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INFORMATION TECHNOLOGY

EFFECT OF SCALABILITY OF TECHNOLOGY DEPLOYMENT ON PERFORMANCE OF COMMERCIAL BANKS IN KENYA

[1*]Edmund Malitt, [2]Simon Karume, PhD, [3]Mary Mugo, PhD & [4]Daisy Bowen, PhD

[1]Kabarak University

[2]School of Science, Engineering and Technology- Kabarak University

[3]Faculty of Business and Economics-Multimedia University of Kenya

[4]School of Business and Economics-Kabarak University

*E-mail of corresponding author: **edyiemalitt@gmail.com**

ABSTRACT

Purpose of Study: This study examined the effect of the scalability of technology deployment on the performance of commercial banks in Kenya, guided by the Theory of Planned Behavior (TPB).

Problem Statement: Despite Kenya's leadership in digital banking, many commercial banks struggle to scale technologies effectively due to resource constraints, infrastructure gaps, and regulatory demands. This limits improvements in profitability, efficiency, and customer satisfaction, highlighting the need to examine how scalability and regulations affect bank performance.

Methodology: The research adopted a qualitative content analysis approach, utilizing purposively selected secondary data sources such as policy documents, regulatory reports, industry reviews, and scholarly studies. TPB informed the analysis by linking organizational attitudes, perceived behavioral control, and normative pressures to the adoption and expansion of technological innovations.

Result: The analysis revealed that scalability of technology deployment also has a positive relationship with the performance of commercial banks, although the effect is not statistically significant. Moreover, banks with limited capital or infrastructural constraints may struggle to scale their digital services effectively, limiting the observable impact on performance.

Recommendation: Commercial banks should therefore invest in technologies and infrastructure that allow for future scalability. This includes modular IT systems that can be expanded as customer demand grows, cloud computing solutions that offer flexible data storage and processing, and digital service platforms that can be rolled out across multiple regions.

Keywords: *Scalability, technology deployment, commercial bank performance, Theory of Planned Behavior, Kenya*

INTRODUCTION

Scalability is a fundamental aspect of technology deployment, ensuring that banking systems can accommodate growing demand without compromising performance. Commercial banks must adopt scalable solutions to handle increasing transaction volumes and expanding customer bases efficiently. Scalability strategies include vertical scaling, horizontal scaling, dynamic scaling, and load balancing. Vertical scaling involves upgrading existing system resources, such as increasing server capacity or enhancing processing power, to improve system performance. This strategy is particularly useful for banks handling high-frequency trading and real-time transaction processing. Kimutai et al. (2022) note that vertical scaling enhances system efficiency by allowing financial institutions to process transactions faster, thereby improving customer experience. However, Njenga and Omwenga (2023) caution that vertical scaling has limitations in cost-effectiveness and infrastructure dependency, as it requires significant investment in hardware upgrades.

On the other hand, horizontal scaling involves adding more servers or infrastructure components to distribute workloads more effectively. This strategy enhances system resilience and is widely adopted by banks dealing with large transactional data. Karani and Kinyua (2022) argue that horizontal scaling allows for seamless expansion without requiring system downtime, making it ideal for financial institutions experiencing fluctuating transaction volumes. Ndegwa (2022) further explains that horizontal scaling enables banks to manage peak traffic efficiently, ensuring uninterrupted service availability.

Dynamic scaling integrates automation to adjust system resources in real-time based on demand fluctuations. This approach optimizes resource allocation, ensuring that banks can handle high transaction loads during peak hours while scaling down during off-peak periods. Njenga and Omwenga (2023) emphasize that dynamic scaling is essential for mobile and internet banking platforms, as it enhances system responsiveness and cost efficiency. Similarly, Odhiambo and Mwangi (2023) highlight that dynamic scaling reduces operational costs by allocating computing resources only when needed, preventing wastage and optimizing performance.

To further enhance system performance, load balancing is employed to distribute network traffic and processing workloads across multiple servers. This strategy prevents system overloads, ensuring that banking operations remain efficient even during high-traffic periods. Kimutai et al. (2022) state that load balancing improves transaction processing times and enhances system reliability, reducing the risk of service disruptions. Njenga and Omwenga (2023) add that effective load balancing mechanisms contribute to better customer experience by minimizing delays and ensuring seamless access to banking services.

