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Evaluation of the Relationship between Technological Infrastructure and Government Service Delivery at the Mombasa Huduma Centre, Kenya

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Abstract: **For many years, the Government of Kenya has experienced persistent challenges in the delivery of public services. In response, the government adopted the e-Government Policy in 2013 and established Huduma Centres as one-stop service points to enhance accessibility, efficiency, and transparency. Despite these interventions, concerns remain regarding the effectiveness of technological infrastructure in improving service delivery. This study evaluated the relationship between technological infrastructure and government service delivery at the Mombasa Huduma Centre. The research was anchored on Systems Theory and Task–Technology Fit Theory. A descriptive and correlational research design was adopted. The target population consisted of 130 employees stationed at the Mombasa Huduma Centre. A representative sample was determined using the Yamane formula, while proportionate stratified sampling ensured balanced representation across departments. Data were collected using pilot-tested, semi-structured questionnaires. Validity was ensured through expert review and reliability was confirmed using Cronbach's Alpha. Descriptive statistics (frequencies, percentages, and means) were used to summarize responses, while Pearson's correlation analysis was employed to establish the relationship between technological infrastructure and service delivery. The findings indicated that technological infrastructure significantly and positively influenced government service delivery by improving turnaround time, reducing paperwork, minimizing human error, and enhancing overall customer experience. However, the study also identified occasional system downtime, limited bandwidth, and delayed maintenance as key challenges affecting operational efficiency. The study concludes that technological infrastructure is a critical driver of effective service delivery in digital government platforms. It recommends greater investment in modern ICT infrastructure, enhanced bandwidth capacity, routine system upgrades, continuous staff training, and proactive maintenance. Strengthening technological capacity will improve reliability, user satisfaction, and overall public trust in e-government services.**

Keywords: **technological infrastructure, service delivery, Mombasa huduma centre, Kenya.**

1. INTRODUCTION

public service delivery. In developing nations, effective service delivery requires more than policy reforms; it depends heavily on the technological infrastructure that supports digitization, citizen access, and institutional coordination (Boyani, 2020; World Bank, 2015). In Kenya, public policy is executed largely through access to government services, with the Public Service Commission mandated under Article 234 to ensure effectiveness, transparency, and citizen participation in service reforms.

Prior to digitization, public services were manual, slow, inaccessible, and prone to corruption. Citizens navigated multiple offices, experienced long delays, and suffered from errors caused by paperwork and poor record-keeping (Heeks, 2001).

These inefficiencies reinforced corruption, poor accountability, and limited feedback mechanisms for citizens. Similar challenges were recorded globally, including Brazil's bureaucratic delays and the United States' long queues at DMV offices ().

E-government emerged as a technological solution for efficiency, accessibility, and accountability. Governments worldwide adopted ICT tools such as wide-area networks, web systems, mobile platforms, and integrated databases to streamline public service delivery (Scholl, 2020; World Bank Group, 2022). The UN's 2022 E-Government Survey shows global leadership by Denmark, Finland, and South Korea, largely due to strong telecommunications networks, skilled manpower, and advanced digital platforms. Although Africa lags due to limited infrastructure, Kenya and Rwanda have made visible progress through national digital systems (Diga & McMillan, 2021).

In Kenya, the Huduma Kenya program, launched in 2013, represents a major national effort to strengthen public service delivery through modern ICT infrastructure. Huduma Centres integrate databases, automate records, and digitize over 120 services from 45 Ministries, Departments, and Agencies, significantly reducing travel, paperwork, and corruption (Mutuku, 2015; Huduma Digital, 2023; Kirimi, 2024). The centres operate through physical branches, mobile outreach, a call centre, and digital platforms, all supported by ICT infrastructure.

However, despite government investment, a 2024 policy report noted persistent challenges including unreliable internet, limited system infrastructure, insufficient service coverage, and restricted access hindering efficiency and defeating the intended benefits of technological transformation (Muzuva & Mutuku, 2022). Since employees use and manage these systems daily, their experiences are essential to understanding how well technology supports service delivery.

