



## **DIGITALIZATION PRACTICES AND ORGANIZATIONAL PERFORMANCE OF INFORMATION AND COMMUNICATION TECHNOLOGY AUTHORITY, KENYA**

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### **ABSTRACT**

As technology continues to evolve, governments worldwide increasingly recognize the transformative impact of digitalization on organizational performance. Public institutions are under pressure to modernize their service delivery systems to provide efficient, cost-effective, and responsive services that meet citizens' expectations. In Kenya, as in many African countries, bureaucratic processes, resulting in delays, inefficiencies, and low levels of customer satisfaction, have hindered public service delivery. The main objective of this study was to evaluate the influence of digitalization practices on the organizational performance of the Information and Communication Technology Authority (ICTA). Primary data were collected using structured questionnaires, interview guides, and secondary sources from institutional records. The instruments were reviewed for content validity and tested for reliability using Cronbach's Alpha. Descriptive and inferential statistics were applied in the analysis, and results were generated using the Statistical Package for Social Sciences (SPSS) Version 28, presented through tables, charts, and graphs, while qualitative findings were analyzed thematically. Research assistants supported the administration of questionnaires to respondents. Data were analyzed using multiple regression, descriptive statistics, and correlation analysis. The findings revealed that ICT infrastructure and human capital had a significant and positive effect on organizational performance. ICT infrastructure and human capital emerged as the strongest predictors. The study therefore recommended investment in modern infrastructure and institutionalized continuous training. At the policy level, it further recommended that the Ministry of ICT and Digital Economy develop clear interoperability standards, ensure sustained funding for digital transformation, and promote citizen-centered policies to accelerate Kenya's digital agenda.

**Key Words:** Digitalization Practices, Organizational Performance, Information and Communication Technology Authority (ICTA), ICT Infrastructure, Human Capital

## **Background of the Study**

In today's competitive and constantly changing environment, in order to thrive and operate successfully, it is inevitable for organizations to give up manual ways of operations and adjust to changes in their environments. Nadeem and Ahmad (2016) pointed out that the focus should not only be to reduce operational costs but also to provide better and unique services that would leave customers satisfied. The need for operational efficiency has become more prevalent as, among other reasons, aggressive competition, increasingly changing customers' demands and requirements, technological advancements, and globalization have become increasingly difficult to monitor, and are continuously impacting organizational strategic goals (Anastassiou, Santoro, Recker & Rosemann, 2016).

The ubiquitous nature of Information and Communication Technologies (ICTs) has contributed to transforming every sector of the economy right from the financial services industry (Youngs, 2018) to the public sector. Over the last decade, a significant number of investments and growth has seen governments embracing and increasing the use of innovative methods to provide government information and services to citizens, businesses, and to other governments (Soliman, 2006), a practice known as electronic government (e-government). Governments' adoption of Information Systems (IS) is geared towards promoting efficiency and policy effectiveness (Reddick, 2011).

E-government is the use of ICTs by governments for the provisioning of public services, enhancement of managerial effectiveness, and the promotion of democratic values and mechanisms (Gil-Garcia, 2013). The prevalence of e-government across the world means that it is now a global phenomenon (Manoharan, 2018) with national governments, and a majority of government entities offering official websites from which they can provide information and services electronically. E-government offers several benefits ranging from cost-effective service delivery, reduced administrative burdens, transparent, and easily accessible services to the public.

The emergence of Information and Communication Technology has provided a means to create and deliver services, which are useful and have an effective impact on businesses and citizens. Information and Communications Technology (ICT) is an integral component of government operations and service delivery. ICT is increasingly used as a strategic tool to efficiently support any Government's priorities and program delivery. In order to have a successful e-government, the Information and Communication Technology (ICT) solutions, which are at the very core of the e-government infrastructure, have to be reachable by all citizens (Reddick, 2012).

Globally, ICT enhances government operations by improving responsiveness, increasing efficiency, and strengthening governance practices (Halpin, 2013). Governments promote the adoption of ICT by offering online services and utilizing new technologies in their operations. In the realm of government, ICT applications enhance the delivery of services to citizens not only by improving the process and management of government but also by redefining old-age traditional concepts. Information and Communication Technologies (ICT) has assumed a critical role in the development agenda of most countries due to their essential role in facilitating socio-economic development.

Approximately 74% of government Chief Information Officers (CIOs) worldwide reported an increased focus on digital automation to enhance service delivery and operational efficiency (Milakovich, 2021). This shift underscores the growing recognition of automation's potential to streamline processes, reduce costs, and improve the speed and quality of public services. By automating repetitive tasks, governments can free up valuable human resources for more complex and impactful roles, thereby improving overall productivity and citizen satisfaction. The integration of advanced technologies like artificial intelligence (AI) is pivotal in achieving

these goals, allowing governments to adapt to rising expectations and evolving demands (Dunleavy, 2013). This trend reflects a strategic move towards leveraging technology to foster innovation, transparency, and efficiency in public service delivery, aligning with the global digital transformation effort.

In the African region, the focus on digitalization in government services is gaining momentum as countries seek to enhance efficiency, transparency, and service delivery (Engin, 2019). Governments are increasingly adopting technologies such as Artificial Intelligence (AI), and digital platforms to streamline processes and reduce manual intervention. African countries are utilizing automation to enhance the efficiency of their processes. These efforts are part of a broader push across the continent to embrace digital transformation, driven by the need to meet rising citizen expectations and improve the overall effectiveness of public administration (Pramod, 2022). World Bank statistics highlight the substantial progress in digital transformation across the continent. Between 2016 and 2021, there was a 115% increase in internet users in Sub-Saharan Africa, with over 160 million Africans gaining broadband internet access between 2019 and 2022 (Southwood, 2022). Additionally, the adoption of digital payments has surged, with 191 million additional individuals making or receiving digital payments from 2014 to 2021 (Tamang et al, 2021).

