International Journal of Multidisciplinary and Current Research ISSN: 2321-3124
Research Article Available at: http://ijmcr.com

Influence of ICT Infrastructure on the Adoption of E-Government on Service Delivery in Turkana County Government, Kenya

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Received 01 Dec 2025, Accepted 12 Dec 2025, Available online 15 Dec 2025, **Vol.13 (Nov/Dec 2025 issue)**

Abstract

E-government is application of digital technologies including ICT systems, networks, and online platforms in the modernization of service provision to the public. It was initiated in the 1990s and it tries to enhance efficiency, transparency, accountability, and responsiveness through automation of processes, lessening of bureaucracy, and increasing access of the citizen to information and services. When properly introduced, it improves resource management, boosts the confidence of the people, and is beneficial to the citizens, businesses, and civil society by providing them with more connected and trustful governance. This study aimed to establish the influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government. It was anchored on the Diffusion of Innovation Theory. A descriptive survey design and correlation designs were employed, targeting 22 Senior Managers, 44 Middle-Level Managers, 40 Lower-level Managers, and 545 Technicians involved in the execution of e-government digital platforms. The sample size included 336 respondents, 230 Technicians were chosen by simple random sampling and 106 key informants (Middle-level, Senior, and Lower-level Management) were selected purposely. Data was collected using questionnaires, surveys, observations, interviews and document reviews. The quantitative data were studied and evaluated through descriptive and inferential statistics (measures of central tendency, Pearson, regression analysis, ANOVA), and were represented in tables. The results showed that ICT infrastructure has a significant impact on service delivery and through the regression analysis, a positive correlation was determined between the two (r= 0.705, p- value=0.000). The regression analysis showed a regression coefficient of 0.563 and p value of 0.000<|human|>ICT infrastructure showed a regression coefficient of 0.563 and a p value of 0.000. The researcher found that, there was a positive and significant impact of ICT infrastructure on service delivery. The paper suggested the county government to invest in consistent and stable internet services by collaborating with service providers to increase connectivity among all the sub-counties.

Keywords: *E-government, ICT Infrastructure, Service Delivery, Diffusion of Innovation Theory, Public Sector Digitalization*

Background of the study

E-government as a concept was born in the 1990s and it is the use of information and communication technologies (ICT) to enhance efficiency, effectiveness as well as transparency of the operations of a government. ICT has also changed the way in which governments communicate with the citizens, businesses, and other stakeholders by computerizing their administrative processes and service provision. The final goal of e-government is to empower the efficiency, accountability, and satisfaction of citizens in the public sector by using advanced digital governance systems (Osundwa, 2024).

Adoption of e-government in service delivery is the application of ICT and the use of the internet and other digital technologies to improve responsiveness, efficiency, and effectiveness in the operations of the public sector, even though not limited to digitizing front- and back-office functions but also involves re-engineering organizational processes and automating services to improve accessibility and transparency [24]. Online portal integration with mobile applications and cloud systems allows governments to facilitate transactions faster, minimize bureaucracy, and enhance accountability via open government data programs [14].

Denmark has consistently achieved the highest scores on the United Nations E-Government Development Index (EGDI). This is a composite index that ranks the countries

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DOI: https://doi.org/10.14741/ijmcr.v.13.6.3

in terms of online services, telecommunication infrastructure, and human capital, the almost perfect EGDI score is 0.9847 in 2024. GovX Digital. Specifically, Denmark is doing well in Telecommunication Infrastructure Index, which has extensive coverage of both broadband and mobile, with almost full coverage of 5G. When it comes to maximizing ICT infrastructure for e-government service delivery, Denmark stands out as the global leader (Totonchi, & Mohadis, 2025).

In an e-government implementation study in South Africa, the authors highlight that institutional factor including proper ICT infrastructure and funding and involvement of stakeholders are important in strengthening and maintaining e-government initiatives [27]. The analysis was on the continued financial investment of digital government in South Africa. The research is supported by the survey by [30] who states that South Africa has the strongest score of 0.86 in Africa where it is far superior to the other countries in terms of sustained financial investment in digital infrastructure, identity systems, cybersecurity, and integrated online platforms.

In Kenya, e-government was officially incorporated in 2004 as a national structure with the aim of improving the quality of life of the citizens, by providing more effective, convenient and affordable services. The program marked the start of the government to enhance service provision through the use of ICT to streamline the relations between the citizen and businesses alongside the state authorities. Some of the planned services were online tax filing, downloading the passport application and digitalization of police operations. The overall e-government is expected to attain transparency, efficiency, and citizen-focused governance through ensuring that services and information are easily accessed through the internet and other electronic media. The notion of citizens as consumers of the government services is gradually becoming the defining conceptualization of Kenya in terms of the digital transformation agenda over the past decade, which is evident in the Kenya Digital Economy Blueprint and the corresponding policy frameworks [33].

Turkana County, in accordance with the digital transformation policy in Kenya, has been undertaking the e-government projects in order to improve service delivery and the interaction with the citizens. Such initiatives involve the use of county websites, forums to engage the people, and the use of social media platforms to communicate. Nevertheless, the participation of the civic population is low, and such issues as insufficient technical competence, poor ICT infrastructure, and economic obstacles are still present (World Bank, 2022; UN DESA, 2022) [34]. There are four institutional determinants that are interplayed to make e-government successful in Turkana. The base of digital platforms is an ICT infrastructure such as internet penetration, cybercafes in cities, and mobile phone use (Ogola, (2021).

To enhance service delivery in several areas, the Turkana County has adopted several e-government solutions. A type of specific digital platform of Early Childhood Development and Education, called the Turkana ECDE Management Information System (TECDEMIS), allows collecting and managing school-level data, such as the records of pupils, administrative indicators, GIS maps, and resource planning (Kemboi, & Premanandam, 2025). Likewise, the Turkana investment promotion portal which was launched in March 2023 offers information on investment opportunities, registration of investors, monitoring of queries, and investment care thus enhancing the involvement of the private sector and economic development. The Turkana County Energy Database is a centralized platform that provides information on all facets of energy and specifically renewable energy, access, and infrastructure to enhance planning and policymaking in the energy sphere [21].

The occupation services are also digitalized with the help of the Jobs and Vacancies Portal in the official site of the county that gives an opportunity to see the job listings, view the application forms, and track the recruitment processes. The Turkana Bursary Portals, which are hosted under each sub-county, promote bursaries application and funding transparency through online means. The county has also launched Digital Billing System of the Turkana Rural Water Company (TURWASCO) in the water sector to facilitate payments through digital training of employees. Lastly, the county facilitates accountability by allowing citizens to express discontent and input regarding service delivery on an online Complaints and Feedback Form [22]

Statement of the problem

Although, both the national and county-level governments of Kenya have invested in e-government systems, the levels of adoption and proper use of these platforms in Turkana County are minimal. As stated by Communication Authority of Kenya (2023), internet penetration in Turkana is lower than the national average and there is a great disparity in the broadband penetration and ICT infrastructures. This digital divide directly limits the capacity of the citizens to use online services of the government. Moreover, the audit reports of counties (Office of the Auditor-General, 2025) indicate chronic inefficiencies in service delivery, such as the slowness of the procurement process, the absence of financial management transparency. The survey of citizen satisfaction by the Public Service Commission (2023) [26] also reveals the problems with accessing timely information, ineffective complaint-resolution methods, and the low use of digital service platforms despite the fact that more connected counties like Nairobi or Mombasa are seen to do better than the rest. These weaknesses cast serious doubts on the sufficiency of institutional factors, including ICT infrastructure, financial resources, stakeholder participation, and human resource

capacity building in promoting effective e-government adoption in Turkana County. This poses a threat to the county not achieving the transformative potential of e-government, including increased responsiveness, lower administrative expenses, and increased public trust, unless these institutional gaps are filled with specific policies and investments.

