

Technology Infrastructure and Business Performance of Commercial Banks in Kenya

¹ Jeremiah Mugambi Ananga; ²Dr. Samson Nyang'au Paul; ³Dr. Tobia Mwalili

¹PhD Student; ²Lecturer

Jomo Kenyatta University of Agriculture and Technology

Abstract:- The general objective of the study was to examine the role of technology infrastructure on business performance of Commercial Banks in Kenya. The philosophy that guided the research is positivism philosophy. The study adopted correlational research design. The target population was commercial Banks in Kenya register by the Central Bank of Kenya. The population consisted of all 42 commercial banks in Kenya. Respondents' population comprised of five top managers from each bank translating to 210 top managers. Slovin's formula was used to calculate the sample size. Purposive sampling technique was used to select 138 top managers of the 42 commercial Banks in Kenya. This study used a self-administered, closed and open-ended questionnaire to obtain primary data. A pilot study was conducted to test the validity and reliability of the data collection instrument. Quantitative data was collected and analyzed in this study by calculating the response rate with descriptive statistics such as mean, standard deviation, median and proportions using the Statistical Package for Social Sciences (SPSS) version 24). Regression analysis and correlation analysis was used to carry out inferential data analysis to determine the direction and strength of the relationship between the independent and the dependent variables. In order to test the influence of information technology capability on business performance of Commercial Banks in Kenya, the study employed a hierarchical regression analysis with moderation. The study results were presented through use of tables and figures. The study concludes that technology infrastructure has a positive and significant effect on business performance of Commercial Banks in Kenya. The study revealed that hardware/Software, network and database influence business performance of Commercial Banks in Kenya. This implies that improvement in information technology infrastructure (hardware/Software, network and database) would lead to improvement in business performance of Commercial Banks in Kenya. The study recommends that the management of commercial banks in Kenya should ensure they had adequate and up to date hardware/Software to enable their employees improve their productivity.

Keywords:- Technology Infrastructure, Business Performance of Commercial Banks and Positivism Philosophy.

I. INTRODUCTION

The contemporary business landscape is undergoing profound transformations driven by rapid technological advancements, expanding globalization, evolving demographics, and increased regulatory scrutiny. These factors collectively give rise to a milieu characterized by novel prospects, formidable challenges, and heightened risks for managers (Owuori, Ngala, & Obwatho, 2020). In this dynamic and unpredictable market environment, competition engenders fluctuations in both demand and supply, manifesting more rapidly, extensively, and unpredictably than in the past (Lu & Ramamurthy, 2019). Consequently, the ability to swiftly perceive and adapt to market fluctuations, seizing opportunities and mitigating threats with agility and ingenuity, has become imperative for organizational survival (Huang, Ouyang, Pan, & Chou, 2018).

The IT infrastructure encompasses the tangible and intangible components of information technology, including hardware, software, and networks, which are structured into systems to support the implementation of IT-based products and processes, thereby facilitating innovation (Basheer et al., 2016; Lu & Ramamurthy, 2011). Due to the inherent diversity among firms in cultivating and enhancing IT capabilities, they exhibit varying degrees of proficiency in harnessing information systems (IS) to bolster their competitive edge. Scholars have delineated various dimensions of IT capability, encompassing aspects such as IT strategy and structure (Bergeron, Raymond, & Rivard, 2004); human and infrastructure capabilities, along with planning, development, and operational prowess (Ravichandran, Lertwongsatien, & Lertwongsatien, 2005); infrastructure, business experience, relationship resources, and human resources (J.-S. Chen & Tsou, 2012); managerial, personnel, and infrastructure prowess (Kim, Shin, Kim, & Lee, 2011); infrastructure capability, business spanning capability, and proactive stance (Lu & Ramamurthy, 2011); as well as value, competitive, and dynamic capabilities (Bhatt & Grover, 2005); and finally, managerial, technical, and relational IT capability (Garrison, Wakefield, & Kim, 2015).

Technological capability serves as a pivotal determinant of firms' performance enhancement, enabling incremental advancements through the adoption of novel technologies (Jonker, Romijn, & Szirmai, 2006). Enhanced access to a diverse array of cutting-edge technologies

(Tatikonda & Stock, 2003) exerts influence on various aspects such as product cycle time (Montoya Weiss & Calantone, 1994), innovation velocity within the firm (Coombs & Bierly III, 2006), as well as the speed and efficiency of new product introduction to the market (Calantone & Di Benedetto, 2012). Moreover, it impacts product development costs and the success rate in bringing new products to fruition (Tatikonda & Stock, 2003), underscoring its significance as a fundamental component of organizational knowledge and expertise (Renko, Carsrud & Brännback, 2018). A firm's competitiveness and performance hinge upon its adeptness at performing across various dimensions, implying that its success emanates from its multifaceted capabilities (Stouder & Gallagher, 2015). As elucidated by Kim, Shin, and Min (2016), a firm's capabilities enable it to navigate daily operations, facilitate growth, adapt to dynamic market shifts, and ultimately attain a competitive edge within the industry.