Vision 2030 & the Kenya National ICT Master Plan envisaged the country as an ICT hub and a globally competitive digital economy (ICT Master Plan, 2022-2032). The Master Plan has three pillars. The first pillar being e-government services, which aims at ensuring the provision of eGovernment information and services that are key to improving productivity, efficiency, effectiveness, and governance in all key sectors. The second pillar is ICT as a Driver of Industry, which aims at transforming key Vision 2030 economic sectors to significantly enhance productivity, global competitiveness, and growth. The third pillar is Developing ICT Businesses that can produce and/or provide exportable quality products and services that are comparable to the best in the world.

### **Statement of the Problem**

Kenya is ranked 116th out of 193 countries in the UN E-Government Development Index 2020 with a rating of 0.53, reflecting ongoing efforts toward comprehensive digital transformation indicating progress and areas for improvement in integrating digital technologies within state agencies (Galal,2024). As of June 2024, approximately 80% of public services have been digitized and are accessible through the e-Citizen platform (Kenya News Agency, 2024). Kenya's National Digital Master Plan 2022-2032 aims to digitize 80% of government services, but challenges persist due to varying technology adoption, infrastructure readiness, and business objectives. Studying systems automation in the public sector could encourage successful cases (Mwamba et al, 2016).

Digitalization enhances efficiency, but success depends on ICT infrastructure quality, security measures, and workforce adaptability (Porter & Tanner, 2012; World Bank, 2022). In Kenya, the penetration rate of mobile connectivity is at 114.8% as of 2023, with internet access of more than 40% reflecting ongoing efforts to improve digital infrastructure. Data on digital skills remains scarce globally. However, available information indicates that skills related to information and data literacy are the most prevalent, with a median of 56% and an average ranging between 33% and 69% for most countries (International Telecommunication Unit, 2024). Kenya's government is addressing service delivery issues due to bureaucratic systems, resulting in delayed services and long queues, affecting 70% of citizens' access to public services, as reported by the Kenya National Bureau of Statistics.

In many cases, organizations struggle with aligning their digital strategies with their overall business goals, leading to suboptimal performance despite significant investments in technology (Martinho, Rijo, & Nunes, 2015).

A study revealed that only 25% of organizations have a clear digital or workforce strategy roadmap, indicating a gap in aligning digital initiatives with overarching business objectives (Pastukh, 2024). The effectiveness of digitalization in enhancing performance is often hindered by outdated ICT infrastructure, and insufficient human capacity for managing new technologies (Lee, 2017; Thota, Shajin, & Rajesh, 2020). Hence this study aims to address these gaps by investigating the interplay between digitalization, ICT infrastructure, information security, and human capacity to understand their combined effect on organizational performance. By analyzing these factors, the study sought to provide insights into how organizations can effectively leverage digitalization to enhance their performance and achieve their strategic objectives, while also identifying strategies to overcome the challenges associated with digital transformation

### **General Objective of the Study**

The purpose of this study was to examine the influence of digitalization practices on organizational performance of the Information and Communication Technology Authority in Kenya.

### **Specific Objective of the Study**

- i. To investigate the influence of ICT Infrastructure on the organizational performance at the ICT Authority in Kenya.
- ii. To examine the influence of human capital development on the organizational performance at the ICT Authority in Kenya

## **LITERATURE REVIEW**

### **Theoretical Review**

#### **Resource-Based View Theory**

The Resource-Based View (RBV) theory, proposed by Barney in 2001, suggests that a company's success and performance can be attributed to its resources and their efficient use. According to this theory, the internal capabilities of a firm play a crucial role in enhancing its effectiveness, and an organization should aim to maximize the use of its available capabilities, including physical resources, human capital, and organizational resources, to understand and implement strategies. In other words, the RBV theory emphasizes the importance of internal resources for a company's economic benefit (Barney, 1991).

To gain economic benefit, an organization must possess four unique features: Valuable Rare, Inimitable, and Non-substitutable (VRIN). Valuable features create value and help an organization surpass competitors, while rarity refers to resources not accessible to competitors. Imperfect imitability means a resource's value is exclusive to one organization, and other firms cannot replicate it. Non-substitutable resources are unique and cannot be substituted or replaced by any other within the organization. These unique characteristics give organizations a competitive advantage (Barney, 2001).

ICT Infrastructure refers to the essential technological resources that support digital operations, including data centers, servers, networking systems, cloud platforms, end-user hardware and software, and system support tools. These tangible and intangible assets offer performance advantages when robust, secure, and uniquely tailored to institutional needs. The ICT authority ICT infrastructure is valuable for its ability to deliver fast, secure, and reliable digital services to government departments and citizens. It enhances the uptime of platforms like e-Citizen, IFMIS, and Government Cloud, improving efficiency, cost-effectiveness, and public satisfaction. ICT Authority's advanced and centralized infrastructure is rare, giving it a strategic advantage as a central service provider for other ministries, departments, and agencies (Mwangi & Muchelule, 2024).

The unique combination of systems, expertise, and public-sector alignment ensures ICT Authority's central role in digital transformation and performance leadership. ICTA's infrastructure is non-substitutable, as alternatives to centralized government infrastructure may violate sovereignty, cost-efficiency, or data protection laws. By applying RBV, ICT Authority's investment in rare, inimitable, and valuable ICT infrastructure enhances service availability, reliability, faster delivery of government services, higher stakeholder trust and satisfaction, better coordination across ministries, and strategic cost-savings through shared platforms, contributing to enhanced organizational performance and public value. The RBV theory is relevant to this study as it provides guidance on the integration of systems and applications as well as the enhancement of ICT infrastructure to improve the performance of ICT authority in Kenya.

