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DRIVERS OF ICT SYSTEMS PERFORMANCE IN SELECTED STATE CORPORATIONS UNDER THE MINISTRY OF INFORMATION COMMUNICATION TECHNOLOGY AND DIGITAL ECONOMY, KENYA

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ABSTRACT

The study sought to identify the key drivers that contribute to ICT systems performance in selected state corporations under the Ministry of ICT and Digital Economy, Kenya, and provide recommendations on how to improve the efficiency and effectiveness of these ICT systems in service delivery and daily operations in these selected state corporations under the ministry of ICT and Digital Economy, Kenya. To realize this, the study examined the influence of ICT infrastructure, Cybersecurity, ICT funding, and Human Capital on the performance of ICT systems in the selected state corporations under the Ministry of ICT and Digital Economy, Kenya. The study was guided by four theories namely; Information Infrastructure Theory (IIT), Information Security Management System (ISMS) Theory, Resource-based View (RBV)Theory, and Human Capital Theory. A purposive sampling technique was used to select a sample size of 130 respondents from the 13 selected state corporations under the Ministry of ICT and Digital Economy, Kenya. The respondents included top ICT management and technical staff within the Selected 13 state corporations under the Ministry of ICT which consisted of ICT directors and ICT officers, network administrators, systems administrators, and information security officers. Primary data was collected by the use of administered questionnaires, interview guides, and secondary data from state corporations' materials and records. The questionnaires were reviewed and evaluated for content validity and reliability. Descriptive and inferential statistics were utilized in the analysis of data and presented using the Statistical Package for Social Sciences (SPSS V26). This was in the form of graphs, tables, and charts while qualitative findings were presented thematically. Further scrutiny revealed that ICT infrastructure, Cybersecurity, ICT Funding, and Human capital were highly significant in the performance of ICT systems in selected state corporations under the Ministry of ICT and Digital Economy, Kenya. The study recommended standardized ICT infrastructure management, continuous investment in network upgrades, cybersecurity standardization, transparent financial reporting, and comprehensive training programs. These measures aim to optimize ICT system performance across state corporations in Kenya, ultimately improving operations and service delivery. The knowledge exuded in this study will enhance decision-making, financial resource allocation, and successful implementation, use, and maintenance of ICT systems in the Government Ministries, Counties, Departments, and Agencies in Kenya.

Key Words: ICT systems performance, State Corporations, ICT infrastructure, Cybersecurity, ICT funding, Human Capital

INTRODUCTION

ICT systems refer to the use of technology to manage and communicate information. These systems encompass a wide range of technologies, including hardware, software, networks, and services, that work together to manage, process, store, and transmit data and information.

ICT systems play a critical role in modern businesses, organizations, and societies, as they enable the efficient and effective management of data and communication. Examples of ICT systems include enterprise resource planning (ERP) systems, customer relationship management (CRM) systems, content management systems (CMS), human resource management (HRM) systems, Business Intelligence systems, communication and collaboration systems, and many others (Wikipedia).

Some of the benefits of ICT systems include increased efficiency and productivity, improved decision-making, better collaboration and communication, enhanced security and data protection, and cost savings. However, there are also risks associated with the use of ICT systems, such as cyberattacks, data breaches, and system failures. Therefore, organizations need to implement appropriate security measures and best practices to mitigate these risks.

State Corporations in Kenya are established under The State Corporations Act, Cap 446, 1986. The State Corporations Act sections 2 and 3, define a State Corporation as one established by order under the State Corporations Act, an Act of Parliament. According to (State Corporations Act, 1986), A state corporation refers to both commercial and non-commercial entities where the government controls the majority or all of the shares. Under the government's Vision 2030, State Corporations remain strategic to the socio-economic development of the country and the government intends to use State Corporations to achieve the objectives of transforming Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment (Fiebelkorn et al., 2021).

State corporations like other government institutions have a duty of ensuring that the citizens get quality and affordable services promptly. However, according to Wambugu et al. (2017) public service delivery in Kenya has been poor and has not been serving the public interest within its most optimal capacity due to bureaucratic systems and lack of accountability which is characterized by delayed services, long queuing and rampant corruption.

ICT systems are seen as tools to support the work of state corporations to deliver public services and information in a more convenient, citizen-centric, and cost-effective manner. Thus, in Kenyan public service, ICT can be an effective tool to ensure increased access to government services, improved value for money, increased productivity, transparency, and better service delivery (Ewuim et al., 2016).

The use of ICT systems in state corporations has become increasingly important in recent years, as it has the potential to improve efficiency, reduce costs, and enhance service delivery. However, the effectiveness of these systems depends on a range of factors, including the quality of the technology, the skills of the users, and the organizational culture. Recent studies have highlighted the importance of understanding the drivers of ICT systems performance in state corporations. For example, a study by Ongori and Migiro (2020) found that the quality of ICT infrastructure, user skills, and organizational culture were key drivers of ICT systems performance in Kenyan state corporations. Another study by Kinyua (2019) identified the importance of leadership, governance, and strategic planning in driving the effective use of ICT systems in state corporations. This study on drivers of ICT systems performance in state corporations in Kenya is based on the need to understand the factors that influence the effectiveness of these systems and to identify strategies for improving their performance.

