SERDEC Education Journal (SEJ)
Online ISSN: 2710-4796 https://sej.so/

Impact of E-government Adoption on Quality Service Delivery: Mediating role of Staff Satisfaction and Moderating effect IT Infrastructure

Abdulkadir Jeilani[1]
[1] Faculty of computer science and IT, Postgraduate Program and Research
DOI: 10.70595/sej112

Abstract

This study examines the impact of e-government adoption on quality service delivery, with a focus on the mediating role of staff satisfaction and the moderating role of IT infrastructure. The Technology, Organization, Environment (TOE) Framework and the Delone and McLean Information Systems Success Model were used as the basis for developing and validating the research model. Quantitative research design and purposive sampling technique were employed to collect data through structured questionnaires from 250 public sector employees. Structural Equation Modeling (SEM) was used to analyze relationships among the variables and test the mediation and moderating effects. Data analysis was conducted using AMOS - SPSS and SPSS to assess relationships and test hypotheses. The findings reveal that e-government adoption significantly improves staff satisfaction and quality service delivery. Staff satisfaction partially mediates the relationship between e-government adoption and quality service delivery, highlighting the importance of employee well-being. Additionally, top management support emerged as a critical factor for successful e-government implementation and enhanced service quality. Perceived IT infrastructure significantly moderates the relationship between e-government adoption and service quality but does not moderate the relationship between top management support and quality service delivery. This study offers valuable insights for policymakers and researchers, particularly in developing countries, by emphasizing the critical roles of staff satisfaction, top management support, and IT infrastructure in optimizing e-government adoption and enhancing service delivery. The research provides actionable implications for improving digital governance and achieving service efficiency in public sector organizations.

Keywords: E-government adoption; IT infrastructure; Staff satisfaction; Quality service delivery

Paper Type: Article

1 Introduction

Since the late 1980s, governments worldwide have embraced e-government systems rapidly. By 2020, 193 countries had implemented various forms of e-government to enhance their engagement with citizens(Vereinte, 2020). The United Nations supports e-government initiatives to enhance good governance aimed at achieving the Sustainable Development Goals for 2030, focusing on environmental, technological, socio-cultural, and political sustainability. Numerous countries are earnestly working to establish an environment conducive to e-government that aligns with these goals (Bhaskar et al., 2020). The expanding adoption of e-government applications also means that citizens increasingly use these platforms to interact with their government. E-government services include online portals for paying taxes, renewing driver's licenses, and accessing public yrecords(Lee-Geiller, 2024). Hence the major of the governments have made significant investments in e-government infrastructure and services in recent years, with the goal of making government more accessible, efficient, and transparent(NJ Office of Information Technology, 2023). E-government services include online portals for paying taxes, renewing driver's licenses, and accessing public records.

E-government adoption has emerged as a critical enabler of efficient, transparent, and accessible public service delivery, particularly in developing countries grappling with governance challenges(Alcaide Muñoz & Rodríguez Bolívar, 2017; Meiyanti et al., 2019; Samsor, 2021). Its value lies in transforming traditional bureaucratic processes into streamlined, citizen-centric services, fostering trust and satisfaction among stakeholders. However, the success of e-government systems depends heavily on top management support and staff satisfaction, which serve as key organizational drivers for adoption and effective implementation. Top management support plays a critical role in securing resources, addressing resistance, and fostering a culture that values technological innovation(Rana et al., 2015). Similarly, staff satisfaction is essential, as employees' willingness to engage with e-government systems can significantly impact their operational success(Aleisa, 2024). IT infrastructure is a fundamental enabler of e-government systems, providing the necessary technological backbone to support complex operations and ensure service delivery efficiency(Azamela et al., 2022).

The adoption of e-government systems has revolutionized public service delivery by enhancing transparency, efficiency, and accessibility(Ciborra, 2005; Siddiquee, 2016). However, the success of these systems relies on critical factors such as top management support, IT infrastructure, and staff satisfaction. The growing body of research on e-government, limited attention has been given to understanding the mediating effect of staff satisfaction in improving quality service delivery and moderating role IT infrastructure between e-government adoption system and perceived quality service delivery. Furthermore, the study integrates technology, organization, environment and DeLone and McLean Information Systems (IS) Success Model to seek empirical evidence and validation of the theoretical model outside of developed countries. In Somalia, the adoption of e-government services is still at an early stage. Factors such as limited internet access, digital literacy, shortage of e-government investment and infrastructure challenges could influence the pace and success of e-government initiatives. Thus, the study focuses on these two research questions: ***(1) How does staff satisfaction mediate the relationship between e-government adoption and perceived quality service delivery? (2) How does IT infrastructure moderate the relationships among e-government adoption, top management support, and perceived quality service delivery?***

2 Literature Review

2.1 Technology-Organization-Environment (TOE) Framework

The process by which a firm adopts and implements technological innovations is influenced by the technological context, the organizational context, and the environmental context(R Depietro, E Wiarda, 1990) . The TOE framework examines three critical contexts: the technological context, which focuses on the availability, reliability, and capability of IT infrastructure that supports e-government systems; the organizational context, which includes key factors such as top management support, staff satisfaction, and organizational readiness; and the environmental context, which considers external influences like government policies, user expectations, and market trends(Depietro et al., 1990). In the context of the study, we consider some of the variables in organizational context such as top management support, in technological context: IT infrastructure, e-government adoption.

2.2 DeLone and McLean IS Success Model

The **DeLone and McLean Information Systems (IS) Success Model**, initially proposed in 1992 and updated in 2003, offers a multidimensional framework for evaluating the success of information systems(W. H. DeLone & McLean, 2002; William H. DeLone & McLean, 2003). It identifies six interrelated dimensions: system quality, which assesses the technical performance and usability of the system; information quality, focusing on the relevance, accuracy, and completeness of the information provided; service quality, emphasizing user support and responsiveness; use, measuring system usage frequency and intensity; user satisfaction, reflecting the overall experience of users; and net benefits, capturing the broader impact of the system on organizational performance, decision-making, and productivity (William H. DeLone & McLean, 1992, 2003). The model emphasizes the cyclical relationship between system use, user satisfaction, and net benefits, highlighting their interdependence. While comprehensive, the IS Success Model has been critiqued for its reliance on subjective measures like user satisfaction and the complexity of causal relationships among its dimensions. We consider the variables: staff satisfaction, perceived quality service delivery,

2.3 E- government adoption

E-government adoption involves the integration of information and communication technology to enhance public service delivery, transparency, and civic engagement. E-government adoption involves the integration of digital technologies into government operations to enhance service delivery, transparency, and efficiency. E-government adoption has gained significant attention in research due to its potential to enhance government services and citizen engagement. The adoption process is influenced by various factors, including technological infrastructure, user acceptance, and organizational support. E-government can expedite public service processes, increase transparency, and minimize corruption by enabling more effective interagency collaboration through integrated information systems(Setyawan, 2024). E-government initiatives can transform the relationship between citizens and the state, building trust and fostering a more participatory democratic process(Zhang & Kaur, 2024). E-governance facilitates the balance of interests between citizens and the state by promoting transparency and public participation. It supports e-democracy by enabling automated interactions between government entities and the public(Iryna et al., 2024). However, the study posits that the E-government adoption has a positive and significant effect on perceived quality service delivery.