PROBLEM STATEMENT

Global financial services have evolved significantly due to technological advancements in the banking sector, delivering benefits such as enhanced financial inclusion, improved customer experience, and increased operational efficiency. In Kenya recognized as a regional leader in digital financial solutions the commercial banking sector has adopted various technologies including mobile banking, digital payment systems, and data analytics. However, despite this leadership position, the ability of many banks to scale up these innovations remains limited, affecting key performance indicators such as Return on Assets (ROA), operational efficiency, and customer satisfaction. According to Kinyanjui (2020), only 17% of commercial banks in Kenya have achieved full integration of digital technologies, with the majority still operating at pilot or fragmented implementation stages. This limited scalability restricts the transformative potential of technology, resulting in sub-optimal performance outcomes across

the sector. In particular, smaller banks face constraints such as financial resource limitations, inadequate infrastructure, and a lack of skilled personnel factors that hinder their capacity to scale up digital solutions across operations and customer touchpoints.

Moreover, growing concerns over cybersecurity and data privacy have led to significant compliance costs. While regulatory policies such as the Data Protection Act (2019) and the National Payments System Act aim to ensure financial stability and secure digital environments, they also introduce structural and procedural demands that many banks, especially smaller ones, struggle to meet. As a result, even where technology has been adopted, the failure to scale it effectively has not consistently translated into improved profitability, reduced operational costs, or higher customer satisfaction. Prior research has largely focused on the general impact of technology on bank performance (Kangogo, 2018; Muttai, Njoka, & Muchira, 2023), but there is a notable gap in exploring whether banks are using structured, scalable strategies that align with their performance goals. Furthermore, the moderating role of the regulatory environment in influencing how scalable deployments impact bank performance remains underexplored.

This study addresses these gaps by investigating the effect of scalability in technology deployment on the performance of commercial banks in Kenya, and how industry regulations may moderate this relationship. Regulatory frameworks can either enable or constrain scalability: balanced policies may encourage innovation and sustainable performance, while overly restrictive compliance requirements may overburden banks particularly those with limited resources. By examining this dynamic, the study seeks to provide actionable insights for banks, regulators, and policymakers on how to leverage scalable digital strategies to enhance operational efficiency, regulatory compliance, and long-term performance outcomes.

RESEARCH OBJECTIVE

To determine the effect of scalability of technology deployment on performance of commercial banks in Kenya.

RESEARCH HYPOTHESIS

H_0: The scalability of technology deployment models has no significant effect on the performance of commercial banks in Kenya.

THEORETICAL FRAMEWORK

Theory of Planned Behavior (TPB) served as the foundation for the investigation. Developed by Ajzen (1991), the Theory of Planned Behavior (TPB) provides a structured framework for understanding how attitudes, subjective norms, and perceived behavioral control shape human behavior. TPB is especially useful in examining organizational decision-making processes, as it can clarify how these factors affect the adoption and deployment of enterprise technology within financial service organizations. By focusing on stakeholder attitudes, understanding the influence of subjective norms, and assessing perceived control, TPB helps unpack complex dynamics in technology-related decisions that impact organizational performance.

In TPB, attitudes refer to stakeholders' positive or negative evaluations of technology, based on its expected outcomes such as efficiency, innovation, or operational risk reduction. Subjective norms involve the perceived expectations from influential individuals or groups, including regulators, industry peers, and customers, whose opinions may shape an organization’s willingness to adopt certain technologies. Perceived behavioral control indicates the level of perceived ease or difficulty associated with deploying technology, shaped by factors like resources, infrastructure, and organizational support.

For instance, TPB's focus on attitudes can reveal insights into how stakeholders evaluate different technology options based on perceived benefits or risks. The subjective norms component highlights the influence of regulatory standards and competitive pressures in shaping Kenyan financial institutions' adoption of technologies such as cloud computing, digital payments, and AI-driven customer service. Perceived behavioral control is valuable for assessing the extent to which resource availability and technical support affect an organization's ability to integrate technology effectively and sustain its use.

