ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

ROOT CAUSE ANALYSIS OF E-GOVERNMENT SERVICES QUALITY FAILURE IN ETHIOPIA

By: ERMIAS GETNET GSE/2775/14

Advisor: LEMMA LESSA (PhD)

June, 2024

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

SCHOOL OF INFORMATION SCIENCE

ROOT CAUSE ANALYSIS OF E-GOVERNMENT SERVICES QUALITY FAILURE IN ETHIOPIA

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Information Science and Systems (*Information Systems Specialization*)

By: ERMIAS GETNET

Advisor: LEMMA LESSA (PhD)

June, 2024

Addis Ababa, Ethiopia

ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCE

SCHOOL OF INFORMATION SCIENCE

ROOT CAUSE ANALYSIS OF E-GOVERNMENT SERVICES QUALITY FAILURE IN ETHIOPIA

By: ERMIAS GETNET

Name and signature of Members of the Examining Board

Lemma Lessa (PhD)	_____	_____
Advisor	Signature	Date
Million Meshesha (PhD)	_____	_____
Examiner	Signature	Date
Getachew Hailemariam(PhD)	_____	_____
Examiner	Signature	Date

Declaration

This thesis has not previously been accepted for any degree and is not being concurrently submitted in candidature for any degree in any university.

I declare that this thesis entitled "ROOT CAUSE ANALYSIS OF E-GOVERNMENT SERVICES QUALITY FAILURE IN ETHIOPIA" is a result of my own investigation, except where otherwise stated. I have undertaken the study independently with the guidance and support of my research advisor. Other sources are acknowledged by citations giving explicit references. A list of references is appended.

Signature: _____

Ermias Getnet

This thesis has been submitted for examination with my approval as university advisor.

Advisor's Signature: _____

Lemma Lessa (PhD)

Acknowledgments

Praise be to God, whose boundless mercy and wisdom have been a constant source of inspiration and strength throughout my research journey. I am profoundly grateful to my advisor, Lemma Lessa (PhD), whose exceptional mentorship and academic rigor have not only shaped this work but have also inspired and energized me. Lemma's enthusiasm and constructive feedback have been crucial in overcoming the challenges encountered during my research.

I would like to extend my gratitude to the staff of the Ministry of Innovation (MiNT), Ministry of Revenue (MoR), Public Servant Social Security Agency (PSSSA), and Ethiopian Construction Authority (ECA) for their involvement in this study. Additionally, I am deeply thankful to all my interview respondents for their willingness to participate and for sharing their insights on the quality of E-government services.

I must also express my heartfelt appreciation to my family and friends, whose unwavering belief in my abilities and endless words of encouragement have buoyed my spirits and sustained my resolve. Your praises and faith in my work have been a source of immense motivation, making this journey not only possible but also enjoyable.

Each of you has contributed significantly to my personal and professional growth, and for this, I am eternally grateful.

Ermias Getnet

June, 2024

Addis Ababa, Ethiopia

Abstract

The digital transformation of governmental services, known as e-government, aims to enhance the efficiency, transparency, and accessibility of public services. Despite the potential benefits, the implementation of e-government in Ethiopia has faced significant challenges, leading to notable service quality failures. This study investigates the root causes of these failures through a comprehensive analysis. The study employs a mixed-method approach using survey data from 525 users of e-government services and in-depth interviews with key stakeholders, this research identifies critical factors contributing to the quality failure of e-government services in Ethiopia. The study applies the eGovQual framework and Root Cause Analysis (RCA) methods, including the Fishbone (Ishikawa) diagram and the 5 Whys technique, to systematically uncover the underlying issues.

Key findings indicate that infrastructure limitations, inadequate legal and regulatory frameworks, low digital literacy, and public awareness significantly impact the quality of e-government services. The research highlights that these factors lead to issues such as poor service reliability, lack of user trust, and insufficient support and functionality of the interaction environment.

