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TECHNOLOGICAL SCALABILITY ON PERFORMANCE OF FINANCIAL INSTITUTIONS IN KENYA

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ABSTRACT
Financial institutions are adapting to changes in technology through the development of innovative alternative banking services such as mobile banking due to its ability to help them minimize costs and maximize profit. Despite this, clients continue to report that their money was transferred from their account without their permission and this raises concerns about information security as well as inefficient operations and time-consuming procedures. There was need therefore to establish the effect of technological scalability on performance of financial institutions in Kenya. This study adopted cross-sectional research design and targeted all Relationship managers, General Managers, Customer service managers and System administrators from financial institution who were 357 respondents as they were conversant with the effect of blockchain on performance. Data was analysed using both descriptive and inferential statistic using SPSS version 27 software. The overall average mean of 2.96 (SD = 1.48) indicates a moderate level of agreement with technological scalability statements, suggesting that while institutions have made some progress in building flexible, adaptive digital capacity, there remains room for improvement particularly in leveraging technology to directly enhance customer experience and in systematically assessing transformation across different service areas. The study recommends that financial institution should fully embrace technology since it uses less resources and facilitate financial accessibility as well as technology so as mitigate on the effect of financial instability. Financial institution strategy should be reviewed so as to align with the ever-changing financial environment by incorporating the use of innovative approach and new digital technologies hence improve on customer experience as well as overall operational performance.
KEYWORDS: *Technology Scalability, Financial Performance*

1.0 INTRODUCTION

A financial institution's technological scalability refers to the ability of banking technology solutions to handle increasing volumes of work or to expand to accommodate growth. This rise might be attributed to an influx of new banking customers, greater transaction volumes, or the rapid deployment of innovative services such as mobile banking. The ongoing reliance on rigid legacy systems is a major impediment to the scalability of digital banking services. During high transaction times, they become bottlenecks, decreasing service delivery and reducing the customer experience (Scalo, 2024).

Major outages at Australian banks in early 2024 exposed the vulnerabilities of outmoded digital technologies, resulting in severe customer unhappiness and reputational harm. As digital banking services grow, cyber threats become one of the most visible hazards to digital transformation. Furthermore, the delayed rollout of new products and digital processes might upset users, prompting them to migrate to more agile competitors. As a result, scalable digital architectures such as micro-services and cloud solutions are critical in enabling banks to innovate (Scalo, 2024).

Banks and insurance companies provide a wide range of products to their consumers. To remain competitive, businesses produce ideas and develop creative, often disruptive, goods for their customers. To handle all of these items and organise them into a structured entity, they deploy cutting-edge technology that enable Big Data processing and proper enterprise resource management.

Lui and Lamb (2018), used case studies to demonstrate that many banks and FinTech start-ups are investing in AI. The study discovered that augmented intelligence collaboration is required to allow industry actors and regulators to provide seamless regulation and financial stability. The study found that scalability is especially crucial in situations where service continuity and remote operation are critical. An institution's capacity to expand effectively not only improves its operational effect but also strengthens its capacity to adjust to the rapidly changing digital countryside, ensuring that it remains stable as well as responsive to competitive dynamics.

An organization's performance is a measure of the results achieved based on specific criteria. An economic outcome can be quantified by gathering data on sales growth rates, cash flows, return on investment, and economic value. Thus, it is primarily determined by the organization's policies and the extent to which the organization's growth rate contributes to its success, as these

policies influence performance and the extent to which financial returns are related to all activities, as well as the appropriate use of available resources in order to achieve performance goals at the lowest cost (Bolton *et.al.,* 2024).