Purpose of the Study

The purpose of the study was to establish the influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government.

Research Hypothesis

H_{01}: There is no significant influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government.
H_1: There is a significant influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government.

Scope of the Study

The study examined the institutional factor that determine the adoption of e-government and related services. ICT infrastructure was the independent variables investigated. Service delivery was the dependent variable being considered. The study exclusion-inclusion criteria were based on the staff members of the Turkana County Government headquarters located in different departments and using digital platforms, to determine the adoption of e-government in the delivery of services in Turkana County. This was carried out on a budget of Ksh. 300,000 and a period of 12 months (Aug, 2024 - Aug, 2025). The research design was correlational and descriptive.

Literature Review

Theoretical Framework

The Diffusion of Innovation Theory (DOI)

The DOI theory informed the first objective; To establish the influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government. According to the Diffusion of Innovation theory, which was invented by Rogers in 1962, the situation of adoption and usage of a new technology is determined not only by the perceptions of other people about its advantages but also by the nature of the individuals who adopt it. The modern uses of the DOI by Rogers state that technology adoption in the government sector is not only tied to the perceived advantages but also to the institutional and infrastructural factors that render the advantages visible and reproducible [10]. The five DOI attributes are directly mapped to ICT infrastructure, which is one of the critical determinants of e-government adoption and include the following:

Relative advantage: Good availability networks, secure hosting, and trustworthy identity/authenticating makes transaction faster and more convenient, and is proven to be better than paper-based systems. Conformability: Standards, data exchange (APIs, registries), and interoperable platforms introduce less friction into integration with existing systems and business processes, and bring innovations in line with institutional practices [23].

Complexity: User-centric design built on the stable infrastructure (bandwidth, devices, cybersecurity) reduces perceived complexities among civil servants and citizens, enhancing intention to use. Trialability: Sandboxes, pilots, and staged deployments on common infrastructure (e.g., cloud or shared government networks) allow teams to test services at low risk, then scale them at county-wide levels [9]. Observability: Dashboards and service analytics provided by reliable networks and data systems make performance improvements visible (uptime, queue times, completion rates), which reinforces diffusion by means of peer learning [29]

The DOI attributes are simply curtailed by the underlying ICT infrastructure in counties with sparse connectivity and low power reliability. In the case of Turkana, the expanded broadband backbones, shared platforms, and cyber-secure environments, the national frameworks acknowledge the need to ensure their end-users perceive a clear relative advantage and low complexity in the county systems (e.g., the sector MIS, portals, billing platforms). The ICT policy direction of Turkana specifically predicts capacity and infrastructure, consistent electricity and last-mile connectivity, shared hosting, the ability to access devices and data governance, as the conditions to scale digital services and make pilots visible and repeatable across departments [20].

Regulators of the Kenyan sector also emphasize that the device penetration and connectivity are precursors of the investments in platforms, determining citizen preparedness and workforce efficiency as the main antecedents of local-level diffusion. Concisely, DOI anticipates increased adoption whereby infrastructure enables services to be faster, interoperable, simple, testable and visibly successful. This is exactly where Turkana needs to work out so that the isolated pilots turn to a sustainable, county-wide e-government.

Empirical Review

ICT infrastructure is no new development as the implementation of e-government has always been identified to be a backbone of the project as no implementation of a digital government can be effective without the corresponding technical background. In its

essential meaning, e-government infrastructure has secure servers, data and content management systems, hardware, operating systems, application development tools, and systems management platforms. These are the core of digital governance in which the governments can host platforms and provide credible online services (Yu, 2022).

Researchers throughout the world have reiterated that e-government can only be successful using ICT infrastructure, as it forms the backbone upon which digital government relies. It does not only refer to physical assets, i.e., computers, networks, databases, but also their interoperability, reliability, and flexibility (Dahiya & Mathew,2018). Previous researchers, including [150] emphasized the role of infrastructure capability in determining the results of adoption. This opinion is reinforced by more recent data, which indicates that the rates of broadband penetration, secure hosting environments, and cloud platforms have a direct positive impact on the adoption rates and citizen trust.

In Africa, poor electricity supply and lack of telecommunications infrastructure, however, remains a limiting factor to ICT adoption. Most of the rural places have substandard or unreliable electricity systems and therefore experience frequent power outages, which hamper service delivery (Dahiya & Mathew, 2018). This disparity is evident in Kenya: as of 2024, about 75 percent of households in the country had access to electricity, but the counties like Turkana were still many years behind, with 10 percent of households connected to electricity in those counties. Solar PV systems and mini-grids became significant in communities of refugees and hosts, which was why there was a severe necessity to find sustainable energy options to support digital infrastructure [12].

In Kenya, experimental studies have continuously revealed that a weak network coverage, poor hardware equipment and unreliable broadband networks lower the success of e-government projects. As an example, a study in Kisumu County established that high-speed broadband and sufficient ICT equipment enhanced communication and coordination in the local government activities. Simultaneously, the disparities in the access to ICT resources contributed to inefficiencies. On the same note, the National Optic Fiber Backbone Infrastructure (NOFBI) is not present in Turkana County, which also contributes to the digital divide (Mabele et al., 2022).

The infrastructural difficulties faced in Turkana County are aggravated by its expansive rural landscape, sparse population and little grid connectivity. Although the County Government has implemented specific digital solutions, including Turkana ECDE Management Information System (TECDEMIS) and Turkana Investment Promotion Portal, the success of these programs largely relies on the expansion of infrastructure (electricity, fiber network, and local ICT competencies). In that regard, ICT infrastructure cannot be considered a technical input, but a systemic enabler: without sustainable power, reliable connectivity, and affordable digital access, countries can hardly scale e-government services in a meaningful manner (Umbach, & Tkalec, 2022).

The latest national frameworks support this point of view. According to the UN E-Government Survey, the Digital Economy Blueprint of Kenya, the expansion of broadband, the GovTech Maturity Index, which is offered by the World Bank, shared digital platforms, and well-developed data exchange systems are the foundation of digital public services. The county-level practice at Turkwana is indicative of this thought. With sectoral platforms including TECDEMIS and its Energy Data Portal, Turkana has also introduced an e-services portal as well as a long-term ICT policy that aims at leading to a fully-digitalized inclusion by 2040. Through these efforts, transaction costs are slowly reducing, service reliability increases, and these meet the needs of the citizens. According to the national statistics of the Communications Authority of Kenya [6], there is a growing smartphone subscription and internet penetration, and this implies that there is a willingness that Turkana can utilize through the provision of last-mile connection.

Conceptual Framework

The conceptual model applied in this research comprises ICT infrastructure forming the independent variable of the study. The dependent variable, on the other hand, is service delivery. This is illustrated in figure 2.1.