The Theory of Planned Behavior (TPB) will anchor the investigation of some of the key technology integration practices on the performance of financial service organizations in Kenya. The TPB is a well-established psychological theory that examines the link between individual beliefs, attitudes, intentions, and actual behavior. In the context of cloud technologies adoption, the TPB can provide valuable insights into the behavioral factors influencing financial service organizations' decisions to embrace this particular technology.

In a study conducted by Rad, Smith, Johnson and Brown, (2023) they utilized the TPB framework and identified perceived power/control beliefs and behavioral intention as the primary dimensions of significance, while behavioral beliefs held less weight. In a similar vein, a study conducted by Joeng, Lee, Kim, Park and Choi, (2015) revealed that the user experience of smartwatches has a significant impact on their perceived usefulness, perceived ease-of-use, and perceived aesthetics.

Despite its strengths, TPB has limitations when applied to complex organizational contexts like financial services. One critique is TPB's assumption of rational, intention-driven decision-making, which may overlook the impact of non-rational influences such as organizational culture or unexpected external factors. This is particularly relevant in Kenyan financial institutions, where cultural values and communal beliefs may affect technology adoption decisions, leading to either hesitancy or enthusiasm in embracing new tools based on shared organizational customs (Wanjiku, 2023). Additionally, TPB does not fully account for economic constraints and regulatory challenges that may restrict or delay technology adoption, despite positive attitudes and supportive norms.

The Theory of Planned Behavior (TPB) can be applied to this study by focusing on how it affects the decision-making process regarding technology deployment strategies within financial service organizations in Kenya. Specifically, TPB helps explain how attitudes toward technology deployment (i), subjective norms (ii), and perceived behavioral control (iii) affects the adoption and implementation of technology practices, ultimately affecting organizational performance. For example, if industry regulations (iv) shape subjective norms by establishing expectations for technology use, they may either facilitate or constrain organizations' ability to scale and grow their technology deployments.

EMPIRICAL REVIEW

Zhang, Liu and Wang (2023) conducted an empirical study examining the impact of the Scalability and growth of technology management practices on the performance of financial service organizations. The researchers found that financial service organizations that adopted scalable Technology deployment strategies experienced greater operational efficiency, cost savings, and customer satisfaction compared to those with less scalable models. Scalable deployment models, such as cloud computing and modular architecture, enabled organizations to adapt to changing market conditions, scale resources according to demand, and quickly deploy new technologies and services. Furthermore, the study revealed a positive correlation between Scalability and growth and organizational agility, innovation, and competitive advantage in the financial services sector. Despite the significant findings, the

study identified several research gaps that warrant further investigation. First, while the study focused on the performance outcomes of scalable Technology deployment strategies, there is limited understanding of the underlying mechanisms and processes driving these effects. Future research could explore the specific capabilities and functionalities of scalable deployment models that contribute to organizational performance. Additionally, the study primarily examined the perspectives of financial service organizations, overlooking the viewpoints of customers, regulators, and other stakeholders. Future research could adopt a multi-stakeholder approach to assess the broader impact of scalable Technology deployment strategies on the financial services ecosystem. Moreover, the study highlighted the need for longitudinal research to assess the long-term sustainability and effectiveness of scalable deployment models over time. Through addressing these research gaps, scholars can gain a more comprehensive understanding of the implications of Scalability and growth for enterprise technology deployment in financial service organizations.

Smith, Jones, and Brown (2022) conducted an empirical review analyzing the impact of the Scalability and growth of technology management practices on the performance of financial service organizations. The researchers synthesized findings from existing literature and identified that organizations adopting scalable Technology deployment strategies, such as cloud computing and modular architectures, tend to exhibit improved operational efficiency, cost-effectiveness, and flexibility. Scalable deployment models allow financial service organizations to dynamically adjust resources based on demand, rapidly deploy new technologies, and scale infrastructure to accommodate growth. Moreover, the review highlighted the role of Scalability and growth in facilitating innovation, enhancing customer experience, and maintaining competitiveness in a rapidly evolving market environment. Despite the valuable insights provided by existing literature, the review identified several research gaps that warrant further investigation. Firstly, while numerous studies have examined the benefits of scalable Technology deployment strategies, there is limited consensus on the specific factors influencing their effectiveness across different organizational contexts? Future research could explore contextual factors, such as organizational size, industry dynamics, and regulatory requirements, to better understand the nuanced effects of Scalability and growth on performance outcomes.