IT capabilities encompass a tripartite of components: IT infrastructure, IT applications, and human IT skills (Bharadwaj, 2000). This amalgamation provides the requisite hardware and software infrastructure for establishing networks that serve as conduits for fostering firm innovation. Effective deployment of IT infrastructure enables firms to seamlessly integrate suitable applications at opportune moments, thereby widening pathways for technological breakthroughs (Zeng & Lu, 2020). By leveraging IT infrastructure, organizations can expedite the identification and development of pivotal technologies, facilitate information sharing across products, services, and geographical locations, institute standardized transaction processing, and streamline supply chain management across various business functions (Zahra et al., 2019). Furthermore, firms endowed with robust human IT skills are not only better positioned to anticipate and cater to the future business needs of the organization but also possess the acumen to innovate novel product features ahead of competitors, thereby reaping intangible benefits such as enhanced customer satisfaction (Bharadwaj, 2000).

Innovative concepts encompass leveraging IT to pioneer new markets and secure a competitive edge through heightened interactivity, cost-effective transactions, and direct engagement with partners and clientele (Hoque, Mohammad, Albar, & Bao, 2016; Zhu, Zou, & Zhang, 2018). Innovation catalyzes enhancements across a firm's value chain, ushering in novel products, services, solutions, and operational methodologies (Shaw, O'Loughlin, & McFadzean, 2005). Schumpeter (1942) delineated innovation as a pivotal facet of a firm's life cycle within the realm of entrepreneurship. Empirical studies by information systems researchers have underscored that investments in Information Technology (IT) bolster firms' productivity, augment consumer welfare, and fortify their comparative advantage (Barua et al., 2000). Additionally, other research has highlighted that IT management capabilities, encompassing managerial proficiencies related to the acquisition, administration, and utilization of information technologies, exert a substantial influence on business performance (Bharadwaj, 2014; Santhanam et al., 2013).

The Central Bank of Kenya serves as the primary regulator overseeing microfinance banks, foreign exchange trading bureaus, credit reference bureaus, and commercial banks. Within Kenya, there exist a total of 42 commercial banks, each holding an equal market share (Central Bank of Kenya Annual Report, 2021). The commercial banking sector in Kenya has witnessed a proliferation of players, including locally incorporated banks and internationally incorporated commercial banks (multinationals), both originating from within the continent and beyond (Aburime, 2009). This influx of diverse participants underscores the competitive landscape within the industry, where all banks vie for market dominance amidst a mix of public and private banking entities. Chowdhury and Rasid (2015) contend that private commercial banks, in particular, have witnessed steady growth across various branches, leading to increased employment opportunities, higher deposit volumes, expanded loan disbursements, and augmented net income and earnings per share over time.

According to Ongore and Kusa (2013), the ability of commercial banks to fulfill their role as financial intermediaries hinges on their capacity for financial innovation and the tailored development of financial products. Indeed, there is a pressing need for financial institutions to recognize the value of technology-driven financial services in order to sustain profitability and operational efficiency. In recent years, banks have faced intensified competition stemming from heightened innovation among existing players and the emergence of new market entrants (Cegarra-Navarro, Reverte, Gómez-Melero, & Wensley, 2016). These shifts include the transition from traditional decentralized banking to a more centralized model, facilitated by the integration of diverse business capabilities (PWC, 2012). To maintain brand leadership and foster customer loyalty within the commercial banking sector in Kenya, various strategies are employed, such as the introduction of innovative products and the implementation of robust customer relationship management initiatives.

II. STATEMENT OF THE PROBLEM

Technological capability stands as a pivotal factor in enhancing organizational performance (Zhou, Yim & Tse, 2019). Consequently, many successful organizations worldwide rely on their technological prowess to efficiently execute their routine business processes and activities (Ajonbadi, 2018). According to Bharadwaj (2018), J.-S. Chen & Tsou (2021), and Zeng & Lu (2020), the adeptness of organizations in leveraging, cultivating, and advancing their IT capabilities holds paramount importance (Bharadwaj, 2019). Information Technology capabilities possess immense potential to revolutionize organizations by shaping decision-making and operational execution through innovation.

Inadequate implementation of technological capabilities has led to excessive operational expenses, disjointed business processes, failure to meet domestic policy objectives, and challenges in attracting and retaining

skilled professionals (Zahra et al., 2019). Several studies have explored the realm of IS/IT capabilities, such as Akinbola, Adeniyi, and Oluwatosin's (2017) examination of IS capabilities in the telecommunications sector in Nigeria, Bhatt and Grover's (2019) investigation into the role of information technology capabilities in gaining competitive advantage, and Oh and Kim's (2021) research on the managerial capabilities of Information Technology and their impact on firm performance.