The study provides actionable recommendations for policymakers and stakeholders to address these root causes. Enhancing infrastructure, developing robust legal frameworks, improving digital literacy, and increasing public awareness are essential steps to improve e-government service quality. The insights gained from this research are crucial for guiding strategic planning and policy-making, aiming to foster an inclusive, efficient, and reliable digital government infrastructure in Ethiopia

Keywords: *E-government, e-government failure, Digital transformation, e-Service quality*

Contents

List of Figures

List of Tables

List of Acronyms

ECA	Ethiopian Construction Agency
EGDI	E-Government Development Index
EPI	E-Participation Index
GTP	Growth and Transformation Plan
HCI	Human Capital Index
MINT	Ministry of Innovation
MOR	Ministry Of Revenue
OECD	Organization for Economic Co-operation and Development
OSI	Online Service Index
PSSSA	Public servants social security agency
SDG	Sustainable Development Goals
TII	Telecommunication Infrastructure Index
UN	United Nation
UNDESA	United Nations Department of Economic and Social Affairs.

CHAPTER ONE

INTRODUCTION

1.1 Background

The desires and behaviors of individuals in economies and communities are constantly changing as a result of the digital age (Zaffiro & Mourgis, 2018). All facets and facets of people's lives are changing as a result, and new demands are being placed on governments. Globally, governments have been working toward the shared objective of efficient public administration through effective policymaking. As a result, governments are implementing strategies focused on the welfare of people and integrating technological advancements to develop a governance model that is open, reliable, and inclusive(Agbozo & Spassov, 2018). This leads to e-government adoption worldwide increasing as nations and their citizens realize the convenience, cost, and time-saving it offers(Nunes et al., 2017).

The goal of E-Government is to reinforce the push for good governance, transparency, and better service delivery while also enhancing access to and delivery of government services to bring convenience and ease of doing business to both citizens and enterprises (Durickovic & Kovacevic, 2011a). E-government services hold transformative potential for developing countries, particularly in regions like Ethiopia, where such advancements can overcome traditional bureaucratic challenges. By digitizing government services, these countries can significantly enhance efficiency, transparency, and accessibility, thereby fostering stronger governance and public trust(Shin et al., 2020). For Ethiopia, with its fast-growing economy and large, youthful population, e-government initiatives can bolster economic growth, support social development, and enhance the capacity of government institutions to meet the needs of their citizens (Belachew, 2010a). Moreover, it aligns with the United Nations' Sustainable Development Goals (SDGs), which emphasize the importance of innovation and infrastructure in achieving inclusive and sustainable development(“Goal 9: Industry, Innovation and Infrastructure,” 2019). E-government in Ethiopia could thus be a catalyst for broad-reaching societal reforms, further integrating the country into the global digital economy. E-government services have become an important part of modern-day governance, providing citizens with efficient and effective access to government

services (Jain, 2017a). E-government service quality failure refers to a situation where digital services provided by a government do not meet the expected standards or fail to deliver the intended results(Al-Nidawi et al., 2018a). A common cause of e-government service failure is low perceived quality, which is based on customer happiness and perceptions. Empirical studies have demonstrated that the efficacy of e-government initiatives is closely linked to the satisfaction of e-government customer, which is subsequently determined by their assessments of the perception of e-government services(Špaček & Špačková, 2023). Furthermore, e-government initiatives may fail as a result of low quality e-services. Therefore, the success of such projects depends on providing high-quality e-government services. E-Government services traditionally focus on three major segments of society, i.e., citizens, businesses, and government agencies. Government-to-citizen (G2C) services include information dissemination and service requests from the public. Government to Business (G2B) services include interactions between businesses and the Government. Government-to-government (G2G) services entail intra-governmental interactions for communication, data access, and sharing, government-to-citizen.