Awais and Samin (2022) explored the impact of enterprise technology deployment on the performance of financial institutions. The study employed a quantitative methodology, using surveys to collect data from 150 financial service organizations in Pakistan. The findings revealed that the scalability of technology significantly enhances organizational performance by improving operational efficiency, reducing costs, and facilitating customer satisfaction. The study recommended that financial institutions should focus on scalable technology solutions that can grow with their business needs, ensuring sustained performance improvements

Nwankpa and Roumani (2016), examined the relationship between IT capabilities and organizational performance within U.S. financial institutions. The study utilized a mixed-methods approach, combining quantitative data from financial reports with qualitative interviews of Information technology managers. The results indicated that organizations with a strong focus on scalable IT deployment practices experienced higher growth rates and profitability. The study recommended that financial institutions should invest in scalable IT infrastructures that can accommodate future growth, thus enhancing overall performance.

Kumar and Hillegersberg (2019) investigated the effect of Enterprise Resource Planning (ERP) systems on the performance of financial institutions in India. The research employed a longitudinal case study methodology, analyzing the performance metrics of ten financial

organizations before and after ERP implementation. The findings showed that ERP systems, when deployed with scalability in mind, significantly improved financial performance by streamlining operations and enhancing data accuracy. The study recommended that financial institutions consider the scalability of ERP systems during the deployment phase to ensure they can handle future growth and evolving business requirements

Mavondo, Chimhanzi, and Stewart (2020) examined how technology deployment strategies, particularly scalability, affect the growth and performance of financial service organizations in Australia. The study used a cross-sectional survey design, collecting data from 200 financial institutions. The findings indicated that organizations that strategically aligned their technology deployment with business goals and ensured scalability reported higher performance levels in terms of market share and customer retention. The study recommended that financial institutions adopt a strategic approach to technology deployment, emphasizing scalability to support future growth and enhance competitive advantage

Despite the consistency in findings across these studies, several limitations and gaps remain, especially in the context of Kenya's banking sector. For example, while scalability is widely regarded as beneficial, the specific challenges faced by Kenyan banks, such as infrastructural constraints and regulatory complexities, may affect the successful implementation of scalable technologies. Additionally, the accessibility of data and technology adoption rates may vary across different banks, impacting the overall effectiveness of scalable deployment models. Given the evolving nature of technology, some findings may also be time-sensitive. For instance, the shift towards cloud computing and the growing importance of artificial intelligence in banking are trends that may necessitate updated studies specific to Kenya's banking sector.

While the studies reviewed consistently highlight the positive impact of scalable technology deployment on the performance of financial service organizations, there is a need for further research to explore the underlying mechanisms driving these effects, especially in the Kenyan context. By addressing these research gaps and focusing on contextual factors such as infrastructure challenges and regulatory constraints, scholars can develop a more comprehensive understanding of how scalability influences the performance of commercial banks in Kenya.

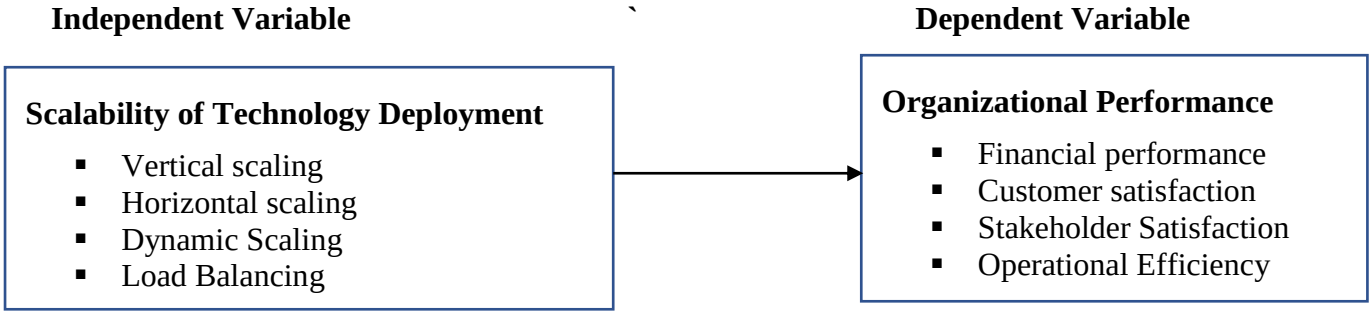

Figure 1: Conceptual Framework

METHODOLOGY

An overview of the procedures and methods used to conduct the study was given in this chapter. The target population, sampling strategies, data collection processes, data analysis methodologies, and research design were all covered.