Mugambi and Kinyua (2020) conducted a study investigating the impact of innovation capability on organizational performance within the context of Commercial Banks in Nairobi City County, Kenya. Their research encompassed dimensions of product innovation, service innovation, and service innovation. In contrast, the current study examines the effects of Information Technology Strategy, Information Technology Processes, Information Technology Organization, and Information Technology Infrastructure capabilities. Kamau, Senaji, Eng, and Nzioki (2019) endeavored to ascertain the influence of Information Technology Capability on the competitive advantage of the banking sector in Kenya. Anchored on the McKinsey 7S Framework Model, the study employed a descriptive survey design and focused on 39 operational commercial banks in Kenya. In contrast, the present study investigates the impact of IT capability on both financial and non-financial performance metrics of Commercial banks, while incorporating various dimensions of ITC and theories as the study's foundation.

The underexplored facets within this internal domain pertain to the dynamics of information technology capabilities, including Information Technology Strategy, Information Technology Processes, Information Technology Organization, and Information Technology Infrastructure, which pose a significant area for further research (Lu & Ramamurthy, 2011). Scholars have demonstrated that a firm's capacity to effectively harness its IT investments through the development of robust IT capabilities can yield positive outcomes in terms of firm performance. Pertinent literature delves into concepts such as managerial capability and organizational performance (Conyers, 2017), dynamic capability and competitive advantage (Rudolf, 2019), as well as innovation and performance (Kauzya, 2020). Despite the evolving nature of firms' technological capabilities, existing studies and reports have largely overlooked the impact of Information Technology Strategy, Information Technology Processes, Information Technology Organization, and Information Technology Infrastructure capabilities on the business performance of Commercial Banks in Kenya. This gap underscores the necessity for conducting a comprehensive study to explore the role of Technology Infrastructure in influencing the business performance of Commercial Banks in Kenya.

A. General Objective

To examine the role of Technology Infrastructure on business performance of Commercial Banks in Kenya.

B. Theoretical Framework

➤ Dynamic Theory

Dynamic capabilities encompass an organization's adaptive responses to rapid environmental changes. These capabilities are rooted in the managerial and organizational processes of the organization (Sher and Lee, 2004). While the nature of dynamic capabilities is unique, characterized by path dependence and emergent details, there exist commonalities, connections, and best practices across firms and organizations. Dynamic capabilities theory extends the Resource-Based View (RBV) and underscores that while the acquisition of capabilities is essential, it alone is not adequate for achieving competitive advantage (Teece, Pisano, and Shuen 1997).

Teece, Pisano, and Shuen (1997) argue that only firms capable of effectively creating, integrating, and reshaping their resources to suit evolving environments can sustain their competitive advantage. According to Dynamic Capabilities View (DCV), disparities in firm performance superiority are not dictated by variations in resource endowments but rather by the capabilities firms acquire and deploy (Eisenhardt and Martin, 2000). These capabilities are deemed dynamic when they furnish firms with the capacity to enact novel strategies in response to shifting market dynamics (Teece, Pisano, and Shuen, 1997).

The concept of IT capabilities originates from the resource-based view, which has faced criticism for its failure to elucidate the benefits derived from IT capabilities in volatile business environments (Wade & Hulland, 2004). An increasing number of scholars advocate for embracing the concept of IT capabilities through the lens of dynamic capability view, which underscores the necessity of adaptation and change amidst rapidly evolving market demands. These capabilities represent the interconnected processes within a firm that are crucial for future resource generation, enabling firms to navigate forthcoming challenges in a dynamic business landscape. By channeling their efforts towards creating, renewing, or modifying a resource mix to gain competitive advantage, firms enhance their performance (Eisenhardt & Martin, 2000; Teece et al., 1997). Firms with robust IT capabilities often exhibit accelerated decision-making processes by promptly responding to evolving market demands. Despite the widespread recognition of the significance of IT capabilities, there remains a paucity of understanding regarding the multifaceted role of IT capabilities in shaping firm performance. Numerous studies have established a connection between the dynamic capabilities of organizations and their innovation capability, as evidenced by research conducted by Lawson and Samson (2001), Ellonen, Wikström, and Jantunen (2009), and Liao, Kickul, and Ma (2009).

In their study, Lawson and Samson (2001) proposed that organizations aiming for increased innovation should invest in seven key capability areas: vision and strategy, organizational intelligence, leveraging the competence base, fostering creativity, optimizing organizational structure,

nurturing a conducive culture, and effective technology management. Dynamic capabilities can be analyzed and classified based on different business contexts and a spectrum of dimensions where they can be applied. Research conducted on a Japanese automobile company revealed that dynamic capabilities constituted the primary and most potent source of competitive advantage. Nevo and Wade (2010) assert that IT capabilities play a supportive role for other dynamic capabilities by introducing new modules and facilitating various routine business processes.

Consequently, IT capabilities contribute to enhancing innovation activities and firm performance (Del Giudice & Straub, 2011). Therefore, it is imperative to conduct studies aimed at gaining a clear understanding of how Technology Infrastructure enhances the operations of commercial banks.

C. Conceptual Framework

The conceptual framework shows the anticipated relationship between Technology Infrastructure and firm performance (dependent variable).