LITERATURE REVIEW

Theoretical Review

Theories are used as the basis of most research work. Dusick (2011) elaborates that the theoretical framework is presented by a research scholar to place a particular study work within the viewpoint of other similar work in the same area of research. It, therefore, offers support for the planned research work by establishing known connections among variables and sets parameters or confines for the proposed study. This study was guided by four theories/models namely; Information Infrastructure Theory (IIT), Information Security Management System (ISMS) Theory, Resource-based View (RBV)Theory, and Human Capital Theory.

Conceptual Framework

A conceptual framework is a research tool intended to assist a study to develop awareness and understanding of the situation under scrutiny (Abok, 2013). The framework sets out broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation (Reichel and Ramley, 1987). It therefore functions as the foundation required to understand the interdependence configurations through occurrences, notions, opinions, concepts, reason, and explanations between the dependent variable and the independent variables (Svinicki, 2010).

As indicated in Figure 2.1, the conceptual framework for this study is based on one independent variable and one dependent variable. According to the study, ICT Infrastructure has the most positive significant relationship on the performance of the ICT Systems.

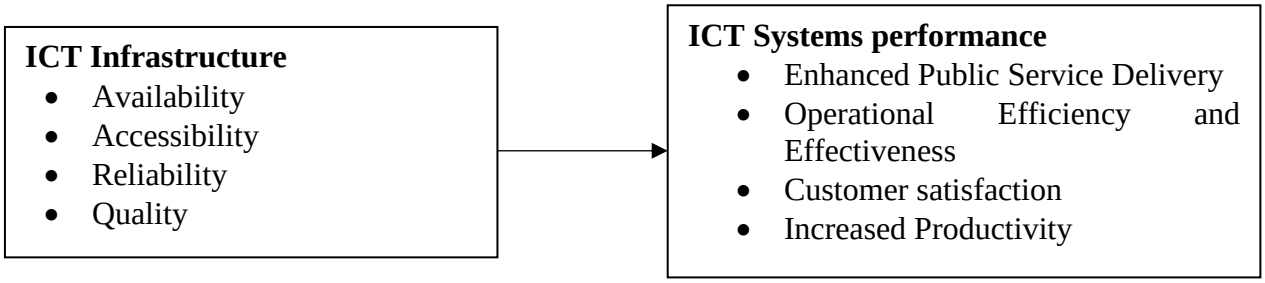

Figure 1

ICT Infrastructure

ICT infrastructure is a crucial element in driving the performance of ICT systems in organizations. ICT infrastructure can be defined as the physical and virtual components necessary to support the delivery of information technology services within organizations.

Research has shown that ICT infrastructure is a key determinant of the performance of ICT systems in organizations. For instance, a study by Ayo and Adebiyi (2014) found that the availability and reliability of ICT infrastructure significantly influenced the performance of ICT systems in Nigerian universities. Similarly, Njiraine and Murathe (2018) found that ICT infrastructure played a critical role in enhancing the performance of ICT systems in Kenyan public hospitals.

In the context of state corporations under the Ministry of ICT and Digital Economy in Kenya, the availability and quality of ICT infrastructure could impact the performance of ICT systems in the organizations. For instance, if the state corporations lack reliable internet connectivity, it may affect the accessibility and reliability of the ICT systems, thus leading to poor performance. Similarly, if the state corporations have outdated hardware or software, it may affect the speed and efficiency of the ICT systems, thus hindering their performance.

Therefore, in the study on drivers of ICT systems performance in selected state corporations under the Ministry of ICT in Kenya, it is important to investigate the role of ICT infrastructure as an independent variable in determining the performance of ICT systems in state corporations. The study will explore the availability, accessibility, reliability, and quality of ICT infrastructure in organizations and how these factors influence the performance of ICT systems.

Cyber-Security

Cybersecurity is an essential component of ensuring the efficient and effective performance of ICT systems in organizations. It involves protecting information, networks, and computer systems from unauthorized access, theft, damage, or disruption. The following studies provide insights into the role of cybersecurity as an independent variable in the study of drivers of ICT systems performance:

A study by Kitindi and Kabanda (2018) examined the relationship between cybersecurity and the performance of ICT systems in Tanzanian government agencies. The study found that cybersecurity measures such as access control, firewalls, and antivirus software had a positive impact on the performance of ICT systems.

Another study by Ngugi and Waema (2017) investigated the impact of cybersecurity on the adoption and use of e-government services in Kenya. The study found that cybersecurity concerns were a significant barrier to the adoption of e-government services and that the perceived security of the systems influenced users' trust and confidence in the ICT systems.

A study by Bada et al. (2020) assessed the level of cybersecurity readiness in Nigerian public institutions and its impact on the performance of ICT systems. The study found that a lack of cybersecurity preparedness was a significant barrier to the effective performance of ICT systems, and recommended the implementation of cybersecurity frameworks and policies to enhance the security of the ICT systems.

These studies highlight the critical role of cybersecurity as an independent variable in ensuring the effective and efficient performance of ICT systems in organizations, including state corporations under the Ministry of ICT in Kenya. Proper cybersecurity measures can enhance the security, reliability, and availability of ICT systems, leading to improved performance and service delivery.

Funding

Funding is a critical factor in the successful implementation and performance of ICT systems in state corporations under the Ministry of ICT and Digital Economy, Kenya. The availability and allocation of funds to support ICT infrastructure and cybersecurity initiatives have a direct impact on the efficiency and effectiveness of the ICT systems.

