

# Role of Process Automation in Enhancing Public Service Delivery: Evidence from Huduma Centres in Nairobi Metropolitan Area, Kenya

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## Abstract

Process automation drives public service efficiency, yet its specific effect on citizen outcomes at Kenya's Huduma Centres remains insufficiently examined. Despite deployment of automated queuing, biometric verification, and digital workflow systems, persistent challenges in service timeliness, accessibility, and user satisfaction continue to raise questions about the effectiveness of automation implementation across Huduma Centre locations. This paper investigated the effect of process automation on public service delivery among Huduma Centres in the Nairobi Metropolitan Area, Kenya. The study was anchored in pragmatic philosophical paradigm and guided by the SERVQUAL model. An explanatory mixed-methods design was adopted, targeting 13,796 individuals across nine Huduma Centres in Nairobi, Kiambu, Machakos and Kajiado counties. A stratified sampling approach using Cochran's formula yielded a sample of 549 respondents. Primary data were collected through semi-structured questionnaires, with reliability and validity ensured through Cronbach's alpha, factor analysis, and expert validation. Quantitative data were analysed using descriptive statistics, Pearson correlation and regression, while qualitative data underwent thematic analysis. The study found that process automation had a significant positive effect on service delivery ( $\beta = 0.358, p = 0.000$ ), explaining 33.4% of the variance in service delivery outcomes. Descriptive findings revealed that routine service automation recorded the highest mean ( $M = 4.41, SD = 0.73$ ), while reduction in human error recorded the lowest mean ( $M = 4.21, SD = 0.68$ ), indicating variability in the depth and consistency of automation implementation across centres. Qualitative findings corroborated these results, with employees identifying automated workflows as key enablers of fairness, transparency, and processing speed, while customers confirmed that functioning automated systems significantly reduced wait times and enhanced their overall service experiences. The study concludes that process automation is a significant driver of public service delivery effectiveness at Huduma Centres, yet systematic gaps in automation standardisation, backup protocols, and workflow integration across locations require immediate institutional intervention. The study recommends that Huduma Centres focus on full integration and standardisation of process automation systems across all service delivery points, ensuring that automated queuing, biometric verification, digital ticketing and workflow management platforms work seamlessly across peak and off-peak service periods. Partial automation, in which some stages of the service are still manual and others are digitised, introduces inefficiencies that offset the speed and accuracy improvements that automation is intended to provide. Centre managers should carry out periodic workflow audits in order to identify and remove remaining bottlenecks in the process, but to replace them with integrated digital processes which will synchronise in real time with central government platforms including the National Registration Bureau and NTSA systems.

**Keywords:** *Process Innovation, service delivery, Huduma Centres, Kenya*

## 1.1 Background to the Study

The shift from manual paper-based bureaucratic public service delivery processes to automated digital workflows is one of the most significant changes in modern public administration. Process automation - defined as the application of digital technologies such as robotic process automation, biometric verification systems, automated queuing, and digital case tracking to implement the unvaried administrative tasks with minimal human processing - is now appeared as a slam-bang tactical power in enhancing the efficiency, accuracy, and service responsiveness of operations (Ordieres-Mere et al., 2020; Wang et al., 2023). Unlike investments in hardware or staff-training, process automation is a direct restructuring of the architecture of service delivery, which replaces error-prone manual workflows with standardised, traceable and time-bound digital processes. Li et al. (2024) and Teng et al. (2022) establish that at the functional strategy level, process automation optimises resource utilisation, reduces bottlenecks in service delivery and increases organisational agility which makes it a fundamental pillar of effective public sector digital transformation.

Globally, for governments that have implemented process automation into their public service frameworks, the results in increased efficiency, transparency and citizen satisfaction are measurable. In the United States, Macha (2022) found through a systematic literature review that AI-driven automation was significantly beneficial for improving regulatory compliance, decision accuracy and fraud detection, while greatly reducing operational costs across federal agencies. Estonia's digital governance model, on which more than ninety-nine percent of the government services are based on automated workflows and digital identity verification, is widely cited as the global standard for automated public service delivery (Tamppuu et al., 2022). In South Korea and Denmark, automated administrative systems have provided better service processing speeds, lower bureaucratic delays, and improved inter-agency coordination compared to countries that are still using manual processes (Manita et al., 2023). These cases in other countries collectively show that process automation is not only an operational tool but a strategic governance tool whose implementation fundamentally changes the relationships of citizens with governments.