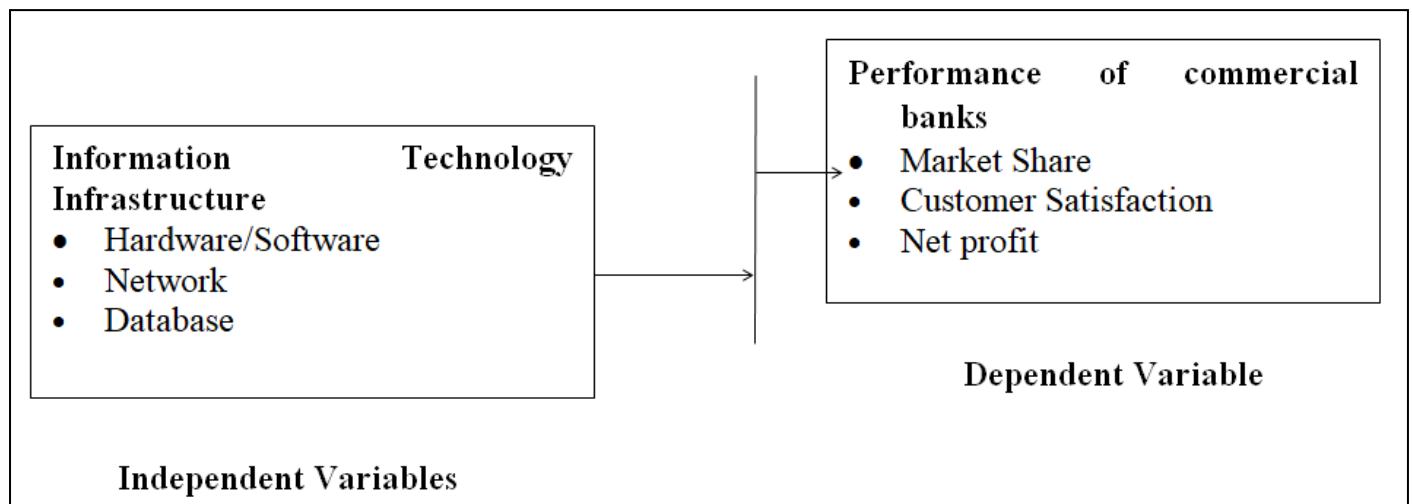


Fig 1: Conceptual Framework

D. Empirical Review

➤ *Information Technology Infrastructure*

IT infrastructure encompasses an organization's capacity to deploy hardware platforms and associated software systems (Lu & Ramamurthy, 2006). IT infrastructure capability refers to a firm's proficiency in implementing shareable platforms and encompasses its effectiveness in managing data management services, network communication services, and application portfolio and services tailored to the firm's specific information system applications (Bharadwaj, 2000; Broadbent, Weill, & St Clair, 1999; Laudon & Laudon, 2013). A flexible IT infrastructure synergizes information generation and distribution, thereby enhancing a firm's competitiveness in dynamic environments and fostering a competitive advantage (Lyver & Lu, 2018).

IT infrastructure encompasses the array of IT resources, including hardware, software, and networks, structured through systems, which forms the technical foundation for implementing IT and process innovation in product development (Basheer et al., 2016; Lu & Ramamurthy, 2011). Huang et al. (2012) shed light on IT capability, emphasizing its role in acquiring, disseminating, gathering, and recycling IT resources to bolster business strategies and operational processes. Effective management of diverse tasks within an organization, facilitated by a well-coordinated system supported by flexible IT infrastructure, is crucial for reducing production costs and enhancing

overall firm performance (Byrd & Turner, 2001; Jacks et al., 2011).

IT infrastructure holds significant importance among the dimensions of IT capabilities (Flyvbjerg & Budzier, 2011). According to Sambamurthy et al. (2003), the integration of infrastructure can generate myriad digital possibilities that enhance organizational learning, thereby supporting the organization's capacity to leverage and apply available knowledge. A robust IT infrastructure enables organizations to rapidly implement new IT initiatives. By fostering information technology sharing, IT infrastructure facilitates diverse organizational functions, thereby streamlining processes and bolstering innovation activities (Bharadwaj, 2000).

IT infrastructure flexibility empowers firms to enhance innovation and optimize the efficiency of all business functions (Pavlou & El Sawy, 2006; Ray et al., 2005). Through its adaptability, IT infrastructure flexibility facilitates firm development, fostering market equilibrium by catalyzing the introduction of innovative activities (Todd & Javalgi, 2007). Firms must cultivate robust IT infrastructure flexibility to drive innovation initiatives. Researchers have identified IT infrastructure as a pivotal resource, serving as a new competitive weapon that can bestow sustained competitive advantage (Bharadwaj, 2000). From the perspective of resource-based theory, IT infrastructure enabling firms to implement innovations represents a type of causally ambiguous resource (Bharadwaj, 2000; Reed and DeFillippi, 1990).