### **Social Technical Systems Theory**

The Socio-Technical Systems (STS) Theory, developed by Trist and Emery in 1951, emphasises that an organisation can achieve optimal performance when its technical systems (including tools, technologies, and work processes) are harmoniously integrated with its social systems (encompassing people, skills, values, and organisational culture). In the case of the ICT Authority of Kenya, which serves as the implementing body for digital transformation in the public sector, the development of human capital is a vital social element that significantly impacts the efficient use of technical systems to deliver services. The theory emphasizes that, regardless of how sophisticated the technology may be, maximum organizational performance cannot be realized without a well-trained and adaptable workforce capable of utilizing, managing, and innovating with those technologies (Trist & Emery, 1951).

For ICT Authority, human capital development involves continuous training, upskilling, knowledge-sharing, and change management initiatives aimed at empowering staff to operate complex digital systems and adapt to emerging technologies. According to STS theory, such development is not merely a support function but a co-equal pillar in ensuring system success. When employees are equipped with relevant ICT skills, digital literacy, cybersecurity awareness, and agile mindsets, they are better positioned to align their work processes with the evolving technical systems (Fischer et al, 2023). This alignment fosters enhanced efficiency, innovation, and responsiveness which are key metrics of institutional performance.

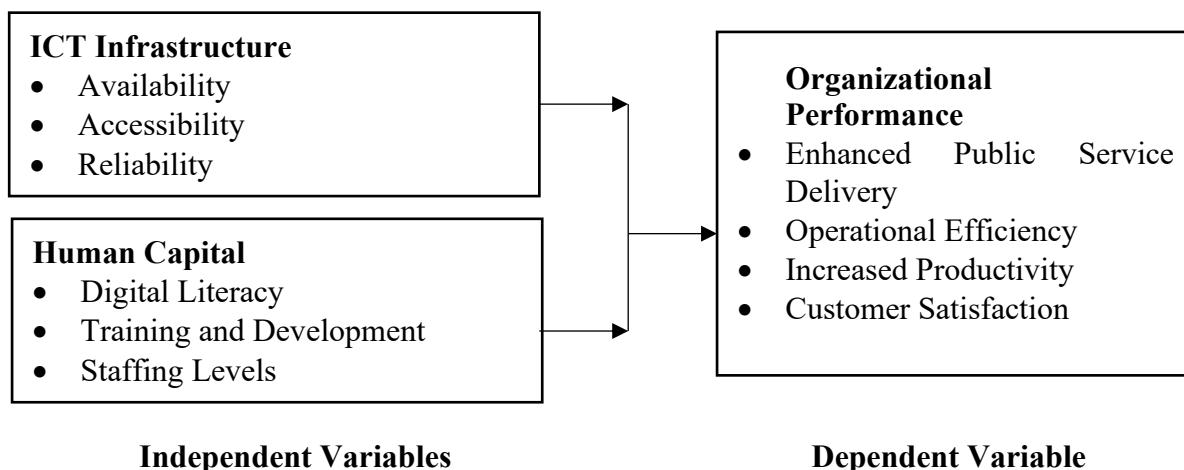
Moreover, STS theory views work systems as socio-technical ensembles where people must be active participants in shaping how technology is implemented and used (Hendrick, 2006). In this regard, the ICT authority's investment in human capital helps foster ownership, reduce resistance to change, and promote a culture of innovation. For instance, training programs in system integration, data analytics, and digital governance enable staff not only to perform tasks more effectively but also to contribute to the continuous improvement of digital platforms (Mumford, 2006). This results in increased service delivery speed, stakeholder satisfaction, and overall organizational agility, which are key indicators of high performance.

The Socio-Technical Systems Theory explains the connection between human capital development and ICT Authority performance. It suggests that digital transformation benefits are fully realized when the social system, including human skills, motivation, and organizational learning, is developed alongside the technical system. Therefore, ICT Authority's strategic focus on human capital is crucial for sustaining digital innovation and improving public service outcomes (Mumford, 2006).

### **Conceptual Framework**

A conceptual framework is a concise depiction of the phenomenon under investigation, usually depicted visually with the primary variables. It illustrates the interrelationships between the dependent and independent variables in a diagram, as stated by Young (2009) and Mugenda

(2008). The study's conceptual framework was founded on four independent factors and one dependent variable as constructed diagrammatically in Figure 2.1 below:



**Figure 2.1: The Conceptual Framework**

### **ICT Infrastructure**

Robust ICT infrastructure is the backbone of effective digital service delivery. Hassan (2019) highlighted the significance of reliable ICT infrastructure in the success of Kenya's e-government initiatives. The study indicated that increased ICT availability and accessibility led to a reduction in bureaucratic delays by facilitating faster communication and information processing within government departments. The reliability of ICT systems enhanced transparency and accountability, as citizens could access government services and information more easily, leading to increased trust in public institutions.

The quality of ICT infrastructure directly impacts the efficiency and effectiveness of service delivery systems. Marete (2018) explored the adoption of electronic medical records (EMRs) in Kenyan healthcare facilities. The findings revealed that EMRs, supported by high-quality ICT infrastructure, improved patient care by enabling healthcare providers to access accurate and up-to-date patient information swiftly. This accessibility reduced wait times, as medical staff no longer needed to search for paper records, and increased efficiency by streamlining administrative tasks such as billing and appointment scheduling. However, the study also identified significant challenges, including limited network coverage in rural areas, frequent power outages, and inadequate hardware resources, which hindered the full potential of EMRs. These infrastructure deficiencies often forced healthcare providers to revert to manual record-keeping, undermining the benefits of digitalization.

### **Human Capital**

Human capital development, especially in digital literacy, is critical for the successful adoption of new technologies. Venkatesh et al. (2003) demonstrated that training programs significantly improved employees' ability to use automated systems, leading to increased efficiency and job satisfaction. Employees who are confident in their digital skills are more likely to embrace new technologies and contribute to innovation within the organization. Hassan (2019) found that insufficient ICT skills among Kenyan public service employees hindered the effectiveness of e-government initiatives. The lack of digital literacy resulted in underutilization of available technologies and resistance to change, impeding progress towards digital transformation.