2.4 Top Management Support

Top management support continues to play a pivotal role in e-government implementation. Top management is responsible for ensuring that sufficient resources, including financial, human, and technological, are allocated to e-government projects. This is crucial for overcoming challenges such as lack of interoperability and technological expertise, as seen in the Khadamat portal case in Algeria(Makhlouf & Amine, 2023). Top management support plays a crucial role in e-government adoption and implementation. Studies have shown that top management commitment positively influences resource allocation and adoption intentions for government-to-government systems (Zheng et al., 2013). Top management support was found to have a strong direct and indirect effect on e-service adoption (Sokhea, 2019). Similarly, in Iraq, top management support was identified as a significant factor affecting cloud computing adoption for e-government implementation(Wahsh & Dhillon, 2015). However, challenges remain in effectively implementing e-government projects. In Algeria, despite political will for e-government initiatives, functional limitations such as lack of interoperability, unsuitable legislation, and limited technological expertise hinder progress (Makhlouf & Amine, 2023). These findings highlight the importance of top management support in overcoming barriers and driving successful e-government adoption across various contexts. Hence, it is hypothesized that Top management support has a positive and significant effect on e-government adoption.

2.5 Mediating role of staff Satisfaction

Staff satisfaction is closely linked to service delivery to citizens, as it influences the quality and effectiveness of public services. High levels of staff satisfaction can lead to improved performance, which in turn enhances citizen satisfaction. Satisfied staff are more likely to be engaged, leading to better service delivery and responsiveness to citizen needs(Citizens, 2022). Positive staff morale can enhance the quality of interactions between public servants and citizens, improving overall satisfaction with services(Paul Davidson, 2024). High staff satisfaction reduces turnover, allowing for better-trained personnel who can provide consistent and high-quality services(Mahmud, 2021). Satisfaction indicators are essential for assessing both staff and citizen experiences, helping to identify areas for improvement in service delivery(Citizens, 2022). Service quality was a significant mediator between system trust and e-government adoption, highlighting the importance of service quality in enhancing adoption intentions(Aldroubi & Yusof, 2024). E-government initiatives aim to improve service quality by leveraging technology for efficient public service delivery. In Aceh Singkil, Indonesia, e-government quality was found to have a partial effect on service quality, but staff satisfaction did not mediate this relationship effectively(Frinaldi et al., 2023). Therefore, the present study proposes staff satisfaction mediates the relationship between e-government adoption and perceived quality service delivery.

2.6 Moderating Effect IT Infrastructure

Inadequate technological infrastructure, including limited internet access, is a major impediment in developing countries. This digital divide is more pronounced between urban and rural areas(Alfiani et al., 2024). IT infrastructure flexibility is the extent to which a company's IT infrastructure can supply and integrate various hardware, software and communications technologies to quickly and efficiently deliver technical solutions(Byrd & Turner, 2000). The IT infrastructure domain, including hardware, software, networks, and communication channels, is key to providing better e-services(Gupta et al., 2015). Assessing the current status and e-readiness level of IT infrastructure is important for policymakers and budget planners in implementing effective e-government(Marasini & Shakya, 2015). Furthermore, ICT

infrastructure capability has a significant impact on e-governance performance, and its efficient deployment is crucial for effective e-government readiness(Deepak Dahiya, 2015). IT infrastructure forms the backbone of e-government systems, enabling real-time communication and service delivery. Investments in IT assets are essential for building infrastructure capability, which directly influences e-government performance(Dahiya & Mathew, 2018). interaction between information technology (IT) capability and knowledge integration (KI) capability in influencing business model design, focusing on efficiency-centered business model design (EBMD) and novelty-centered business model design (NBMD), found that both IT and KI capabilities positively affect EBMD and NBMD(Guo et al., 2021). Therefore, the study proposes that perceived IT Infrastructure moderates the relationship among e-government adoption, top management support, staff satisfaction and perceived quality service delivery.

2.7 Perceived Quality Service Delivery

E-government adoption significantly influences perceived quality in service delivery, enhancing efficiency, transparency, and citizen satisfaction. While e-government implementation alone may not directly impact satisfaction, perceived service quality significantly influences citizens' contentment (Mishra & Geleta, 2020b; Weerakkody et al., 2016). Key factors affecting e-government adoption and satisfaction include usefulness, information quality, system quality, trust, and cost(Orgeron & Goodman, 2011; Weerakkody et al., 2016) . Factors such as system usability, responsiveness, and information accuracy are key determinants of user satisfaction(Kalankesh et al., 2020). To ensure successful e-government implementation and enhance citizen satisfaction, governments should focus on improving service delivery, staff performance, and the overall quality of electronic services(Weerakkody et al., 2016). However, the study proposes perceived quality service delivery increase citizen satisfaction.

Based on the literature review above, the researchers proposed the following hypotheses:

H1: E-government adoption has a positive and significant effect on perceived quality service delivery

H2: E-government adoption has a positive and significant effect on staff satisfaction.

H3: Staff satisfaction has a positive and significant effect on perceived quality service delivery.

H4: Staff satisfaction mediates the relationship between e-government adoption and perceived quality service delivery.

H5: Top management support has a positive and significant effect on e-government adoption.

H6: Top management support has a positive and significant effect on perceived quality service delivery.

H7: Perceived IT infrastructure moderates the relationship between e-government adoption and perceived quality service delivery.

H8: Perceived IT infrastructure moderates the relationship between top management support and perceived quality service delivery.

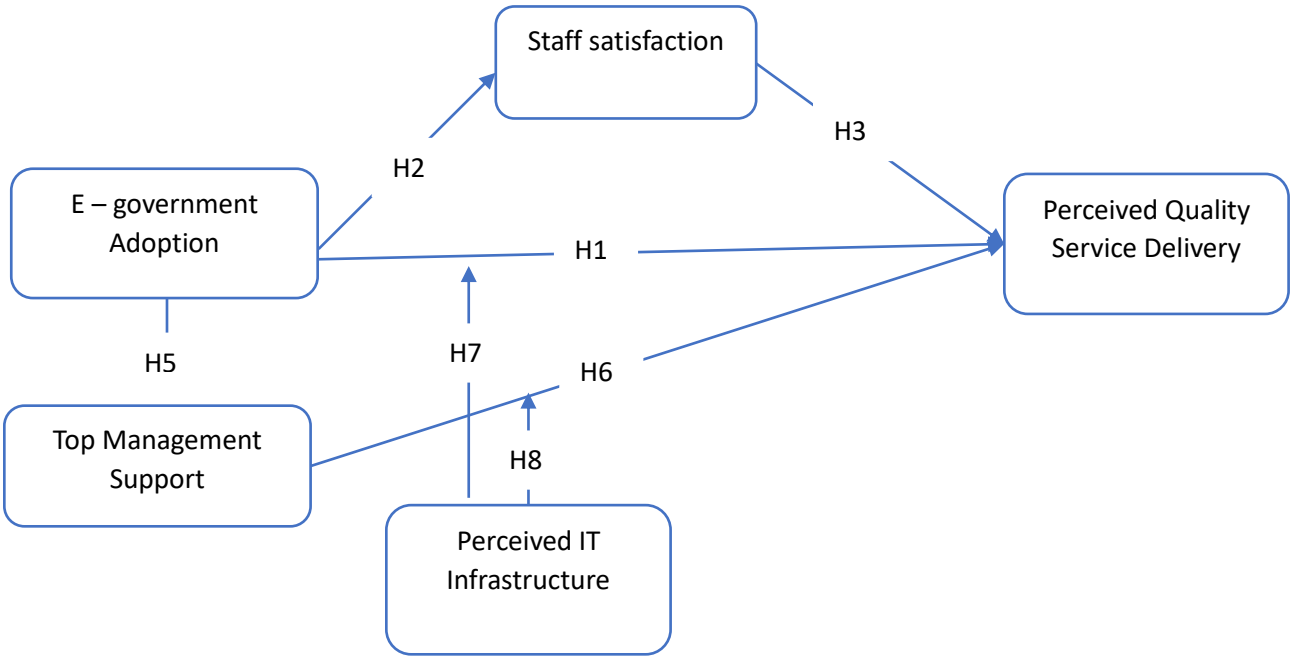


Figure 1. Research Model

3 Research Methodology

3.1 Research Design

This study employed a quantitative, cross-sectional survey design to investigate the mediating effect of staff satisfaction on the relationship between e-government adoption and perceived quality service delivery and the moderating effects of perceived IT infrastructure on the relationship between e-government adoption and perceived quality service delivery in public sector institutions in Somalia. A quantitative approach was chosen to enable the collection of measurable data, while the cross-sectional nature allowed for data collection at a single point in time to assess the relationships between variables.