Across Africa, there is an increasing body of evidence of the contribution of automation to the improvement of public service delivery, though unevenly implemented. In South Africa, Ndalamba and Mafini (2023) through qualitative analysis of twelve government departments found that automation had a significant impact on institutional trust, accuracy of records and predictability of service outcomes with digitized workflows reducing human error in processing documents. In Ghana, Awuah and Kumi (2023) determined through quasi-experimental analysis in three ministries that automation resulted in a forty percent decrease in the turnaround time of tasks and a twenty-five percent decrease in human errors. In Nigeria, Ikegwuru and Gladson-Nwokah (2024) showed that process automation led to an increase in transparency, cost reduction, and improvement in delivery timelines in a public procurement. In Uganda, in a study by Nabwire and Otim (2023) using a mixed method approach with 180 government employees it was proven through statistical analysis that robotic process automation was a significant factor in service timeliness ( $F=6.31$ ,  $p=0.008$ ) and operational cost reduction, contributing to the transformative potential of robotic process automation in a variety of African governance settings.

Within Kenya, the integration of process automation into public service delivery has gone a long way with Huduma Centres being the most visible manifestation of this transformation. At the GPO Nairobi Huduma Centre, data entry, verification and backend forwarding for national ID and driver's license applications are managed through automated workflows that synchronise in real-time with the National Registration Bureau and NTSA systems - reducing

the amount of manual errors and improving service turnaround times (ICT Authority, 2022). Karanja and Waweru (2023) showed in a longitudinal analysis of three years of data from the Kenya Revenue Authority that automation led to a thirty-five percent increase in successful transactions and a twenty-eight percent reduction in customer complaints. Muthee and Mang'ana (2021) further confirmed through a descriptive survey of 128 senior managers at the Ministry of Public Service that user-friendly digital systems, integrated information platforms and automated record tools significantly improved efficiency and responsiveness in public administration.

Studies that focused specifically on automation within Kenyan Huduma Centres offer direct and contextually specific evidence for this paper. Wangari and Chege (2022) used descriptive survey of 220 Huduma Centre users and established significant positive relationship between automation and efficiency of service ( $R^2 = 0.66$ ,  $p < 0.01$ ), while respondents reported faster processing, transparency and digital access. This was further confirmed by Kamau and Ngoya (2023) who, through structural equation modelling of 200 service users, found that the use of automated biometric verification and systems for tracking cases significantly improved accessibility and satisfaction ( $b = 0.71$ ,  $p < 0.05$ ). Ochieng and Ndrialo (2023) through a quantitative survey of 240 public officers, automated workflows had a strong positive impact on the turnaround time for services ( $R^2 = 0.73$ ,  $p < 0.01$ ), with the digitalisation of workflows streamlining the approval and documentation process. These Kenyan findings all collectively support the conclusion that process automation offers direct and measurable benefits in terms of increased accessibility, timeliness and user satisfaction for Huduma Centres.

Despite this compelling body of evidence, there are still large gaps in how process automation has been studied in the context of public service in Kenya. Most of the existing studies focus on automation in isolation from other complementary digital transformation enablers such as technological infrastructure and digital competencies, and few have analysed the effects of automation within a policy-moderated framework (Odhiambo & Okello, 2019). Wangari and Chege (2022), Kamau and Ngoya (2023) and Ochieng and Ndrialo (2023) all confirmed the positive impacts of automation but did not integrate the policy frameworks and examine how the Kenya Digital Masterplan 2022-2032 moderates these relationships. Muthee and Mang'ana (2021) focused solely on one national ministry and therefore cannot be generalized to Huduma Centres operating within a devolved governance structure. The cumulative effect of these conceptual, methodological and contextual limitations is an incomplete understanding of the extent to which process automation specifically influences dimensions of service delivery in the varied operational environments of Huduma Centres in the Nairobi Metropolitan Area.

Process automation at Huduma Centres is part of a dynamic interplay between automated queuing systems, biometric check-in devices, integrated ticketing and digital payment solutions that govern the pace, accuracy and quality of citizen service transactions (ICT Authority, 2022). Yet the extent to which these automation systems consistently deliver on the promise of accessible, timely and satisfying service delivery across all nine centres within the Nairobi Metropolitan Area is insufficiently examined in one, comprehensive empirical framework. The Kenya Digital Masterplan 2022-2032 outlines the policy framework for the standardisation of automation and investment in public institutions and on the ground implementation has proved patchy (Njoroge & Mwangi, 2023). This paper addresses the identified gaps by offering focused empirical evidence on the specific and unique impact that process automation has on service delivery effectiveness in the dimensions of accessibility, timeliness and user satisfaction within Huduma Centres to generate actionable insights to guide institutional investment and policy implementation decisions.

## 1.2 Statement of the Problem

Kenya's Huduma Centres were created as one-stop service centres to offer streamlined citizen access to important government services such as identity card issuance and tax compliance, and are a deliberate move towards digitally efficient public administration (Latupeirissa et al., 2024; Setyawan, 2024). Central to this transformation was the use of process automation systems such as automated queuing systems, biometric verification, and digital workflow management that were designed to eliminate the manual bottlenecks that historically plagued public service delivery. Despite this strategic intent, Huduma Centres are still plagued by persistent failures characterised by long wait times, frequent system downtimes and inconsistent citizen satisfaction (Nurfadilah et al., 2024; Sihombing et al., 2024). These failures indicate a basic conflict between automation aspirations and operational realities, where manual processes continue to interrupt digital service processes, undermining public trust while driving up operational costs (Filgueiras et al., 2019; Nurfadilah & Haliah, 2024).

