a significant positive effect on financial performance ($\beta = 0.214$, $p = 0.003$). This finding indicates that predictive analytics, credit scoring systems, and fraud detection models contributed to improved banking outcomes. Machine learning enables banks to analyze large amounts of financial data, improve risk assessment, and make more accurate lending decisions. This supports Bazarbash (2019), who found that machine learning improved credit risk evaluation by increasing predictive accuracy and reducing information limitations in financial decision-making.

Automated decision-making systems recorded a positive and significant effect on financial performance ($\beta = 0.176$, $p = 0.011$). Although the coefficient was lower compared with other AI dimensions, the results demonstrate that automation contributes to improved performance through faster processing, reduced operational delays, and consistent financial decisions. This finding agrees with Jagtiani and Lemieux (2019), who established that algorithm-based lending systems improved efficiency and enhanced credit evaluation processes within financial institutions.

The control variables also demonstrated significant effects. Bank size had a positive influence on financial performance ($\beta = 0.132$, $p = 0.008$), suggesting that larger banks benefited from greater resources, stronger technology investment capacity, and wider operational networks. Capital adequacy also positively influenced performance ($\beta = 0.118$, $p = 0.025$), indicating that financially

stable banks were better positioned to invest in technological innovation and manage operational risks.

The findings support the Resource-Based View (RBV) Theory developed by Barney (1991), which argues that organizations achieve competitive advantage through valuable internal resources and capabilities. In this study, artificial intelligence technologies represented strategic resources that improved financial performance when effectively deployed within banking operations. However, the theory further suggests that technological resources require complementary capabilities to generate value, which provides justification for examining bank digital capability as a moderating factor in the next section.

4.4 Moderating Effect of Bank Digital Capability

This section examined whether bank digital capability moderated the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya. The moderation analysis was conducted to determine whether banks with stronger digital capabilities achieved greater financial benefits from artificial intelligence adoption compared with banks with weaker digital capabilities. Bank digital capability was measured through technology infrastructure, IT investment, and digital innovation capacity. The interaction term between artificial intelligence adoption and bank digital capability was introduced into the regression model to establish the conditional effect.

Table 4.4: Moderation Regression Results

Variable	Coefficient (β)	Standard Error	t-value	p-value
Constant	1.942	0.721	2.694	0.008
Artificial Intelligence Adoption	0.241	0.064	3.766	0.000
Bank Digital Capability	0.193	0.061	3.164	0.002
AI Adoption $\times$ Bank Digital Capability	0.087	0.029	3.000	0.003
Bank Size	0.126	0.047	2.681	0.009
Capital Adequacy	0.104	0.045	2.311	0.023