According to Rella (2019), financial institution regulators are increasingly interested in blockchain technologies as potential tools for financial inclusion of the unbanked and underserved, as well as the formalization of previously informal value transfers, such as remittances. To encourage better performance, Abdulhakeem and Hu (2021), advocated the development of more methods of international money transfers and cross-border payments, citing the greatest potential to enhance people's lives in the

1.1 Statement of the Problem

The adoption of blockchain technology by financial institutions increases transparency and efficiency by eliminating the need for intermediaries such as clearinghouses, auditors, and reconciliation agents. According to the CBK report of 2024, banks are now optimizing the use of established information technology platforms to maximize benefit by creating systems aimed at improving service delivery in the Payments infrastructure in line with the government's ambitions of a 24-hour economy. According to the IRA Report 2023, applying blockchain technology in financial networks could lessen the danger of fraudulent transactions, addressing client needs while also lowering operational costs. Financial institutions have incorporated blockchain technology to varied degrees in their operations, which is expected to boost their performance. Despite this, clients continue to report that their money was transferred from their account without their permission and this raises concerns about information security as well as inefficient operations and time-consuming procedures. In addition, there have been less research on blockchain technology and its impact on performance. This means that the effect of blockchain technology adoption is unclear, necessitating this study to determine the effect of blockchain technology on the performance of financial institutions in Kenya, with a focus on technological scalability, distributed ledger, smart contract, and information security. The study findings advice financial institutions on the benefits of adopting blockchain technology for better service to client which has a ripple effect on financial performance.

2.0 LITERATURE REVIEW

Turki, Rabiya, and Nadeem (2024), conducted a comprehensive review of the scalability difficulties faced by blockchain technology in many sectors and investigated potential solutions based on consensus mechanisms, smart contracts, and directed acyclic graphs. The study discovered that the recommended scaling solutions aim to increase system throughput, reduce costs, and improve blockchain efficiency. The report included an in-depth overview of future open research issues and blockchain uses.

Brühl (2022), examined the diffusion, objectives, and relative popularity of scaled agile frameworks in the German banking industry. The data sheds light on people's expectations and experiences with agile approaches, as well as potential implementation challenges and success factors. The study discovered that practically all banks and fintechs use agile approaches in IT projects. However, fintechs have more expertise with scaled agile methodologies than banks and employ them more frequently. Overall, the study showed that commercial banks had yet to fully realize the benefits of scaled agile methodologies. This appears to indicate that there is still a need to analyze the scalability of agile networks, as the study found that it was too early to determine the usefulness at the time.

Lincopinis and Llantos (2024), reviewed all relevant publications on current research solutions for public blockchain scalability concerns and analyzed the application of several cutting-edge scalability solutions to natural systems and projects, while also highlighting the findings. The study discovered that the scalability problem manifests as low throughput, excessive transaction latency, and large energy usage. Several evaluations and research have addressed these problems and their potential remedies; nevertheless, these studies need to provide more knowledge through real application to natural systems or initiatives.

Gomber *et al.* (2018), in their study Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services, presented a new fintech innovation mapping approach that allows for the assessment of the extent to which there are changes and transformations in four areas of financial services. The study evaluated operations management in financial services and changes occurring such as technology innovations that have begun to leverage the execution and stakeholder value associated with payments, cryptocurrencies, blockchain, and cross-border payments; multiple innovations that have affected lending and deposit services, peer-to-peer (P2P) lending, and social media use; issues with respect to investments, financial markets, trading, risk management, robo-advising. Using machine learning and big data analytics allows institutions to make informed judgments.

Warner and Wäger (2019), conducted a qualitative study to investigate how incumbent enterprises in traditional German industries develop dynamic skills for digital transformation. Digital transformation is defined as the application of new digital technologies, such as mobile, artificial intelligence, cloud, blockchain, and Internet of Things (IoT), to enable significant business improvements such as enhanced customer experience, streamlined operations, or the creation of new business models. The findings show that digital transformation is a continuous process of integrating new digital technology into everyday organizational life. Financial institutions can improve operations and increase remote accessibility by leveraging cloud technology's scalability and flexibility, as well as its cost, which is critical in the digital age. Financial institutions require

technology tools to properly navigate the challenges of digital transformation, hence improving their financial performance. This study demonstrates that digital transformation is unachievable without dynamic capabilities that improve scalability.