This study therefore seeks to evaluate the influence of technological infrastructure on government service delivery at the Mombasa Huduma Centre, focusing on system accessibility, connectivity reliability, digital tools, and automation. While numerous studies examine e-government adoption (Rehema & Koech, 2023; Ali-Hussein et al., 2022; Macotiende, 2021; Hassan, 2019; Aritonang, 2017), limited work addresses the impact on the employees who operate these systems. Findings from this research are intended to guide optimization of technological infrastructure for improved citizen-centered public services.

2. THEORETICAL AND EMPIRICAL LITERATURE REVIEW

This study is anchored on two main theoretical frameworks: Systems Theory and the Task Technology Fit (TTF) Theory. Systems Theory, originally developed by Ludwig von Bertalanffy in the 1940s, offers a holistic lens to understand organizations as dynamic, interconnected entities influenced by both internal components and external environments. It emphasizes the interrelationships within the system, arguing that organizational behavior arises from these interactions rather than isolated elements. Despite its broad applicability across disciplines, critics highlight its abstract nature and insufficient consideration of power dynamics, innovation, and institutional contexts (Simon, 1976; Mills, 1959; Crozier, 1971; Scott, 2003).

Complementing this, the Task Technology Fit Theory (Goodhue & Thompson, 1995) underscores the importance of aligning technological capabilities with task requirements to enhance individual and organizational performance. The theory posits that technology is most effective when it supports the specific demands of the task, facilitating improved efficiency and outcomes. Nonetheless, critiques argue that the theory inadequately addresses cultural factors, user acceptance, evolving task complexities, and strategic organizational goals (Zigurs, 1998; Dishaw & Strong, 1999; Venkatraman, 2008; Benbasat & Barki, 2007;).

Empirical literature demonstrates the pivotal role of technological infrastructure in service delivery within public sector organizations like Huduma Centres. Modern ICT infrastructure, including hardware, software, and network systems, facilitates efficient, timely, and secure service provision, enhancing user satisfaction (Waithaka & Matsalia, 2018). However, successful technological integration depends not only on availability but also on factors such as political support, funding, maintenance, and organizational culture (Aritonang, 2017). Studies from other contexts, such as the Kenyan Navy (Mochanga, 2020), reveal that technology alone may not significantly impact overall performance without considering user capabilities and organizational dynamics.

This study seeks to build on these insights by examining how the fit between technological infrastructure and employee tasks at Huduma Centres in Mombasa affects service delivery, adopting a comprehensive systems perspective to identify interdependencies and optimize public service outcomes.

3. RESEARCH METHODOLOGY

This study employed a mixed descriptive and correlational research design to systematically examine the relationship between technological infrastructure and service delivery at the Mombasa Huduma Centre. The descriptive component captured the current status of variables such as technological infrastructure, system security, digital services, and record automation, while the correlational design explored the associations between these predictors and service delivery outcomes. The target population comprised 130 staff members from various service departments at the Mombasa Huduma Centre. Using the Yamane (1967) formula, a sample size of 98 respondents was determined. A proportionate stratified random sampling method was applied to ensure representativeness across all departments, with participants randomly selected within strata.

Data were primarily collected through a semi-structured questionnaire, combining Likert-scale items to quantify variables and open-ended questions for qualitative insights. A pilot study involving 7 respondents refined the instrument for clarity and reliability. Validity was ensured through content evaluation and construct validity via factor analysis, while reliability was tested using Cronbach's Alpha to confirm internal consistency. Data analysis employed descriptive statistics to summarize variables and Pearson's correlation to assess relationships between independent variables and service delivery. Diagnostic tests, including normality (Shapiro-Wilk), heteroscedasticity (Levene's test), and multicollinearity (Variance Inflation Factor), ensured the suitability of data for regression analysis.