IT infrastructure comprises two primary components: technical IT infrastructure and human IT infrastructure. Managerial IT skills are often tacit and reliant on interpersonal relationships, which may require years to cultivate (Chatfield and Bjorn-Andersen, 1997; Mata, Fuerst, and Barney, 1995). These relationships are typically localized or specific to the organization, making skill development a socially intricate process (Mata, Fuerst, and Barney, 1995). For instance, IT managers must collaborate with functional managers, suppliers, and customers to develop suitable IT applications. Bush (2001) provides evidence supporting the impact of IT infrastructure on supply chain integration. However, previous research has predominantly focused on technical infrastructure while overlooking human IT resources concerning integration and performance.

Cash *et al.* (2020) posited that an IT infrastructure evolves through learning and assimilation of a firm's information requirements. Exploration of the environment can facilitate the development of appropriate capabilities. Research also indicates that the development of IT skills, integrated into specific business practices, requires knowledge assimilation over time (Lu & Ramamurthy, 2011). In a quantitative study investigating the direct influence of intangible IT resources on sustainable competitive advantages in the high-tech industry in Algeria, Makhloufi, Abu Al-Rejal, and Mohtar (2018) discovered that IT infrastructure significantly affects sustainable competitive advantage. Similarly, Bhatt, Wang, and Rodger (2017) examined the moderating effect of organizational learning intensity on the relationships between information systems and the competitive advantage of Chinese firms, collecting data from 122 IT managers. The results indicate that flexible IT infrastructure has a significant impact on competitive advantage.

III. RESEARCH METHODOLOGY

A. Research Philosophy

This research was guided by Positivism. Positivism is a philosophical perspective and approach to knowledge that emphasizes empirical observation, scientific method, and the objective analysis of data (Mulwa 2013). Positivism holds that knowledge should be derived from empirical observation and sensory experience. It emphasizes the importance of gathering data through direct observation or measurement rather than relying on speculation or intuition (Saunders *et al.*, 2007).

B. Research Design

The study used descriptive design. Descriptive research design serves as a fundamental approach in the realm of research methodology, offering crucial insights and advantages in various fields. Its significance lies in its ability to systematically describe and summarize characteristics, phenomena, or trends within a population or sample (Mohajan, 2018). Sekaran and Bougie (2010) indicates that descriptive research allows researchers to gain a comprehensive understanding of a particular phenomenon or subject. By providing detailed descriptions and

summaries, it helps researchers to explore the intricacies and nuances of the topic under investigation

C. Target Population

The target population was commercial Banks in Kenya register by the Central Bank of Kenya. The population consisted of all 42 commercial banks in Kenya. Respondents' population comprised of five top managers from each bank translating to 210 top managers. The top managers were targeted because top managers of a firm mostly handle strategic management issues.

D. Sample Size and Sampling Technique

Sample size refers to the number of individual subjects or units selected from a larger population for inclusion in a research study or experiment. It is a critical aspect of research design, as the size of the sample directly affects the validity and reliability of the study's findings (Mugenda & Mugenda, 2003). Respondents' population comprised of five top managers from each organization translating to 210 top managers. Slovin's formula (1960) was applied as illustrated:

$$n = N / (1 + Ne^2),$$

Where;

n = Sample Size

N = Total Population

e = Error of Tolerance with a confidence level of 95 % (giving a margin error of 0.05)

$$n = 210 / (1 + 210 * 0.05 * 0.05) = 138$$

Hence, the sample size was 138.

E. Data Collection Instruments

This study employed a self-administered questionnaire, comprising both closed and open-ended questions, to gather primary data. Additionally, secondary data regarding the performance of commercial banks was gathered, guided by predefined parameters. These parameters were established by the researcher, drawing upon information supplied by the respondents. The selection of a questionnaire as the data collection instrument for this study was deliberate, driven by its practicality and efficiency in gathering information from a large number of individuals within a relatively short timeframe. Moreover, questionnaires offer the advantage of facilitating scientific and objective analysis compared to other research methods (Kothari, 2004).

F. Pilot Study

A pilot test was conducted to identify any weaknesses in the instrumentation and to gather proxy data for selecting a probability sample. The pre-testing procedure for the questionnaire mirrored that of the actual study and data collection process. Cooper and Schindler (2011) recommend that the pre-test sample size should be relatively small, ranging from 1% to 10% of the total sample size. In adherence to this guideline, 21 respondents, constituting 10% of the sample size, participated in the pilot study. Notably, these participants were not included in the main survey.

G. Data Analysis and Presentation

Quantitative data collection and analysis were conducted in this study utilizing the Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics, including measures such as mean, standard deviation, median, and proportions, were calculated to provide an overview of the data. Additionally, regression analysis and correlation analysis were employed for inferential data analysis to ascertain the direction and strength of the relationship between the independent and dependent variables. To examine the influence of information technology capability on the business performance of Commercial Banks in Kenya, hierarchical regression analysis with moderation was utilized. This approach allows the researcher to determine the sequence in which variables are entered into the regression equation (Yeomans, 2017).

IV. PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

A. Descriptive Statistics Analysis

➤ Technology Infrastructure

The fourth specific objective of the study was to examine the role of Technology Infrastructure on business performance of Commercial Banks in Kenya. The respondents were requested to indicate their level of agreement on various statements relating to Technology Infrastructure and business performance of Commercial Banks in Kenya. The results were as presented in Table 1.