Since their establishment in 2013, Huduma Centres have experienced deteriorating inefficiencies fuelled by increasing demand for services that have overwhelmed partially automated systems (Koech et al., 2023; Sihombing et al., 2024). Automating processes such as ticketing, verification, record keeping, and backend forwarding is widely recognised as being key to addressing these gaps (Kirana & Majid, 2022; Odhiambo & Okello, 2019). However, empirical research on process automation in the public service sector in Kenya has mainly focused on the effects in isolation, ignoring interactions with technological infrastructure, digital competencies, and policy frameworks (Kasmiah et al., 2024; Khisro, 2020). Most of the existing research is also limited to developed country contexts with significant gaps in understanding automation challenges in the context of Kenya's devolved governance framework. The moderating role that policy instruments like the Kenya Digital Masterplan 2022-2032 play in shaping the effectiveness of automation has not received enough empirical attention and therefore insufficient actionable evidence for policymakers and decision-makers at the institutional level (Latupeirissa et al., 2024).

The operationalization of the Kenya Digital Masterplan 2022-2032 introduced a policy framework that was meant to speed up the process automation and enhance service delivery across public institutions (Koech & Bett, 2023; Latupeirissa et al., 2024). Nevertheless, how far this framework has been translated into consistent improvements in automation and measurable gains in service delivery within Huduma Centres remains under-explored (Larasati et al., 2022; Setyawan, 2024; Sihombing et al., 2024). The socio-economic consequences of poor automation such as lower government revenue, lower citizen satisfaction, and increased inequalities require urgent empirical research (Filgueiras et al., 2019; Nurfadilah & Haliah, 2024). Addressing these empirical, contextual and conceptual gaps is key to pushing knowledge towards Kenya Vision 2030 and Sustainable Development Goals (Li et al., 2024; Nurfadilah et al., 2024). This paper therefore examines the specific impact of process automation on public service delivery in Huduma Centres in the Nairobi Metropolitan Area

## 1.3 Research Objective

To examine the effect of process automation on service delivery among Huduma Centres in Nairobi Metropolitan Area, Kenya.

## 1.4 Research Hypothesis

H<sub>0</sub>: There is no statistically significant effect of process automation on service delivery among Huduma Centres in Nairobi Metropolitan Area, Kenya.

## 2.0 Literature Review

The literature review is critical to determining the existing knowledge and in the chapter included theoretical review, empirical review and conceptual framework.

### 2.1 Theoretical Review

The study was supported by the SERVQUAL model that was developed by Parasuraman, Zeithaml and Berry (1988) and is the most suitable theoretical lens to investigate the impact of process automation on citizen-perceived dimensions of public service delivery. The model assesses the quality of services using five dimensions: tangibles, reliability, responsiveness, assurance, and empathy, each of which directly relates to the ways in which automation affects citizen experiences at Huduma Centres (Narteh, 2018; Yesmin et al., 2023). Process automation is situated as the operational mechanism by which reliability - the consistency of automated service provision - and responsiveness - the speed of automated request processing - are enhanced or undermined. SERVQUAL is especially relevant as it measures service quality from the citizen's lived experience and not just from institutional efficiency measures, and is therefore directly applicable to an assessment of how automated workflows translate into measurable improvements in accessibility, timeliness and user satisfaction across Huduma Centres in the Nairobi Metropolitan Area.

The applicability of SERVQUAL in the context of this study is further confirmed by the fact that it has been used in the evaluation of digital and blended public service environments. Prakash (2019) notes that SERVQUAL is still the most diagnostically powerful framework for identifying gaps between citizen expectations and actual service experiences - a gap that process automation directly seeks to close by reducing delays and standardising transactions. Mutuku et al. (2023) confirm that service quality in public institutions requires enabling policy such as the Kenya Digital Masterplan 2022-2032 to effectively bridge service gaps which is in line with the conceptual framework of the study. SERVQUAL is adopted over E-SERVQUAL and PUBQUAL because Huduma Centres are blended environments where automated and in-person interactions are present, and a framework that captures the full range of citizen-staff-system interactions is needed (Yesmin et al., 2023). Together, these considerations make SERVQUAL a coherent and contextually grounded theoretical foundation for exploring the impact of process automation on the effectiveness of service delivery at Huduma Centres.