Annie, Irene, Neil, Maurice, Derrick, Kerry and Isaac (2019), investigated how to increase the scalability and viability of early-stage financing provision, hence reducing the need for charitable money and subsidies to local providers of finance and assistance for early-stage businesses. The study employed a landscape exercise to define and prioritize archetypes of early-stage financing provision, and it chose business accelerators, business angel networks, and venture capital fund models to investigate further, as well as supplemental non-traditional lending possibilities. The study carefully identified and evaluated 15 early-stage financial firms. The study concluded that more experimentation with different revenue models and more effective program assistance can improve financial performance. The study concluded that a business can improve its financial performance by strengthening its lead generation, deal selection, and investment processes. According to the findings of this study, it is necessary to determine the effect of blockchain technology on the performance of commercial banks, since early-stage enterprises may have improved their financial performance.

According to Scalo (2024), a significant barrier to the scalability of digital banking services is the continuous reliance on inflexible legacy systems in which financial transactions create bottlenecks, resulting in sluggish service delivery and a poor customer experience during peak times. Fintech Times (2019), revealed that financial organizations' ever-increasing customer base necessitates a highly scalable system capable of managing communication, services, and other critical internal activities.

Gomber *et al.* (2018), examined operations management in financial services and developments such as technological innovations and found that using machine learning and big data analytics enables institutions to make sound judgments. Warner and Wäger (2019), stated in their qualitative study that financial institutions need to have technology tools so that they successfully tackle the obstacles of digital transformation, hence improving their financial performance. According to Lui and Lamb (2018), scalability is especially critical in situations where service continuity and remote operation are required. Annie *et al.* (2019), investigated how to increase the scalability and profitability of early-stage finance provision, concluding that more experimentation with diverse revenue sources and more efficient program assistance can boost financial performance.

Brühl (2022), while assessing scalability, discovered that fintech companies use blockchain technology more extensively than banks. This means that the impact of technology scalability on commercial bank performance remains to be determined. Brühl also stated that scalability could be an implementation and success element. This means that scalability can have an impact on performance, both positively and negatively. Many studies have been conducted in other nations where digital transformation has been more effective. Many others have concentrated on fintech and AI enterprises, leaving banking and insurance corporations relatively untapped.

3.0 RESEARCH DESIGN

According to Kothari and Garg (2023), study design refers to the detailed designs that guide data gathering and analysis processes. This study used a descriptive research approach to determine the effect of technology scalability on the financial performance of financial institutions in Kenya. The design was used because, according to Ogula (2015), it answers questions such as what, who, and how of a phenomenon in a study and aided in gaining insights into current phenomena in regard to circumstances, processes, and interactions (Taherdoost, 2021).

The study was undertaken in financial institutions which are Commercial Banks and Insurance Companies in Kenya. According to the Central Bank of Kenya (CBK), (2024), there are a total of 38 commercial banks and 56 insurance companies. Commercial banks in Kenya are licensed and guided by prudential guidelines formulated by the CBK while Insurance companies are licensed and regulated by Insurance Regulatory Authority of Kenya. As profit driven institutions financial institutions are expected to adopt blockchain technologies so as to enhance their performance.

The study's sample consisted of relationship managers, general managers, customer service managers, and system administrators from Kenyan financial institutions since they are familiar with the effect of blockchain on financial institution performance. Given the small population size of 357 respondents, a census was used in this study to select all respondents.

To acquire primary data, the researcher used a standardized questionnaire that was self-administered. According to Khan, Mohammadi, Nazari, Yousufzada, and Fayazi, (2024), a self-administered structured questionnaire is utilized to collect both quantitative and qualitative data. Thus, the study used a structured questionnaire because it included both qualitative and quantitative components of both independent and dependent variables, as well as sections covering distinct study factors. The researcher analyzed the data using quantitative techniques, with descriptive data analyzed as frequency, mean, and standard deviation. Data was presented using tables and figures.