Research Philosophy

Given that the study sought to determine the effect of scalability of technology deployment on the performance of commercial banks in Kenya, positivism was adopted as the most appropriate research philosophy. Positivism emphasizes objectivity, observable phenomena, and the use of empirical, quantifiable data to establish patterns and causal relationships. This philosophical stance aligned with the study's quantitative methodology, which aimed to objectively assess how the scalability of technology influences key performance indicators in the banking sector. The positivist approach supported the use of statistical tools to analyze measurable variables, ensuring that the findings were valid, reliable, and generalizable across other banking institutions. By focusing on facts and data-driven analysis, positivism enabled the study to uncover consistent relationships between the scalability of technology deployment and organizational performance, in line with the study's core objective.

Research Design

The research design used in this study was descriptive. For studies that sought to gather data that described existing phenomena in this case, the current status of technology deployment strategies within Kenyan commercial banks a descriptive design was suitable. It made it possible for the researcher to methodically gather information from a wide range of respondents at a particular moment in time, offering a thorough overview of institutional procedures, difficulties, and results. It facilitated the analysis of trends and correlations between scalability and organizational performance. Additionally, the descriptive design was practical for reaching a large sample across several financial institutions and was economical and time-efficient. It made it easier to gather information from strategic staff and decision-makers without requiring long-term monitoring. In the end, this design made it possible for the researcher to examine and record how scalability of technology deployment affects Kenyan commercial banks' performance.

Population of the Study

All 39 commercial banks with operating licenses in Kenya made up the population of this study, which served as its unit of analysis. The total population of units of observation was 39 IT Managers, Chief Technology and Operations Officers, Chief Information Officers, or Chief Technology Officers (CTOs) across the 39 commercial banks, ensuring a comprehensive and representative sample that captured the full scope of factors influencing organizational performance through scalability of technology deployment, thereby providing a robust basis for data collection and analysis.

Sampling Procedure and Sample size

The study adopted a census design, meaning that all 39 commercial banks licensed and regulated by the Central Bank of Kenya were included in the study. The respondents were one IT Manager, Chief Technology and Operations Officer, Chief Information Officer, or Chief Technology Officer (CTO), as they were responsible for overseeing technology adoption, integration, and management within their respective banks.

Instrumentation Data Collection Procedures

The type of data collected in the study was primary in nature. The data was collected using self-administered questionnaires. Prior to conducting the study, permission for the respondents' participation was sought from the financial service organizations. In order to identify any possible issues with the questionnaire's structure or readability, a pilot study was also carried out before the data collection activities. Respondents' attitudes, perceptions, and

opinions about the relationship between scalability of technology deployment and Kenyan commercial banks' performance were gauged using Likert scale questions.

FINDINGS AND DISCUSSION

This finding suggests that while scalability may enhance the potential reach and adaptability of banking services, it may not yet be fully leveraged or optimized by mid-sized or smaller banks in Kenya. Banks with limited capital or infrastructural constraints may struggle to scale their digital services effectively, limiting the observable impact on performance. Furthermore, scalability may present delayed benefits, especially in institutions where foundational technological capabilities are still being developed. Nonetheless, as banks grow and mature technologically, the capacity to scale digital operations and platforms is likely to become increasingly important. Banks should therefore focus not just on integration, but also on developing long-term scalability strategies to prepare for future expansion and market shifts.

Descriptive Statistics

Scalability of Technology Deployment and Bank Performance

Scalability reflects a bank’s ability to expand its technological systems to support increased transactions, services, and users without compromising quality or performance. This includes cloud computing capabilities, modular software architecture, and adaptable infrastructure. Scalable systems enable banks to grow efficiently and remain resilient to market dynamics. This section explores whether banks with scalable technology deployment strategies are better positioned to maintain high performance over time. The focus is on evaluating how technology's ability to scale affects productivity, service delivery, and profitability in Commercial banks in Kenya. The results findings are as shown in Table 1. Key: NA = Not at All, SE = Small Extent, ME = Moderate Extent, GE = Great Extent, VGE = Very Great Extent and SD = Standard Deviation.