3.2 Population and Sample

The target population comprised public sector employees in Somalia, including government officials involved in the implementation and management of e-government systems. Using purposive sampling, approximately 250 respondents were selected based on their roles, ensuring that participants had sufficient knowledge of e-government adoption and service delivery processes. This sample size was deemed adequate for structural equation modeling (SEM) and ensured the reliability and validity of statistical findings.

3.3 Data Collection Instruments

The primary data collection instrument was questionnaire designed to capture key variables relevant to the study through online platform. Table 1 shows the data file items. The questionnaire included Likert-scale items ranging from 1 (strongly disagree) to 5 (strongly agree) to measure perceptions of:

- E-government Adoption: The extent of integration and implementation of e-government systems in public sector operations.
- Perceived Quality Service Delivery: Employees' perceptions of the efficiency and effectiveness of service delivery following the adoption of e-government.
- Top Management Support: The level of leadership commitment and support for e-government initiatives.
- Staff Satisfaction: Employees' satisfaction with e-government systems and their impact on work processes.
- Perceived IT Infrastructure: The quality and availability of the technological infrastructure supporting e-government.

Table 1 the data file items

Constructs	Items remaining after measurement model	Source
E- government adoption (EGA)	EG1, EG2, EG3, EG4	(Shareef et al., 2011; Venkatesh et al., 2012)
Perceived Staff Satisfaction (PSS)	SS1, SS2, SS3	(William H. DeLone & McLean, 2003)
Top Management Support (TMS)	TM1, TM2, TM3, TM4	(Bass, B. M., & Avolio, 1955; Shao et al., 2017)
Perceived Quality Service Delivery (PQSD)	SD1, SD2, SD3, SD4	(Parasuraman, A; Zeithaml, Valarie A; Berry, 1988)
Perceived IT Infrastructure (PIT)	IT1, IT2, IT3	(Bharadwaj, 2000; Melville et al., 2004)

3.4 Data Analysis Techniques

Data were analyzed using Structural Equation Modeling (SEM) to explore the direct and moderated relationships between variables. SEM was chosen for its ability to test complex relationships and interaction effects simultaneously. Interaction terms, such as ITxEG (IT infrastructure and e-government adoption), and ITxTM (IT infrastructure and top management support), were created to examine the moderating role of perceived IT infrastructure.

Key statistical measures included:

- Estimate Values: Standardized regression coefficients to assess the strength of relationships.
- Standard Error (S.E.): To evaluate variability in the regression estimates.
- Critical Ratio (C.R.): The ratio of the estimate to its standard error, used to determine statistical significance.
- P-values: To assess the significance of the hypothesized relationships, with values below 0.05 considered statistically significant.

3.5 Data Collection Procedure

Data were collected through self-administered questionnaires distributed to the participants. Respondents were informed of the study’s purpose and assured of the confidentiality of their

responses. Completed questionnaires were reviewed for completeness and accuracy before proceeding to data analysis.

3.6 Ethical Considerations

The study adhered to ethical research practices, including obtaining informed consent from participants, ensuring anonymity and confidentiality of responses, and using the data exclusively for academic purposes. The research protocol was reviewed and approved Postgraduate Program & Research at Mogadishu University in Mogadishu, Somalia (Date: 01.08.2024, Decision No: 23). The study was carried out voluntarily.

4 Data analysis and results

The study utilized **Structural Equation Modeling (SEM)** to examine the relationships and interactions among the variables. SEM was selected because it allows for testing both the **measurement model** and the **structural model**, providing a comprehensive framework for analyzing complex relationships. Data analysis was conducted using AMOS - SPSS and SPSS to assess relationships and test hypotheses.

4.1 Measurement Model

The measurement model was used to validate the constructs and ensure reliability and validity. The study evaluated the **Construct Validity**: Assessed through factor loadings, ensuring that all items measured the intended constructs, items with low factor loadings (<0.6) were removed (Gefen & Straub, 2005). **Reliability**: Measured using Cronbach's alpha and Composite Reliability (CR) to confirm internal consistency. A threshold of 0.7 was considered acceptable for both measures(Ringle et al., 2020). **Convergent Validity**: Evaluated using Average Variance Extracted (AVE), with a threshold of 0.5 indicating that constructs explained a significant proportion of variance(Fornell & Larcker, 1981). **Discriminant Validity**: Ensured by comparing the square root of AVE with inter-construct correlations(Stephanie, 2015). Table 2 indicates the factor loadings and square multiple correlations. All squared multiple correlations (R-squared) should be a minimum of 0.40.(Bollen, 1989). Table 3 shows composite reliability, convergent validity and discriminant validity.

Table 2 factor loading and squared multiple correlations

Constructs	Items	Factor loading	SMC
	EGA2	0.584	0.341
Perceived E-government Adoption (EGA)	EGA3	0.797	0.635
	EGA4	0.755	0.57
	PSS1	0.695	0.483
Perceived Staff Satisfaction (PSS)	PSS2	0.755	0.57
	PSS3	0.745	0.555
	TMS1	0.776	0.602
Top Management Support (TMS)	TMS2	0.816	0.666
	TMS3	0.737	0.543
	TMS4	0.669	0.448
	PQSD1	0.708	0.501
	PQSD2	0.744	0.554
Perceived Quality Service Delivery (PQSD)	PQSD3	0.800	0.64
	PQSD4	0.715	0.511
	PIT1	0.515	0.265
Perceived IT Infrastructure (PIT)	PIT2	0.742	0.551
	PIT3	0.852	0.726

Table 3 Composite reliability, average variance extracted and Fornell–Larcker Criterion (the square root of average variance extracted (AVE) shown in bold on the diagonal).

	CR	**AVE**	**MSV**	**MaxR(H)**	**SD**	**EG**	**IT**	**TM**	**SS**
SD	0.831	0.552	0.520	0.835	**0.743**				
EG	0.775	0.513	0.325	0.803	0.560	**0.685**			
IT	0.753	0.514	0.520	0.809	0.721	0.564	**0.717**		
TM	0.838	0.565	0.471	0.846	0.686	0.570	0.511	**0.751**	
SS	0.776	0.536	0.329	0.778	0.468	0.548	0.424	0.574	**0.732**

SD= Staff satisfaction; EG= E-government adoption; TMS= Top Management Support; QSD= Quality Service Delivery; IT = IT infrastructure; CR = Composite Reliability; AVE = Average Variance Extracted; MVS= Maximum Shared Variance

4.2 Structural Model Analysis

The structural model analysis confirms the validity of all proposed hypotheses. H1, which posits that e-government adoption has a positive and significant effect on perceived quality service delivery, is supported (Estimate = 0.451, C.R. = 5.960, $p < 0.001$), indicating that implementing e-government systems enhances the quality of services provided. H2, asserting that e-government adoption positively influences staff satisfaction, is also supported (Estimate = 0.523, C.R. = 8.013, $p < 0.001$), emphasizing its role in improving employee experiences and morale. H3, which states that staff satisfaction positively affects perceived quality service delivery, is validated as well (Estimate = 0.234, C.R. = 3.573, $p < 0.001$), suggesting that satisfied employees contribute significantly to better service outcomes. Additionally, H5 and H6, which propose that top management support positively impacts both e-government adoption

(Estimate = 0.398, C.R. = 8.017, p < 0.001) and perceived quality service delivery (Estimate = 0.452, C.R. = 7.441, p < 0.001), are confirmed, highlighting the importance of strong leadership in driving and integrating e-government systems within public sector institutions and emphasis the critical role of leadership in ensuring effective service delivery by providing strategic guidance, resources, and oversight. . Overall, the findings confirm the importance of e-government adoption, staff satisfaction and top management support in enhancing service delivery quality. Table 4 shows the results of the hypotheses tested.