### 2.2 Empirical Literature Review

Process automation has become a pillar of digital transformation in the public sector, enormously impacting the efficiency, transparency and reliability of service delivery. By keeping human intervention to a minimum, automating the workflow helps reduce delays, improve record management and user satisfaction. Governments around the world have been increasingly adopting the power of automation, including robotic process automation, biometric verification systems and digital case tracking to better their operational efficiency and accountability. Yet despite increasing evidence that automation improves administrative performance, the majority of studies still analyse it in isolation without incorporating supporting elements such as technological infrastructure, digital competencies and legislative frameworks that are necessary to sustain transformation outcomes. In South Africa, Ndalamba and Mafini (2023) through qualitative analysis of twelve government departments found that automation led to significant improvement of institutional trust, record accuracy and predictability of service outcomes, with digitised workflows reducing human error in document processing, confirming that automation is a game changer not only in terms of efficiency, but also in terms of public trust in government institutions.

In Ghana Awuah and Kumi (2023) used a quasi-experimental research design with time-motion studies and staff surveys in three ministries to demonstrate that the introduction of automation resulted in a forty percent reduction in the turnaround time of tasks and a twenty-five percent reduction in human errors. These efficiency gains showed that automation is a direct response to processing bottlenecks that compromise accessibility and timeliness of service. In Uganda, a study by Nabwire and Otim (2023) conducted a mixed-method study of 180 government employees, found through the use of the statistical analysis method of the analysis of variance that robotic process automation led to significant improvements in the timeliness of service ( $F = 6.31, p = 0.008$ ) and operational costs, with qualitative findings indicating that automated workflows led to enhanced accountability and transparency by minimising manual data handling. Both studies confirm that the benefits of automation go beyond internal administrative gains to directly impact the outcomes of citizen-facing service delivery, although both failed to include policy frameworks that link the outcomes of automation to national digital strategies.

In the United States, Macha (2022) performed a systematic literature review of AI and robotic process automation in government, revealing that AI-driven automation helped greatly improve regulatory compliance, decision accuracy, and fraud detection and lowered the operational costs of federal agencies, raising evidence that policy-supported automation fundamentally helps improve the reliability and assurance dimensions of public service quality. In Nigeria, Ikegwuru and Gladson-Nwokah (2024), using documentary analysis, also found that process automation improved transparency, cost savings and delivery timeline across procurement operations, stating the applicability of automation across industries. These international and African findings collectively affirm that the citizen-facing benefits of process automation - faster processing, less errors and greater transparency - are consistent across governance contexts when implementation is systematically supported by institutional policy and adequate digital infrastructure.

Karanja and Waweru (2023) showed with longitudinal analysis of data from the Kenya Revenue Authority over three years that automation led to a thirty-five percent increase in successful transactions and a twenty-eight percent reduction in customer complaints. Muthee and Mang'ana (2021) confirmed through a descriptive survey of 128 senior managers at the Ministry of Public Service that user-friendly digital systems and automated record tools significantly improved efficiency and responsiveness, but the study was limited to one ministry without considering policy frameworks interactions. Ochieng and Ndrialo (2023) determined via a quantitative survey of 240 public officers that there is a significant positive link between automated workflows and the reduction in service turnaround time ( $R^2 = 0.73, p < 0.01$ ) with the digitalisation of workflows streamlining the approval and documentation process, although the study did not consider the qualitative triangulation and alignment with national policy instruments.

Wangari and Chege (2022) through descriptive survey of 220 Huduma Centre users, there was a significant positive relationship between automation and service efficiency ( $R^2 = 0.66, p < 0.01$ ). Kamau and Ngoya (2023) confirmed using structural equation modelling of 200 service users that automated biometric verification and case-tracking systems increased significantly the accessibility and satisfaction of service ( $b = 0.71, p < 0.05$ ). Collectively, the reviewed studies confirm that process automation is a proven way to improve efficiency, transparency and user satisfaction across public institutions, but most studies consider process automation in isolation from policy frameworks and complementary transformation enablers. This paper bridges these gaps by placing process automation in a holistic context anchored on the Kenya Digital Masterplan 2022-2032, and producing targeted empirical evidence of the impact of

automation in accessing, timeliness, and user satisfaction in nine Huduma Centres in the Nairobi Metropolitan Area.

### 2.3 Conceptual Framework

A conceptual framework is a diagrammatic representation that illustrates the relationship between study variables as presented in Figure 1. It shows how process automation influences service delivery, with government policy moderating this relationship.