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4.0 FINDINGS AND DISCUSSIONS

The study sought to establish the effect of technological scalability on performance of financial institutions. Respondents were asked to respond on the technological scalability statements and their responses were on a five-point Likert scale, where 1 was Strongly Disagree, 2 was Disagree, 3 was Undecide, 4 was Agree and 5 was Strongly Agree. A mean of between 0.0 and 2.5 meant strongly disagreed while a mean of between 2.6 and 5.0 meant strongly agree. The results are as presented in Table 1.

Table 1

Technological Scalability on Performance of Financial Institution

Statements on Technological Scalability	1	2	3	4	5	M	SD
Our financial institution strategy encourages iterative development by making sure that our digital solutions stay flexible and in line with the ever-changing financial environment.	63 (18.1%)	88 (25.2%)	5 (1.4%)	94 (26.9%)	99 (28.4%)	3.2	1.5
Innovative approach adopted by our financial institution enables the assessment of the extent to which there are changes and transformations in four areas of financial services	54 (15.5%)	92 (26.4%)	6 (1.7%)	111 (31.8%)	86 (24.6%)	2.7	1.5
Our financial institution use new digital technologies to enable major business improvements to customer experience.	18 (5.2%)	108 (30.9%)	6 (1.7%)	128 (26.7%)	89 (25.5%)	2.6	1.4
Our financial institutions have technological tools to handle the difficulties of digital transformation hence enhances their financial performance	69 (19.8%)	74 (21.2%)	7 (2.0%)	116 (33.2%)	83 (23.8%)	3.1	1.5
Our financial institution's capacity to expand effectively has improves on our operational effect and strengthens our capacity to adjust to the rapidly changing digital countryside	70 (20.1%)	70 (20.1%)	9 (2.6%)	114 (32.7%)	86 (24.6%)	3.2	1.5
Average						**2.96**	**1.48**

Table 4.3 reveals that financial institution strategy encourages iterative development by making sure that or digital solutions stay flexible and in line with the ever-changing financial environment. This is as per the majority of the respondents who were 99 (28.4%) who strongly agreed together with 94 (26.9%) respondents who agreed. The respondents who were 88 (25.2%) disagreed as well as 63 (18.1%) respondents who strongly disagreed that financial institution strategy encourages iterative development by making sure that or digital solutions stay flexible and in line with the ever-changing financial environment while 5 (1.4%) respondents were undecided.

The mean of 3.2 and standard deviation of 1.5 implies that financial institution strategy encourages iterative development by making sure that or digital solutions stay flexible and in line with the ever-changing financial environment. This concurs with Scalo (2024) who established that reliance on rigid legacy systems is a major impediment to the scalability of digital banking services since during high transaction times, they become bottlenecks, decreasing service delivery and reducing the customer experience. Hence financial institutions should continuously innovate so as to be competitive in the current age of ever-changing technology. As per Fintech Times (2019), financial organizations' ever-increasing customer base necessitates a highly scalable system capable of managing communication, services, and other critical internal activities.

Majority of the respondents who were 111 (31.8%) agreed as well as 86 (24.6%) respondents who strongly agreed that innovative approach adopted by financial institution enables them assess the extent to which there are changes and transformations in areas of financial services. respondents who were 92 (26.4%) disagreed as well as 54 (15.5%) respondents who strongly disagreed that innovative approach adopted by financial institution enables them assess the extent to which there are changes and transformations in areas of financial services while 6 (1.7%) respondents were undecided. The findings had a mean of 2.7 and a standard deviation of 1.5 which implies that innovative approach adopted by financial institution enables them assess the extent to

which there are changes and transformations in areas of financial services. The findings agree with Turki, Rabiya, and Nadeem (2024), who established that scaling solutions aim to increase system throughput, reduce costs, and improve blockchain efficiency. The delayed rollout of new products and digital processes might upset users, prompting them to migrate to more agile competitors as postulated by Scalo, (2024). Hence financial institutions should innovative in transformations in areas of financial services.