Table 4 Analysis of the hypotheses

			Estimate	S.E.	C.R.	P	Decision
Quality Service Delivery	<---	E-government adoption	.451	.076	5.960	***	Supported
Staff Satisfaction	<---	E-government adoption	.523	.065	8.013	***	Supported
Quality Service Delivery	<---	Staff Satisfaction	.234	.066	3.573	***	Supported
E-government adoption	<---	Top management support	.398	.050	8.017	***	Supported
Quality Service Delivery	<---	Top management support	.452	.061	7.441	***	Supported

4.3 Mediating analysis

The mediation analysis provides further insight by testing Hypothesis H4, which posits that staff satisfaction mediates the relationship between e-government adoption and perceived quality service delivery. The findings reveal a partial mediation effect, with the total effect of e-government adoption on service delivery being significant (Standardized estimation = 0.465, C.R. = 7.881, p < 0.001). Both the direct effect (Estimate = 0.451, C.R. = 6.178, p < 0.001) and the indirect effect through staff satisfaction (Estimate = 0.122, C.R. = 3.210, p = 0.002) contribute meaningfully, indicating that e-government adoption not only directly enhances service delivery but also indirectly improves it by enhancing staff satisfaction. These results validate all the hypotheses and underscore the interconnected roles of e-government adoption, staff satisfaction, and top management support in enhancing quality service delivery. In the table 5 shows the mediation analysis and figure 2. Figure 3 summarizes the results of research model.

Table 5. Mediation analysis

Relationship		Standardized estimation	C.R	P – value	Conclusion
H4: EGA →SS→QSD	Total Effects	0.465	7.881	0.000	Partially mediation
	Direct effects	0.451	6.178	0.000	
	Indirect effects	0.122	3.210	0.002	

EGA = E- government adoption; SS = Staff Satisfaction; QSD = Quality service delivery.

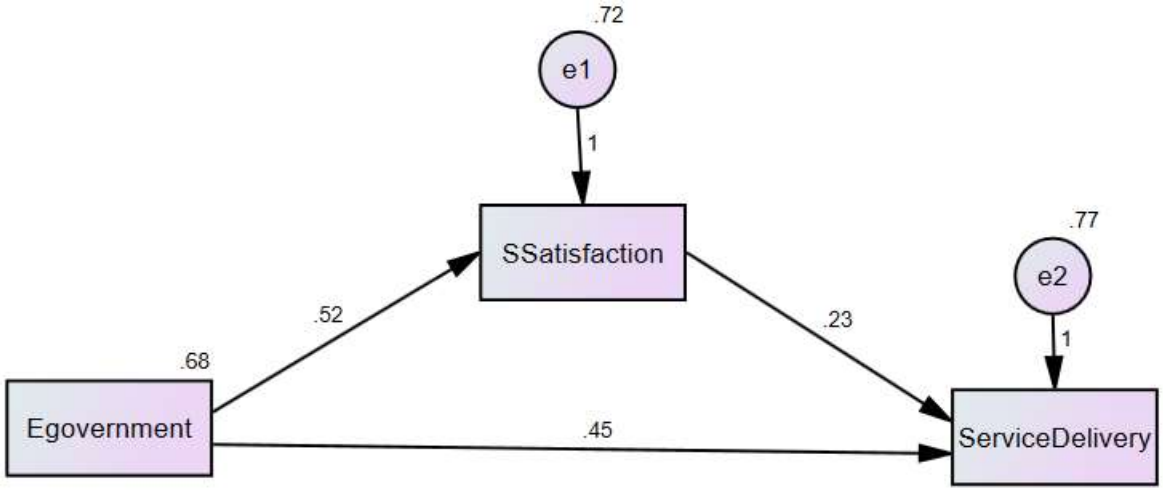


Figure 2. Mediation analysis.

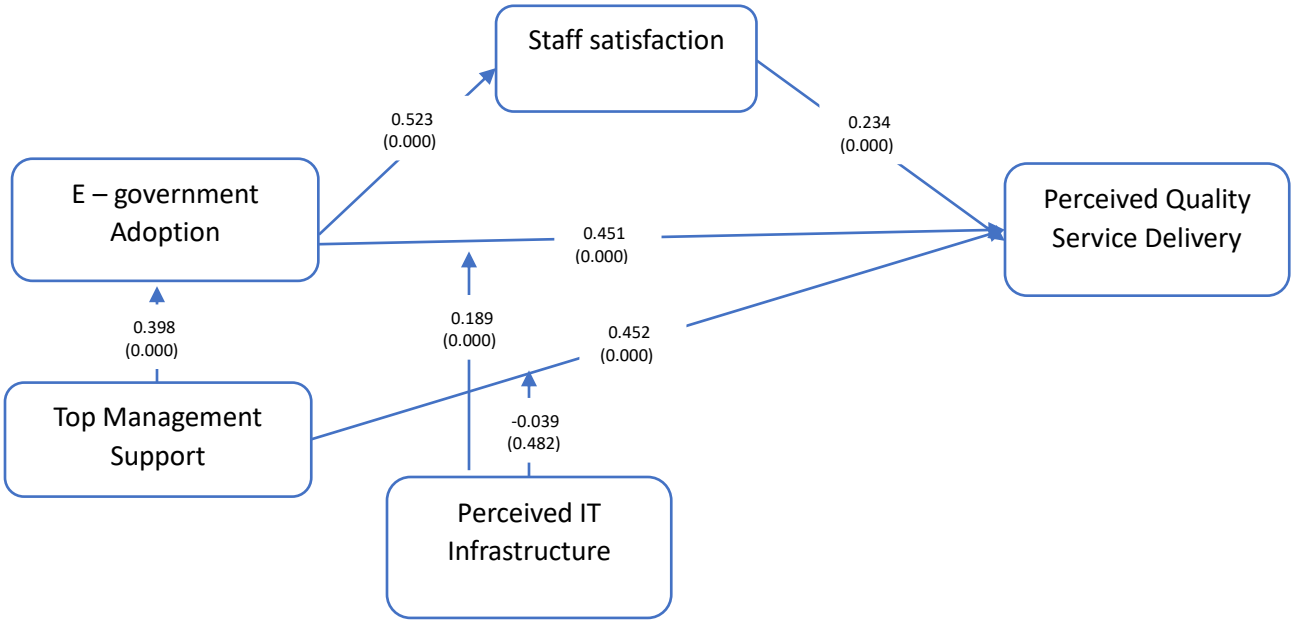


Figure 3. Results of research model

4.4 Moderating Analysis

The moderating analysis examined the role of **perceived IT infrastructure** in the relationships between e-government adoption, top management support, and perceived quality service delivery. The results indicated that **perceived IT infrastructure significantly moderated the relationship between e-government adoption and perceived quality service delivery (H5)** (Estimate = 0.189, P = 0.001). This finding suggests that high-quality IT infrastructure strengthens the positive impact of e-government adoption on service delivery. Conversely, the moderating effects of perceived IT infrastructure on **top management support and service delivery (H7)** (Estimate = -0.039, P = 0.482) were not significant. These results emphasize the critical role of IT infrastructure in maximizing the effectiveness of e-

government systems while showing its limited impact on the relationships involving staff satisfaction and top management support. In the table 6 indicates the moderating analysis, and figure 4.