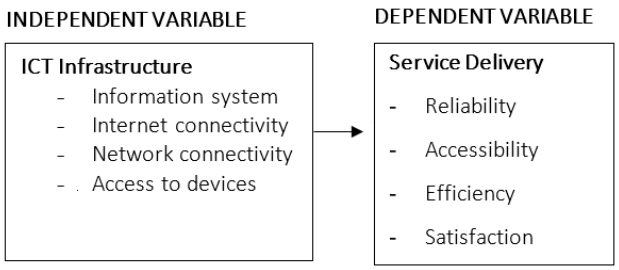

Figure 1: Conceptual Framework
(Source: Researcher, 2025)

Research on the Health Management Information System (ZHMIS) in Zambia established that most of the rural health facilities continue to experience difficulties in benefiting from the initiative because of the insufficient digital infrastructure and the use of paper-based reporting systems (Chisha et al., 2019).

In the same way, studies in the recent Sub-Saharan African region indicate that telecommunication networks are still uneven, with rural and remote communities still facing limited broadband and weak internetworking, which prevents successful information exchange [19]. In addition, Access to electricity has been found to be one of the key facilitators of ICT adoption, with poor and unreliable power supply in many African countries limiting the functionality of ICT facilities [2].

The practical forms of the ICT infrastructure implementation are information systems (IS) and the

information systems include such items as national portals, authentication platforms, and secure servers. Modern studies suggest that such systems can be best measured by the key quality dimensions, namely, system quality, information quality and service quality that precondition the user satisfaction, intentions to use, and the success of the system in the end (e.g. DeLone and McLean IS Success Model as confirmed in the recent researches).The efficiency of such systems can be assessed with the help of the following metrics: 5G availability and coverage, the network speed, the rate of internet use, the availability of broadband, penetration, and affordability. Such measures are good precursors of ICT infrastructure preparedness, and these are used to guide e-government capacity, digital inclusion, and policy planning [3].

Network connectivity indicates the number of connected sites, bandwidth available, redundancy, type of connection (fiber, microwave, VSAT) and the level under which it can be referred to WAN, LAN, and Wi-Fi. These features imply the level of deployment and the capacity of government networks (Dahiya & Mathew, 2018).

The accessibility to devices is a crucial and quantifiable aspect of ICT infrastructure since it directly influences the accessibility of citizens and public servants to e-governmental platforms. This may be quantified by the proportion of households having devices with an internet connection (computers, smart phones, tablets), the quantity of government offices with workstations and the number of devices to the employees in government agencies. Access to devices also affects the supply and demand of e-government: on the citizen side, the more people use a smartphone, the more they are willing to use mobile government services; on the government side, offices are well equipped to improve internal operations and the delivery of services [25].

Research Methodology

Research Design

The study employed a descriptive survey research design and correlational research deign. According to [1], a descriptive survey is a systematic approach used to collect data from a target population in order to explore characteristics, opinions, and relationships. On the same note, [28] stress that such design gives the researcher an opportunity to collect uniform information that facilitates descriptive as well as inferential analysis. This approach was particularly appropriate for gathering descriptive data needed for both descriptive and inferential analyses. Additionally, it helped characterize the study population and examine the relationships between dependent and independent variables.

Location of the study

The research was conducted in the 14 departments of Turkana County Government. The researcher resides within Turkana County, which secures close proximity to the County Government. It is important to identify an appropriate site of the research that will be easily accessible to the researcher and enable him to establish a quick rapport with the informants and, in this way, be successful in data collection [7]. The Turkana County was selected due to its proactive initiatives to adopt the Information and Communication Technology (ICT) to enhance service delivery. The research used a mixed research design involving descriptive survey research design and correlational research design, based on primary and secondary data. The primary data were collected by using questionnaires issued to the employees of all the departments and to the users of the e-government services, capturing their experiences and views on e-policies, procedures, and processes vital for successful e-government adoption. Secondary data was collected from relevant government reports, policy documents, and official statistics. This mixed method enabled the research to assess the success as well as the obstacles of e-government implementation to give information that can sway subsequent policy making and adjust the frameworks of service delivery.

Target Population

In this research study, the target population included 651 employees of Turkana County Government, covering County Top-Level Management across various sectors (22). This group contains executives such as the Executive Committee members, County Attorney, County Secretary, Deputy County Secretary, Commissioners, Governor's Advisors, Deputy Governor, and the Governor. They are responsible for establishing the vision, mission, and strategic goals, making major decisions, and distributing resources. The second level is County Middle-Level Management (44), which comprises Chief Officers, Board Secretary, Municipal Manager, County Solicitor, Deputy Municipal Manager, CEOs, Chief of Staff, Directors, Deputy Directors, and Assistant Directors. In Job groups, Q, R and S, these officials execute the top-level strategies to lower-level plans of operation, organize the activities and control the lower-level managers. The third level is Lower-Level Management (or First-Line Management) (40), consisting of officers in charge of departmental sections, Sub-Counties, and Wards, in Job groups 'L, M, N & P.' These are the foremen, team leaders and supervisors who are directly in charge of day-to-day activities of employees to ensure that work is done on schedule. The fourth critical level consists of Technicians (545), who are highly skilled and mainly responsible for executing daily key e-government technical tasks. The target population distribution is indicated in Table 3.1.

Table 1. 1: Target Population

Sector	Target Population
Top-level Management	22
Middle-level Management	44
Lower-level Management	40
Technicians	545
Total	**651**

Source: Turkana County Government HRMS (June, 2024)

Sampling Procedures and Techniques

This study used two sampling techniques: Purposive and Simple Random Sampling. A Purposive sampling is a non-probability sampling technique used to select participants based on specific characteristics or criteria relevant to the research study [4] Purposive sampling was relevant in covering 100% participation of Key informants (Managerial levels) due to their in-depth knowledge related to the research objectives.

In contrast, Simple Random sampling involves A simple random sample is a randomly selected subset of a population. In this sampling method, each member of the population has an exactly equal chance of being selected. (Creswell & Creswell, 2017). Because it uses randomization, it has advantage on this sample since it has high internal and external validity, and puts the research at a lower risk for research biases like sampling bias and selection bias.

The overall number of respondents was 336 people: 230 Technicians, 106 Managers (Lower-level Management, Middle-level Management, and Top-level Management) of Turkana County as summarized in Table 1.2.

Sample Size Determination

Gathering information from all managers (Top-level, Middle-level and Lower-level) within the target population through Purposive method was easy due to their manageable population numbers, thereby ensuring full coverage and eliminating sampling error. However, since it was not possible to study all Technicians of this study target population due to constraining on time and resources, a proportion of the Technicians' population was selected. The technician sample size was be calculated using the Yamane sample size determination for 1967.

$$n = \frac{N}{1+N\,(e)^2}$$

Where

n=sample size; **N**=population size; **e**-margin error (5%) ; **1**= constant

Therefore, the sample size for registered Technicians is as illustrated below.

$$n = \frac{545}{1+545\ (0.0025)}$$

n= 230 Technicians.

Table 1. 2: Sample Size Determination

Sector	Target Population	Sample
Top-level Management	22	22
Middle-level Management	44	44
Lower-level Management	40	40
Technicians	545	230
Total	**651**	**336**

Source: Field Data (2025)

Sampling Population

The researcher used both probability and non-probability sampling methods to select respondents. Key informants such as Lower-level Management, Middle-level Management, and Top-level Management were purposely chosen. At the same time, technicians were selected through simple random sampling, where individuals were picked from a group in a regular and organized manner based on probability. The sampling interval (k) will be calculated by dividing the population size by the sample size.