Majority of the respondents who were 128 (26.7%) agreed as well as 89 (25.5%) respondents who strongly agreed that financial institution use new digital technologies to enable major business improvements to customer experience. Respondents who were 108 (30.9%) disagreed together with 18 (5.2%) respondents who strongly disagreed that financial institution use new digital technologies to enable major business improvements to customer experience. Respondents who were 6 (1.7%) were undecided. The findings had a mean of 2.6 and a standard deviation of 1.4 which implies that financial institution use new digital technologies to enable major business improvements to customer experience. The findings agree with Brühl (2022), who discovered that practically all banks and fintechs use agile approaches in IT projects for them to fully realize the benefits of scaled agile methodologies and hence eliminate scalability problem which manifests as low throughput, excessive transaction latency, and large energy usage (Lincopinis & Llantos, 2024).

Financial institutions had technological tools to handle the difficulties of digital transformation hence enhances their financial performance since the majority of the respondents who were 116 (33.2%) agreed as well as 83 (23.8%) respondents who strongly agreed to it. The respondents who were 74 (21.2%) disagreed as well as 69 (19.8%) respondents who strongly disagreed that financial institutions had technological tools to handle the difficulties of digital transformation hence enhances their financial performance while 7 (2.0%) were undecided. The findings mean of 3.1 and a standard deviation of 1.5 implies that financial institutions had technological tools to handle the difficulties of digital transformation hence enhances their financial performance. This agrees with Gomber *et al.,* (2018), who established that the current operations management in financial services occurring such as technology innovations leverage machine learning and big data analytics in the execution and stakeholder value associated with payments, cryptocurrencies, blockchain, and cross-border payments hence allows institutions to make informed judgments of all its operations in once centralized monitoring screen.

Majority of the respondents who were 114 (32.7%) agreed as well as 86 (24.6%) respondents who strongly agreed that financial institution's capacity to expand effectively has improves on operational effect and strengthens capacity to adjust to the rapidly changing digital countryside. The respondents who were 70 (20.1%) disagreed as well as 70 (20.1%) respondents who strongly disagreed that financial institution's capacity to expand effectively has improves on operational effect and strengthens capacity to adjust to the rapidly changing digital countryside. The respondents who were 9 (2.6%) were undecided. The findings had a mean of 3.2 and a standard deviation of 1.5 which implies that financial institution's capacity to expand effectively had improved on operational effect and strengthens capacity to adjust to the rapidly changing digital countryside. The findings agree with Warner and Wäger (2019), who established that financial institutions can improve operations and increase remote accessibility by leveraging cloud technology's scalability and flexibility, as well as its cost, which is critical in the digital age. The study findings also agree with Annie, Irene, Neil, Maurice, Derrick, Kerry and Isaac (2019), study who concluded that a business can improve its financial performance by strengthening its lead generation, deal selection, and investment processes. Financial institutions should not rely on inflexible legacy systems in which financial transactions create bottlenecks, resulting in sluggish service delivery and a poor customer experience during peak times as postulated by Scalo (2024), since it a significant barrier to the scalability of digital banking services.

5.0 CONCLUSION AND RECOMMENDATION

The study concludes that financial institution strategy encourages iterative development by making sure that digital solutions stay flexible and in line with the ever-changing financial environment; innovative approach adopted by financial institution enables them assess the extent to which there are changes and transformations in areas of financial services; financial institution used new digital technologies to enable major business improvements to customer experience; financial institutions had technological tools to handle the difficulties of digital transformation hence enhances their financial performance and; that financial institution's capacity to expand effectively has improves on operational effect and strengthens capacity to adjust to the rapidly changing digital countryside.

The study recommends that; financial institution strategy should be reviewed so as to align with the ever-changing financial environment by adoption of innovative approach and new digital technologies so as to improve on customer experience as well as operational effect.

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