Table 6. moderating analysis

			Estimate	S.E.	C.R.	P	Decision
Quality Service Delivery	<---	Interaction term ITxEG	.189	.055	3.446	***	Supported
Quality Service Delivery	<---	Interaction term ITxTM	-.039	.055	-.703	.482	Not supported

IT = IT infrastructure; EG= E-government; SS = Staff satisfaction; TM = Top management

- **IT x EG** (Interaction between IT Infrastructure and E-government Adoption)
- **IT x TM** (Interaction between IT Infrastructure and Top Management)

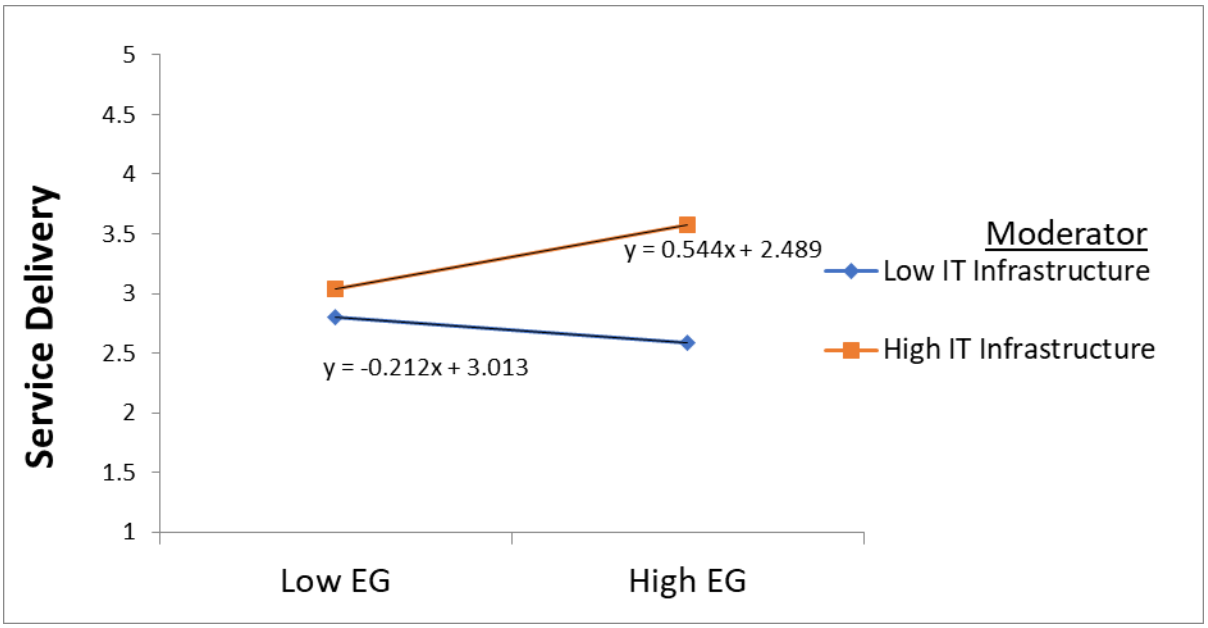


Figure 4. moderating analysis

4.5 Evaluation of the model fit

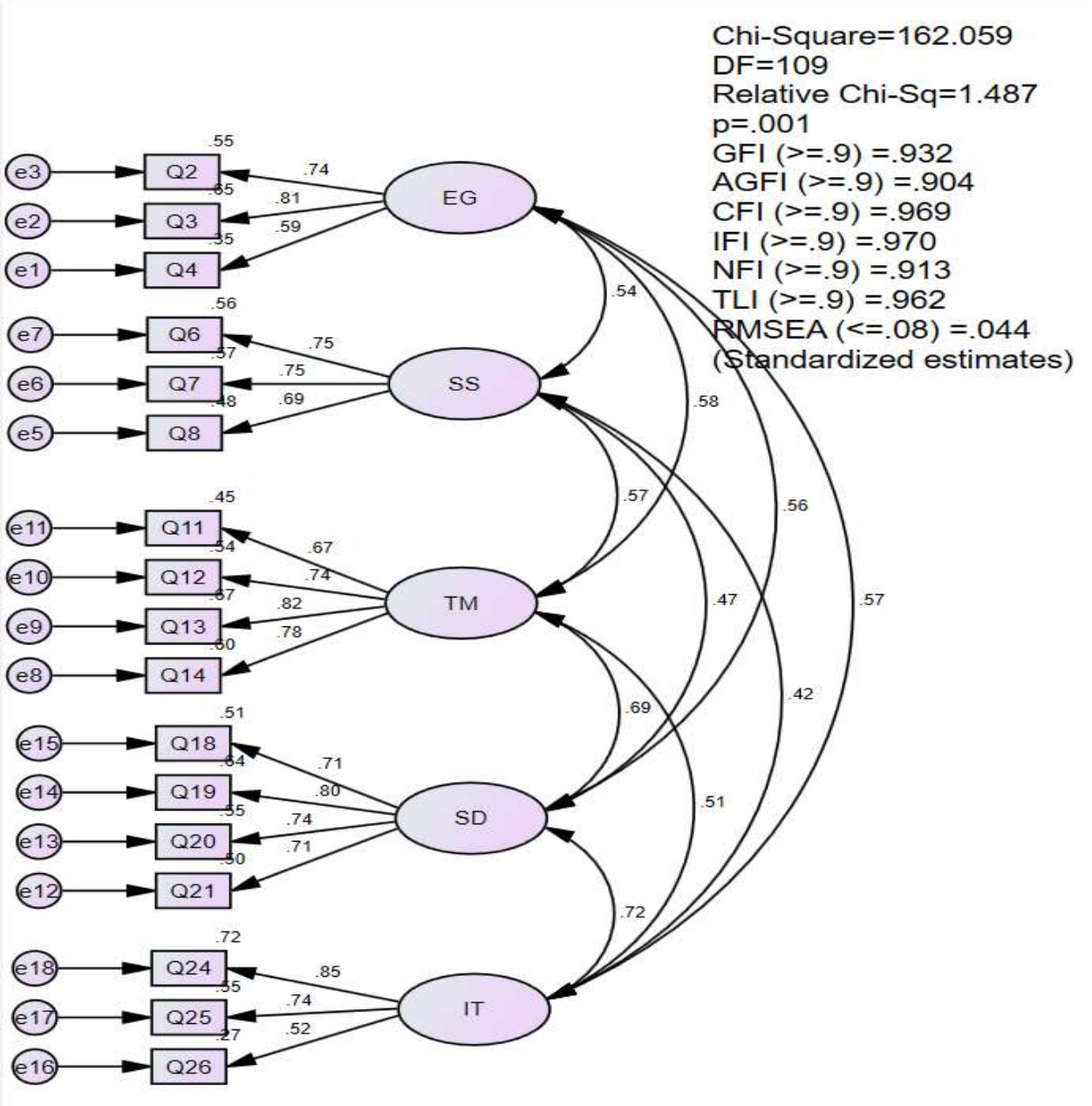
The evaluation of the model fit indicates that the research model demonstrates an excellent fit to the data, meeting or exceeding the recommended thresholds across multiple indices. The chi-square value (χ^2) of 177.447 with 125 degrees of freedom (df) is statistically significant (p = 0.001); however, given the sensitivity of chi-square to sample size, this significance is not a definitive indicator of poor fit. The relative chi-square (χ^2/df) value of 1.420 falls well below the recommended threshold of <3, indicating a strong fit. The Goodness of Fit Index (GFI) and Adjusted Goodness of Fit Index (AGFI) values are 0.923 and 0.903, respectively, exceeding the >0.90 threshold, which reflects that the model accounts for a high proportion of variance and adjusts well for model complexity. Incremental measures such as the Comparative Fit Index (CFI) and Incremental Fit Index (IFI) both show values of 0.971, while the Normed Fit Index (NFI) and Tucker-Lewis Index (TLI) are 0.909 and 0.964, respectively—all surpassing

the >0.90 benchmark, signifying strong incremental improvement over baseline models. The Root Mean Square Error of Approximation (RMSEA) is 0.041, significantly below the <0.08 cutoff, indicating close approximation of the model to the population. Similarly, the Standardized Root Mean Square Residual (SRMR) value of 0.0457, below the <0.08 threshold, suggests minimal residual discrepancies between observed and predicted values. Overall, the model's excellent fit provides confidence in its ability to accurately represent the hypothesized relationships and structure, supporting the validity of the findings and their interpretations.