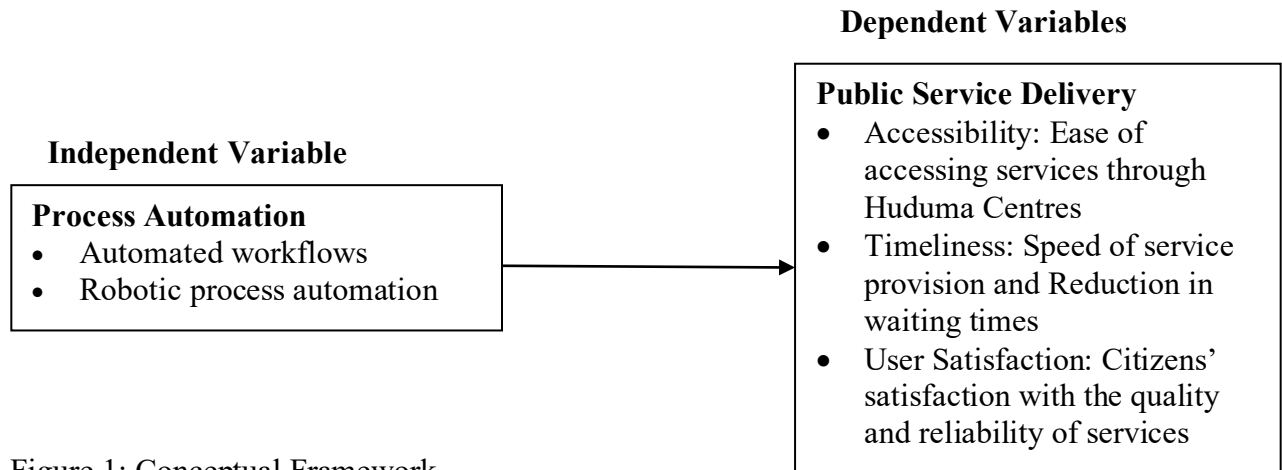


Figure 1: Conceptual Framework

### 3.1 Research Methodology

The study was based on a pragmatic philosophical orientation. Pragmatism was suitable for examining process automation and service delivery at Huduma Centres where the quantifiable efficiency improvements of automated systems and the experiential quality perceptions of citizens and staff needed to be examined simultaneously. An explanatory mixed-methods design was adopted that allowed for the simultaneous collection of quantitative and qualitative data with primacy given to the quantitative strand. The study population consisted of 13,796 people including 296 employees stratified as managers, heads of department, and senior management and 13,500 customers across nine Huduma Centres in the Nairobi Metropolitan Area. Stratified sampling was used to ensure that there is proportionate representation among staff and customer groups to minimise sampling error. The final sample of 549 respondents included 169 employees and 380 customers. Semi-structured questionnaires were administered to a stratified sample of 549 respondents in nine Huduma Centres in Nairobi, Kiambu, Machakos and Kajiado counties using Cochran's (1977) formula for finite population sampling. Quantitative data were analysed using descriptive statistics, Pearson correlation and regression to determine the effect of process automation on service delivery using the regression model

$$Y = B_0 + BX + e.$$

Qualitative data were submitted to thematic analysis in order to contextualize and deepen quantitative results. Ethical clearance was acquired from Daystar University ISERC and NACOSTI with the confidentiality of all participants, informed consent and all data handling being governed by the Kenya Data Protection Act 2019 throughout the duration.

## 4.0 Introduction

This chapter presents the data presentation, analysis and discussion of findings.

### 4.1 Pretesting of the Research Instrument

Pretesting of the research instrument was carried out at Huduma Centre Nakuru and Huduma Centre Naivasha and involved 17 employees and 38 customers. The goal of pretesting was to determine validity and reliability of the questionnaire items. Construct validity was evaluated with the help of Kaiser Meyer Olkin measures and Bartlett's Test of Sphericity. Process automation had a KMO of 0.422 and significance of 0.014, which was above the minimum threshold and indicated factorial suitability. The service delivery constructs of accessibility, timeliness and user satisfaction recorded KMO values of 0.626, 0.579 and 0.620 respectively, all of which are above the 0.5 minimum. The aggregate KMO of 0.620 and Bartlett's significance of 0.006 confirmed the overall suitability of the dataset for factor analysis, establishing that all the items of the questionnaire were sufficiently correlated and valid for measuring their respective constructs in the main study.

Construct validity was confirmed for both process automation and service delivery items by factor analysis, with all 21 items on the questionnaire having extraction values above the 0.4 threshold (Stevens, 2002). Process automation items had extraction values ranging from 0.611 to 0.919, confirming sufficient item-construct alignment, whereas service delivery items across accessibility, timeliness and user satisfaction had extraction values ranging from 0.806 to 0.909. Face validity was determined by supervisor review and participant feedback with all 55 pretest respondents indicating that the items related to automation were a clear reflection of their daily experiences with queuing, biometric and workflow systems at Huduma Centres. Content validity was verified by systematic evaluation of all items by supervisors (Carmines & Zeller, 1979). Reliability assessment using Cronbach's alpha resulted in 0.753, 0.873, 0.734, and 0.772 for process automation, accessibility, timeliness, and user satisfaction, respectively, which are all above Nunnally's (1978) threshold of 0.7. The aggregate reliability of 0.842 confirmed all items for retention in the main study.

### 4.2 Response Rate

Table 1 presents the response rate obtained from the study conducted among employees and customers at Huduma Centres within the Nairobi Metropolitan Area. A total of 518 questionnaires were distributed, out of which 479 were duly completed and returned, representing a 73.2 percent response rate. The remaining 39 questionnaires, equivalent to 7.5 percent, were not returned. This high response rate demonstrates strong participant engagement and enhances the reliability and representativeness of the data collected.