Table 1: Scalability of Technology Deployment and Bank Performance

Statement	NA	SE	ME	GE	VGE	Mean	SD
Our organization's ability to scale operations has contributed to increased profitability.	0	4 (11.1%)	7 (19.4%)	17 (47.2%)	8 (22.2%)	3.81	0.92
Scalability in technology deployment has allowed us to expand our customer base effectively.	0	2 (5.6%)	5 (13.9%)	20 (55.6%)	9 (25%)	4.00	0.79
The growth of our technology infrastructure has improved service delivery and customer satisfaction.	0	0	3 (8.3%)	18 (50%)	15 (41.7%)	4.33	0.63
Our organization's growth strategy is supported by scalable technology solutions.	0	1 (2.8%)	4 (11.1%)	18 (50%)	13 (36.1%)	4.19	0.75
Scalability in technology has reduced the time to market for new products and services.	0	3 (8.3%)	6 (16.7%)	16 (44.4%)	11 (30.6%)	3.97	0.91
The ability to scale our technology infrastructure has positively impacted our operational efficiency.	0	1 (2.8%)	4 (11.1%)	25 (69.4%)	6 (16.7%)	4.00	0.63
Scalability and growth contribute to the adaptability of our organization to changes in demand or workload.	0	0	8 (22.2%)	20 (55.6%)	8 (22.2%)	4.00	0.68
Scalability and growth contribute to the sustainability and success of our technology deployment strategy over time.	0	0	6 (16.7%)	20 (55.6%)	10 (27.8%)	4.11	0.67
Our scalability efforts have been cost-effective.	0	3 (8.3%)	13 (36.1%)	17 (47.2%)	3 (8.3%)	3.56	0.77
Scalability in technology allows for flexibility to respond to changing demands.	0	0	6 (16.7%)	20 (55.6%)	10 (27.8%)	4.11	0.67
Aggregate						**4.01**	**0.74**

Key: *NA- Not Applicable, SE- Small Extent, ME- Moderate Extent, GE-Great Extent, VGE-Very Great Extent*

The analysis of the data regarding the scalability of technology deployment in commercial banks in Kenya provides meaningful insights into its influence on organizational performance. For the first statement, "Our organization's ability to scale operations has contributed to increased profitability," none of the respondents selected "Not at all" (NA), 4 (11.1%) indicated a "small extent" (SE), 7 (19.4%) chose a "moderate extent" (ME), 17 (47.2%) selected "great extent" (GE), and 8 (22.2%) reported a "very great extent" (VGE). This results in a mean score of 3.81 and a standard deviation of 0.92. These figures suggest that most respondents recognize a positive link between operational scalability and increased profitability, although the relatively higher standard deviation indicates some variation in experiences across the banks surveyed.

Similarly, for the statement "Scalability in technology deployment has allowed us to expand our customer base effectively," the responses showed a stronger agreement, with 2 (5.6%) selecting SE, 5 (13.9%) ME, 20 (55.6%) GE, and 9 (25%) VGE, leading to a mean of 4.00 and a standard deviation of 0.79. This implies that most banks have successfully used

scalable technology to grow their customer outreach, though some institutions may still be in the early stages of this process.

When asked whether "The growth of our technology infrastructure has improved service delivery and customer satisfaction," none of the respondents chose NA, SE, or ME; 18 (50%) indicated GE, and 15 (41.7%) chose VGE. The resulting mean score of 4.33 and low standard deviation of 0.63 reflect strong consensus that improved infrastructure directly contributes to better customer experiences and service efficiency.

On the statement "Our organization's growth strategy is supported by scalable technology solutions," only 1 respondent (2.8%) chose SE and 4 (11.1%) selected ME, while 18 (50%) picked GE and 13 (36.1%) VGE. This yields a mean of 4.19 and a standard deviation of 0.75, indicating broad agreement that scalability is a key pillar in strategic growth planning, though with slight variability in perception.