In Ethiopia, however, e-government service quality has been a challenge with numerous failures reported. This has resulted in dissatisfaction among citizens and has hindered the effectiveness of e-government services (Lessa & Tsegaye, 2019). While factors leading to e-government information systems (IS) project failures have been identified and studied, the root causes of such failures has not be thoroughly articulated, especially in the context of developing countries like Ethiopia. The e-Government Strategy for Ethiopia aims to leverage Information and Communication Technology (ICT) to improve the livelihoods of Ethiopians and foster the development of the country. The strategy and implementation plan for 2011-2015 was developed by the former Ethiopian Ministry of Communication and Information Technology (MCIT), aims to implement 219 e-services—79 informational and 140 transactional—across various domains of public service via a multi-channel delivery approach including a portal, call centers, mobile devices, and common service centers(Key et al., 2013).

During the implementation of the E-government strategy from 2011 to 2015, the Ethiopian Government introduced 168 services to its E-Services platform. Despite this, the adoption rate remained minimal due to the absence of backend and inter-departmental connectivity. In response, the authorities revised their approach with a new e-Government Strategy for the period 2015-2020.

This updated approach outlined six strategic actions, 39 national projects, and 40 initiatives at the ministry and agency levels, and aimed to more than double the portal's offerings to 320 services by the end of the decade. Central to this strategy was the focus on creating a conducive ecosystem for electronic services, improving the government's digital readiness, boosting service uptake, and establishing a functional operating framework. It also aimed to stimulate economic expansion, ensure the provision of affordable, high-quality services, and achieve governance that is both effective and transparent. Additionally, the strategy emphasized fostering innovation, streamlining business processes to facilitate entrepreneurship, and incorporating SMART technology-driven initiatives.

Root cause analysis (RCA) is essential in addressing e-government service quality failures as it systematically identifies the root causes of problems to prevent recurrence. The process involves defining the event, identifying and analyzing causes, pinpointing the root cause, finding solutions, taking action, and verifying the effectiveness of the solutions. This approach ensures that the exact cause of the failure is determined and appropriate measures are implemented to rectify it.

1.2 **Motivation**

E-Government, or the application of Information and Communication Technology (ICT) for delivering government services, has become a pivotal strategy globally for enhancing governance and public administration(MacLean & Titah, 2022). The shift towards digital governance is particularly crucial in developing countries like Ethiopia, where E-Government is seen as a tool to foster administrative efficiency, transparency, and citizen engagement. However, despite these potential benefits, the implementation of E-Government in Ethiopia has faced significant challenges, leading to service quality failures(Sugebo & Sekhar, 2022). The motivation behind this study is the critical necessity to comprehend and tackle these obstacles to fully realize the capabilities of E-Government services in Ethiopia.

Ethiopia presents a unique case in E-Government implementation. With its distinct socio-economic, political, and cultural contexts, as well as varying levels of technology penetration and digital literacy, the challenges faced here might differ significantly from those in other countries. This uniqueness offers an invaluable opportunity to contribute to the global understanding of E-Government challenges in diverse settings, expanding upon the existing literature that is

predominantly focused on more digitally mature economies (Balaraman, 2018a). The researcher, an expert in the Ministry of Innovation and Technology (MInT) that facilitates and coordinates E-government services in Ethiopia has observed that service quality issues are leading to inefficiencies in delivering critical government services, which could impede economic development and public trust in government institutions. Drawing from years of experience and expertise in the sector, the researcher recognizes that such failures can have profound implications for the effectiveness of government operations and the provision of services to citizens.

Improving E-Government services has significant socio-economic implications. Efficient and reliable digital government services can enhance citizen satisfaction, reduce bureaucratic inefficiencies, and promote greater civic participation (Javaid & Arfeen, 2017). For Ethiopia, which is working towards economic growth and development, understanding the impediments to effective E-Government is essential for policy-making, strategic planning, and leveraging ICT as a driver for development (Belachew, 2010b). As Ethiopia undergoes significant digital transformation, understanding the root causes of E-Government service quality failure becomes even more crucial. This research is timely and essential for ensuring that the digitalization of government services is not only technologically advanced but also inclusive, sustainable, and effective in meeting the needs of its citizens.