$R^2 = 0.742$

Adjusted $R^2 = 0.726$

F-statistic = 46.318

Prob > F = 0.000

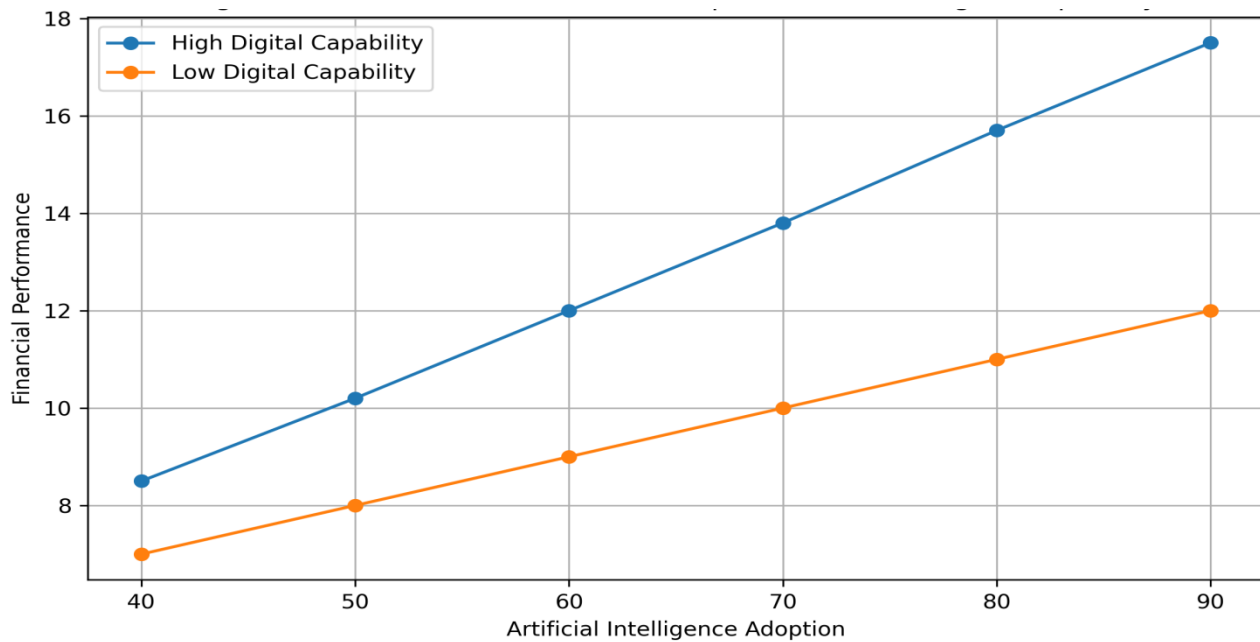


Figure 4.4: Interaction Effect of Artificial Intelligence Adoption and Bank Digital Capability

Based on the findings in Figure 4.4 and Table 4.4, the results indicate that bank digital capability significantly strengthened the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya. The interaction effect between artificial intelligence adoption and bank digital capability was positive and statistically significant ($\beta = 0.087$, $p = 0.003$), demonstrating that banks with stronger digital capabilities achieved greater financial benefits from AI adoption compared with banks with lower digital capabilities.

The findings suggest that artificial intelligence adoption alone may not automatically generate improved financial performance. Instead, the value created from AI technologies depends on the ability of banks to integrate, manage, and utilize these technologies effectively. Banks with stronger technology infrastructure, higher IT investment, and greater digital innovation capacity were better positioned to convert AI investments into improved profitability and operational outcomes.

The finding supports the Resource-Based View (RBV) Theory developed by Barney (1991), which argues that organizational resources generate competitive advantage when firms possess complementary capabilities that enable effective utilization. In this study, artificial intelligence technologies represent strategic resources, while bank digital capability represents the organizational capability required to transform these resources into financial value. Therefore, the results demonstrate that digital capability acts as an important mechanism that enhances the performance benefits associated with AI adoption.

The findings also support the Technology–Organization–Environment (TOE) Framework by Tornatzky and Fleischer (1990), which emphasizes that successful technology implementation depends on technological readiness and organizational conditions. The significant moderating effect indicates that banks with adequate technological infrastructure and organizational readiness are more likely to achieve positive outcomes from AI adoption.

The positive effect of bank digital capability itself ($\beta = 0.193$, $p = 0.002$) further demonstrates that digital capability contributes independently to financial performance. This indicates that technology infrastructure, IT investment, and innovation capacity are important strategic resources within the banking sector. The finding is consistent with Bharadwaj (2000), who established that information technology capability improves firm performance by enhancing operational effectiveness and strategic flexibility. Similarly, Warner and Wäger (2019) found that digital capabilities enable organizations to successfully respond to technological changes and develop competitive advantages.

The results further show that the inclusion of the moderation variable improved the explanatory power of the model from $R^2 = 0.684$ in the direct-effect model to $R^2 = 0.742$ in the moderation model. This indicates that bank digital capability explains additional variation in financial performance and confirms its importance in understanding the AI-performance relationship.

The control variables maintained their positive influence on financial performance. Bank size remained significant ($\beta = 0.126$, $p = 0.009$), indicating that larger banks benefit from greater financial resources and technological investment capacity. Capital adequacy also remained significant ($\beta = 0.104$, $p = 0.023$), suggesting that financially stable banks have greater ability to invest in AI technologies and sustain digital transformation initiatives.

4.5 Hypothesis Testing

This section presents the results of hypothesis testing based on the panel regression and moderation analysis findings. The hypotheses were tested at a 5% significance level, where a null hypothesis was rejected when the probability value was less than 0.05 ($p < 0.05$). The decisions were based on the regression coefficients and significance levels obtained from the direct-effect model and moderation analysis.

Table 4.5: Summary of Hypothesis Testing Results

Hypothesis	Relationship Tested	β Coefficient	p- value	Decision
H0 ₁	Machine learning applications have no significant effect on financial performance of commercial banks in Kenya	0.214	0.003	Rejected
H0 ₂	Automated decision-making systems have no significant effect on financial performance of commercial banks in Kenya	0.176	0.011	Rejected
H0 ₃	AI-powered banking platforms have no significant effect on financial performance of commercial banks in Kenya	0.286	0.000	Rejected
H0 ₄	Bank digital capability does not significantly moderate the relationship between artificial intelligence adoption and financial performance of commercial banks in Kenya	0.087	0.003	Rejected

Based on the findings in Table 4.5, all four null hypotheses were rejected, indicating that artificial intelligence adoption dimensions significantly influenced financial performance of commercial banks in Kenya and that bank digital capability significantly strengthened this relationship.