K=651/336~1.9.

Therefore, every 2nd-ranked Technician from the sampled list was picked.

Research Instruments

Primary data was gathered through the administration of structured questionnaires widely recognized tool for capturing reliable and comparable responses (Siedlecki, 2020). Also, Observation checklist was used. Interview schedules were used on the key informants. Secondary data was captured through document review was also used.

Questionnaire

A questionnaire is a methodological tool that is a written list of questions which are structured to require answers of respondents regarding their attitudes, behaviour, experiences, or features [16]. It contains a systematic set of questions used to obtain data for describing, comparing, or explaining knowledge, attitudes, and behaviors.

A structured questionnaire based on the 5-point Likert scale was used to collect predetermined responses from the departmental technicians and county government managers. Respondents were asked to answer questions developed from the three research questions, which provided substantial data for analysis to conclude. The questionnaire was written in simple, clear language. It was divided into two sections: the first part asked for personal information such as gender, academic and professional levels, work experience, and the officer's position. The second part requested respondents' opinions on specific questions, rated as strongly agree, agree, neutral, disagree, and strongly disagree.

Observation Checklist

The researcher used observation checklist to find out the availability of ICT infrastructure in the Turkana County Government which is essential for adoption of E-government services in the county government. The infrastructure involved both software and hardware components of the computers.

Structured Interview Schedule

Structured Interview was used to source information from the three levels of management who were key informants, on the adoption of e-government as well as the managers' viewpoint on how institutional determinants, such as ICT infrastructure, financial resources, stakeholder engagement, and human resource capacity building, enable successful e-government adoption in Turkana County [5] defines an interview schedule being the guide a researcher uses when conducting a structured interview. The interview schedule was made-up precisely of open-ended questions.

Document review

The researcher systematically examined existing written materials such as; the Kenya National Audit Reports, Communication Authority of Kenya Surveys, Kenya ICT Authority Surveys, Kenya PSC Surveys, Turkana County Policy documents, Turkana County Cabinet Memos and County Assembly of Turkana Hansard Reports.

Testing for Validity and Reliability

Validity

Validity refers to the degree to which a research instrument accurately measures what it is intended to measure and the extent to which the findings genuinely represent the phenomenon under investigation (Creswell & Creswell, 2017). It is the extent to which the results obtained from the analysis truly represent the phenomenon under study. The validity of the instrument was used to measure how well the items represented the specific areas covered by the survey. Scholars of the research profession tested the instrument by looking at the method of measuring and coverage of the aims of the study. The supervisors also checked the instruments validity and they were convinced that the questionnaire items were correct. The researcher worked closely with the experts in maintaining the reliability of the instruments, in ensuring that all the research objectives were addressed from the information sought in the instruments. The findings of the pilot study went a long way in improving the questionnaire, thereby enhancing its dependability.

Pilot of the Study

A pilot study is a small but preliminary study that is done in advance of the actual research to test the feasibility, reliability, and validity of the research design, instruments and procedures. It assists the researchers to determine possible issues and to narrow data collection instruments and minimize the risks of mistakes in the primary research. The researcher carried out a pilot study to pretest and validate the questionnaire using a sample of 24 technicians. Contemporary research underscores that pilot studies are a vital step in assessing the validity and the dependability of the data collection tools preceding the main study [17]. Methodological advice also suggests that a pilot sample of 10 to 30 respondents is usually adequate to determine possible problems with the design of the instruments and their administration. The number of technicians that were randomly chosen was 24, and a questionnaire was administered. The pilot study did not involve the respondents in the main study. There were four sections of the questionnaires. The initial part touched on the personal information of the respondents. The second part discussed the impact of e-government ICT infrastructure on the delivery of services. The third section discussed how e-government financial resources impact service delivery. The fourth part was devoted to the effects of the involvement of the stakeholders of e-government. The fifth part has studied the role of e-government human resource capacity building in service delivery to Turkana County.

Reliability of the Research Instrument

Reliability is the extent to which a research instrument is stable and reproducible in a variety of applications and situations (Noble and Smith, 2018). In other words, a reliability of an instrument is said to be true when measurements of an instrument under the same conditions give the same results. It also pertains to the stability, accuracy, and precision of measurement. To ensure this, the researcher administered the instruments in person to evaluate their clarity. To assess the reliability of the research instruments, the split-half method was used, where the questionnaire was given to two groups odds and evens and the results compared. This technique measures how well all parts of the test contribute equally to what is being measured. It was done by comparing the results of one half of the test with the other half. Cronbach's alpha was used to test the reliability of the measures in the questionnaire. Cronbach's Alpha was used to assess the internal consistency (reliability) of the questionnaire. The researcher tested the reliability of each research variable which were between 0.75 and 0.81 indicating that the questionnaire was distributed to research professionals for critique and suggestions on necessary changes to improve its validity. The instrument was also corrected to add some corrections on questions that were identified to make it valid. Validity was assured

by ensuring that the questions reflected what they were supposed to measure that is, clarity of words used and whether the respondents understood all questions. The researcher found out areas of confusion and ambiguity and corrected them, formulating questions in a clearer way, which served the purpose of collecting similar responses among various participants. An internal consistency of the instruments with a correlation coefficient of **r = 0.7** or higher was considered acceptable. The reliability of research variables is indicated in Table 1.3.

Table 1. 3: Reliability of Research Variables

	Cronbach's Alpha if Item Deleted
ICT Infrastructure	.708
Service Delivery	.724

Source: Field Data (2025)

The closer Cronbach's alpha coefficient is to 1, as displayed in the table above, the main variables of the study had a scale of above 0.7, the higher the internal consistency reliability (Sekaran, 2006), therefore the instrument was reliable for collecting data.

Data Collection Methods and Procedure

Research data was collected through researcher aided self-administered questionnaires and researcher observation checklist. Both tools were responded to under the guidance of the researcher. A conducive atmosphere to the respondents was sought by the researcher, to enable the respondents to open up and respond to the questions honestly. A cover letter from Turkana University College and a research license were submitted to facilitate the administration of the research instrument. Respondents were assured of the confidentiality of their names and responses, which would be handled only by the researcher and used solely for academic purposes. Each research instrument was coded, and only the researcher knew which response belonged to which respondent. The study participants were invited to participate in the online survey using the appropriate platform. The researcher made a prior visit to relevant offices within Turkana County Government to familiarize themselves and to initially administer the tools to Key Informants. This approach was deliberately applied to obtain deeper insights and clarify issues that were not fully captured through the questionnaires (Creswell & Creswell, 2018; Saunders, Lewis, & Thornhill, 2019).

Data Analysis and Presentation

Data analysis is the systematic process of organizing, coding, and interpreting collected information to make it meaningful and helpful in drawing valid conclusions (Creswell & Creswell, 2017). For this study, quantitative data was generated through questionnaires. The collected data was put into categories, edited, coded, then analysis was carried out. Editing was to make sure that the responses were given to all questions, accurate and worthy to conclude from. Questions whose responses were in the Likert scale were computed by assigning values in numbers to enable quantitative analysis. The Statistical Package for Social Sciences (SPSS version 25) was used to electronically capture and analyze the quantitative data obtained from the questionnaire. The analysis included both descriptive and inferential statistics. Pearson correlation was used to establish the association between the determinants of E-government adoption and Service delivery in Turkana County Government, and was subjected to a 0.05 test significant value. Such techniques indicate the direction and magnitude of the relationship between the independent variables and the dependent variable (Mugenda, 2008). The researcher applied regression analysis to evaluate the study's hypotheses because regression is well known as a powerful statistical tool used in testing the relationships between the dependent and independent variables in modern research [13]. This quantitative data was presented through tables.