1.3 **Statement of the problem**

E-Government initiatives involve the use of digital technologies to provide government services. E-government services aim to transform the delivery of services and to make it more convenient and easier for both citizens and businesses by enhancing the accessibility, efficiency, and transparency of public services (Lindgren & Van Veenstra, 2018). Studies have shown that E-government services have numerous benefits for citizens, businesses and government. According to (Amanbek et al., 2020) these services save customers time, money, and effort, and provide them with the ability to access information and services without geographical and time limitations. E-government services can make government more transparent and accountable by providing citizens with easy access to information about government programs and services(Al-Nidawi et al., 2018b). It also reduces corruption and fosters citizen participation in the political system (Lessa et al., 2016). Despite the potential benefits, E-Government projects in developing countries have

faced significant challenges and failures in service quality(Apleni & Smuts, 2020). E-government services often fail to meet user expectations, leading to dissatisfaction and a return to traditional methods of information acquisition (Ibraheem et al., 2016).

In Ethiopia, E-Government initiatives have been part of the broader ICT policy framework aimed at transforming public service delivery mechanisms (Balaraman, 2018b). The government of Ethiopia through its Ministry of Innovation and Technology (MInT) is spending a lot of budget for the development of several E-government and digitizing services. The introduction and implementation of e-services for more than a decade, their full adoption and utilization by customers remains unachieved. The Ethiopian Electronic Government Strategic Implementation Plan II, e-gov (2016), highlighted the low-level use of government web portals compared to other channels for delivering electronic services. In Ethiopia, to access public information and services, customers continue to favor visiting government offices and engaging in paper-based transactions. Consequently, traditional, in-person interactions between the government and its customers prevail over e-government services as the primary mode of communication. There is a significant failure rate, 64.23%, in the delivery of quality public services in Ethiopia (Lessa & Tsegaye, 2019). This figure verifies that even with the increasing importance of providing a wide range of e-government services, the root cause of such failure should be identified and given much attention. The United Nations conducted a worldwide survey in 2022 which revealed that Ethiopia has experienced a decline in its performance in recent reports. Specifically, Ethiopia's overall Electronic Government Development Index (EGDI) score decreased from 0.3463 in 2018 to 0.2865 in 2022. Consequently, Ethiopia's global ranking fell from 151st in 2018 to 179th in 2022. E-Government Development Index (EGDI) score signifies deteriorating e-government service quality. This composite index reflects the quality of online services index (OSI), telecommunication infrastructure(TII), and human capital index (HCI). A lower EGDI score indicates issues such as reduced accessibility and usability of online services, inadequate content, connectivity problems, and skill gaps among the population. These deficiencies lead to decreased user satisfaction, eroded trust in government, and operational inefficiencies. Improving these areas is crucial for enhancing the quality of e-government services and fostering greater public confidence in digital governance.

Although various aspects of e-government in Ethiopia have been explored, there is a noticeable lack of comprehensive studies addressing the quality failures of e-government services. Lessa

(2015) designed a sustainability framework for the e-government project WoredaNet in his dissertation. Feyisa (2020) examined factors influencing the adoption of e-government services from the customer's perspective. Zeleke (2018) proposed the Ethiopia e-Government Websites Usability and Accessibility Model (WUAM) to improve the usability and accessibility of e-government websites. Furthermore, Feleke (2022) identified determinants of e-government maturity and developed a conceptual framework linking e-government maturity to sustainable e-government services.

Despite these valuable contributions, there is a significant gap in research specifically addressing the quality failures in e-government services. This thesis aims to fill this gap by identifying and analyzing the root causes of e-service quality failure in Ethiopia. The goal is to provide actionable insights and strategies to enhance e-service quality, ultimately guiding policymakers, service providers, and stakeholders in improving the reliability, usability, and overall effectiveness of e-services, which is crucial for the country's advancement in the digital age.