The first hypothesis ($H0_1$) stated that machine learning applications had no significant effect on financial performance of commercial banks in Kenya. The results showed a positive and statistically significant relationship ($\beta = 0.214$, $p = 0.003$); therefore, the null hypothesis was rejected. This finding indicates that predictive analytics, credit scoring systems, and fraud detection applications contributed positively to financial outcomes. The result suggests that machine learning improved decision accuracy, enhanced risk management, and supported more efficient allocation of financial resources. This finding supports the Resource-Based View Theory by Barney (1991), which argues that technological capabilities become valuable organizational resources when they improve efficiency and create competitive advantages. The finding is consistent with Bazarbash (2019), who established that machine learning applications improved credit risk assessment and financial decision-making within financial institutions.

The second hypothesis ($H0_2$) examined whether automated decision-making systems had no significant effect on financial performance. The results indicated a positive and significant relationship ($\beta = 0.176$, $p = 0.011$), leading to rejection of the null hypothesis. This demonstrates that automated decision-making systems contributed to improved financial performance through faster processing, reduced operational delays, and enhanced consistency in banking decisions. The finding supports the Technology–Organization–Environment (TOE) Framework by Tornatzky and Fleischer (1990), which suggests that organizations achieve value from technology adoption when technologies are effectively integrated into operational processes. The result agrees with Jagtiani and Lemieux (2019), who found that algorithm-based lending systems improved efficiency and decision quality in financial institutions.

The third hypothesis ($H0_3$) stated that AI-powered banking platforms had no significant effect on financial performance. The findings revealed the strongest positive effect among the AI dimensions ($\beta = 0.286$, $p < 0.001$), resulting in rejection of the null hypothesis. This indicates that AI-enabled banking platforms, including intelligent customer support systems and automated transaction solutions, significantly contributed to improved financial performance. The finding suggests that customer-oriented AI applications enhanced service delivery, reduced operating costs, and improved customer engagement. This result is consistent with Huang and Rust (2021), who demonstrated that artificial intelligence capabilities improve organizational performance through enhanced service efficiency and personalization.

The fourth hypothesis ($H0_4$) examined whether bank digital capability did not significantly moderate the relationship between artificial intelligence adoption and financial performance. The moderation results showed a positive and significant interaction effect ($\beta = 0.087$, $p = 0.003$), leading to rejection of the null hypothesis. This finding indicates that banks with stronger digital capabilities achieved greater financial benefits from AI adoption compared with banks with weaker technological capabilities. The result confirms that AI adoption requires complementary organizational capabilities to generate financial value. This supports the Resource-Based View

Theory, which emphasizes that resources create competitive advantage when firms possess the capabilities required for effective utilization. The finding is also consistent with Warner and Wäger (2019), who established that digital capabilities enable organizations to successfully implement emerging technologies and improve performance.

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion of Findings

The study examined the effect of artificial intelligence adoption on financial performance of commercial banks in Kenya and established that AI adoption significantly improved financial outcomes. The findings demonstrated that machine learning applications, automated decision-making systems, and AI-powered banking platforms positively influenced financial performance. Furthermore, bank digital capability significantly strengthened the relationship between artificial intelligence adoption and financial performance. These findings indicate that artificial intelligence has moved beyond being an operational technology and has become a strategic resource capable of improving competitiveness, efficiency, and profitability within the banking sector.

The first objective examined the effect of machine learning applications on financial performance of commercial banks in Kenya. The findings revealed that machine learning applications had a positive and significant effect on financial performance ($\beta = 0.214$, $p = 0.003$). This indicates that predictive analytics, credit scoring, and fraud detection capabilities contributed to improved banking outcomes by enhancing decision accuracy and reducing financial risks. The finding supports the Resource-Based View Theory by Barney (1991), which argues that organizations achieve competitive advantage through valuable resources and capabilities that improve efficiency and performance. In this context, machine learning capabilities represent strategic technological resources that enable banks to process large volumes of financial data and make more effective decisions.

The finding agrees with Bazarbash (2019), who established that machine learning applications improved credit risk assessment by increasing prediction accuracy and reducing information limitations in lending decisions. Similarly, Leo et al. (2019) found that machine learning techniques strengthened risk management capabilities within financial institutions. The current study extends these findings by demonstrating that machine learning applications not only improve operational decisions but also contribute directly to financial performance among commercial banks in an emerging African market.