Adequate staffing levels and ongoing professional development are essential for maintaining and advancing technological capabilities. Al-Sharhan et al. (2013) highlighted that organizations with sufficient and well-trained personnel experienced smoother technology adoption processes. Continuous professional development ensures that staff remain updated on the latest technological advancements and best practices, enabling the organization to adapt

quickly to changes in the digital landscape. Investment in human capital also contributes to employee retention, as opportunities for growth and development enhance job satisfaction. Empirical studies consistently report positive impacts of automation and ICT adoption on service delivery, but these benefits are contingent upon addressing the challenges in the aforementioned areas.

### **Organizational Performance**

Performance is a critical measure of success for organizations undergoing digital transformation, particularly given the increasing demands for efficiency and effectiveness from clients, shareholders, and employees. In the context of ICT, performance encompasses several dimensions, including the speed of system deployment, operational efficiency, and the effectiveness of digital technologies in achieving organizational goals (Hsieh & Lin, 2010). For organizations, successful digital transformation requires not only the effective implementation of technology but also the alignment of digital strategies with overall business objectives to ensure that these systems enhance operational efficiency and strategic outcomes. Organizations must evaluate performance through both qualitative and quantitative metrics. Quantitatively, performance can be measured by indicators such as system uptime, response times, and the cost-effectiveness of digital solutions. Qualitatively, factors like user satisfaction and the impact of digital technologies on business processes are crucial. These metrics help organizations assess whether their digital investments are delivering the expected benefits and meeting stakeholder expectations (Baker, 2023).

To gauge performance effectively, organizations should use a range of technical, operational, design, and financial metrics. Performance measurement is essential for tracking progress, identifying areas for improvement, and driving continuous enhancement (Lee, 2017). By setting clear key performance indicators (KPIs) and regularly evaluating digital systems against these benchmarks, organizations can ensure that their digital transformation efforts are successful and contribute to overall operational success (Thota, Shajin, & Rajesh, 2020).

### **Empirical Review**

#### **ICT Infrastructure and Organizational performance of ICT Authority**

A robust ICT infrastructure serves as the foundation for successful digital transformation in organizations. In the context of Kenyan state corporations, adequate ICT infrastructure facilitates effective communication, information sharing, and transaction processing, which are essential for enhanced service delivery (Mwangi & Murigu, 2020). For instance, the adoption of high-speed internet connectivity and modern hardware enables employees to access and process information efficiently, leading to improved organizational performance (Kariuki & Kinyua, 2021).

The availability and accessibility of quality ICT infrastructure significantly impact the performance and competitiveness of state corporations. A study by Mureithi and Kamau (2020) found that organizations with well-established ICT infrastructure reported higher levels of efficiency and customer satisfaction. The research indicated that investments in modern servers, reliable networks, and updated software applications contributed to streamlined operations and reduced service delivery times (Mureithi & Kamau, 2020). Challenges such as inadequate ICT infrastructure remain significant obstacles to digitalization efforts in Kenyan state corporations. According to a report by the Communications Authority of Kenya (2020), many state corporations struggle with outdated hardware, insufficient network bandwidth, and unreliable internet connectivity. These issues hinder the implementation of advanced digital systems and limit the ability of organizations to leverage technology for improved service delivery (Communications Authority of Kenya, 2020).

The quality of ICT infrastructure directly affects the performance of digital systems and applications. Kariuki and Kinyua (2021) emphasized that high-quality ICT infrastructure

enhances data processing and management, increases the speed and accuracy of transaction processing, and improves communication among employees. Their study demonstrated that state corporations with superior ICT infrastructure experienced fewer system downtimes and could support more complex digital applications, leading to better service delivery outcomes (Kariuki & Kinyua, 2021). The expertise required to manage and maintain ICT infrastructure is critical for its optimal performance. Wambua and Mungai (2019) highlighted the importance of having skilled ICT personnel capable of handling the complexities of modern infrastructure. Their research showed that organizations investing in training and development of ICT staff were more successful in implementing digital initiatives and achieving desired performance levels.

Government policies and initiatives also play a significant role in shaping ICT infrastructure development in state corporations. The Kenyan government's National ICT Policy (2019) outlines strategies to improve ICT infrastructure, including promoting investments in broadband connectivity and encouraging public-private partnerships (Ministry of ICT, Innovation and Youth Affairs, 2019). These policies aim to address existing infrastructure gaps and support state corporations in their digital transformation journeys. The rapid pace of technological advancement presents challenges in keeping ICT infrastructure up-to-date. Organizations often face difficulties in upgrading infrastructure due to financial constraints and the fast obsolescence of technology (Otieno & Omwenga, 2019). Muthoni and Njuru (2020) pointed out that without continuous investment and strategic planning, state corporations risk falling behind in digital capabilities, negatively impacting service delivery performance.

Interoperability and integration of ICT infrastructure components are also essential for efficient digitalization. Mwangi and Murigu (2020) discussed how seamless integration between different systems and platforms enhances data flow and reduces operational silos. Their study found that state corporations prioritizing interoperability were better equipped to implement comprehensive digital solutions that improved overall service delivery (Mwangi & Murigu, 2020).

### **Human Capital and Organizational Performance of ICT Authority**

The digital skills and competencies of employees significantly influence the effectiveness of digitalization efforts. According to a study by Mureithi and Njagi (2020), state corporations with employees possessing high levels of digital literacy are more successful in implementing digital systems and improving service delivery. The study emphasized that digital skills enable employees to utilize new technologies effectively, adapt to changing work environments, and contribute to organizational innovation (Mureithi & Njagi, 2020).

Training and development programs are vital for enhancing human capital in organizations undergoing digital transformation. Kinyanjui and Juma (2021) highlighted that continuous professional development equips employees with up-to-date knowledge and skills required to manage and operate advanced digital systems. Their research found that state corporations investing in training programs experienced improved employee performance, higher adoption rates of new technologies, and increased customer satisfaction (Kinyanjui & Juma, 2021).