Research by Alzahrani et al. (2021) shows that insufficient funding remains a significant challenge in the implementation of ICT infrastructure projects, particularly in developing countries such as Kenya. This lack of funding can result in inadequate planning, maintenance, and upgrade of ICT systems, leading to poor performance. Furthermore, a study by Mutula and Brakel (2010) revealed that budgetary allocation for ICT is often inadequate and poorly managed in African countries, including Kenya.

On the other hand, sufficient and appropriate funding can enable state corporations under the Ministry of ICT and Digital Economy to invest in critical ICT infrastructure and cybersecurity systems. Funding can facilitate the acquisition of high-quality ICT equipment, software, and services, as well as support the hiring and training of skilled ICT personnel. In a study by Muriithi et al. (2017), it was found that adequate funding facilitated the implementation and adoption of e-government services in Kenya, leading to improved service delivery and performance.

Human Capital

Human capital refers to the knowledge, skills, talents, and other intangible assets that employees possess, which can be leveraged for organizational success. In Kenya, several studies have linked human capital to the performance of ICT systems in state corporations.

According to a study by Abdi et al. (2018), human capital plays a significant role in the adoption and utilization of ICT systems in Kenya's state corporations. The study found that the availability of skilled personnel was a critical driver of ICT adoption and utilization. The authors noted that employees who possess advanced digital skills and experience could better navigate complex ICT systems and leverage them to increase productivity and efficiency.

Similarly, a study by Mwiti and Onsongo (2019) found that the training and development of employees played a crucial role in enhancing the performance of ICT systems in state corporations. The study noted that employees who received regular training on new technologies were more likely to be proficient in using ICT systems, thus, reducing the learning curve and increasing efficiency.

Moreover, a study by Chepkonga et al. (2020) found that employee empowerment was a significant driver of ICT systems performance in Kenyan state corporations. The study noted that empowering employees by delegating responsibilities, providing resources, and promoting collaboration could increase their commitment towards ICT systems usage and facilitate knowledge sharing.

Empirical Review

Empirical studies are researchers who derive their data using direct observation or experiment to answer a question or hypothesis (Sekaran, 2006). Enough background information should therefore be presented for readers to understand and evaluate the results of the study (Abok, 2013). This section, therefore seeks to explore the previous empirical studies relating to the influence of the independent variables on the dependent variable i.e., the drivers of ICT systems performance in selected state corporations under the Ministry of ICT and Digital Economy, Kenya.

ICT Infrastructure

ICT infrastructure is a critical factor in the study of ICT systems performance in state corporations in Kenya. In organizations, ICT infrastructure comprises hardware, software, and network components that enable the implementation and utilization of ICT systems. The effectiveness and efficiency of ICT systems in state corporations are heavily dependent on the quality and effectiveness of ICT infrastructure. This empirical review aims to explore the existing literature on ICT infrastructure and its impact on ICT systems performance in state corporations in Kenya.

ICT infrastructure is a prerequisite for the successful implementation and utilization of ICT systems in organizations. In state corporations in Kenya, ICT infrastructure comprises hardware, software, and network components that enable effective communication, information sharing, and transaction processing. The quality and effectiveness of ICT infrastructure have a direct impact on the performance and competitiveness of state corporations. The study of ICT infrastructure in the study of ICT systems performance in state corporations in Kenya should consider several factors. These factors include the quality of ICT infrastructure, its availability, the level of expertise required to manage ICT infrastructure, and the relationship between ICT infrastructure and ICT systems performance. ICT infrastructure remains a significant challenge in the implementation and utilization of ICT systems in state corporations in Kenya. For example, a study by Kipkoech et al. (2018) on the implementation of ICT systems in Kenyan public universities found that inadequate ICT infrastructure was a significant challenge in the successful implementation of ICT systems.

The study identified inadequate ICT infrastructure, including outdated hardware and software, lack of internet connectivity, and insufficient network bandwidth, as primary factors affecting ICT systems performance.

Furthermore, the quality of ICT infrastructure has a direct impact on ICT systems performance. In a study conducted by Wambugu and Wanyaga (2017) on the impact of ICT infrastructure on ICT systems performance in state corporations, it was found that the availability of high-quality ICT infrastructure led to enhanced ICT systems performance. The study noted that high-quality ICT infrastructure facilitated the efficient processing and management of data, enhanced speed and accuracy of transaction processing, and improved communication and collaboration among employees.

Lastly, the expertise required to manage ICT infrastructure is critical in determining ICT systems performance in state corporations. According to Kassiri et al. (2017), the availability of skilled personnel to manage ICT infrastructure is crucial in determining ICT systems performance. The study noted that trained personnel were critical in ensuring the optimal performance of ICT systems and the effective management of ICT infrastructure.

Cyber-Security

Cybersecurity has become a growing concern in the digital world, particularly with the increasing use of ICT systems in state corporations. State corporations in Kenya are significantly vulnerable to cyber-attacks due to their critical role in providing essential services such as energy, health, telecommunications, and finance. In light of these risks, it is important to examine the role of cybersecurity in the study of ICT systems performance in state corporations in Kenya. This empirical review aims to explore the existing literature on cybersecurity and its impact on ICT systems performance in state corporations in Kenya. Cybersecurity is essential in protecting ICT resources and ensuring their optimal performance in organizations. According to Ondiege and Waema (2018), cybersecurity refers to the practices, technologies, and policies used to protect systems, networks, devices, and data from unauthorized access, theft, damage, or disruption. Cybersecurity is critical in the performance of ICT systems as it not only protects against cyber-attacks but also ensures data, Information, and ICT infrastructure privacy, confidentiality, availability, and integrity.