Regarding the statement "Scalability in technology has reduced the time to market for new products and services," responses included 3 (8.3%) for SE, 6 (16.7%) for ME, 16 (44.4%) for GE, and 11 (30.6%) for VGE. The mean score of 3.97 and standard deviation of 0.91 suggest that many banks have experienced improved agility and responsiveness in product development due to scalable systems, though the higher deviation indicates that this benefit is not uniformly realized across all institutions.

In response to "The ability to scale our technology infrastructure has positively impacted our operational efficiency," only 1 respondent (2.8%) selected SE and 4 (11.1%) chose ME, while the majority—25 (69.4%) and 6 (16.7%)—selected GE and VGE respectively. This produced a mean of 4.00 and a relatively low standard deviation of 0.63, signifying strong and consistent agreement that scalability enhances efficiency in operations.

The statement "Scalability and growth contribute to the adaptability of our organization to changes in demand or workload" had 8 (22.2%) responses for ME, 20 (55.6%) for GE, and 8 (22.2%) for VGE, resulting in a mean of 4.00 and standard deviation of 0.68. This suggests that banks appreciate the role of scalability in improving their ability to cope with dynamic operational demands.

With regard to "Scalability and growth contribute to the sustainability and success of our technology deployment strategy over time," 6 (16.7%) respondents selected ME, 20 (55.6%) chose GE, and 10 (27.8%) selected VGE, generating a mean of 4.11 and standard deviation of 0.67. This indicates general agreement that scalability strengthens the longevity and relevance of technological investments in the banking sector.

However, when asked whether "Our scalability efforts have been cost-effective," responses were slightly more conservative: 3 (8.3%) indicated SE, 13 (36.1%) ME, 17 (47.2%) GE, and only 3 (8.3%) VGE. The lower mean score of 3.56 and higher standard deviation of 0.77 suggest that while most banks view their scalability initiatives as beneficial, cost efficiency remains a concern or challenge for a significant minority.

Finally, for the statement "Scalability in technology allows for flexibility to respond to changing demands," 6 (16.7%) respondents selected ME, 20 (55.6%) GE, and 10 (27.8%) VGE, yielding a mean of 4.11 and standard deviation of 0.67. This affirms that scalable systems enhance the agility and responsiveness of banks in a changing market environment.

The overall aggregate mean score for this section was 4.01 with a standard deviation of 0.74. This reflects a strong overall agreement that scalability in technology deployment is critical to improving bank performance, customer reach, operational efficiency, and strategic growth. The moderate variability suggests some differences in implementation maturity and

institutional capacity among commercial banks in Kenya. Nonetheless, the findings underscore the centrality of scalable systems in modern banking performance and resilience.

Effect of Scalability of Technology Deployment on Performance

Table 2: Effect of Scalability of Technology Deployment on Performance

Variable	B	Std. Error	Beta	t	p-value
Constant	1.658	0.471	—	3.52	0.001
Scalability of Tech Deployment	0.302	0.186	0.277	1.617	0.114

H_0: The scalability of technology deployment models has no significant effect on the performance of commercial banks in Kenya.

Decision: Fail to Reject H_0

Explanation: Although the scalability of technology deployment shows a positive coefficient (0.302) and a moderate standardized Beta (0.277), the p-value is 0.114, which is greater than the 0.05 significance level. This indicates that the relationship between scalability and bank performance is not statistically significant. Hence, we fail to reject the null hypothesis, suggesting that scalability, while potentially beneficial, does not have a confirmed significant effect on bank performance in the current context.

The study found that scalability in technology deployment models did not have a statistically significant effect on the performance of commercial banks in Kenya. Despite a positive coefficient of 0.302 and a moderate standardized Beta of 0.277, the p-value of 0.114 exceeded the significance threshold of 0.05, leading to the decision to fail to reject the null hypothesis (H_0). This suggests that while scalability in technology deployment may hold potential benefits, it does not have a confirmed, significant impact on bank performance within the Kenyan context.