Table 1: Technology Infrastructure

	Mean	Std. Deviation
Information Technology facilities support the connection of various digital platforms (such as, on-line transactions)	4.168	0.905
System software or functional components supporting the integration and extension of digital platforms	3.989	0.885
Our bank easily retrieve relevant information from our partner databases	3.970	0.605
The components of our bank’s IT infrastructure are evolving with our business partners	3.955	0.981
Our IT standards are defined and enforced across functional units, and with joint coordination among our strategic business partners/alliances	3.911	0.873
IT systems is an enablers and drivers for the bank’s business strategy	3.897	0.786
Our bank is informed of key IT emerging technologies related applicable in banking sector	3.889	0.896
Our bank’s ICT capability is characterized by investment towards improvement of the ICT hardware	3.875	0.897
Data management services are reasonably good	3.852	0.934
The communication network is largely fulfilled in terms of connectivity, reliability, and availability	3.786	0.763
The quality of IT service applications such as ERP is able to meet needs	3.765	0.852
IT management services is able to coordinate the physical infrastructure effectively and efficiently	3.721	0.743
IT management services can manage relationships with business units effectively and efficiently	3.652	0.733
Aggregate	3.790	0.867

From the results, the respondents agreed that information technology facilities support the connection of various digital platforms (such as, on-line transactions) (M=4.168, SD=0.905). In addition, the respondents agreed that system software or functional components supporting the integration and extension of digital platforms (M=3.959, SD=0.885). Further, the respondents agreed that their bank easily retrieve relevant information from their partner databases (M=3.970, SD=0.605). The respondents also agreed that the components of their bank’s IT infrastructure are evolving with their business partners (M=3.955, SD=0.981).

The respondents agreed that IT standards are defined and enforced across functional units, and with joint coordination among their strategic business partners/alliances(M=3.911, SD=0.873).In addition, the respondents agreed that IT systems is an enablers and drivers for the bank’s business strategy (M=3.897,

SD=0.786). Further, the respondents agreed that their bank is informed of key IT emerging technologies related applicable in banking sector(M=3.889, SD=0.896). The respondents also agreed that bank’s ICT capability is characterized by investment towards improvement of the ICT hardware(M=3.875, SD=0.897).

From the results, the respondents agreed that data management services are reasonably good (M=3.852, SD=0.934). In addition, the respondents agreed that the communication network is largely fulfilled in terms of connectivity, reliability, and availability (M=3.786, SD=0.763). Further, the respondents agreed that the quality of IT service applications such as ERP is able to meet needs (M=3.765, SD=0.852). The respondents also agreed that IT management services is able to coordinate the physical infrastructure effectively and efficiently (M=3.721, SD=0.743). The respondents agreed that IT management

services can manage relationships with business units effectively and efficiently(M=3.652, SD=0.733).

The research findings corroborate the assertions of Sambamurthy et al. (2003) regarding the potential of infrastructure integration to generate numerous digital alternatives, thereby enhancing organizational learning and facilitating the effective utilization of available knowledge. A robust IT infrastructure enables organizations to promptly implement new IT initiatives, thereby supporting the diverse operational needs of the firm through the sharing of information technology resources and fostering innovation activities (Bharadwaj, 2000).Moreover, the effectiveness of a company in leveraging IT resources is intricately linked to the interaction between the IT function and the various business units (Panda &Rath, 2018). This relationship infrastructure entails a shared risk and responsibility for IT application management between IT and business unit management (Zahra et al., 2019).

The study conducted by Lyver and Lu (2018) underscores the role of flexible IT infrastructure in

enhancing both information generation and distribution within organizations. This capability, in turn, augments the firm’s capacity to compete effectively in turbulent environments, thereby fostering competitive advantage. Furthermore, the research by Huang et al. (2012) sheds light on the diverse functions of IT capability, including its capacity to acquire, disseminate, collect, and recycle IT resources to support and advance business strategies and operational procedures.The success of firms is contingent upon their adept management of various tasks facilitated by a well-coordinated system supported by the flexibility of IT infrastructure (Byrd & Turner, 2001). Such infrastructure not only streamlines production processes but also contributes to cost reduction, ultimately enhancing overall firm performance (Jacks et al., 2011).

➤ *Business Performance of Commercial Banks in Kenya*

The respondents were requested to indicate their level of agreement on various statements relating to business performance of Commercial Banks in Kenya. The results were as presented in Table 2.