1.4 Research Questions

- What are the root causes of E-government service quality failure in the Ethiopian context?
- How can those root causes be addressed?

1.5 Objective

1.5.1 General Objective

The general objective of this study is to identify the root causes of E-Government service quality failure in Ethiopia and strategies how to address these causes.

1.6 Specific Objectives

- Review related literature to identify determinants of E-Government Service Quality
- Identify models or frameworks to do root cause analysis
- To collect and analyze data on the factors contributing to the failure of e-government service quality in Ethiopia
- Empirically identify the root causes of the selected organization

- Propose actionable recommendations and strategies to mitigate the identified issues and improve the quality of E-Government services in Ethiopia.

1.7 Scope of the study

The focus of the study on Ethiopia's e-government service quality is to identify the root causes of quality failure in the e-government services provided by federal offices and agencies. This study explores how stakeholders, including citizens, government workers, and residents, e-service delivery characteristics including usability, accessibility, reliability, responsiveness, and security. It primarily concentrates on the electronic services offered through the national E-government portals (www.eservices.gov.et) of Ethiopian government institutions, including Ministries, Agencies, and Authorities. With a specific focus on federal services, the research seeks to identify problems and bottlenecks impeding the efficacy and efficiency of e-government services. Through interacting with different user groups and examining their input, the research aims to identify the particular difficulties encountered as well as to understand the larger background of these service delivery failures. Despite concentrating on federal entities and potentially facing data accessibility challenges, the objective is to offer insightful analysis and actionable solutions to address and rectify the root causes of e-government service quality failures in Ethiopia, ultimately aiming for a more inclusive, accessible, and reliable digital government infrastructure.

1.8 Significance of the study

Enhancing the quality of e-government services is essential for boosting citizen satisfaction, encouraging the utilization of these services, and increasing the overall efficacy of government operations in Ethiopia. Identifying the fundamental issues that impede service quality is a critical step in this process. This involves a thorough evaluation of current e-government offerings to pinpoint areas that require enhancement and to understand the public's perspective on these services. The study could also contribute to the development of a theoretical framework. This framework could serve as the foundation for ongoing research and the formulation of strategies aimed at improving service quality. Moreover, the insights gained from this research should directly influence the design and execution of e-government services, ensuring they meet user expectations. This includes recognizing the various technological, organizational, and environmental factors that can affect the quality of service and addressing these in the design

phase. The researcher aims to contribute both to academic theory and practical application. Academically, it seeks to enrich the literature on E-Government, particularly in the context of Ethiopia. Practically, the findings are expected to guide policymakers, IT practitioners, and administrators in Ethiopia and similar contexts, aiding in the formulation of more effective strategies for E-Government implementation.

Finally, enhancing the capacity within government bodies is paramount for the sustainable development and management of e-government services. Initiatives should be established to boost the expertise of government staff in this domain. Moreover, it is important to improve interagency cooperation to guarantee a cohesive service delivery system. By addressing specific challenges, such as increasing public awareness and trust, tackling capacity deficits within government agencies, and promoting better coordination among different agencies, Ethiopia can significantly improve its e-government services, thereby leading to a more competent and responsive government.

1.9 Organization of the Study

The remaining part of this thesis is organized into four chapters. Chapter two reviews the literature on the overview of e-government, e-government services quality determinants, and related topics in terms of the basic concepts, theories, and empirical works. The third chapter presents research methodology which constitutes research approaches, strategies, site and case selection, sampling technique, data collection methods, data analysis technique, and reliability and validity assessments. The data presentation, analysis, and discussion are all covered in Chapter Four. The final chapter wraps up the study and presents recommendations for action to have an understanding of e-government service quality failure. The chapter also points limitations of the study and outlines suggestions for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1. Overview

This section of the study explores both local and global scholarly works and literature that are relevant to the quality of E-government services, with a particular focus on aspects relevant to this study. It offers an exploration and clarification of various attributes linked to this topic, as recognized by numerous academics. To gather relevant literature, the researcher employed a variety of keywords. This chapter will cover the following main topics an overview of E-government, types of E-government, overview of E-government services, benefits of E-government services, Services quality in E-government, theoretical framework related to services quality, Challenges of E-government in developing countries, E-government Initiatives in Ethiopia, Review of Related works, and summary of the chapter.