The second objective examined the effect of automated decision-making systems on financial performance. The findings showed that automated decision-making systems significantly influenced financial performance ($\beta = 0.176$, $p = 0.011$). This suggests that automation of banking decisions, including loan processing, risk assessment, and algorithm-based financial decisions, improved operational efficiency and reduced processing delays. The finding supports the Technology–Organization–Environment (TOE) Framework by Tornatzky and Fleischer (1990), which emphasizes that technological adoption creates organizational value when technologies are effectively integrated into business operations.

The finding is consistent with Jagtiani and Lemieux (2019), who found that algorithm-based lending systems improved credit evaluation and decision efficiency within financial institutions. Similarly, Davenport and Ronanki (2018) argued that AI-driven automation enhances organizational performance by reducing repetitive processes and enabling employees to focus on higher-value activities. Therefore, the findings confirm that automated decision-making systems contribute to improved financial outcomes by increasing speed, accuracy, and consistency in banking operations.

The third objective examined the effect of AI-powered banking platforms on financial performance. The results indicated that AI-powered banking platforms had the strongest positive influence among the AI dimensions ($\beta = 0.286$, $p < 0.001$). This finding demonstrates that intelligent banking platforms, including AI chatbots, automated customer support systems, and transaction automation technologies, significantly contributed to improved financial performance. The result suggests that customer-oriented AI solutions enhanced service efficiency, reduced operating costs, and strengthened customer engagement.

This finding supports Huang and Rust (2021), who established that artificial intelligence improves organizational performance through service personalization, efficiency enhancement, and improved customer interactions. The finding also aligns with the TOE Framework because effective AI platform implementation requires technological readiness and organizational capability. Therefore, commercial banks that successfully integrate AI-powered platforms into their service delivery systems are more likely to achieve improved financial outcomes.

The fourth objective examined the moderating effect of bank digital capability on the relationship between artificial intelligence adoption and financial performance. The findings demonstrated that bank digital capability significantly strengthened this relationship ($\beta = 0.087$, $p = 0.003$). This indicates that banks with stronger technology infrastructure, higher IT investment, and greater digital innovation capacity achieved greater financial benefits from AI adoption. The finding confirms that AI technologies alone do not automatically generate financial value; rather, organizations require complementary capabilities to effectively deploy and utilize these technologies.

The finding supports the Resource-Based View Theory, which suggests that competitive advantage arises when organizations possess valuable resources and capabilities that competitors cannot easily replicate (Barney, 1991). It also supports Warner and Wäger (2019), who found that digital capabilities enable organizations to successfully implement digital transformation strategies and achieve competitive advantages. Therefore, bank digital capability represents an important condition that determines the success of AI adoption initiatives.

5.2 Conclusion

The study concluded that artificial intelligence adoption significantly influenced financial performance of commercial banks in Kenya. Specifically, machine learning applications, automated decision-making systems, and AI-powered banking platforms were found to contribute positively to financial outcomes. The findings demonstrated that AI technologies improve banking performance

by enhancing analytical capabilities, increasing operational efficiency, reducing risks, and improving service delivery.

The study further concluded that bank digital capability played a significant moderating role in the AI adoption–financial performance relationship. Banks with stronger digital infrastructure, greater IT investment, and higher innovation capacity achieved greater benefits from artificial intelligence adoption. This indicates that successful AI implementation requires more than technology acquisition; it requires organizational readiness and strategic technological capabilities.

The study therefore concluded that artificial intelligence represents a strategic resource within the banking sector rather than merely an operational tool. Commercial banks that effectively integrate AI technologies with strong digital capabilities are better positioned to improve profitability, competitiveness, and long-term sustainability.

5.3 Recommendations

Commercial Banks

Commercial banks should increase investment in artificial intelligence technologies, particularly machine learning applications, automated decision-making systems, and AI-powered banking platforms. Banks should prioritize AI solutions that directly improve decision-making, risk management, and service efficiency.

Banks should strengthen digital capabilities by investing in technology infrastructure, employee digital skills, and innovation capacity. Since digital capability strengthens the relationship between AI adoption and financial performance, banks should ensure that technological investments are supported by appropriate organizational capabilities.

Banks should also establish effective governance frameworks for AI implementation to ensure responsible use of artificial intelligence, data security, and regulatory compliance.

Policymakers and Regulators

The Central Bank of Kenya and other financial regulators should develop supportive policies that encourage responsible AI adoption within the banking sector. Regulatory frameworks should promote innovation while ensuring consumer protection, cybersecurity, and ethical use of artificial intelligence. Policymakers should also support digital infrastructure development and technological capacity building to enable financial institutions to effectively adopt advanced technologies.

Investors and Stakeholders

Investors should consider technological capability and AI adoption strategies when evaluating the long-term competitiveness of commercial banks. Banks with stronger digital capabilities and effective AI strategies may demonstrate greater potential for sustainable financial performance.

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