Table7 shows model fit index. Figure 5 shows Measurement model and model fit indices.

Table7 model fit index

Fit measure	Recommended value	Value for the research model
Chi – square		177.447
Degrees of freedom (df)		125
Relative Chi-Sq	<3	1.420
P – value	<0.05	0.001
Good fit index (GFI)	>.90	0.923
Adjusted GFI	>.90	0.903
Comparative Fit Index (CFI)	>.90	0.971
Incremental Fit Index (IFI)	>.90	0.971
Normed Fit Index (IFI)	>.90	0.909
Tucker Lewis Index (TLI)	>.90	0.964
Root means square error of approximation (RMSEA)	<0.08	0.041
Standardized RMR	<0.08	.0457



EG = e-government adoption; SS = staff satisfaction; TM= top management; SD = Service delivery; IT= IT infrastructure.

Figure 5. Measurement model and model fit indices.

5 Discussion

This study aimed to examine the relationships among e-government adoption, top management support, staff satisfaction, and perceived quality of service delivery in Somalia's public sector, with a particular focus on the mediating effects of staff satisfaction and moderating role of perceived IT infrastructure. The

findings provide valuable insights into the factors influencing the success of e-government systems in enhancing service delivery quality.

The study confirmed that e-government adoption positively and significantly affects perceived quality of service delivery. E-government adoption has been widely recognized as a transformative mechanism for streamlining processes, improving transparency, and fostering accountability in public service delivery (Aleisa, 2024; Alzahrani et al., 2017; Zeebaree et al., 2023) This finding aligns with prior research highlighting the potential of e-government systems to improve service efficiency, accessibility, and transparency. For instance, a systematic review by Bhaskar (Bhaskar et al., 2020) and emphasizes the ability of e-government systems to reduce inefficiencies, improve access to services, and enhance organizational performance(Mohammed Alshehri & Steve Drew, 2010; Savoldelli et al., 2014).

Staff satisfaction plays a crucial role in amplifying the benefits of e-government adoption. The implementation of e-government systems often involves automating repetitive tasks, improving information access, and providing tools that enable employees to perform their roles more effectively(Ziemba et al., 2016). These enhancements positively impact employee morale, job satisfaction, and engagement, which are integral to delivering high-quality services(Stefanovic et al., 2016). This aligns with some existing literature(Alkraiji & Ameen, 2022; Uzir et al., 2021; West, 2004) suggesting that a satisfied workforce is often more productive and engaged, contributing to improved service quality. In this study, it is possible that other factors, such as system usability, training, or the external customer experience, have a more direct impact on service delivery quality than employee satisfaction.

The results also highlighted the significant role of top management support in both e-government adoption and perceived quality of service delivery. The strong relationship between top management support and these outcomes underscores the critical influence of leadership in facilitating the adoption and effective utilization of e-government systems. Leaders who prioritize e-government initiatives by allocating resources, fostering a supportive culture, and addressing challenges are instrumental in driving successful outcomes. This finding corroborates previous studies emphasizing leadership's role in adopting technological innovations in public sector institutions. For example, a study by Aleisa (Bhaskar et al., 2020) identifies top management support as a key factor influencing e-government adoption. When top management provides robust support, including IT infrastructure and continuous training, employees are more likely to embrace technological changes, resulting in improved satisfaction and service delivery outcomes(Apleni & Smuts, 2020). This study reaffirms the importance of leadership in fostering a culture of innovation and adaptability, which are essential for the success of e-government systems.

However, a key contribution of this study lies in highlighting the mediating role of staff satisfaction in the relationship between e-government adoption and quality service delivery. The mediation analysis demonstrated that, while e-government adoption directly influences quality service delivery, this impact is significantly strengthened when staff satisfaction is high. This finding aligns with previous research, which has shown that employee satisfaction is a critical determinant of successful organizational outcomes in technology adoption contexts (Mishra & Geleta, 2020a; Nawafleh, 2020; Qatawneh et al., 2024).

Finally, the moderating role of perceived IT infrastructure was also examined. IT infrastructure significantly strengthened the relationship between e-government adoption and perceived quality of service delivery, highlighting its critical role in ensuring the success of e-government initiatives. Without robust and reliable IT infrastructure, the potential benefits of e-government systems may remain

unrealized, the study consistency with the prior studies. However, perceived IT infrastructure did not significantly moderate the relationships between staff satisfaction and service delivery or between top management support and service delivery. These findings suggest that IT infrastructure primarily enhances the technical and operational aspects of e-government adoption, while its influence on employee satisfaction or leadership effectiveness may be indirect or less pronounced.

6 Implications

Theoretically, the study advances the body of knowledge on e-government adoption by demonstrating the critical roles of top management support and IT infrastructure in enhancing service delivery quality. This aligns with established frameworks like the Technology-Organization-Environment (TOE) and DeLone and McLean IS Success Model theories, reaffirming the importance of organizational leadership and technological readiness in driving successful e-government outcomes. Additionally, the lack of a direct relationship between staff satisfaction and service delivery challenges existing literature, suggesting that contextual or structural factors may hold greater influence in developing countries like Somalia. By highlighting the mediating effect of staff satisfaction in the relationship between e-government adoption and quality service delivery and moderating role of IT infrastructure in the relationship between e-government adoption and service delivery quality, the study enriches theoretical models by emphasizing the operationalization of technological capabilities. Furthermore, this research addresses a critical gap by providing insights into e-government adoption in a developing country context, broadening the applicability of theoretical models to underrepresented regions.

Practically, the study provides actionable recommendations for policymakers and public sector leaders. Policymakers should prioritize investments in robust and scalable IT infrastructure to enhance the success of e-government initiatives and improve service delivery. Leadership development programs are essential to train public sector leaders to succuss e-government initiatives, allocate resources effectively, and foster a culture of innovation. While staff satisfaction partial mediates the relationship between e-government adoption and quality service delivery. A phased implementation approach focusing on leadership and infrastructure readiness is recommended to maximize the benefits of e-government systems. Context-sensitive strategies, such as leveraging mobile-based e-government services, can address the unique challenges of Somalia’s public sector, including political instability and resource constraints. Finally, the insights from this study can inform e-government initiatives in other developing countries facing similar challenges, encouraging knowledge sharing and best practice exchanges across the region. By addressing both theoretical and practical dimensions, this study provides a comprehensive framework for understanding and implementing e-government initiatives to improve public service delivery.