Leadership and management play a pivotal role in fostering a culture that supports digital innovation and employee development. Wambugu and Gichoya (2020) noted that transformational leadership styles positively impact employees' willingness to embrace change and engage in continuous learning. Effective leaders inspire and motivate staff to develop their skills, experiment with new technologies, and contribute to organizational goals (Wambugu & Gichoya, 2020). Challenges such as resistance to change and fear of job displacement can hinder the development of human capital in the digital era. A study by Mwangi and Karanja (2019) found that some employees perceive digitalization as a threat to job security, leading to reluctance in adopting new technologies. Addressing these concerns through transparent



communication, involvement in decision-making, and providing reassurances about the value of human roles is essential (Mwangi & Karanja, 2019).

Talent retention and attraction are also critical factors affecting human capital in state corporations. According to Kimani and Waithaka (2020), the competitive demand for ICT professionals poses challenges in retaining skilled employees within the public sector. Their study suggested that offering competitive remuneration, career advancement opportunities, and conducive working environments are strategies that can help retain talent and ensure continuity in digital transformation efforts (Kimani & Waithaka, 2020). Collaborations with educational institutions and industry partners can enhance the human capital pool available to state corporations. Kariuki and Wanjiru (2021) emphasized that partnerships with universities and technical colleges facilitate the development of tailored training programs that meet specific organizational needs. Such collaborations also provide internship and apprenticeship opportunities, creating pathways for new talent to enter the public sector workforce.

## **RESEARCH METHODOLOGY**

A descriptive research design was adopted because it offers an accurate and systematic way of describing the characteristics of a particular population or phenomenon. This design aligns with the study's focus on understanding the extent, nature, and outcomes of automation in government service delivery, consistent with methodological guidance emphasizing the "what" aspect of research phenomena. The target population comprised stakeholders involved in the design, implementation, and evaluation of digitalization initiatives within the public sector. Specifically, the study focused on 12 state corporations under the Ministry of ICT and Digital Economy, including agencies such as the Communications Authority (CA), ICT Authority (ICTA), Konza Technopolis Development Authority (KOTDA), the Postal Corporation, Kenya Broadcasting Corporation (KBC), and others. These institutions formed the unit of analysis, capturing organizational-level perspectives on digital transformation. The unit of observation consisted of 120 ICT personnel drawn from these corporations, including directors, system analysts, administrators, information security officers, and general system users. Their technical expertise provided essential insights into digital infrastructure, cybersecurity, and service efficiency.

A purposive sampling technique guided respondent selection, focusing specifically on ICT staff within the selected corporations. Given that the exact number of ICT personnel in these agencies was unknown, a homogeneous purposive sampling approach was used to select a consistent subset of 10 ICT staff from each of the 12 corporations, resulting in a total sample size of 120 participants. This approach ensured that respondents shared common roles and expertise relevant to evaluating public sector automation.

Data for the study was obtained through both primary and secondary sources. Primary data was collected using structured questionnaires and interview guides designed to capture information on factors influencing digitalization and its effect on service delivery. Secondary data included official records and documents from relevant authorities, which provided contextual and theoretical grounding for the study.

A pilot study involving 12 respondents—representing 10% of the intended sample—was conducted to evaluate the clarity, reliability, and validity of the research instruments. The pilot exercise helped refine the questionnaire by assessing completion time, clarity of items, and the extent to which they addressed the study objectives. Instrument reliability was measured using Cronbach's Alpha, with a threshold of 0.7 adopted as the indicator of acceptable internal consistency. Validity assessment focused on content validity, ensuring that the items adequately represented the constructs under investigation.

The collected data underwent systematic preparation, including editing, coding, and entry into SPSS version 28 for analysis. Descriptive statistics such as frequencies, percentages, graphs, and tables were used to summarize the data. Likert-scale responses were analyzed to determine perceptions and attitudes related to automation. Inferential statistics—particularly correlation and regression analysis—were applied to examine relationships between automation components and organizational performance.

## RESEARCH FINDINGS AND DISCUSSION

Of the 108 questionnaires distributed, 91 were completed and returned, yielding a response rate of 84.3%. Although slightly lower than the pilot's 100% completion rate, this response rate is still considered robust, as it surpasses the 70% threshold recommended for survey research (Mugenda & Mugenda, 2003). This high level of participation indicates strong cooperation from ICT staff and enhances the representativeness of the findings. The rate also minimizes the likelihood of non-response bias, providing confidence in the reliability of the data collected.

### Descriptive Statistics of Study Variables

#### ICT Infrastructure

This section assessed the determinants of ICT infrastructure and their influence on organizational performance at the ICT Authority in Kenya. Respondents evaluated nine items under the dimensions of availability, accessibility, and reliability of ICT infrastructure. The results are summarized in Table 1.

**Table 1: Descriptive Statistics for ICT Infrastructure**

Dimension	Statement	Mean	Std. Dev.
<b>Availability</b>	ICT systems and networks are available 24/7 with minimal downtime.	3.716	0.702
	Backup systems and failover protocols ensure continuous service.	3.654	0.689
	ICT availability is proactively monitored, and issues are addressed promptly.	3.605	0.734
<b>Accessibility</b>	Authorized personnel can easily access ICT systems and information from any location.	3.642	0.729
	ICT user interfaces are designed for ease of access and user-friendliness.	3.605	0.741
	Clear and streamlined processes exist for ICT support and troubleshooting.	3.568	0.721
<b>Reliability</b>	ICT infrastructure consistently performs its intended functions without failures.	3.654	0.713
	Reliability of ICT systems supports uninterrupted business operations.	3.605	0.698
	Regular maintenance and upgrades contribute to dependable ICT performance.	3.593	0.746
<b>Aggregate ICT Infrastructure Score</b>		<b>3.632</b>	<b>0.722</b>

The results show that respondents generally agreed that ICT systems and networks were available 24/7 with minimal downtime (mean = 3.716, SD = 0.702). Backup systems and failover protocols also scored strongly (mean = 3.654, SD = 0.689), reflecting resilience in service continuity. Proactive monitoring of ICT availability was rated slightly lower (mean = 3.605, SD = 0.734), implying that while monitoring exists, it may not always be consistently enforced. Collectively, these findings suggest that state corporations have established robust

availability practices, but there are still opportunities to improve proactive monitoring and response speed.