**Table 1: Response rate**

Category	Target Respondents	Actual Respondents	Response Rate (%)
Pretest (Nakuru)	55	55	100%
Main Study	549	402	73.2%
Employees	169	138	81.7%
Customers	380	264	69.5%

Source: Field Data (2025)

The study employed rigorous methodological procedures, including pretesting to validate research instruments. The pretest was conducted at Huduma Centres in Nakuru County with 55 respondents (17 employees and 38 customers), achieving a 100% response rate. This

complete participation during pretesting eliminated non-response bias in instrument validation and confirmed that the questionnaire design was accessible to both employee and customer groups. For the main study, the sample size of the study was 549 respondents across nine Huduma Centres in the Nairobi Metropolitan Area, comprising Nairobi, Kiambu, Machakos, and Kajiado counties. The study demonstrated strong participant engagement with a robust response rate among both employees and customers in the public service delivery centers. Participants achieved a 73.2% response rate with 402 respondents out of the targeted 549 individuals, comprising 138 employees (81.7% response rate from 169 targeted) and 264 customers (69.5% response rate from 380 targeted), representing solid participation given the operational nature of digital transformation research in active service delivery environments.

The employee response rate of 81.7% was notably higher than the customer response rate of 69.5%, reflecting the greater accessibility and engagement of staff compared to transient service users. The overall 73.2% response rate exceeds widely accepted thresholds for survey research validity and generalizability. According to Babbie (2016), response rates above 50% are considered adequate for analysis and reporting, while rates above 60% are considered good, and those above 70% are considered very good for social science research. Similarly, Dillman et al. (2014) note that response rates above 60% are sufficient to provide adequate statistical analysis. Nulty (2008) further supports that response rates above 60% minimize non-response bias and enhance the reliability of findings in educational and organisational research contexts.

This 73.2% response rate minimizes selection bias and enhances the reliability of findings within the specific context of public sector employees and service users in Kenya's metropolitan region. The response rate provides sufficient statistical power for meaningful analysis of digital transformation practices effectiveness, service delivery performance assessment, and Pearson correlation analysis and regression analysis between technological infrastructure, digital competencies, process automation and service delivery outcomes. The participation demonstrates that digital transformation research was considered relevant and important by managers, heads of departments, senior management, and customers across different service categories, supporting the validity of conclusions drawn about digital transformation impact and the role of government policy on service delivery among this population of public sector stakeholders in both urban and peri-urban settings within the Nairobi Metropolitan Area.

### 4.3 Descriptive Statistics

#### 4.3.1 Process Automation

The objective of the study was to examine the effect of process automation on service delivery among Huduma Centres in Nairobi Metropolitan Area, Kenya. The study assessed process automation through automated workflows and robotic process automation as outlined in the conceptual framework.

**Table 2: Descriptive Statistics for Process Automation**

Question	Mean (M)	Std. Dev. (SD)
Routine services are well-automated (ticketing, verification, workflow processing).	4.41	0.73
Automation has led to greater efficiency and fewer delays in service delivery.	4.31	0.73
The use of technology has reduced human error in service processes.	4.21	0.68
Overall Mean / SD	4.31	0.71

Source: Field Data (2025)

The overall mean for process automation was  $M = 4.31$  with  $SD = 0.71$ , showing that respondents generally agreed that process automation is strongly implemented across Huduma Centres. The results indicate that automation initiatives have been widely adopted, though with moderate variability in implementation across different centres. Routine service automation achieved the highest mean ( $M = 4.41$ ), suggesting that core services such as ticketing, verification, and workflow processing are effectively automated. The slightly higher standard deviation ( $SD = 0.73$ ) implies that while most centres have embraced automation, the extent of its application differs between locations. Efficiency improvements from automation recorded a mean of  $M = 4.31$ , equal to the overall mean, showing broad agreement that automation has improved workflow efficiency and reduced service delays. Reduction in human error achieved a mean of  $M = 4.21$ , still high, indicating strong consensus that technology has improved accuracy and consistency in service provision.

The study findings align with previous empirical research underscoring the pivotal role of automation in public service efficiency. Ndalamba and Mafini (2023) found that automation improved public trust, record-keeping, and predictability of service outcomes in South African institutions. Similarly, Awuah and Kumi (2023) reported that administrative automation enhanced performance efficiency and reduced human-related errors in Ghanaian public agencies. Nabwire and Otim (2023) established that robotic process automation improved service timeliness and reduced operational costs in Uganda's public sector. In Kenya, Wangari and Chege (2022) observed that automation of public services improved operational efficiency and citizen satisfaction in Huduma Centres. Kamau and Ngoya (2023) further found that automated systems such as biometric verification and case tracking enhanced accessibility and user satisfaction.