Limitations and Future Directions

The study has several limitations that should be acknowledged to guide future research. The research model was validated within a specific geographical context, which limits the generalizability of the findings to other regions with differing socio-economic or cultural settings. Additionally, the cross-sectional design restricts the ability to establish causal relationships, suggesting the need for longitudinal studies to better understand the dynamics over time. The focus on staff satisfaction as a mediator and IT infrastructure as a moderator excludes other potentially influential factors, such as organizational culture, technological readiness, or citizen engagement, which could enhance the comprehensiveness of the model. Future studies can enhance the applicability and depth of the findings and contribute to a more comprehensive understanding of e-government success.

Declaration of Competing Interest

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Alcaide Muñoz, L., & Rodríguez Bolívar, M. P. (2017). Experiences of e-government development implementation in developing countries: Challenges and solutions. In L. Alcaide Muñoz & M. P. Rodríguez Bolívar (Eds.), *International E-Government Development: Policy, Implementation and Best Practice* (pp. 3–18). Springer International Publishing. https://doi.org/10.1007/978-3-319-63284-1_1

Aldroubi, W. A. E., & Yusof, Y. (2024). The Mediating Role of Service Quality in System Trust and E-Government Adoption in Jordan. *Journal of Economics, Finance and Management Studies*.

Aleisa, N. (2024). Key factors influencing the e-government adoption: a systematic literature review. *Journal of Innovative Digital Transformation*, *1*(1), 14–31. https://doi.org/10.1108/jidt-09-2023-0016

Alfiani, H., Kurnia Aditya, S., Lusa, S., Indra Sensuse, D., Wibowo Putro, P. A., & Indriasari, S. (2024). E-Government Issues in Developing Countries Using TOE and UTAUT Frameworks: A Systematic Review. *Policy & Governance Review*, *8*(2), 169. https://doi.org/10.30589/pgr.v8i2.932

Alkraiji, A., & Ameen, N. (2022). The impact of service quality, trust and satisfaction on young citizen loyalty towards government e-services. *Information Technology & People*, *35*(4), 1239–1270. https://doi.org/10.1108/ITP-04-2020-0229

Alzahrani, L., Al-Karaghouli, W., & Weerakkody, V. (2017). Analysing the critical factors influencing trust in e-government adoption from citizens' perspective: A systematic review and a conceptual framework. *International Business Review*, *26*(1), 164–175. https://doi.org/https://doi.org/10.1016/j.ibusrev.2016.06.004

Apleni, A., & Smuts, H. (2020). *An e-Government Implementation Framework: A Developing Country Case Study BT - Responsible Design, Implementation and Use of Information and Communication Technology* (M. Hattingh, M. Matthee, H. Smuts, I. Pappas, Y. K. Dwivedi, & M. Mäntymäki (eds.); pp. 15–27). Springer International Publishing.

Azamela, J. C., Tang, Z., Ackah, O., & Awozum, S. (2022). Assessing the Antecedents of E-Government Adoption: A Case of the Ghanaian Public Sector. *SAGE Open*, *12*(2). https://doi.org/10.1177/21582440221101040

Bass, B. M., & Avolio, B. J. (1955). Multifactor Leadership Questionnaire. *APA Style*.

Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly: Management Information Systems*, *24*(1), 169–193. https://doi.org/10.2307/3250983

Bhaskar, P., Vinay, M., & Joshi, A. (2020). E-government adoption among employees: A systematic review-derived conceptual framework. *Transforming Human Resource Functions With Automation*, 20–43. https://doi.org/10.4018/978-1-7998-4180-7.ch002

Bollen, K. A. (1989). A New Incremental Fit Index for General Structural Equation Models. *Sociological Methods & Research*. https://doi.org/10.1177/0049124189017003004

Byrd, T. A., & Turner, D. E. (2000). Measuring the flexibility of information technology infrastructure: Exploratory analysis of a construct. *Journal of Management Information Systems*, *17*(1), 167–208. https://doi.org/10.1080/07421222.2000.11045632

Ciborra, C. (2005). Interpreting e-government and development: Efficiency, transparency or governance at a distance? *Information Technology and People*, *18*(3), 260–279. https://doi.org/10.1108/09593840510615879

Citizens, S. (2022). *Serving Citizens Scorecards*. 226–231. https://doi.org/10.1787/gov_glance-2017-81-en

Dahiya, D., & Mathew, S. K. (2018). IT infrastructure capability and eGovernment system performance: an empirical study. *Transforming Government: People, Process and Policy*, *12*(1), 16–38. https://doi.org/10.1108/TG-07-2017-0038

Deepak Dahiya, S. K. M. (2015). *Impact of ICT Infrastructure Capability on E-Governance Performance: Proposing an Analytical Framework*.

DeLone, W. H., & McLean, E. R. (2002). Information systems success revisited. *Proceedings of the Annual Hawaii International Conference on System Sciences*, *2002-Janua*, 2966–2976. https://doi.org/10.1109/HICSS.2002.994345

DeLone, William H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60–95. https://doi.org/10.1287/isre.3.1.60

DeLone, William H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9–30. https://doi.org/10.1080/07421222.2003.11045748

Depietro, R., Wiarda, E., & Fleischer, M. (1990). The context for change: Organization, technology and environment. In *The processes of technological innovation* (Issue January, pp. 151–175). https://doi.org/10.1007/978-1-4419-1142-1

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39. https://doi.org/10.2307/3151312

Frinaldi, A., Saputra, B., Embi, M. A., Habibie, D. K., & Hashanah, F. (2023). Mediation effect of job satisfaction: Work motivation and e-government on service quality in the government of aceh singkil, Indonesia. *Journal of Public and Nonprofit Affairs*, *9*(3), 317–337. https://doi.org/10.20899/jpna.9.3.317-337

Gefen, D., & Straub, D. (2005). A Practical Guide To Factorial Validity Using PLS-Graph: Tutorial And Annotated Example. *Communications of the Association for Information Systems*, *16*(July). https://doi.org/10.17705/1cais.01605

Guo, J., Zhou, S., Chen, J., & Chen, Q. (2021). How information technology capability and knowledge integration capability interact to affect business model design:A polynomial regression with response surface analysis. *Technological Forecasting and Social Change*, *170*(May), 120935. https://doi.org/10.1016/j.techfore.2021.120935

Gupta, A., Shakya, S., & Marasini, S. (2015). *E-Readiness Assessment for Ministries of Nepal for Implementation of e-government*. 155–162. https://doi.org/10.17758/erpub.r815215

Iryna, K., Mukola, M., & Nadia, M. (2024). *УДК 330 КРАВЕЦЬ Ірина МИКУЛЕЦЬ Микола МАТІЙЧУК Надія ELECTRONIC GOVERNMENT AS A TOOL FOR ENSURING THE BALANCE OF*. 54–58.

Kalankesh, L. R., Nasiry, Z., Fein, R., & Damanabi, S. (2020). Factors Influencing User Satisfaction with Information Systems: A Systematic Review. *Galen Medical Journal*, *9*, e1686. https://doi.org/10.31661/gmj.v9i0.1686

Lee-Geiller, S. (2024). The Moderating Effect of Digital Literacy on the Link between E-government Effectiveness and Trust in Government. *SSRN Electronic Journal*, 1–41. https://doi.org/10.2139/ssrn.4811022

Mahmud, R. (2021). Citizen satisfaction in the service delivery of city corporations in Bangladesh. *Scholars Journal of Research in Social Science*, *1*(2), 1–13. https://doi.org/10.5281/zenodo.5703382

Makhlouf, L., & Amine, F. (2023). Top management support for e-governement project implementation: Case study of Khadamat's portal in Algeria. *International Journal of Public Administration, Management and Economic Development*, *8*(1), 74–87. https://doi.org/10.60026/ijpamed.v8i1.87

Marasini, S., & Shakya, S. (2015). E-Readiness : A Study of Infrastructure for E-Government of Nepal. *International Journal of Computer Science and Mobile Computing*, *4*(12), 30–34.