Accessibility practices were positively rated, with remote access for authorized personnel scoring relatively high (mean = 3.642, SD = 0.729). The design of user-friendly ICT interfaces (mean = 3.605, SD = 0.741) and the presence of streamlined ICT support processes (mean = 3.568, SD = 0.721) also showed moderate-to-strong agreement. These findings reflect that ICT systems are accessible and functional for both operational and support needs, although usability and troubleshooting efficiency could still be improved to enhance user satisfaction and reduce downtime.

Reliability indicators scored well, with consistent performance without failures (mean = 3.654, SD = 0.713) and support for uninterrupted operations (mean = 3.605, SD = 0.698). Regular maintenance and upgrades were also moderately acknowledged (mean = 3.593, SD = 0.746), suggesting that corporations invest in infrastructure upkeep but may face challenges with timely system upgrades. Overall, respondents view reliability as a strength, but continuous investment is necessary to sustain high performance.

The overall mean score for ICT infrastructure was 3.632 (SD = 0.722), falling in the *agree* category. This indicates that state corporations have moderately strong ICT infrastructure that ensures availability, accessibility, and reliability, all of which support service delivery. However, some gaps in proactive monitoring, user interface optimization, and timely upgrades indicate that there is still work to be done to fully optimize ICT systems for long-term efficiency and resilience.

These findings resonate with existing studies. Hassan (2019) highlighted that reliable ICT infrastructure was central to the success of Kenya's e-government initiatives, as it reduced bureaucratic delays and improved transparency. Marete (2018) similarly found that strong ICT infrastructure, particularly in healthcare, enhanced efficiency by reducing wait times and improving accuracy through electronic medical records. In the broader African context, Waema and Ndung'u (2012) emphasized that digital transformation depends heavily on ICT availability and reliability, warning that infrastructure weaknesses lead to delays and higher operational costs. Collectively, the current study affirms that robust ICT infrastructure underpins organizational performance, while gaps in monitoring and upgrades mirror challenges noted in prior empirical work.

## **Human Capital**

This section evaluated the role of human capital in supporting digitalization and its contribution to organizational performance at the ICT Authority in Kenya. Respondents assessed nine items grouped under digital literacy, training and development, and staffing levels. The findings are presented in Table 2.

**Table 2: Descriptive Statistics for Human Capital**

Dimension	Statement	Mean	Std. Dev.
<b>Digital Literacy</b>	The organization provides sufficient resources to improve digital literacy among employees.	3.642	0.721
	Most employees can efficiently use digital tools and software required for their roles.	3.716	0.689
	The state corporation has clear digital literacy standards that employees must meet.	3.605	0.729
<b>Training &amp; Development</b>	Regular training sessions keep employees updated on technological trends relevant to service delivery.	3.568	0.734
	There are ample opportunities for professional development and upskilling.	3.531	0.746
	The training provided aligns with the latest advancements in digitalization.	3.506	0.741
<b>Staffing Levels</b>	The state corporation effectively recruits and retains skilled personnel in ICT.	3.482	0.754
	The agency recruits and retains skilled personnel in our department.	3.444	0.768
	The agency has sufficient staff with expertise in digitalization and ICT.	3.395	0.781
<b>Aggregate Human Capital Score</b>		<b>3.543</b>	<b>0.740</b>

Respondents agreed that employees were generally proficient in using digital tools (mean = 3.716, SD = 0.689), indicating that digital literacy is embedded in daily operations. The provision of resources to improve literacy scored slightly lower (mean = 3.642, SD = 0.721), suggesting that while staff are competent, investment in continuous improvement could be strengthened. The establishment of digital literacy standards (mean = 3.605, SD = 0.729) was acknowledged but not rated as strongly, pointing to the need for clearer and more enforceable benchmarks for competence.

Training opportunities were rated moderately, with regular sessions to update staff on emerging trends scoring 3.568 (SD = 0.734). Opportunities for professional development (mean = 3.531, SD = 0.746) and training aligned to the latest digital advancements (mean = 3.506, SD = 0.741) also reflected agreement but indicated gaps in systematic, forward-looking capacity building. The findings suggest that while training structures exist, they may not always keep pace with the rapid evolution of digital technologies.

Staffing levels scored lowest among the dimensions. While respondents somewhat agreed that recruitment and retention of ICT talent is in place (means ranging between 3.395 and 3.482), these scores show challenges in sustaining a sufficiently skilled workforce. This implies that state corporations often face shortages of specialized personnel to drive digital transformation initiatives, potentially slowing down implementation and innovation.

The overall mean score for human capital was 3.543 (SD = 0.740), placing it in the *agree* category but on the lower end compared to other variables. This suggests that while employees generally possess digital literacy and have access to training opportunities, significant challenges remain in ensuring adequate staffing and aligning development programs with cutting-edge digital trends. Without stronger investments in professional growth and recruitment, the momentum of digital transformation may not be sustained over the long term.

The findings align with prior studies. Heeks (2018) emphasized that digital transformation in the public sector hinges not only on technology but also on the human capabilities that support it, with inadequate staffing being a common barrier. Njihia and Merali (2013) similarly found that while Kenyan organizations have improved in digital literacy, gaps in training and human

resourcing continue to hinder the full realization of ICT-driven efficiency. Waema and Ndung'u (2012) further highlighted that digital skills development must be continuous and strategically aligned with evolving technologies to ensure sustainability. The current results confirm that although state corporations have moderately strong human capital, weaknesses in staffing and professional development remain critical constraints to service delivery

### Organizational Performance

This section examined the effect of digitalization and automation systems on the organizational performance at the ICT Authority in Kenya. Respondents assessed nine items grouped under enhanced public service delivery, operational efficiency and effectiveness, increased productivity, and customer satisfaction. The results are summarized in Table 3.