Data Analysis, Presentation and nd Interpretations

Descriptive Statistical Analysis

ICT infrastructure and the adoption of e-government on service delivery

Respondents were asked to rate various statements that helped in establishing the influence of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government. The results were shown in Table 4.2.

Table 4. 1: ICT Infrastructure and Service Delivery

No.	ICT Infrastructure	1 SD	2 D	3 N	2 A	1 SA	Total
1.	My county has internet infrastructure to enhance public service delivery	84 44.4%	71 37.6%	8 4.2%	11 5.8%	15 8.0%	189 100.0%
2.	The county embraces online platforms to advance service delivery for citizens	89 47.1%	52 27.5%	11 5.8%	13 6.9%	24 12.7%	189 100.0%
3.	My county has integrated e-government systems	91 48.2%	64 33.9%	4 2.1%	18 9.5%	12 6.3%	189 100.0%
4.	The ICT infrastructure is adequate in its operations	81 42.9%	62 32.8%	10 5.3%	20 10.6%	16 8.4%	189 100.0%
5.	The county's online platforms, like the website and interface, are client–oriented	75 39.7%	66 34.9%	7 3.7%	22 11.6%	19 10.1%	189 100.0%
6.	County e-government services are accessible to citizens	21 11.1%	37 19.6%	13 6.9%	49 25.9%	69 36.5%	189 100.0%

Source: Field Data (2025)

Respondents were asked on whether their county has internet infrastructure to enhance public service delivery. The findings showed that most of the respondents (82.0%) were of the opinion that this was not the case and thus, Turkana County continues to experience a big problem in terms of having a consistent ICT infrastructure which can support effective implementation of the e-government. This means that a majority of the public offices, service delivery points would be inaccessible due to unstable internet connections that in turn restricts automation, efficiency and availability of public services. This is in line with [8] who affirm that low level of ICT infrastructures and low internet penetration are still among the greatest barriers to e-government implementation in most developing countries because it acts as a hindrance towards the successful incorporation of the digital tools in government. Some of the respondents (13.8%) agreed indicating that there are isolated cases where ICT infrastructure is available, maybe in more urbanized areas or in county headquarters where there is basic connectivity and digital infrastructure. This is consistent with [18] who add that e-government projects are usually initiated at centralized locations with more technological capabilities and then extended over time to isolated areas. The neutral answers (4.2) can be of people who either do not know of ICT initiatives in their locations or feel that the current infrastructure is not adequate yet is improving. This was backed up using the data collected through the key informants when they were questioned whether they have frequent Internet failures and the impact of the same to service delivery. Key informant 1 noted the following;

Yes, the internet regularly experiences downtimes and they impact greatly on service delivery within the county. Online systems communicate with most of the departments and process data and services. The internet failure reduces the pace of the operations significantly, and service delivery to citizens is also delayed and, occasionally, the staff members are compelled to switch to the manual system which is not as efficient, and time-consuming.

According to the statement of the key informant, the problem of the unreliability of the internet connection is also among the most significant issues of the functioning in the Turkana County. The frequent downtimes disrupt the regular performance of the county departments and lead to delays in handling the information, inefficient coordination between the offices and ineffectiveness at large in terms of service delivery. The fact that the staff in most of the cases are being forced into manual systems is testimony to the fact that e-government initiatives are yet to be entrenched and they depend on a constant internet connection. This does not only slow down the operations of the public services, but also spoils the trust of the citizens with the digital platforms. The quote also emphasizes that the absence of a stable ICT infrastructure implies that the e-government benefits of speed, transparency and accessibility cannot be reaped to maximum given the system can be easily influenced by the interference to the intended performance.

The study asked a question of the issue of whether the county embraces the use of online platforms to advertise service delivery among the citizens. The results indicated that the difference between the respondents who agreed and those who did not agreed, meaning that majority of the citizens do not believe that the Turkana County Government has effectively modified online platforms to provide its services was 74.6%. It means that the nation is always experiencing the same problems in the form of ineffective ICT infrastructure, weak internet connectivity, and poor digital illiteracy rates among citizens and civil servants. Dahiya and Mathew (2018) assert that inadequate ICT infrastructure and institutional capacity are the major challenges with e-governments adoption and implementation, particularly in the developing world with low technological readiness. Similarly, [32] observe that the shortage of infrastructures, high cost of data services, and unequal access to digital tools are limiting the adoption of digital governance in majority of African contexts, and this is also applicable in the Turkana County. On the other hand, there were also respondents (19.3) who believed that the county embraces the use of online platforms and this implies that some departments in the county may have embraced some use of e-government activities, such as, use of websites or social media to provide and pass information. This percentage as a small portion tells some initial steps to digitization, but not popular yet. The degree of transparency, efficiency and citizen involvement in government activities can be enhanced using the ICT infrastructure as seen by Dahiya and Mathew (2018) whereby the infrastructure is in place and well-coordinated. Another point emphasized by [11] on the topic is that partial ICT implementation within the governance industry will improve access to information and administrative efficacy provided that there is a stable policy and an investment in infrastructures. The remaining 5.8 percent of the neutral respondents are likely to refer to the unconvinced, or even non-aware people of the ongoing e-government efforts and therefore, improved communication and sensitization in the digital service platforms is required.

They were asked to answer the questions in regards to the adoption of e-governments by the county in which they were residing. The study aim was to establish the integration of the e-government systems in Turkana County. The results indicated that the majority of the participants (82.1) disagreed with the suggestion that a majority of the county citizens are yet to integrate or adapt e-government systems holistically. This can mean that the county continues to have significant amount of manual service delivery, and less amount of technology that can either help to enhance efficiency, accountability or accessibility. Such factors as inadequate ICT infrastructure or inadequate technical capacity or lack of

budget funding of digital transformation may lead to the lack of integration. A low proportion of the respondents (15.8) answered in the affirmative, and this implies that there are a few departments or sectors in the county government that may have already started using some form of digital tools or systems, such as online databases or mediums of communication, but is not already widespread across the county. The small number of the neutral (2.1) may be interpreted as individuals who did not know or did not know about any e-government activities in the county which is feasible as the systems were not publicized or made available to the common people. The information above discussion was in line with the information obtained following the interview with the key informant who was asked to answer the question of what kind of Information Systems are currently being run in your department. Key informant 2 noted that;

We primarily utilize the simple information systems within our department, namely Microsoft Excel in the data entry and file keeping, and email services in communication. Another example is that there are some instances in which document storage is done using digital filing systems. Nevertheless, these systems are not intertwined among departments so data sharing and coordination is very challenging and time consuming.

The response of the key informant points out that although some means of digital tools are present in the departments of the Turkana County, they are minimal and restricted in terms of scope and functioning. Its use of simple tools like the Excel and email platform is an indication that the county is yet to graduate into a complete e-government system where information is easily shared amongst departments. Such interconnectivity is a barrier to service delivery coordination, transparency, and efficiency. It also substantiates most of the respondents who believed that the county has not embraced the integrated e-government systems. This scenario displays a rudimentary attitude to digital transformation where single departments are working in silos and not using a single digital platform; this slows down the process of a successful and comprehensive e-government implementation.