2.2. Overview of E-Government

Globally, discussions about e-government have gained significant traction in the context of delivering public services (Almutairi et al., 2020). Government departments and agencies worldwide are increasingly utilizing Information and Communication Technologies (ICTs) to electronically provide services to diverse stakeholders. This shift to ICTs has undeniably transformed the methods of processing, packaging, and distributing government services to businesses and citizens. As a result, advocates of e-government argue that the adoption of ICTs within government entities has revolutionized the delivery of public services(Madariaga et al., 2019; Solinthone & Rumyantseva, 2016a). Which in turn leads to the emergence of e-government.

The concept of e-government has been defined by a range of researchers and organizations over time, each offering their own interpretations in different settings, yet to be agree up on a common definition(Abu-Shanab & Harb, 2019). Electronic government (e-government) also referred as digital government, online government and sometimes transformational government(Scholl, 2020). A widely shared e-government definition is the use of information technology to enhance government operations and services, which has the potential to improve efficiency, transparency,

and citizen engagement(District, 2012; Jain, 2017b). E-government as inclusive and highly integrated information and communication technology platforms, constructed using progressive systems architecture, aim to enhance the effectiveness of government service delivery, emphasizing transparency, dependability, and accountability (Malodia et al., 2021). World Bank strengthen this idea by defining E-Government involves government agencies using information technologies like Wide Area Networks, the Internet, and mobile computing to enhance their interactions with citizens, businesses, and other government branches. This results in improved service delivery, better business engagement, citizen empowerment via information access, and more efficient government operations (*E-Government*, 2015).

2.3. Types of E-government

There are four categories of e-government: Government to citizen (G2C), Government to Business (G2B), Government to Employees(G2E), and Government to Government (G2G). Government-to-citizen (G2C) services include information dissemination and service requests from the public (Omar et al., 2011). Some of the services provided by the Ethiopian government to its citizens via the national e-services portal include but are not limited to, services such as license applications and renewals, motor vehicle registration, ordering of birth/death/marriage certificates, filing of income taxes, issuance of ICT competency certificate issuance of the trade registration certificate, and citizen assistance for essential services like education, health care, hospital information, libraries etc.

Government to Business (G2B) is designed to facilitate interactions between businesses and the Government(Van Den Boer et al., 2016). An online platform that makes it possible for businesses and government agencies to conduct business electronically. For instance, this could be for company registration, license renewal, obtaining permits, filing of tax returns, or applying for tax refunds and procurement or information dissemination.

Government to Employee (G2E) refers to the online interactions and services between government agencies and their employees. This is an internal relationship between employees and government(Joshi & Islam, 2018). In this type of e-government employees can interact with management and each other as well. online services such as application transfers, and leave

application could be an examples of services offered to employee. Government to Government (G2G) services entail intra-governmental interactions for communication, data access, and sharing. G2G services enable collaboration by enabling transactions and information flows between the federal, provincial, and local/city-level ministries, public departments, agencies, and bureaus.