The study of cybersecurity in ICT systems performance in state corporations in Kenya should consider several key factors including risks, threats, and vulnerabilities of state corporations to cyber-attacks, the cybersecurity measures in place to mitigate these risks, and the impact of these measures on ICT systems performance.

Cybersecurity threats constitute a significant challenge to ICT systems performance in state corporations in Kenya. For example, a study by Mutai (2019) on data breaches in the Kenyan banking sector revealed that cyber-attacks were among the top five causes of data breaches. The study identified insider threats, phishing attacks, social engineering, and malware as the most common hacking techniques used in cyber-attacks.

To mitigate these cybersecurity risks, state corporations in Kenya have implemented various

cybersecurity measures aimed at improving the performance of ICT systems. A study by Ondiege and Waema (2018) revealed that the most common cybersecurity measures used in state corporations include firewalls, intrusion detection systems, access control, encryption, and security training for employees. These measures have helped in protecting ICT resources and reducing security breaches.

Furthermore, there is a positive correlation between cybersecurity and ICT systems performance in state corporations in Kenya. According to Kassiri et al. (2017), cybersecurity measures have a significant impact on the performance of ICT systems in state corporations. The study based its analysis on the Deterrence Theory, which posits that cybersecurity measures serve a deterrent role in reducing the incidence and severity of cybersecurity breaches. The findings revealed that effective cybersecurity measures enhanced ICT systems performance by reducing the number and severity of cyber-attacks, increasing data security, and improving customer trust and confidence.

Funding

Funding is a critical factor in the study of ICT systems performance in state corporations in Kenya. The successful implementation and utilization of ICT systems require significant financial resources to finance the hardware, software, and infrastructure necessary for optimal performance. The ICT funding model adopted by state corporations will ultimately affect their ICT systems' performance and competitiveness. This empirical review aims to explore the existing literature on funding and its impact on ICT systems performance in state corporations in Kenya.

Funding is a prerequisite for the successful implementation and utilization of ICT systems in

organizations. In state corporations in Kenya, funding for ICT systems entails investment in hardware, software, infrastructure, and skilled human capital. ICT systems have the potential to enhance the performance and competitiveness of state corporations in Kenya. However, the amount of funding channeled towards ICT systems is critical in determining their success.

The study of funding for ICT systems in state corporations in Kenya should consider several factors. These factors include the sources, amount, and distribution of funding, the impact of funding on ICT systems implementation and utilization, and the relationship between funding and ICT systems performance. Funding continues to be a significant challenge in the implementation and utilization of ICT systems in state corporations in Kenya. For example, a study by Ogallo and Waema (2018) on ICT systems implementation in Kenyan universities found that inadequate funding was a significant challenge for the successful implementation of ICT systems. The study identified the lack of funds for ICT infrastructure and hardware, inadequate funds for ICT personnel training and development, and lack of funds for system maintenance and upgrades as the primary funding issues affecting ICT systems performance.

Furthermore, the amount of funding channeled toward ICT systems has a direct impact on their

implementation and utilization. In a study conducted by Mwabu and Wangombe (2018**)** on the impact of funding on ICT systems performance in state corporations in Kenya, it was found that higher funding levels led to greater utilization of ICT systems. The study noted that increased funding led to an increase in the number of hardware and software applications used, which, in turn, led to enhanced ICT systems performance.

Lastly, there exists a direct relationship between funding and ICT systems performance in the state

corporations in Kenya. According to Salano (2017), increased funding levels led to an increase in ICT systems performance. In addition, the study highlighted that the appropriate allocation and management of funds were crucial in determining ICT systems performance in state corporations. Proper allocation and management of funds helped in the deployment of high-quality ICT infrastructure, enhanced personnel training and development, and effective maintenance and upgrades of ICT systems.

Human Capital

Human capital is a critical resource that is essential for the effective implementation of ICT systems in state corporations. State corporations in Kenya have invested heavily in ICT systems to improve their performance, profitability, and competitiveness. However, the success of these investments depends on the skills, knowledge, and experience of the workforce that utilizes these systems. This empirical review aims to examine the role of human capital in the study of ICT systems performance in state corporations in Kenya.

According to Becker (1964), human capital refers to the knowledge, skills, and competencies that individuals acquire through education, training, and experience. Human capital forms an essential resource in organizations as it contributes to the development, implementation, and utilization of ICT systems. The Kenyan government has prioritized ICT systems as a critical aspect of its economic development and growth strategy, with investments projected to reach Kshs. 167.2 billion ($1.6B) by 2023 ICT Authority (2021). This investment has been directed toward developing communication infrastructure, supporting startups, and building the capacity of the labor force to utilize and develop ICT systems.

Determination of the correlation between human capital and ICT systems performance requires an understanding of the types of human capital that are necessary for the optimal performance of ICT systems in state corporations. According to Alarcón and Pérez-Rodríguez (2012), these types of human capital include technical skills, managerial skills, teamwork skills, and creative skills. Technical skills involve the knowledge and expertise to design, develop, and implement ICT systems. Managerial skills refer to the ability to manage and optimize resources to improve ICT systems performance. Teamwork skills include effective collaboration and communication among team members to achieve common goals. Creative skills involve ideation, innovation, and development of solutions that improve ICT systems performance.