**Table 3: Descriptive Statistics for Organizational Performance**

Dimension	Statement	Mean	Std. Dev.
<b>Enhanced Public Service Delivery</b>	The quality of public services has significantly improved due to digitization.	3.716	0.689
	Adoption of digital technology has enabled more transparent and accountable service delivery.	3.642	0.701
<b>Operational Efficiency &amp; Effectiveness</b>	Operational processes have become more efficient with new digital systems.	3.716	0.713
	Digital systems have reduced manual interventions and minimized errors.	3.654	0.721
	The organization consistently meets service delivery targets due to enhanced processes.	3.605	0.746
<b>Increased Productivity</b>	Productivity metrics have improved significantly since digital adoption.	3.642	0.729
	Automation and digitalization have reduced redundancies and improved productivity.	3.605	0.741
<b>Customer Satisfaction</b>	Citizen satisfaction levels have increased due to enhanced digital systems.	3.568	0.734
	The quality of services meets or exceeds citizens' expectations.	3.531	0.754
<b>Aggregate Organizational Performance Score</b>		<b>3.631</b>	<b>0.725</b>

Respondents generally agreed that digitization has led to a noticeable improvement in the quality of public services (mean = 3.716, SD = 0.689). Transparency and accountability in service delivery were also rated highly (mean = 3.642, SD = 0.701), suggesting that digital platforms enhance openness and reduce opportunities for inefficiency or malpractice. These findings highlight digitalization as a tool not only for efficiency but also for building public trust.

Operational processes were reported to have become more efficient with the implementation of digital systems (mean = 3.716, SD = 0.713). Manual interventions and errors were reduced significantly (mean = 3.654, SD = 0.721), while consistency in meeting service targets scored moderately (mean = 3.605, SD = 0.746). Together, these results suggest that automation streamlines workflows, but consistent performance still depends on broader structural and managerial support.

Respondents agreed that productivity metrics have improved since adopting digital tools (mean = 3.642, SD = 0.729) and that automation reduced redundant tasks, boosting productivity (mean = 3.605, SD = 0.741). These results confirm that digitalization has tangible operational benefits, particularly in freeing staff from repetitive tasks to focus on higher-value work.

Satisfaction levels among citizens were rated positively, though slightly lower than other dimensions (mean = 3.568, SD = 0.734). Similarly, perceptions that service quality meets or exceeds expectations were moderately high (mean = 3.531, SD = 0.754). This indicates that while digitalization has improved citizen interactions, gaps remain in aligning service outcomes fully with public expectations.

The overall mean score of 3.631 (SD = 0.725) places Organizational Performance in the *agree* category, indicating that digitalization has enhanced efficiency, productivity, transparency, and satisfaction within state corporations. However, the relatively lower scores in meeting targets consistently and fully satisfying citizens' expectations suggest that while progress is evident, digitalization alone is not sufficient, broader reforms in process management and customer engagement are necessary to maximize impact.

The findings align with Waema and Ndung'u (2012), who found that Kenya's digital initiatives improved efficiency and transparency in public service delivery, but citizen expectations often outpaced implementation capacity. Heeks (2018) similarly observed that digitalization increases productivity and reduces errors, but without strong organizational support, the sustainability of improvements remains limited. Njihia and Merali (2013) also emphasized that while digital systems create operational efficiencies, citizen satisfaction requires continuous refinement of processes and better responsiveness to public needs. The current results therefore affirm that digitalization improves performance in measurable ways but must be embedded in broader reforms to fully meet public service delivery goals.

### Correlation Analysis

This section presents the correlation analysis results examining the strength and direction of the linear relationships between the independent variables, ICT infrastructure, and human capital, and the dependent variable, organizational performance. Pearson's product-moment correlation coefficient ( $r$ ) was used to assess these relationships. The interpretation of correlation coefficients followed conventional guidelines: values between 0.00–0.19 indicate a very weak relationship, 0.20–0.39 a weak relationship, 0.40–0.59 a moderate relationship, 0.60–0.79 a strong relationship, and 0.80–1.00 a very strong relationship. Positive coefficients indicate that an increase in one variable is associated with an increase in the other, while negative coefficients suggest an inverse relationship.

**Table 4: Correlation Matrix**

Variable		Organizational Performance	ICT Infrastructure	Human Capital
Organizational Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	91		
ICT Infrastructure	Pearson Correlation	.734**	1	
	Sig. (2-tailed)	.000		
	N	91	91	
Human Capital	Pearson Correlation	.683**	.405*	1
	Sig. (2-tailed)	.000	.123	
	N	91	91	91

\* \* Correlation is significant at the 0.05 level (2-tailed)

With respect to ICT infrastructure, the correlation with performance was even stronger ( $r = .734$ ,  $p < 0.05$ ). This implies that availability, accessibility, and reliability of ICT systems are foundational to improvements in operational efficiency and citizen satisfaction. More recent empirical work corresponds: Kamau & Omwenga (2025) reported that "Digital Infrastructure" was among the top predictors of service delivery effectiveness in ICT Ministry agencies. Also, Optimizing ICT Infrastructure Performance: A Kenyan Viewpoint (Ominde et al., 2021)

highlighted that adequate infrastructure is essential for reliability and performance in ICT-enabled projects. These findings suggest that state corporations should prioritize resilient infrastructure investments to sustainably improve digital service delivery.

Finally, human capital showed a strong positive correlation with organizational performance ( $r = .683$ ,  $p < 0.05$ ). This implies that digital literacy, regular training, and sufficient staffing are key to translating infrastructure and systems into improved outcomes. Supporting literature includes Digitalization and Service Delivery, Ministry of ICT (Kamau & Omwenga, 2025), which emphasizes training and staff capacity as essential enablers. Also, the Kenya Digital Public Infrastructure policies and strategies (2025) report argues that capacity building and workforce development are major enablers of digital public institutions. For Kenyan state corporations, this underscores the need for continuous investment in human capital if performance improvements are to stick.