Table 2: Business performance of Commercial Banks in Kenya

	Mean	Std. Deviation
Service delivery in commercial banks has improved over time	4.084	0.997
Adoption of information technology capability has enhanced competitive advantage of commercial banks	3.917	0.831
Am satisfied with the level of competitive advantage in our organization	3.898	0.563
There are few customer complaints on the quality of services offered by our organization	3.851	0.851
The net profit has increased with technology implementation	3.832	0.923
Generally, quality of service delivery has improved hence contributing positively to bank annual profitability	3.795	0.865
Am satisfied with the level of performance of in our organization	3.767	0.785
Adoption of IT capability has improved the market share of commercial banks	3.721	0.821
Net profit of commercial banks has been increasing as a result of adopting information technology capabilities	3.698	0.828
Aggregate	3.766	0.858

From the results, the respondents agreed that service delivery in commercial banks has improved over time (M=4.084, SD=0.997). In addition, the respondents agreed that adoption of information technology capability has enhanced competitive advantage of commercial banks (M=3.917, SD=0.831). Further, the respondents agreed that they are satisfied with the level of competitive advantage in their organization(M=3.898, SD=0.563). The respondents also agreed that there are few customer complaints on the quality of services offered by their organization(M=3.851, SD=0.851).

The respondents agreed that the net profit has increased with technology implementation (M=3.832, SD=0.923). In addition, the respondents agreed that generally, quality of service delivery has improved hence contributing positively to bank annual profitability (M=3.795, SD=0.865). Further, the respondents agreed that they are satisfied with the level of performance of their organization (M=3.767, SD=0.785). The respondents also agreed that adoption of IT capability has improved the

market share of commercial banks (M=3.721, SD=0.821). The respondents also agreed that net profit of commercial banks has been increasing as a result of adopting information technology capabilities (M=3.698, SD=0.828).

The findings of this study align with the observations of Basheer et al. (2016) and Galliers et al. (2020), who emphasized the widespread adoption of IT capabilities by companies for various functions such as information collection, processing, storage, and retrieval. These capabilities have significantly enhanced companies' capacity to capitalize on opportunities and mitigate threats in the business environment. Additionally, IT plays a crucial role in identifying the strengths and weaknesses of business strategies (Chu et al., 2019).By integrating IT into their operations, businesses gain insights into external environmental dynamics and develop strategies for processing incoming data to predict external factors (Lu & Ramamurthy, 2011). This integration not only enhances the understanding of external environmental factors but also

informs decision-making processes aimed at adapting to changing business landscapes.

Hadjet *al.* (2020) highlighted the fundamental role of IT capabilities in achieving competitive advantage, suggesting that they may offer insights into the seemingly contradictory impact of IT capabilities on competitive advantage. Information Technology Capability (ITC)

encompasses the hardware and software necessary for establishing networks that facilitate firm innovation. Through the proper implementation of IT infrastructure, firms gain the ability to deploy the appropriate applications at the opportune moment, thereby expanding opportunities for technological innovation (Sambamurthy, Bharadwaj, & Grover, 2003).

B. Correlation Analysis

Table 3: Correlation Coefficients

		Organization Performance	Technology Infrastructure
Organization Performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	131	
Technology Infrastructure	Pearson Correlation	.859**	1
	Sig. (2-tailed)	.000	
	N	131	131

The findings demonstrated a highly significant relationship between Technology Infrastructure and the business performance of Commercial Banks in Kenya (r = 0.859, p value = 0.000). This significance was evident as the p-value of 0.000 was below the threshold of 0.05, indicating

statistical significance. These results align with those of Minjeong and Sungyong (2021), who similarly identified a robust correlation between technology infrastructure and organizational performance.

Table 4: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.341	0.089		3.831	0.000
	Technology Infrastructure	0.398	0.102	0.399	3.716	0.002
a Dependent Variable: Organization Performance						

The regression model was as follows:

$$Y = 0.341 + 0.398X_1 + \epsilon$$

In addition, the results revealed that Technology Infrastructure has significant effect on business performance of Commercial Banks in Kenya (β=0.398, p value= 0.002). The relationship was considered significant since the p value 0.002 was less than the significant level of 0.05. The findings are in line with the results of Minjeong and Sungyong (2021) who revealed that there is a very strong relationship between technology infrastructure and organization performance

V. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The study also concludes that technology infrastructure has a positive and significant effect on business performance of Commercial Banks in Kenya. The study revealed that hardware/Software, network and database influence business performance of Commercial Banks in Kenya. This implies that improvement in information technology infrastructure (hardware/Software, network and database) would lead to improvement in business performance of Commercial Banks in Kenya.

B. Recommendations

The study found that technology infrastructure has a positive and significant effect on business performance of Commercial Banks in Kenya. This study therefore recommends that the management of commercial banks in Kenya should ensure they had adequate and up to date hardware/Software to enable their employees improve their productivity.

REFERENCES

- [1]. Al-Shawabkeh, A., & Lim, A. (2014). The Use of Social Media In Higher Education Learning: Swot Analysis of Using Social Media for Learning. *ECSM 2014 University of Brighton Brighton, UK 10-11 July 2014*, 10.
- [2]. Alreemy, Z., Chang, V., Walters, R., & Wills, G. (2016). Critical success factors (CSFs) for information technology governance (ITG). *International Journal of Information Management*, 36(6), 907-916.
- [3]. Antoni, D., Jie, F., & Abareshi, A. (2020). Critical factors in information technology capability for enhancing firm's environmental performance: case of Indonesian ICT sector. *International Journal of Agile Systems and Management*, 13(2), 159-181.