The respondents were questioned whether the ICT infrastructure is appropriate in its operations. The findings show that 75.7% voted in the negative, 5.3% were equal and 19.0% voted in the affirmative. The results indicated that most of the respondents (75.7%) disagreed which means that most citizens and employees feel that there is a shortage of the ICT infrastructure in the county that can enable efficient implementation of e-government and service delivery. It means that essential elements like the internet connection, digital devices, and support machines are non-existent or immature, and this compromise the performance and creativity in the county activities. Some respondents (19.0) were in agreement, indicating probable absence of even development or complete advancement in infrastructure investment development of the county in that some departments or units might be having relatively better ICT facilities. The low number of neutral respondents (5.3) could be connected to people that are either not aware of the situation with the ICT infrastructure in the county or are not sure whether it is sufficient because they have little contact with the digital systems. Using these findings as a prism of the Resource-Based Theory, one can see that the ICT infrastructure is a highly important strategic resource that could give the county an edge in its public service delivery provided that it is developed and used adequately. The inadequacy recorded by the majority of the respondents implies that Turkana County has not fully tapped its technology to enhance the efficiency of operations, transparency, and satisfaction among citizens. The participants were consulted on whether the county online platforms such as the website and interface are client oriented. The findings indicated that most of the respondents (74.6%) were in the opposite and it means that most citizens feel that the online platforms existing in the county are not user friendly or receptive to their needs. This means that such platforms might not be designed or operate based on the easy to use and access as well as interactiveness and thus limit their potential in supporting service delivery. [31] argue that most counties in Kenya are finding it a challenge to make their digital platforms customer-oriented because of their limited ICT capacity, poor stakeholder consultation, and lack of system upgrades. On the same note, Mabele et al. (2022) observe that lack of usability and inclusion of user feedback undermine citizen trust and engagement in digital governance. Conversely, some respondents (21.7) also affirmed that the online platforms in Iava County are client-focused, albeit that some users perceive it to be convenient and easy to use in order to gain access to information or use some services. This low percentage can be taken to mean that some sections of the county government have started to adopt user-friendly digital solutions. When e-government systems are user-friendly, i.e. have a user-centered design, with user-friendly navigation, understandable content, and responsiveness, they can increase citizen satisfaction, as well as, as Mabele et al. (2022) note, transparency. The fact that the number of neutral respondents is just 3.7 can be an indication of people who have fewer or no exposure or experience with the online services of the county either because of low digital literacy or poor communicated information about the presence of e-services.

The respondents were questioned on the issue of accessibility of county e-government services to citizens. These findings revealed that most of the interviewees (62.4% of the total number) were in agreement, so most of the citizens consider the e-government services in the county relatively convenient and available. This is an indication that the Turkana County has recorded a significant improvement in the digital accessibility via online platforms or service points that allow citizens to access information, place applications or ask questions

conveniently. Nonetheless, even with this relatively good attitude, there are those who (20.7) did not agree suggesting that there are still some citizens that face difficulties in accessing these services which may be through inadequate internet connectivity, lack of ICT facilities or digital illiteracy in the rural regions. The low percentage of the neutral ones (6.9) can be viewed as the number of ambiguous respondents who are not sure about the existence of such services, perhaps, due to the lack of contacts with it or simple ignorance of its presence. The interpretation of the findings as per the Theory of Diffusion of Innovation indicates that Turkana County is at the initial phases of the adoption process with e-government innovations starting to diffuse among the citizens but has not yet been fully saturated. This theory explains that accessibility and high prevalence are influenced by the awareness, perceived usefulness, and ease of use variables, which seem to be improving in the county yet need strategic communication and capacity-building to be achieved to reach all the citizens. The discussion is consistent with the information provided by key informants when he told me about the approach used by the County in ensuring stable network connections across Sub-counties. Key informant 3 noted that;

The county has collaborated with the internet service providers to provide network access to additional sub-counties and major administrative centres in particular. We have also provided Wi-Fi hotspots in select offices, which will ensure that staffs and citizens who need access to e-government services remain connected. Nevertheless, the problem of connectivity is still common in remote areas because of the inadequate infrastructure and the distance between network towers.

The answer of the key informant throws more light in the fact that although the Turkana County has made significant efforts to enhance network accessibility through agreements with service providers and enthusiasm on Wi-Fi hotspots coverage is not uniform. Administrative centres have been the main beneficiary of the initiatives thus explaining why most of the respondents consider e-government services to be accessible. Nevertheless, the fact that there are constant issues with connectivity in remote locations substantiates the results that these services have not yet been made accessible to all citizens. Such uneven coverage of network infrastructure highlights the place the county is at in the early adoption phase outlined in the Theory of Diffusion of Innovation where it can be seen but has not penetrated much yet. It also indicates that although the accessibility to the e-government platforms is on the rise, there is a need to invest more and plan better to achieve equitable digital inclusion in all the sub-counties.

Service Delivery

Respondents were asked to rate various statements that helped in identifying the state of service delivery in Turkana County Government, Kenya. The results were shown in Table 4.6.

Table 4. 2: Service Delivery

No.	Rate service delivery in:	1 VP	2 P	3 UD	4 G	5 E	Total
1.	e-government quality services	73 38.6%	62 32.8%	12 6.4%	22 11.6%	20 10.6%	189 100.0%
2.	e-government reliability	60 31.8%	73 38.6%	8 4.2%	23 12.2%	25 13.2%	189 100.0%
3.	e-government accessibility	55 29.1%	62 32.8%	14 7.4%	27 14.3%	31 16.4%	189 100.0%
4.	e-government efficiency	75 39.7%	61 32.3%	9 4.8%	21 11.1%	23 12.1%	189 100.0%
5.	e-government satisfaction	63 33.3%	67 35.5%	6 3.2%	24 12.7%	29 15.3%	189 100.0%

Source: Field Data (2025)

N.B; Very poor (VP); poor (P); Undecided (UD); Good (G); Excellent (E)

The respondents were requested to evaluate the e-government quality services. The findings demonstrate that there is an evident level of customer dissatisfaction with e-government service provision in the Turkana County. The majority of the respondents, 38.6% perceived the services as very poor, and this could imply that a high number of citizens find it very difficult to interface with the platforms, perhaps because of poor digital infrastructure, slowness in response, or poorly-integrated services. The rating of services as poor was found to be 32.8 percent which supports the argument that the adoption of e-government has not yet implanted efficient or reliable service delivery to most people. A small portion of users, 6.4%, did not respond, which means that there is a possibility that a small group of respondents were not exposed to the services much or were not informed enough to have an opinion, which points to the problem of access, awareness, or participation. Conversely, a small fraction of the respondents found the services to be positive with 11.6% rating services as good and 10.6% as excellent indicating that there are pockets of effectiveness, which are not pervasive but may be concentrated in the departments, user groups, or better managed services.