Empirical studies have shown a strong correlation between human capital and ICT systems performance in state corporations in Kenya. For example, Kamau et al. (2020) conducted a study on the impact of human capital on E-Government service delivery in Kenya. The study found that a skilled workforce was critical in the efficient delivery of E-Government services. In another study, Kiguru (2016) examined the role of human capital in the adoption of ICT systems in the Kenyan banking sector. Results of the study showed that human capital, specifically technical skills, was a significant driver of ICT systems adoption and enhanced performance.

Another study by Njeru et al. (2019) evaluated the effect of human capital on cloud computing adoption in the Kenyan public sector. The study found that a well-trained workforce in cloud computing was essential for the successful adoption and utilization of cloud computing solutions. Furthermore, the study revealed that employee training programs significantly improved cloud computing skills among employees, consequently enhancing

RESEARCH METHODOLOGY

The descriptive research design was adopted in this research since it ensures an accurate description of the characteristics of the population that is being studied. The target population for this research comprised 130 key top management technical staff within the 13 selected state Corporations under the Ministry of ICT and Digital Economy, Kenya. It consisted of ICT directors, ICT officers, network administrators, systems administrators, and information security officers. Selecting an appropriate sample size was essential to the generation of data that reflects the characteristics of the population. This study adopted a purposive sampling technique. Data was collected in two forms: primary data that entailed the use of questionnaires and interview guides and secondary data from the state corporations' materials and records.

Pilot Study

A pilot study of 13 ICT personnel from three selected state corporations (CA, ICTA, and KBC) under the Ministry of ICT and Digital Economy, Kenya was conducted to represent at least 10% of the target sample size. The purpose of the pilot test was to enable the researcher to obtain clarity on the questions contained in the questionnaire. The reliability of the instrument was assessed using Cronbach's alpha test. The findings in the table below indicate the Reliability analysis for the variable item of drivers of ICT systems performance.

Table 3.1: Reliability Analysis

Variable	No. of Items	Cronbach alpha	Comment
ICT Infrastructure	5	0.708	Reliable
Cyber Security	5	0.789	Reliable
ICT Funding	5	0.864	Reliable
Human Capital	5	0.832	Reliable
Measures of Performance of ICT Systems	7	0.878	Reliable

In Cronbach's coefficient alpha, values are clustered into four different points of reliability: excellent (0.90 and above), high (0.70-0.90), highly moderate (0.50-0.70), and low (0.50 and below. A construct is reliable if the alpha (α) is greater than 0.70 (Hair et al 2013).

The finding in table 3.1 revealed that the Impact of ICT Infrastructure on system performance ICT systems in state corporations with 5 items has an alpha (α) of =0.708, Impact of Cyber Security on the performance of ICT systems in state corporations with 5 items has an alpha (α) of 0.789, Impact of Funding on the performance of ICT systems in state corporations with 5 items has an alpha (α) of 0.864, Impact of Human Capital on the performance of ICT Systems Performance in state corporations with 5 items has an alpha (α) of 0.832, Measures of performance of ICT Systems in State Corporations 7 items has an alpha (α) of 0.879. This shows that all the variables are reliable since the alpha value for all the variables was within the set limit.

Validity refers to how an instrument for research can measure that which it is intended to measure (Mugenda and Mugenda, 2013). Through the guidance of the supervisors. The researcher checked the validity of the questionnaire to ensure that there were no instances of ambiguity. This also ensured that the tool was aligned with the objectives of the study and provided assurance on the levels of accuracy.

Data Processing and Analysis.

Once the data was collected, its analysis was done using Statistical Package for Social Sciences (SPSS V26). Descriptive statistics that were used in the analysis included frequencies, percentages, mean, and standard deviation. Inferential statistics was used to establish correlation analysis that provided information on how the independent variable relates to the dependent variable. The following regression model guides the analysis:

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$,
Where; Y= Drivers of ICT Systems Performance
X_1 = ICT Infrastructure
X_2= Cyber-Security
X_3= Funding
X_4= Human Capital
ε = is the error term

RESEARCH FINDINGS AND DISCUSSION

Introduction

A sample size of 130 respondents was targeted in the research study out of which 116 respondents managed to return questionnaires that were filled. This made up a response rate of 89.2%. This enabled a satisfactory and sufficient conclusion to be reached concerning the study. A response rate of 70% is considered sufficient for a descriptive study (Mugenda and Mugenda, 2003). According to the findings, 91% of the respondents were ICT technical personnel and 9% were ICT managers. According to the findings, 80.2% of the respondents had achieved degree-level qualification and 19.8% had achieved a master's degree as their highest level of academic qualification. This insinuates that the level of education of the respondents was sufficient enough to provide proper information regarding the study. According to the findings, 46% of the respondents had 3-5 years of experience, 34 % had over 5 years of experience 20%% had less than 3 years of experience.

Descriptive Analysis

This is a quantitative description of a collection of information that is provided in the form of a summary of statistics. Simple summaries about the sample and measures are provided together with a graphical analysis to form a basis for the analyzed data (Mugenda & Mugenda, 2013).

Influence of ICT Infrastructure on ICT systems Performance in Selected state corporations

This section examined the influence of ICT Infrastructure on ICT System performance in selected state corporations. Opinions were sought from the respondents concerning the Influence of ICT Infrastructure on ICT System performance in state corporations.