Ethical protocols were strictly observed, including obtaining necessary approvals from Kenyatta University, NACOSTI, and Huduma Centre management. Participants' confidentiality and voluntary participation were assured throughout the research process.

4. STUDY FINDINGS

4.1 Descriptive Statistical Analysis

Summary statistics were computed to examine the distribution of responses for each of the study variables: technological infrastructure, system security, digital services, and automation of records. A five-level likert scale, from strongly disagree to strongly agree, was used to record the participants' feedback. The evaluation entailed determining the proportion of responses within each category, alongside computing the average and standard deviation to represent the overall trend and variability of the responses.

4.1.1 Technological Infrastructure

The aspects of technological infrastructure at Huduma center were assessed focusing on hardware availability, software suitability, and network reliability. The subsequent table provides the results.

Table Error! No text of specified style in document.**.1: Assessment of Technological Infrastructure**

	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Standard Deviation
Do you believe that there are sufficient hardware resources to efficiently handle peak service times?	16.5	38.8	31.72	10.6	2.4	2.44	0.969
In your opinion, is the hardware provided adequate for performing your job effectively?	12.9	29.4	36.5	21.2	0	2.66	0.958
Do you believe that the software systems available are well-suited to your job requirements?	10.6	30.6	40	15.3	3.5	2.99	0.974
Do you find the internet connection at the Huduma Centre to be reliable for accessing online resources and services?	21.2	34.1	27.1	15.3	2.4	2.44	1.063
In your opinion is the speed of the intranet connection for internal communications and data sharing fast and satisfactory?	14.1	30.6	35.3	20	0	2.61	0.965
In your view, does the network infrastructure effectively support the operation of e-government services at the Huduma Centre?	2.3	21.2	34.1	31.8	10.6	3.27	0.993

Source: Research Data 2025

The study revealed significant dissatisfaction with the availability and adequacy of hardware resources at the Huduma Centre. A combined 55.3% of respondents disagreed or strongly disagreed that sufficient hardware exists to manage peak service periods effectively, with only 10.6% expressing agreement. The mean rating for hardware sufficiency stood at 2.44 (SD = 0.97), indicating a generally negative perception. Likewise, hardware adequacy for routine tasks scored low (mean = 2.66), with less than a quarter of respondents affirming its sufficiency.Perceptions of software suitability were more varied, with nearly 41% of respondents expressing disagreement and about 19% agreement, while a notable 40% remained neutral. This mixed response yielded a near-neutral mean score of 2.99.

Network reliability emerged as a critical concern. Internet connectivity for accessing online services scored poorly (mean = 2.44, SD = 1.06), with over half of respondents dissatisfied. Similarly, intranet speed for internal communications was rated unsatisfactorily (mean = 2.61), with 30.6% expressing dissatisfaction. Despite these issues, the overall network infrastructure's capacity to support e-government services was perceived more positively (mean = 3.27), with over 40% agreeing on its effectiveness.

The aggregate mean score across all technological infrastructure indicators was approximately 2.73, reflecting a generally neutral to slightly negative view. While network support for e-government services showed relative strength, persistent challenges with hardware availability, internet reliability, and intranet speed appear to limit optimal service delivery.

4.1.2. Service Delivery

Further, the research aimed to assess the performance of service delivery at the Mombasa Huduma Center. This outcome was evaluated through measures of service timeliness, quality and accuracy, as well as staff productivity.