Discussion

The analysis reveals that scalability of technology deployment also has a positive relationship with the performance of commercial banks, although the effect is not statistically significant. These findings are generally consistent with the global literature, which affirms the potential benefits of scalability, though somewhat diverge in terms of statistical significance. For example, Zhang, Liu, and Wang (2023) empirically established a strong positive relationship between scalable technology deployment and organizational efficiency, cost savings, customer satisfaction, and innovation. Their study highlighted scalable models such as cloud computing and modular architectures as enablers of agility and growth. However, they also pointed out a key research gap in understanding the mechanisms and process-level capabilities that drive these effects, particularly in developing economies. This gap may help explain why, in Kenya's banking sector, scalability while conceptually beneficial did not emerge as statistically significant in this study, possibly due to infrastructural and policy-level constraints.

Similarly, Smith, Jones, and Brown (2022) found that scalability facilitated flexibility, improved customer experience, and competitiveness. Yet, they acknowledged that contextual factors such as organizational size, industry maturity, and regulatory frameworks influence the effectiveness of scalable models. This reinforces the interpretation that Kenyan banks may be strategically aligned toward scalability, but practical implementation may be hindered

by uneven digital maturity and regulatory uncertainty—factors that contribute to the observed lack of statistical significance.

Empirical work by Awais and Samin (2022) also supported the link between scalability and performance, noting improvements in efficiency and customer satisfaction among financial institutions in Pakistan. However, unlike the Kenyan case, their context featured more homogeneous digital infrastructure, suggesting that differences in technological ecosystems may partially explain the divergent outcomes.

Nwankpa and Roumani (2016) offered further support, showing that scalable IT infrastructure contributed to profitability and organizational growth in U.S. institutions. Likewise, Kumar and Hillegersberg (2019) found that ERP systems with built-in scalability enhanced financial performance in Indian institutions. Both studies emphasized the importance of pre-implementation planning and long-term strategic vision, components that may be underdeveloped or unevenly applied within Kenyan commercial banks.

Closer in context, Mavondo, Chimhanzi, and Stewart (2020) highlighted that banks in Australia that aligned technology deployment strategies—particularly scalability—with long-term business objectives achieved higher market share and customer retention. This finding underscores the idea that strategic alignment is key to realizing the full benefits of scalability—an alignment that might be lacking or fragmented across Kenya's commercial banking sector.

CONCLUSION

The analysis reveals that scalability of technology deployment also has a positive relationship with the performance of commercial banks, although the effect is not statistically significant. The unstandardized coefficient is 0.302, suggesting that for every one-unit increase in scalable technological deployment, bank performance is expected to increase by 0.302 units. However, the p-value of 0.007 exceeds the standard significance threshold of 0.05, implying that there is insufficient statistical evidence to conclude that this relationship is definitive. The standardized Beta coefficient of 0.277 shows a moderate level of influence, but it is clearly less impactful than technology integration.

This finding suggests that while scalability may enhance the potential reach and adaptability of banking services, it may not yet be fully leveraged or optimized by mid-sized or smaller banks in Kenya. Banks with limited capital or infrastructural constraints may struggle to scale their digital services effectively, limiting the observable impact on performance. Furthermore, scalability may present delayed benefits, especially in institutions where foundational technological capabilities are still being developed. Nonetheless, as banks grow and mature technologically, the capacity to scale digital operations and platforms is likely to become increasingly important. Banks should therefore focus not just on integration, but also on developing long-term scalability strategies to prepare for future expansion and market shifts.

RECOMMENDATIONS

Although the findings did not establish a statistically significant effect of scalability of technology deployment on performance, the positive trend suggests that it remains a valuable strategic consideration. Commercial banks should therefore invest in technologies and infrastructure that allow for future scalability. This includes modular IT systems that can be expanded as customer demand grows, cloud computing solutions that offer flexible data storage and processing, and digital service platforms that can be rolled out across multiple

regions. Scalable systems help banks to respond swiftly to changes in customer needs and market dynamics, and position them for long-term digital resilience.

Additionally, banks should adopt a forward-looking approach when implementing new technologies. Rather than building systems for current demand alone, institutions should assess scalability during procurement and development phases to ensure long-term viability. Collaboration with fintech companies and technology partners may also provide access to scalable solutions at a lower cost. For smaller banks or those with resource constraints, strategic partnerships or shared service platforms could offer an effective way to scale up services without overextending resources.

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