The respondents were requested to scale e-government reliability. The findings show that most of the

respondents feel that e-government reliability in Turkana County is not satisfactory with most of the respondents (31.8) considering it very poor and a very slight percentage (38.6) considering it poor, which means that poor system failure, downtime, or inconsistent service delivery is likely to be compromising the user trust. Small percentage (4.2) of the respondents were neutral indicating that they either had little exposure to the e-government platforms or they were not sure of their performance. Conversely, the majority of respondents actually had a negative perception of the services with 12.2% considering the services to be good and 13.2% considering the services to be good, meaning that only a small proportion of the users actually experience good service delivery especially in certain departments or to certain services that are more effectively managed. The discussion is congruent with the data provided in the key informants where they were questioned on the effects that the state of ICT Infrastructure had on reliability and satisfaction in service delivery. Key informant 9 noted that;

ICT infrastructure conditions have a significant impact on the reliability and satisfaction of e-government services. In most situations, the system is prone to failure and delays due to unstable internet connection, obsolete equipment's and lack of technical support. This impacts the performance of staff members as well as the trust people have on digital services since most users frequently encounter failures or extremely long queues in accessing online services.

This reply of the key informant confirms the survey results that the majority of the respondents consider the e-government reliability in Turkana County to be poor. The reference to poor internet connectivity, inefficient technology, and inadequate support facilities points to the infrastructural issues that destroy the smooth flow of service delivery. Such aspects cause system failure and slowness, which decrease its performance and eliminate user confidence in online platforms. The connection between bad ICT infrastructure and low satisfaction is that reliability is contingent on healthy technological infrastructure that guarantees continuity in its access and a consistent provision of its services. The quote also shows that the county is not in a position to be stable in terms of operations without modern equipment's and proper technical capacity, which explains the negative impression that was captured by the survey results. ICT infrastructure empowerment, hence, is among the major needs to enhance stability and citizen contentment in the provision of e-government services in Turkana County.

The respondents were inquired on the e-government accessibility. The findings indicate that most of the respondents feel that access to e-government services in the Turkana County is poor with most of the respondents (29.1) scoring it as very poor and slightly more (32.8) as poor indicating that most citizens have considerable challenges in accessing the services and this may be as a result of poor internet connectivity, lack of digital devices or lack of user support. The number of those who were not sure (7.4) was minimal, and thus the percentage of the users who might not be exposed to the platforms a lot or are not certain of them being available would be very small. On the other hand, few respondents positively rated the services with 14.3 percent of the respondents rating the services as good and 16.4 percent of the respondents rating the services as excellent indicating that some users have satisfactory access to these services, and this should probably be in regions with improved infrastructure or service provision is more targeted. The findings are consistent with the data gathered through the key informants when requested to provide suggestions on how the appropriate funding enhanced the availability and satisfaction of County Government Services. Key informant 10 stated that;

Adequate funding has made the County Government services very accessible and satisfactory as it is able to invest in stable internet connections, purchase of current ICT equipment and implementation of easy-to-use platforms. It has also enabled the staff training so as to enable the citizens to utilize the e-government systems so that more citizens are able to access services effectively in any places hence minimizing the barriers and increasing the overall service delivery.

The statement made by the key informant is consistent with the survey results that indicated that there was little accessibility of e-government services in the Turkana County. The quote justifies why certain people can enjoy good or excellent accessibility to internet connection, ICT equipment, and staff capacity even as the majority continue to struggle because of funding. It highlights that the key requirements of digital infrastructure expansion, technical assistance, and fair access to e-government services in various regions of the county require specific financial investments. This proves that ineffective funding has a direct influence on the availability and satisfaction of the services.

The respondents were to provide rating on e-government efficiency. The findings show that most respondents feel that e-government efficiency at Turkana County is unsatisfactory with a large number of the respondents (39.7) rating it very poor with a considerable percentage (32.3) rating it poor, meaning that the systems could be sluggish, cumbersome, or fail to provide services to the citizens on time. The number of respondents who were not sure (4.8) was very minimal, hence the low interaction with the e-government platforms or lack of awareness about their effectiveness. The percentage of respondents who rated the services positively was minimal with 11.1% stating that they are good and 12.1% that they are excellent meaning that not many people experience efficient service delivery, maybe in certain sections or when performing certain processes which are managed better. The discussion concurs with the details provided by the key informants when they were questioned to talk about how the involvement of the stakeholder's enhanced efficiency and satisfaction in service delivery. Key informant 11 noted that;

The involvement of stakeholders has enhanced efficiency and satisfaction in service delivery by making coordination, feedback and collaboration between the county government, citizens and partner organization to be more effective. Stakeholders also facilitate the identification of the bottlenecks, introduction of improvements, and streamlining of processes through regular consultations and involvement in decision making. This involvement enables services to be more responsive, minimizes delays and makes the overall effectiveness of e-government platforms more effective.

The above statement made by the key informant assists in understanding the reason why small percentage of the users rated e-government efficiency positively. It implies that where stakeholder engagement is actively practiced in the areas or departments, there is coordination of processes, and provision of a better service delivery. On the other hand, poor and very poor rates are high indicators of the fact that many parts of the county are yet to be fully engaged with stakeholders resulting to sluggish, tedious or inconsistent service delivery. This highlights the need to have a large number of people involved in order to improve effectiveness.

The respondents were requested to evaluate E-government satisfaction. The findings have shown that most of the respondents are not satisfied with the e-government services in Turkana County with most of the respondents (33.3%) reporting their satisfaction to be very poor and slightly more respondents (35.5%), reporting their satisfaction to be poor, which shows that the services are not satisfying the citizens as expected in terms of quality, responsiveness or usability. Only a small number of respondents (3.2%) were not sure, which means that a small portion might have limited usage of the platforms, or it is not clear as to whether they have the experience. On the other hand, the percentage of those who were satisfied was only available in the minority of the respondents, with 12.7% registering it as good and 15.3% registering as excellent, proving that the satisfactory experiences are only available to a small percentage of the users, maybe where there is better management of the services or accessibility.

Inferential Statistical Analysis

Correlation Analysis between ICT infrastructure and the adoption of e-government on service delivery

Pearson product moment correlation was used to examine the strength and direction of the relationship between ICT infrastructure and the adoption of e-government on service delivery in Turkana County Government. Correlation analysis is used to determine how two variables vary in the same direction and the variables have a Correlation of -1 to +1. Correlation values of +1 represent perfection of positive relationship, -1 represents perfection of negative relationship and 0 represents no linear relationship. Practically, correlations of 0.1 to 0.3 are weak, 0.3 to 0.5 moderate and 0.5 and above strong. The analysis has been done at 95% confidence level and it states that there is a 5 percent probability of arriving at the conclusion that there is a relationship when none exists. These findings were indicated in Table 4.7.

Table 4.3: Correlation Analysis between ICT infrastructure and the adoption of e-government on service delivery

		Service Delivery
ICT Infrastructure	Pearson Correlation	.705**
	Sig. (2-tailed)	.000
	N	189

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Field Data (2025)

Findings expressed a correlation of 0.705 at a p-value of 0.000 which implied that there is a strong and positive statistically significant relationship that exists between ICT infrastructure and the adoption of e-government. This means that the higher the ICT infrastructural elements like to better internet connectivity, hardware, and software, the greater is the e-government adoption. That is, with the continued development of ICT infrastructure in Turkana County, the government is more likely to offer services electronically, which will enhance efficiency, accessibility, and responsiveness to the needs of citizens. These results are consistent with the study of Mabele et al. (2022), who state that the well-developed ICT infrastructure plays a huge role in the adoption of e-government because it allows interacting with each other more facilitates and positively influences the results of delivery of certain services to the population.