- [4]. Asante, K. K. (2010). *Information Technology (IT) strategic alignment: A correlational study between the impact of IT governance structures and IT strategic alignment*: Capella University.
- [5]. Bergeron, F., Raymond, L., & Rivard, S. (2004). Ideal patterns of strategic alignment and business performance. *Information & management*, 41(8), 1003-1020.
- [6]. Berman, S., & Marshall, A. (2014). Reinventing the rules of engagement: Three strategies for winning the information technology race. *Strategy & Leadership*.
- [7]. Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS quarterly*, 169-196.
- [8]. Blind, K., Pohlisch, J., & Rainville, A. (2020). Innovation and standardization as drivers of companies' success in public procurement: an empirical analysis. *The Journal of Technology Transfer*, 45(3), 664-693.
- [9]. Cegarra-Navarro, J.-G., Reverte, C., Gómez-Melero, E., & Wensley, A. K. (2016). Linking social and economic responsibilities with financial performance: The role of innovation. *European Management Journal*, 34(5), 530-539.
- [10]. Chae, H.-C., Koh, C. E., & Prybutok, V. R. (2014). Information technology capability and firm performance: contradictory findings and their possible causes. *MIS quarterly*, 38(1), 305-326.
- [11]. Chen, B., & Cheng, H. H. (2010). A review of the applications of agent technology in traffic and transportation systems. *IEEE Transactions on intelligent transportation systems*, 11(2), 485-497.
- [12]. Hsu, J. S.-C., Chu, T.-H., Lin, T.-C., & Lo, C.-F. (2014). Coping knowledge boundaries between information system and business disciplines: An intellectual capital perspective. *Information & management*, 51(2), 283-295.
- [13]. Huang, P.-Y., Ouyang, T. H., Pan, S. L., & Chou, T.-C. (2012). The role of IT in achieving operational agility: A case study of Haier, China. *International Journal of Information Management*, 32(3), 294-298.
- [14]. Iza, C. L. B., & Dentoni, D. (2020). How entrepreneurial orientation drives farmers' innovation differential in Ugandan coffee multi-stakeholder platforms. *Journal of Agribusiness in Developing and Emerging Economies*.
- [15]. Jonker, M., Romijn, H., & Szirmai, A. (2006). Technological effort, technological capabilities and economic performance: A case study of the paper manufacturing sector in West Java. *Technovation*, 26(1), 121-134.
- [16]. Jorfi, S., Nor, K. M., & Najjar, L. (2017). An empirical study of the role of IT flexibility and IT capability in IT-business strategic alignment. *Journal of Systems and Information Technology*.
- [17]. Mugambi, L. M., & Kinyua, G. M. (2020). Role of Innovation Capability on firm performance in the context of Commercial Banks in Nairobi City County, Kenya. *International Journal of Current Aspects in Finance, Banking and Accounting*, 2(3), 14-23.
- [18]. Nevo, S., & Wade, M. R. (2010). The formation and value of IT-enabled resources: antecedents and consequences of synergistic relationships. *MIS quarterly*, 163-183.
- [19]. Panda, S., & Rath, S. K. (2018). Information technology capability, knowledge management capability, and organizational agility: The role of environmental factors. *Journal of Management & Organization*, 1-27.
- [20]. Patten, M. L., & Newhart, M. (2017). *Understanding research methods: An overview of the essentials*: Routledge.
- [21]. Ravichandran, T., Lertwongsatien, C., & Lertwongsatien, C. (2005). Effect of information systems resources and capabilities on firm performance: A resource-based perspective. *Journal of management information systems*, 21(4), 237-276.
- [22]. Rialti, R., Marzi, G., Ciappei, C., & Caputo, A. (2018). Reframing agile organization: do big data analytics capabilities matter?
- [23]. Sabherwal, R., Sabherwal, S., Havakhor, T., & Steelman, Z. (2019). How does strategic alignment affect firm performance? The roles of information technology investment and environmental uncertainty. *MIS quarterly*, 43(2), 453-474.
- [24]. Sambamurthy, V., & Zmud, R. W. (2000). Research commentary: The organizing logic for an enterprise's IT activities in the digital era—A prognosis of practice and a call for research. *Information systems research*, 11(2), 105-114.
- [25]. Taher, M. (2012). Resource-based view theory. In *Information systems theory* (pp. 151-163): Springer.
- [26]. Vila Alonso, M., & Schiuma, G. (2015). Knowledge and sustained competitive advantage: How do services firms compete? *Investigaciones Europeas de Dirección y Economía de la Empresa (IEDEE)*, 21(2), 55-57.
- [27]. Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organizational performance. *MIS quarterly*, 39(2), 497-518.
- [28]. Zahra, M., Hameed, W. U., Fiaz, M., & Basheer, M. F. (2019). Information technology capability a tool to expedite higher organizational performance. *UCP Management Review (UCPMR)*, 3(1), 94-112.
- [29]. Zeng, M., & Lu, J. (2020). The impact of information technology capabilities on agri-food supply chain performance: the mediating effects of interorganizational relationships. *Journal of Enterprise Information Management*.