Karanja and Waweru (2023) reported that process automation reduced customer complaints and improved transaction success rates at the Kenya Revenue Authority, while Ochieng and Ndrialo (2023) confirmed that automated workflows significantly reduced service delivery time in devolved units. These studies collectively affirm that automation strengthens service efficiency, reliability, and citizen confidence-findings that are fully consistent with the results of the current study across Huduma Centres in the Nairobi Metropolitan Area. In conclusion, the findings demonstrate that process automation has significantly enhanced service efficiency, accuracy and fairness at Huduma Centres. Quantitative data confirmed strong agreement that automated systems reduce delays and human error. To sustain the positive outcomes, continued investment in robust ICT infrastructure, comprehensive training for staff, and periodic system audits will be essential. Overall, process automation emerges as a transformative enabler of public service efficiency, promoting transparency, accountability, and user satisfaction in Kenya's Huduma Centres.

#### **4.3.2 Service Delivery**

Service delivery represented the dependent variable in this study, measured across three key dimensions as specified in the conceptual framework: accessibility (ease of accessing services through Huduma Centres), timeliness (speed of service provision and reduction in wait times), and user satisfaction (citizens' satisfaction with the quality and reliability of services). The summary for service delivery is presented in Table 3

**Table 3: Descriptive Statistics for Service Delivery**

Question	Mean (M)	Std. Dev. (SD)
Services are easily accessible through digital platforms at this Huduma Centre.	4.24	0.56
The system enables me to deliver services without requiring citizens to make physical visits.	4.08	0.62
Digital services at this centre face minimal barriers to delivery.	4.07	0.59
Services are provided faster through digital platforms than through manual processes.	4.22	0.55
Waiting times have significantly decreased with digital service adoption.	4.24	0.56
The Centre meets expected service delivery timelines through digital systems.	4.03	0.54
Our customers are satisfied with the quality of services offered through digital platforms.	4.30	0.55
The digital service platforms are easy to use and navigate.	4.28	0.51
Our customers are satisfied with the reliability of digital services at this Huduma Centre.	4.22	0.51
Overall Mean / SD	4.19	0.56

Source: Field Data (2025)

The overall mean for service delivery was  $M = 4.19$  with a standard deviation ( $SD$ ) = 0.56, suggesting that most respondents agreed that digital transformation had significantly improved service delivery in Huduma Centres, with moderate variability in perceptions across locations. Customer satisfaction with service quality recorded the highest mean ( $M = 4.30$ ,  $SD = 0.55$ ), indicating broad consensus that digital platforms provide reliable, high-quality services. Platform usability also rated highly ( $M = 4.28$ ,  $SD = 0.51$ ), showing that respondents found digital systems intuitive and easy to navigate, thus enhancing user experience. Accessibility and reduced waiting times both achieved  $M = 4.24$ , suggesting that services have become easier to access and that queue times have significantly decreased with digitalization. Timeline adherence registered the lowest mean ( $M = 4.03$ ), which, though positive, indicates some challenges in maintaining consistent service timelines across centres. The findings of this study align with several existing studies that define and explain the dynamics of service delivery in the digital governance context. Alvarenga et al. (2020) describe service delivery as the execution of public services through structured interactions between institutions and beneficiaries to achieve policy objectives.

Similarly, the OECD (2024) defines it as the capacity of public agencies to deliver timely, efficient, and satisfactory services that meet citizen needs. Sharma et al. (2023) conceptualize service delivery as a multidimensional construct integrating inclusivity, efficiency, and user experience as indicators of public value in digital governance. Idrus et al. (2024) further established that digitized service systems promote transparency, accountability, and responsiveness in public institutions. In addition, Tripathi et al. (2020) found that technology integration enhances administrative coordination and strengthens citizen engagement by minimizing bureaucratic bottlenecks. Collectively, these studies affirm that well-designed digital service frameworks significantly improve public sector performance, efficiency, and citizen trust—corroborating the findings of the current study in the Huduma Centres context. In

summary, the results confirmed that service delivery performance at Huduma Centres has been substantially enhanced through digital transformation. Quantitative data showed high mean scores across all indicators-accessibility, timeliness, and user satisfaction-while regression results established that digital transformation practices collectively explained over 64 percent of the variance in service delivery outcomes.

#### 4.4 Correlation Analysis

The correlation results are presented in Table 4.

**Table 4: Correlation analysis**

		Service delivery	Process automation
Service delivery	Pearson Correlation	1.000	
	Sig. (2-tailed)		
	Sig. (2-tailed)	0.000	
Process automation	Pearson Correlation	.578**	1.000
	Sig. (2-tailed)	0.000	

Note: \*\* The correlation is statistically significant at the 0.05 level ( $p < 0.05$ )

Source: Field Data (2025)

Process automation exhibits a significant positive correlation with service delivery ( $r=0.578$ ,  $p=0.000$ ), highlighting the importance of automated workflows and robotic process automation in driving service delivery improvements.

#### 4.5 Regression Analysis

The objective was to examine the effect of process automation on service delivery among Huduma Centres in the Nairobi Metropolitan Area, Kenya. The summary of the model fitness results for process automation and service delivery is presented in Table 5.