Table 4.1: Influence of ICT Infrastructure on System performance in state corporations

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
The State Corporation ICT Infrastructure is reliable and resilient enough to handle the data demands.	-	55	42	19	-	3.3103	0.7391
The ICT infrastructure in our state corporation is regularly maintained and Upgraded	35	7	55	11	8	3.4310	1.2103
The ICT infrastructure in our state corporation adequately supports our operational requirements.	-	60	37	19	-	3.3534	0.7490
Our state corporation has sufficient network bandwidth and connectivity for smooth ICT operations	34	44	27	11	-	3.8707	0.9467
The availability of ICT resources and tools is satisfactory in our state corporation.	19	29	33	16	19	3.1121	1.3040

The findings in *Table 4.1* indicate that the majority of the respondents agreed that their state corporations had sufficient network bandwidth and connectivity for smooth ICT operations with a mean of 3.8707, indicating that most respondents agree that bandwidth and connectivity are sufficient for smooth operations. However, the spread in responses suggests room for

improvement. To a large extent, respondents were neutral on the ICT infrastructure in State Corporation being regularly maintained and upgraded with a mean of 3.4310. The infrastructure is seen as adequately supporting operational requirements with a mean of 3.3534, but the variance in responses suggests that not all areas may be equally well supported.

Table 4.2: Extent of agreement on the influence of ICT Infrastructure on ICT systems performance

Statement	Frequency	Percent	Cumulative Percentage
by over 75%	65	56%	56%
between 50% to 75%	48	41%	97%
between 25% to 50%	0	0%	97%
below 25%	3	3%	100%
Total	**116**		

The data in Table 4.2 indicates that 56% of the respondents were of the opinion that ICT Infrastructure influences the performance of ICT systems by over 75%. 41% of the respondents were of the opinion that ICT infrastructure influences performance between 50% to 75%.

Influence of Cyber Security on the performance of ICT systems in state corporations

This section examined the influence of cybersecurity on the performance of ICT systems in state corporations. Opinions were sought from the respondents with regard to the influence of cybersecurity on the performance of ICT systems in state corporations.

Table 4.3: Influence of Cyber Security on the performance of ICT systems in state corporations

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
Our state corporation has implemented robust cybersecurity measures to protect against threats and breaches.	15	47	30	24	-	3.4569	0.96362
Regular security audits and assessments are conducted to ensure the effectiveness of cybersecurity measures	19	44	19	16	19	3.2328	1.33422
There is awareness and training programs in place to educateemployees about cybersecurity best practices	19	13	65	11	8	3.2069	1.05102
Our state corporation has an incident response protocols to handle cybersecurity incidents effectively	15	30	55	16	-	3.3793	0.88126
The protection of sensitive data and information is a priority in our state corporation. The protection of sensitive data and information is a priority in our state corporation.	21	28	56	11	-	3.5086	0.89923

The findings in Table 4.3 show that robust cybersecurity measures to protect against threats and breaches had a mean of 3.4569. The mean suggests that respondents agree that robust cybersecurity measures are in place, though not strongly. The standard deviation indicates moderate variation in responses. Respondents largely agreed that State Corporation conducts regular security audits and assessments with a mean of 3.2328, respondents generally agree that security audits are conducted, but the high standard deviation suggests varied perceptions of their effectiveness. Respondents were largely neutral on awareness and training programs in place to educate employees about cybersecurity with a mean of 3.2069. The mean score indicates an overall neutral to a slight agreement on the presence of awareness and training programs. The standard deviation implies some inconsistency in the perceived adequacy of these programs.

Table 4.4: Extent of agreement on the influence of Cyber Security on the performance of ICT Systems

Statement	Frequency	Percent	Cumulative Percentage
by over 75%	61	53%	53%
by between 50% to 75%	52	45%	97%
by between 25% to 50%	0	0%	97%
by below 25%	3	3%	100%
Total	**116**		

The data in Table 4.4 indicates that 53% of the respondents were of the opinion that Cybersecurity influences the performance of ICT systems by over 75%. 45% of the respondents thought that Cybersecurity influences performance between 50% to 75%.

4.2.3 Influence of funding on the performance of ICT systems in state corporations

This section examined the Influence of Funding on the performance of ICT systems in state corporations. Opinions were sought from the respondents with regard to the Influence of Funding on the performance of ICT systems in state corporations.

Table 4. *5*: Influence of Funding on the performance of ICT Systems in state corporations

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
Our state corporation receives sufficient funding to support ICT initiatives and projects.	19	37	49	11	-	3.5517	0.87819
The allocated budget for ICT in our state corporation is effectively utilized.	-	56	60			3.4828	0.50187
Adequate financial resources are allocated for ICT infrastructure maintenance and upgrades.	64	41	11	-	-	3.4569	0.66453
Our state corporation has access to funding opportunities for ICT innovation and development.	35	30	27	24	-	3.6552	1.11981
There is transparency and accountability in the financial management of ICT projects in our state corporation.	48	46	19	3	-	4.1983	0.80455

The findings in Table 4.7 indicate that a high number of the respondents were neutral on there being an effective utilization of the ICT Budget by state corporations with a mean of 3.4828. Equally, a high number of respondents agreed that the ICT budget is effectively utilized, as indicated by a mean score leaning towards the agree side. The lower standard deviation suggests a more consistent agreement among the respondents. A high number of respondents strongly agreed that state corporations have access to funding for innovation and development with a mean of 3.6552. The responses show an agreement that there are funding opportunities for ICT innovation and development, but the higher standard deviation indicates diverse opinions, possibly reflecting varying experiences or awareness among respondents. Respondents were largely neutral on corporations receiving sufficient funding to support ICT initiatives and projects with a mean of 3.5517. The mean score is above neutral, but the spread of responses is relatively wide, suggesting some diversity in opinion.