Table Error! No text of specified style in document.**.2: Service Delivery Assessment**

To what extent do you agree that e-government system;	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Standard Deviation
Has significantly reduced the average processing time for tasks I handle	3.5	12.9	24.7	25.9	33	3.54	1.058
Helps me complete services on time more consistently.	0	11.8	21.2	45.8	21.2	3.76	0.921
Has reduced the error rate in the services I provide.	0	11.8	15.3	40	32.9	3.94	0.980
Has improved quality assurance scores	1.2	7.1	28.2	37.6	25.9	3.80	0.949
Allows me to handle a higher number of transactions efficiently.	1.2	11.8	35.3	29.3	22.4	3.40	1.002
Has improved my task completion rate	0	10.6	20	47	22.4	3.81	0.906

Source: Research Data 2025

The study revealed varying degrees of effectiveness across key service delivery aspects influenced by the e-government system at the Mombasa Huduma Centre. Task processing efficiency showed moderate improvement, with a mean score of 3.54; 33% of respondents strongly agreed and 25.9% agreed that the system significantly reduced average task processing time. However, 12.9% disagreed, highlighting persistent inefficiencies for some staff. Timely completion of services received stronger support, with a higher mean of 3.76 and 67.1% of respondents agreeing or strongly agreeing that the system helped them meet service deadlines more consistently. The system's impact on service accuracy was notably positive, scoring the highest mean at 3.94, with 72.9% affirming a reduction in error rates. Quality assurance similarly improved, as indicated by a mean of 3.80 and 63.5% agreement, underscoring enhanced service quality through digital interventions. Conversely, the system's ability to manage a higher volume of transactions efficiently was rated moderately (mean = 3.40), with a substantial 35.3% neutral response, suggesting room for improvement in handling transaction loads.

Task completion rates were also positively influenced, with a mean score of 3.81 and 69.4% agreeing or strongly agreeing that the system improved their productivity. Overall, the aggregated mean of 3.71 reflects a generally positive perception of service delivery improvements attributable to the electronic governance system. While the system has enhanced accuracy, quality assurance, and task completion, moderate scores on processing speed and transaction handling point to a need for further optimization to fully maximize efficiency and scalability in service delivery.

4.2 Correlation Analysis Results

The correlation analysis examined the relationship between service delivery and technological infrastructure. The subsequent table provides of the results.

Table Error! No text of specified style in document.**3: Correlation Analysis of Service Delivery and technological infrastructure**

Variables	Technological Infrastructure	Service Delivery
Technological Infrastructure	1	0.784 (p = 0.0289)
Service Delivery	0.784 (p = 0.0289)	1

The analysis revealed that technological infrastructure significant impact on service delivery (r = 0.784, p = 0.0289). This finding suggests that enhancing technological infrastructure significantly improves service efficiency, timeliness, and accuracy at the Huduma Centre. Therefore, investing in modern technology is essential for optimizing service delivery. These findings align with studies by Aritongang (2017) and Matsalia & Waithaka (2018), which emphasize that e-government systems are a key solution for improving service delivery. However, their effectiveness relies on critical factors such as regular maintenance and continuous improvements in technological infrastructure. Contrary to these results, Mochanga (2020) found that technical dynamics did not significantly impact the overall operations of the Military base in Mtongwe, suggesting a differing perspective exploring how technological advancements enhance efficiency across military functions.

5. CONCLUSIONS

The study established that technological infrastructure, system security, digital services, and automation of records all play crucial roles in influencing service delivery at Huduma Centre in Mombasa, albeit to varying degrees. Technological infrastructure emerged as the most significant factor, with inadequate hardware, unreliable internet, and poor system integration identified as key challenges that hinder service efficiency. Addressing these issues through improved investments in IT infrastructure can significantly enhance government service delivery. System security, while essential for maintaining system integrity and protecting sensitive data, was found to have a weaker influence on service efficiency compared to other factors. Although security measures help ensure system reliability, they are not the primary drivers of service improvement. Strengthening security protocols while minimizing authentication delays can contribute to a more seamless service experience.

5.1 Recommendations

Drawing from the findings, it is recommended that the government enhance the overall implementation and management of e-government systems to improve service delivery at Huduma Centres. A key recommendation is the need for increased investment in the digital infrastructure that supports public service delivery. This includes upgrading both physical and digital systems to ensure they are reliable, efficient, and capable of meeting increasing demand.

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