Meiyanti, R., Utomo, B., Sensuse, D. I., & Wahyuni, R. (2019). E-Government Challenges in Developing

Countries: A Literature Review. *2018 6th International Conference on Cyber and IT Service Management, CITSM 2018*, 1–6. https://doi.org/10.1109/CITSM.2018.8674245

Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Review: Information technology and organizational performance: An integrative model of it business value. *MIS Quarterly: Management Information Systems*, *28*(2), 283–322. https://doi.org/10.2307/25148636

Mishra, S. S., & Geleta, A. T. (2020a). Can an E-Government System Ensure Citizens' Satisfaction without Service Delivery? *International Journal of Public Administration*, *43*(3), 242–252. https://doi.org/10.1080/01900692.2019.1628053

Mishra, S. S., & Geleta, A. T. (2020b). Can an E-Government System Ensure Citizens' Satisfaction without Service Delivery? *International Journal of Public Administration*, *43*(3), 242–252. https://doi.org/10.1080/01900692.2019.1628053

Mohammed Alshehri, & Steve Drew. (2010). Challenges of e-Government Services Adoption in Saudi Arabia from an e-Ready Citizen Perspective. *World Academy of Science, Engineering and Technology*, 1053–1059.

Nawafleh, S. (2020). The implementation of e-government and the trust of citizens in public sector performance: The mediating role of service quality. *International Journal of Public Sector Performance Management*, *6*(1), 17–35. https://doi.org/10.1504/IJPSPM.2020.105086

NJ Office of Information Technology. (2023). *IT Business & Technology Strategic Plan*.

Orgeron, C. P., & Goodman, D. (2011). Evaluating citizen adoption and satisfaction of e-government. *International Journal of Electronic Government Research*, *7*(3), 57–78. https://doi.org/10.4018/jegr.2011070104

Parasuraman, A; Zeithaml, Valarie A; Berry, L. L. (1988). Servqual: A Multiple-Item Scale For Measuring Consumer Perc. *Journal of Retailing*.

Paul Davidson. (2024). *Satisfaction with public services*. https://doi.org/10.1787/3df671dd-en

Qatawneh, N., Al-Okaily, M., Alkhasawneh, R., Althonayan, A., & Tarawneh, A. (2024). The mediating role of e-trust and e-satisfaction in the relationship between e-service quality and e-loyalty toward e-government services. *Global Knowledge, Memory and Communication*, *ahead-of-p*(ahead-of-print). https://doi.org/10.1108/GKMC-07-2023-0263

R Depietro, E Wiarda, M. F. (1990). The context for change: Organization, technology and environment. *The Processes of Technological Innovation*.

Rana, N. P., Dwivedi, Y. K., Williams, M. D., & Weerakkody, V. (2015). Investigating success of an e-government initiative: Validation of an integrated IS success model. *Information Systems Frontiers*, *17*(1), 127–142. https://doi.org/10.1007/s10796-014-9504-7

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2020). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, *31*(12), 1617–1643. https://doi.org/10.1080/09585192.2017.1416655

Samsor, A. M. (2021). Challenges and Prospects of e-Government implementation in Afghanistan. *International Trade, Politics and Development*, *5*(1), 51–70. https://doi.org/10.1108/itpd-01-2020-0001

Savoldelli, A., Codagnone, C., & Misuraca, G. (2014). Understanding the e-government paradox: Learning from literature and practice on barriers to adoption. *Government Information Quarterly*, *31*, S63–S71. https://doi.org/https://doi.org/10.1016/j.giq.2014.01.008

Setyawan, A. C. (2024). *Enhancing Public Service Delivery through Digital Transformation : A Study on the Role of E-Government in Modern Public Administration Open Access*.

Shao, Z., Feng, Y., & Hu, Q. (2017). Impact of top management leadership styles on ERP assimilation and the role of organizational learning. *Information and Management*, *54*(7), 902–919. https://doi.org/10.1016/j.im.2017.01.005

Shareef, M. A., Kumar, V., Kumar, U., & Dwivedi, Y. K. (2011). e-Government Adoption Model (GAM): Differing service maturity levels. *Government Information Quarterly*, *28*(1), 17–35. https://doi.org/https://doi.org/10.1016/j.giq.2010.05.006

Siddiquee, N. A. (2016). E-government and transformation of service delivery in developing countries: The Bangladesh experience and lessons. *Transforming Government: People, Process and Policy*, *10*(3), 368–390. https://doi.org/10.1108/TG-09-2015-0039

Sokhea, S. (2019). The Influence of Organization Factor on E-service Adoption: The Case of Cambodia. *Journal of Energy Technologies and Policy*, *9*(1), 33–41. https://doi.org/10.7176/jetp/9-1-04

Stefanovic, D., Marjanovic, U., Delić, M., Culibrk, D., & Lalic, B. (2016). Assessing the success of e-government systems: An employee perspective. *Information & Management*, *53*(6), 717–726. https://doi.org/https://doi.org/10.1016/j.im.2016.02.007

Stephanie. (2015). *Convergent Validity and Discriminant Validity: Definition, Examples - Statistics How To*. https://www.statisticshowto.com/convergent-validity/

Uzir, M. U. H., Al Halbusi, H., Thurasamy, R., Thiam Hock, R. L., Aljaberi, M. A., Hasan, N., & Hamid, M. (2021). The effects of service quality, perceived value and trust in home delivery service personnel on customer satisfaction: Evidence from a developing country. *Journal of Retailing and Consumer Services*, *63*, 102721. https://doi.org/https://doi.org/10.1016/j.jretconser.2021.102721

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly: Management Information Systems*, *36*(1), 157–178. https://doi.org/10.2307/41410412

Vereinte, N. (2020). *Digital government in the decade of action for sustainable development*.

Wahsh, M. A., & Dhillon, J. S. (2015). An investigation of factors affecting the adoption of cloud computing for E-government implementation. *2015 IEEE Student Conference on Research and Development (SCOReD)*, 323–328. https://doi.org/10.1109/SCORED.2015.7449349

Weerakkody, V., Irani, Z., Lee, H., Hindi, N., & Osman, I. (2016). Are U.K. Citizens Satisfied With E-Government Services? Identifying and Testing Antecedents of Satisfaction. *Information Systems Management*, *33*(4), 331–343. https://doi.org/10.1080/10580530.2016.1220216

West, D. M. (2004). E-Government and the Transformation of Service Delivery and Citizen Attitudes. *Public Administration Review*, *64*(1), 15–27. https://doi.org/10.1111/j.1540-6210.2004.00343.x

Zeebaree, M., Aqel, M., & Agoyi, M. (2023). Challenges Facing E-government Implementation and Adoption in the Era of 5G, 6G. *Journal of Internet Technology*, *24*(1), 173–184. https://doi.org/10.53106/160792642023012401016

Zhang, M., & Kaur, M. (2024). Toward a theory of e-government: Challenges and opportunities, a literature review. *Journal of Infrastructure, Policy and Development*, *8*(10), 1–27. https://doi.org/10.24294/jipd.v8i10.7707

Zheng, D., Chen, J., Huang, L., & Zhang, C. (2013). E-government adoption in public administration organizations: integrating institutional theory perspective and resource-based view. *European Journal of Information Systems*, *22*(2), 221–234. https://doi.org/10.1057/ejis.2012.28

Ziemba, E., Papaj, T., Żelazny, R., & Jadamus-Hacura, M. (2016). Factors Influencing The Success Of E-Government. *Journal of Computer Information Systems*, *56*(2), 156–167. https://doi.org/10.1080/08874417.2016.1117378