Table 4.6: Extent of agreement on the influence of ICT funding on the performance of ICT Systems

Statement	Frequency	Percent	Cumulative Percentage
by over 75%	76	66%	66%
by between 50% to 75%	37	32%	97%
by between 25% to 50%	0	0%	97%
by below 25%	3	3%	100%
Total	**116**		

The data in Table 4.6 indicates that 66% of the respondents were of the opinion that funding influences the performance of ICT systems by over 75%. 32% of the respondents were of the opinion that funding influences the performance of ICT systems between 50% to 75%.

Influence of Human Capital on the performance of ICT Systems Performance in state corporations

This section examined the influence of human capital on the performance of ICT Systems. Opinions were sought from the respondents about the influence of the following practices of ICT capacity building on the performance of ICT Systems.

Table 4.*7*: Influence on human capital on the performance of ICT Systems

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
Our state corporation invests in continuous training and development programs for ICT skills enhancement.	33	37	43	3	-	3.8621	0.86373
Employees in our state corporation possess the necessary skills and expertise to effectively utilize ICT systems	42	39	32	3	-	4.0345	0.86408
There is effective knowledge sharing and collaboration among employees to enhance ICT systems performance	42	55	16	3	-	4.1724	0.76073
The recruitment process in our state corporation ensures the hiring of qualified personnel for ICT-related roles	24	71	18	3	-	4.0000	0.68525
Adequate financial resources are allocated for ICT training and Capacity Building	42	44	27	3	-	4.0776	0.83563

The finding in Table 4.7 depicts that the majority of the respondents agreed that state corporations invest in continuous training and development programs for ICT skills enhancement with a mean of 3.8621. The high mean indicates good support for these programs. In addition, a high number of the respondents thought that the recruitment process in State Corporations ensures the hiring of qualified personnel for ICT-related roles with a mean of 4.000. A high number of the respondents thought that employees of state corporations possess the necessary skills and expertise to effectively utilize ICT systems with a mean of 4.0345. This high mean implies agreement that employees possess the necessary skills and expertise, crucial for the effective use of ICT systems.

Table 4.8: Extent of agreement on the influence of Human Capital on the performance of ICT Systems

Statement	Frequency	Percent	Cumulative Percentage
by over 75%	69	59%	59%
by between 50% to 75%	42	36%	96%
by between 25% to 50%	2	2%	97%
by below 25%	3	3%	100%
Total	**116**		

The data in Table 4.8 indicates that 59% of the respondents thought that human capital influences the performance of ICT systems by over 75%. 36% of the respondents believed that human capital influences the performance of ICT systems between 50% to 75%.

Performance of ICT Systems in State Corporations

This section examined the measures of performance of ICT Systems in State Corporations. Opinions were sought from the respondents concerning the measures of performance of ICT Systems in State Corporations.

Table 4.9: Influence of Performance of ICT Systems in State Corporations

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Standard Deviation
ICT systems have helped your organization to streamline your work processes and increase productivity	48	46	19	3	-	4.1983	0.80455
Have the ICT systems helped your organization achieve its goals and desired outcomes effectively	33	37	43	3	-	3.8621	0.86373
How would you rate the improvements in the quality of services provided by your organization since the implementation of ICT systems?	42	39	32	3	-	4.0345	0.86408
How would you rate the responsiveness and timeliness of service delivery after the introduction of ICT systems?	42	55	16	3	-	4.1724	0.76073
How would you rate the overall customer service experience related to the ICT systems	24	71	18	3	-	4.0000	0.68525
How would you rate the impact of ICT systems on increasing the productivity of your organization's business processes?	42	44	27	3	-	4.0776	0.83563

The findings in Table 4.9 above indicate that the ICT systems have helped organizations to streamline their work processes and increase productivity with a mean of 4.1983. The responsiveness and timeliness of service delivery after the introduction of ICT systems was significant with a mean of 4.1724. There have been improvements in the quality of services provided to organizations since the implementation of ICT systems with a mean of 4.0345. There is an impact of ICT systems on increasing the productivity of your organization's business processes with a mean of 4.0776. The customer service experience in selected state corporations that have adopted the ICT system was significant with a mean of 4.000. ICT systems helped organizations achieve their goals and desired outcomes effectively with a mean of 3.8621.

Inferential Statistics

Statistical package for social sciences (SPSS Version 26) was used to code, enter, and compute the measurements of the multiple regressions. The levels of influence among the variables were tested using correlation and multiple regression analysis.

Correlation Analysis

The correlation analysis is used to scrutinize the association between independent and dependent variables. The study used the Pearson Moment Correlation analysis to examine the association between the ICT infrastructure, Cybersecurity, Funding, and Human Capital with the performance of ICT systems in the selected state corporations under the Ministry of ICT and Digital Economy. As shown in Table 4.16 below, ICT infrastructure had a positive significance on the performance of ICT systems with a correlation of .874; (r = 0.874). Cybersecurity was found to be positively related to the performance of ICT systems with a correlation of 0. .809; (r = 0.809) while funding had a positive significance to the performance of to the performance of ICT systems with a correlation of 0.620; (r =0. 620). Finally, Human Capital was also found to be positively related to the performance of ICT systems with a correlation of 0.385 (r = 0.385).