**Table 5: Model Fitness for Process Automation**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.578a	0.334	0.33	0.2602398

a Predictors: (Constant), Process Automation

Source: Field Data (2025)

The R Square value of 0.334 indicates that 33.4% of the variation in service delivery can be explained by process automation. This shows that process automation is an important driver of service delivery improvement, although its explanatory power is slightly lower than that of digital competencies and technological infrastructure.

**Table 6: Analysis of Variance (ANOVA) for Process Automation**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.629	1	4.629	68.355	.000b
	Residual	9.211	136	0.068		
	Total	13.84	137			

a Dependent Variable: Service Delivery

b Predictor: (Constant), Process Automation

Source: Field Data (2025)

The ANOVA results in Table 6 show a statistically significant model with  $F = 68.355$  and  $p = 0.000$ , confirming that process automation significantly influences service delivery. The p-value indicates that the relationship between process automation and service delivery is statistically significant and not due to random chance.

**Table 7: Regression of Coefficients for Process Automation**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.735	0.175		15.617	0.000
	Process Automation	0.358	0.043	0.578	8.268	0.000

Source: Field Data (2025)

The simple regression model becomes:

$$Y = 2.735 + 0.358X$$

Where:

Y = Service Delivery

X = Process Automation

The regression coefficient results in Table 7 show that process automation has a positive and significant effect on service delivery ( $\beta = 0.358$ ,  $p = 0.000$ ). This suggests that for one-unit increase in process automation, service delivery increases by 0.358 units holding other factors constant. Given that the p-value is less than 0.05, the study rejects the null hypothesis ( $H_0$ ), confirming there is a statistically significant effect of process automation on service delivery among Huduma Centres in Nairobi Metropolitan Area, Kenya. This suggests that process automation plays a crucial role in enhancing service delivery by streamlining processes and improving efficiency.

#### 4.6 Qualitative Data Analysis

Employees reported that automated workflows reduced duplication of effort, enabled real-time access to information, and streamlined approval processes. The implementation of digital queuing systems improved fairness and reduced complaints while allowing staff to focus on service delivery rather than crowd management. Process automation particularly benefited routine services such as document verification, payment processing, and information updates. Staff noted that digital systems enabled them to serve more customers per day while maintaining or improving service quality. Customer experiences with automated systems consistently emphasized speed improvements and enhanced service predictability. Queue management displays and real-time updates were particularly valued for reducing uncertainty and allowing customers to plan their time effectively. Customers appreciated knowing their exact position in queues and estimated waiting times, which reduced anxiety and the need for frequent status inquiries. The automation of service sequencing prevented bottlenecks and enabled more efficient resource utilization across service counters. Many customers noted that digital systems created calmer, more organized environments that facilitated faster service delivery for all users, not just those directly using digital options.

The efficiency improvements generated cascading benefits that extended beyond immediate service delivery to broader organisational and citizen outcomes. Employees reported that reduced processing times allowed them to handle increased service volumes without

proportional staff increases, improving overall center productivity and cost-effectiveness. The standardization of processes through digital systems reduced errors and inconsistencies, leading to fewer follow-up visits and customer complaints. Customers noted that efficient service delivery encouraged them to complete multiple transactions in single visits and increased their willingness to access government services proactively rather than reactively. The positive service experiences also generated word-of-mouth recommendations that attracted additional users to digital channels, creating a virtuous cycle of adoption and improvement.

## 5.1 Conclusion

The study concludes that process automation has a significant positive relationship with service delivery, though representing the smallest individual contribution among digital transformation practices. The standardized coefficient of  $\beta = 0.358$  indicates that automated workflows, digital queue management systems, and streamlined processes contribute meaningfully to service delivery improvement, supporting business process reengineering theory's emphasis on automation as an efficiency driver. This finding aligns with research by Wangari and Chege (2022) and Karanja and Waweru (2023), who demonstrated similar positive effects of automation on service efficiency. The moderate effect size suggests that automation functions most effectively as a complementary factor when supported by robust technological infrastructure and competent staff. This confirms that automated processes require adequate technological foundations and human resource capabilities to achieve optimal performance outcomes.

## 6.1 Recommendations

The study recommends that Huduma Centres fully integrate and standardise process automation systems to ensure seamless operation of queuing, biometric verification, digital ticketing, and workflow platforms. Partial automation should be eliminated as it reduces efficiency and accuracy. Centre managers should conduct regular workflow audits to remove bottlenecks and align systems with the National Registration Bureau and NTSA in real time. The ICT Authority should enforce uniform automation standards across all centres to ensure consistency. The Ministry of ICT should develop a clear automation roadmap under the Kenya Digital Masterplan 2022–2032. Backup systems should be mandatory to prevent service disruptions. County governments should allocate dedicated budgets for maintenance and technical support. The National Treasury should strengthen public-private partnerships to enhance investment and ensure equitable service delivery outcomes.

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