Model Summary on ICT Infrastructure and Service Delivery

The model summary gives a statistical profile to the relationship between the independent variable and the dependent variable in the study. It was applied in this case to explore the effect of ICT infrastructure on the adoption of e-government on service delivery in Turkana County Government. The multiple correlation coefficient is referred to as the R value, and it quantifies the direction and strength of relationship between observed and predicted value of dependent variable. It shows the strength of association of the independent variable(s) in unison with the dependent variable. Instead, R-square value expresses the coefficient of determination which indicates the share of the variance in the dependent variable which is accounted by the independent variable in the model. The results were shown in Table 4.8.

Table 4.4: Model Summary on ICT Infrastructure and Service Deliver

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.578[a]**	**.334**	.264	.18968

Source: Field Data (2025)

The results indicate that the R value of 0.578 represents a moderate positive multiple correlation between ICT infrastructure and e-government adoption, meaning that improvements in ICT infrastructure are moderately associated with better service delivery outcomes. The R-square value of 0.334 shows that 33.4% of the variation in e-government adoption can be explained by ICT infrastructure, while the remaining 66.6% is attributed to other factors not captured in this model.

ANOVA on ICT Infrastructure and Service Delivery

Analysis of Variance (ANOVA) was used to determine whether there were significant differences in the mean levels of e-government adoption across varying levels of ICT infrastructure in Turkana County Government. The comparison of the difference between and within groups will be done through ANOVA in order to establish the statistical significance of the difference observed. The F-test value demonstrated the ratio between-group and within-group variance and p-value lower than 0.05 at 95 percent confidence level indicated the presence of significant effect. Table 4.9 indicated the results.

Table 4.5: ANOVA on ICT Infrastructure and Service Delivery

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.369	1	2.369	29.987	.000[b]
	Residual	14.773	187	.079		
	Total	17.142	188			
a. Dependent Variable: Service Delivery						
b. Predictors: (Constant), ICT Infrastructure						

Source: Field Data (2025)

The ANOVA results showed an F-test value of 29.987, which is greater than the F-critical value of 3.89, with a p-value of 0.000. Since the F-calculated exceeds the F-critical and the p-value is below 0.05, the findings indicate that ICT infrastructure has a statistically significant influence on the adoption of e-government in Turkana County Government. This means that the advancements in the ICT infrastructure like better internet connection, sound digital infrastructure, and technological applications greatly facilitate the e-government uptake and subsequently result in the delivery of public services in a more efficient and effective manner.

Regression Coefficients of ICT Infrastructure and Service Delivery

Regression analysis was conducted to determine the extent to which ICT infrastructure influences the adoption of e-government on service delivery in Turkana County Government. The findings showed that the constant value was 2.981, which is not insignificant at the confidence interval of 95 percent, thus showing that despite the absence of ICT infrastructure, there is still a minimum level of e-government adoption. This suggests that other institutional factors contribute to the existing level of e-government implementation. The implication of the significant constant is that the process of adopting e-government depends on both the ICT infrastructure and on the underlying systemic and organizational capacity within the County Government. The results were shown in Table 4.10.

Table 4. 6: Coefficients of ICT Infrastructure and Service Delivery

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.981	.748		3.985	.005
	ICT Infrastructure	.563	.101	.338	5.611	.000
a. Dependent Variable: Service Delivery b. Predictors: (Constant), ICT Infrastructure						

Source: Field Data (2025)

From the above results, the following regression model was established;

Y=2.981 + 0.563 ICT Infrastructure

The regression coefficient of 0.563, with a t-value of 5.611 and a p-value of 0.000, which is less than the significance level of 0.05, indicates a statistically significant positive relationship between ICT infrastructure and e-government adoption. Since the computed t-value exceeds the t-critical value of 1.653, the results confirm that ICT infrastructure has a meaningful and strong influence on e-government service delivery. Therefore, the null hypothesis that ICT infrastructure had no significant effect on e-government adoption was rejected. This suggests that with each increment in ICT infrastructure, there is a concomitant increase of 0.563 in the stage of e-government adoption implying that, improved and efficient service delivery is

the result of improved technological facilities, improved internet connectivity, and improved digital systems. This is aligned with the findings of Osundwa, (2024), who noted that the ICT infrastructure is the backbone of successful e-government implementation since it enables transparency, accessibility and responsiveness when it comes to the delivery of public services.

Summary, Conclusion and Recommendations

Summary of the findings

The study results showed that Turkana County still experiences severe problems with developing proper ICT onboarding that would facilitate the successful adoption of e-government. Majority of the respondents and key informants reported that, the county does not have sustainable internet access, robust digital systems, and integrated technological systems to facilitate effective public service delivery. Internet crashes and use of manual systems were cited as the greatest setbacks that are slowing down business and efficiency in the counties departments. Despite this slight improvement, especially in major cities and administrative capitals, online implementation and the use of e-government systems have not been fully adopted everywhere and among all departments. The results also indicated that available digital tools are fundamental and do not have a connection with each other and thus data sharing and coordination are challenging. Although some citizens admitted that they could access e-government services and there were those platforms that were oriented to the needs of the clients, the overall impression was that these services are underdeveloped, lacked publicity, and that they were not very responsive to the needs of the clients.

The inferential analysis established the significance and positive impact of ICT infrastructure that can affect adoption of e-government in Turkana County. Correlation analysis indicated that ICT infrastructure and e-government adoption showed a high positive correlation, and the correlation coefficient of 0.705 and the p-value of 0.000 indicated that changes in the ICT infrastructure have a close relationship with the greater the e-government implementation. On the same note, the regression output indicated a regression coefficient of 0.563, t-value of 5.611, and a p-value of 0.000 which indicate a statistically significant relationship at all levels of 0.05. The implication of these findings is that, as ICT infrastructure is improved by a unit, e-government services adoption is positively affected by the improvement.

Conclusion of the study

The research determined that e-government adoption and service delivery in the Turkana County Government is a key attribute of the ICT infrastructure. Descriptive findings and interviews indicated that the problem of unreliable internet connectivity, low digital systems, and the inability to cross-departmental integration prevent efficiency, coordination, and service accessibility. Even though there is some improvement in the urban centres, majority of the areas continue to encounter infrastructural problems. Correlation analysis showed a strong positive relationship ($r = 0.705$, $p = 0.000$), and regression results indicated a significant effect ($\beta = 0.563$, $t = 5.611$, $p = 0.000$) of ICT infrastructure on e-government adoption. The researchers thus came up with the conclusion that ICT infrastructure played a big role in the implementation of e-government on service delivery in Turkana County Government.

Recommendation of the study

The research found out that ineffective internet connection and constant disconnections are one of the biggest constraining factors to the successful implementation of e-government in Turkana County. The lack of network coverage in remote locations is slowing down service delivery and compelling departments to use manual systems. The research thus suggested that the county government should invest in the stable and widespread internet infrastructure by collaborating with service providers in an attempt to widen the internet connectivity in all sub-counties.

Results revealed that the majority of county departments have simple, disconnected digital tools and that sharing data and coordinating them are challenging. This is because lack of system integration restricts efficiency and transparency when delivering the services. The research thus suggested that the county should come up and execute an integrated e-government system that would have all the departments linked via a central digitalized system.

The research also determined that not all citizens and staff possess the necessary digital skills and knowledge of the e-government services available to them. This has an impact on the accessibility and usability of the online platforms. The report thus suggested that the county should carry on an ongoing ICT training and digital literacy of the workers and citizens so as to bolster competent, conscious, and effective use of e-government platforms.

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