Table 4.10: Correlations Coefficient

Correlations

		Performance of ICT	Infrastructure	Cyber Security	Funding	Human Capital
Performance of ICT Systems	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	116				
Total Scores for Infrastructure	Pearson Correlation	.874**	1			
	Sig. (2-tailed)	.000				
	N	116	116			
Total Scores for Cyber Security	Pearson Correlation	.809**	.825**	1		
	Sig. (2-tailed)	.000	.000			
	N	116	116	116		
Total Scores for Funding	Pearson Correlation	.620**	.790**	.854**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	116	116	116	116	
Total Scores for Human Capital	Pearson Correlation	.385**	.640**	.613**	.883**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	116	116	116	116	116

Model Summary

The model summary assists in analyzing the variation of the dependent variable as a result of the corresponding changes in the independent variables. The study analyzed the variations in the performance of ICT Systems due to the variations in ICT infrastructure, cybersecurity, funding, and human capital. R squared was 0.582 implying that there was a 58.2% variation in the performance of ICT Systems projects, due to changes in ICT infrastructure, Cybersecurity, Funding, and Human Capital. R is the correlation coefficient which shows the relationship between the study variables thus implying a strong positive relationship between the study variables of 0.763 from the findings as shown in Table 4.13. The remaining 41.8% suggests that other factors can be attributed to variation in other drivers of ICT systems performance that was not discussed in this study. The correlation coefficient (R) shows the relationship strength between the study variables. From the findings, the variables were strongly and positively related as indicated by r= 0.763

Table 4.11: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.763[a]	.582	.567	.44308

a. Predictors: (Constant), Total Score on Human Capital, Total Score on Cyber Security, Total score on Infrastructure, Total Score on Funding

Analysis of Variance

The analysis of variance (ANOVA) assists in determining the significance of the data that has been used in the study. The ANOVA statistics indicated that the processed data had a significance level of 0.001 thus making the data ideal for conclusions to be made on the population's parameter as the significance value (p-value) is less than 5%. The results obtained after the calculation of F indicated that it was greater than F critical (38.658< 2.154) as shown in Table 4.14. This shows that ICT Infrastructure, Cybersecurity, Funding, and Human Capital had a significant influence on the performance of ICT Systems in selected government agencies.

Table 4.12: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.308	4	7.577	38.658	.000[b]
	Residual	21.792	111	.196		
	Total	52.100	115			

a. Dependent Variable: Total_Score_Performance

4.3.4 Beta Coefficients of the Study Variables

The regression equation was:

Y = 1.058+ 0. 257 X1 + 0. 220 X2 + 0. 417 X3 + 0. 273X4

The above equation shows clearly that holding ICT infrastructure, Cybersecurity, funding, and Human Capital building factors constant, the variables will significantly influence the performance of the ICT system in selected government agencies as shown by constant = 1.058.

Table 4.13: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.058	.389		2.723	.008
	Total Score ICT Infrastructure	.257	.081	.206	3.179	.002
	Total Score Cyber Security	.220	.092	.197	2.389	.019
	Total Score Funding	.417	.075	.429	5.544	.000
	Total Score Human Capital	.273	.085	.291	3.202	.002

Dependent Variable: Total_Score_Performance

ICT Infrastructure

The ICT Infrastructure as a factor is statistically significant to the performance of ICT systems in selected government agencies as shown by (β = 0. 257, p=0.002< 0.05). This shows that the ICT Infrastructure has a significant positive relationship with the performance of the ICT Systems. This implies that a unit increase in the use of the ICT Infrastructure will increase the performance of the ICT systems in the selected state agencies.

Cybersecurity

Cybersecurity as a factor is statistically significant to the performance of ICT systems in selected government agencies as shown by (β = 0. 220, p=0.019 < 0.05). This indicates that the adoption of cyber security by selected government agencies had a significant positive relationship with the performance of ICT Systems. Thus, implying that a unit increase in the adoption or implementation of the Cyber security by government agencies result in an increase in the performance ICT Systems.

Funding

Funding as a factor is statistically significant as a driver of ICT performance in government agencies as shown by (β = 0. 417, p=0.000 < 0.05). This implies that the funding of ICT systems had a significant positive relationship with the performance of the ICT Systems. Thus, implying that an increase in funding will result in an increase in the performance of government of governments with regards to acquisition of government agencies.

Human Capital

Human Capital as a factor is statistically significant to the influence of performance of ICT systems in the selected government agencies as shown by (β = 0.273, p=0.003 < 0.05). This shows that the human capital has a significant positive relationship with the performance of ICT Systems. Thus, implying that a unit increase in the building of human capital will result in an increase in the performance of ICT systems in government agencies.

The ICT Infrastructure had the most influence on the performance of ICT Systems (Beta = 0. 257) followed by Cyber Security (Beta = 0. 220), Funding (Beta = 0. 417), and then human capital (Beta = 0. 273).

CONCLUSION AND RECOMMENDATIONS

The study examined the drivers of ICT systems performance in selected state corporations. Data was collected, analyzed, and presented in the form of figures, tables, and pie charts to clearly show how each variable influences the performance of ICT systems. The study revealed that ICT infrastructure, Cybersecurity, ICT Funding, and Human capital were highly significant in the performance of ICT systems in selected state corporations under the Ministry of ICT and Digital Economy, Kenya.

The study recommends ICT infrastructure standardization management, continuous investment in network upgrades, cybersecurity standardization, transparent financial reporting, and comprehensive training programs. These measures aim to optimize ICT system performance across state corporations, ultimately benefiting government institutions in daily operations and service delivery.

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