### Regression Analysis

To determine the combined and individual influence of ICT infrastructure, and human capital on Organizational Performance, a multiple linear regression analysis was conducted. Organizational Performance was regressed on the four independent constructs. This analysis provides insights into both the collective explanatory power of the predictors and their individual contributions to variations in service delivery outcomes.

**Table 5: Regression Coefficients**

Predictor	B	Std. Error	Beta	T	Sig.
(Constant)	0.584	0.197	–	2.964	0.004
ICT Infrastructure	0.267	0.071	0.298	3.761	0.000
Human Capital	0.236	0.070	0.261	3.371	0.001

*a. Dependent Variable: Organizational Performance*

The fitted regression model is expressed as follows:

$$Y = 0.584 + 0.267X_1 + 0.236X_2 + \varepsilon$$

Where:

Y = Organizational Performance

X<sub>1</sub> = ICT Infrastructure

X<sub>2</sub> = Human Capital

$\varepsilon$  = Error term

ICT infrastructure ( $B = 0.267$ ,  $p < 0.05$ ) emerged as the strongest predictor. This means that a one-unit increase in ICT infrastructure results in a 0.267-unit improvement in organizational performance at the ICT Authority in Kenya, holding other variables constant. This underscores the centrality of resilient, accessible, and reliable ICT infrastructure in achieving efficiency, transparency, and responsiveness in public service. Kamau and Omwenga (2025) similarly found that digital infrastructure is a top predictor of service delivery effectiveness within Kenya's Ministry of ICT and Digital Economy. Ominde et al. (2021) also emphasized that without reliable ICT infrastructure, public digital initiatives face service interruptions and poor citizen uptake.

Human capital ( $B = 0.236$ ,  $p = 0.001$ ) was the second strongest predictor. This implies that a one-unit increase in human capital (through improved digital literacy, training, and adequate staffing) leads to a 0.236-unit increase in organizational performance at the ICT Authority in Kenya. These findings highlight the fact that investment in people is nearly as important as

investment in infrastructure. This is consistent with OECD (2021), which noted that skilled human resources are the linchpin of digital government capacity. Similarly, Kamau and Omwenga (2025) identified staff training and upskilling as essential enablers of service delivery outcomes in Kenya's ICT sector.

## **Conclusions**

The first research question sought to establish the role of ICT infrastructure in performance. The study concludes that ICT infrastructure is the backbone of digital transformation at the ICT Authority and emerged as the strongest predictor of organizational performance. The findings showed that availability, accessibility, and reliability of ICT systems ensure continuity of services, reduce downtime, and enhance both staff productivity and citizen trust. Without resilient infrastructure, other digitalization efforts cannot be fully realized. Thus, the Authority's ability to maintain high-performing systems depends on continuous investment in infrastructure upgrades, proactive monitoring, and improved user-friendly interfaces.

The second research question examined the contribution of human capital to organizational performance. The study concludes that human capital is a pivotal determinant of digital transformation, second only to infrastructure. Digital literacy among employees, opportunities for training and professional development, and adequate staffing levels were all associated with improved performance outcomes. However, weaknesses in staffing adequacy and alignment of training with fast-changing technological trends were evident. The conclusion is that the Authority must continue investing in human capital to ensure that employees are not only digitally competent but also continuously prepared to adapt to technological changes that influence service delivery.

## **Recommendations**

### **Enhancing ICT Infrastructure**

ICT infrastructure emerged as the strongest predictor of organizational performance, highlighting its role as the backbone of digital service delivery. While the Authority has made significant progress in ensuring availability and reliability, the study revealed challenges in proactive monitoring, timely upgrades, and user-friendly interfaces. To address this, it is recommended that the ICT Authority invest in next-generation infrastructure solutions such as cloud-based services, virtualization, and software-defined networking to enhance resilience and scalability. A proactive infrastructure monitoring system should be established to detect and resolve downtime before it disrupts services. The Authority should also improve user interface design to enhance accessibility for both staff and citizens. Sustained investment in infrastructure ensures that Kenya's digital services remain reliable, accessible, and capable of meeting growing demand.

### **Investing in Human Capital Development**

Human capital was found to be the second strongest predictor of organizational performance, confirming that skilled personnel are essential to successful digital transformation. While employees demonstrated digital literacy and access to training, the study highlighted weaknesses in staffing adequacy and the alignment of professional development programs with evolving technological trends. To address these gaps, it is recommended that the ICT Authority implement a comprehensive human capital strategy that prioritizes continuous training, certification, and upskilling. Strategic partnerships with universities, training institutions, and private sector firms could be leveraged to keep employees updated on the latest technological advancements. Moreover, the Authority should strengthen its recruitment and retention policies to ensure that it attracts and retains top ICT talent. Investing in human capital ensures that the Authority has the skills and expertise required to sustain digital innovation and deliver high-quality public services.



## Suggestions for Further Research

this study focused on a single institution, the ICT Authority, which serves as the implementing arm of the Ministry of ICT and Digital Economy. While this provided depth and contextual specificity, it limits the generalizability of the findings to other state corporations or ministries. Subsequent research could adopt a comparative design by examining digitalization practices across multiple agencies, both within and outside the ICT sector, to identify sector-specific dynamics and common enablers of performance.

Finally, while this study relied on quantitative methods, future researchers could employ mixed methods to capture the nuanced experiences of ICT professionals and managers. Qualitative insights from interviews or case studies could enrich the quantitative findings by highlighting the practical challenges and innovative strategies employed in digital transformation. Longitudinal studies are also recommended to assess how digitalization practices and organizational performance evolve over time, especially given the rapid pace of technological change.

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