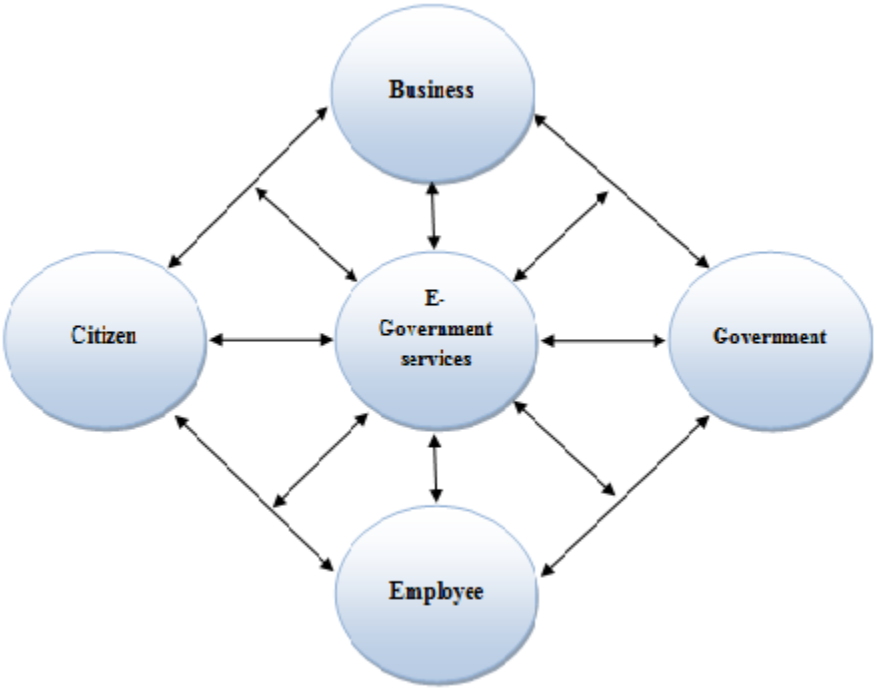


Figure 2.1 E-Government services components Source: (Al-Nidawi et al., 2018)

2.4. Overview of E-Government Services

E-government service is a service that is provided by a government through electronic means, utilizing a variety of digital channels like the internet, email, interactive voice response systems, and digital television, to reach a diverse range of stakeholders(Mahlangu & Ruhode, 2021). It helps businesses, government agencies, and offices to fulfill their transactional needs. (Tremblay-Cantin et al., 2023) define e-government services as government services delivered electronically. E-government services shift from physical to online access has the potential to enhance accessibility, cost-effectiveness, and citizen participation. E-government services include, but not

limited to, the following: e-tax, e-visa, e-procurement, e-bidding, e-voting, e-planning, e-jobs, e-health, e-democracy, e-forums and e-learning(Khanra & Joseph, 2019; Zautashvili, 2017).

The creation of e-government services has been driven by the need to meet to the demands and expectations of key societal players such as businesses, citizens, and various entities requiring government services, as a result of their interactions with the government (Li & Shang, 2020). e-government services are globally the delivery of services through government portals remains a consistent factor influencing the strategies of electronic services provided by various governments. E-Service in the government context refers to the delivery of transactions through online channels. This concept has become a standard feature on governmental portals worldwide, influencing the strategies of electronic services offered by various governments. The focus of these services extends beyond mere provision; development-related policies aim to broaden their scope. This involves integrating vital elements to ensure a precise alignment between the implementation of public services and the needs of the population. Essentially, the goal is to make government services more accessible, efficient, and tailored to the needs of citizens through the use of digital platforms (Sá et al., 2016).

2.5. Benefits of E-Government services

The emergence of e-government services has transformed the way governments interact with their citizens and has a range of benefits. E-government services save citizens time and money by eliminating the need to travel to government offices to access services using the Internet to conduct interaction and exchange in a fast, simple, and efficient manner (Elbahnasawy, 2014). E-government services benefit both citizens and governmental agencies. Citizens can use digital devices like the personal computer and mobile connected to the internet effectively and efficiently for their transactions. For government agencies, it allows them to save some of the costs associated with expenditure on physical sites and facilities because individuals do not need to physically visit government offices to seek desired services(Pham et al., 2023).

E-government services have the potential to improve transparency and accountability since they make it simple for citizen to access information, track the progress of their applications, and receive updates, which fosters trust in government operations (Bwalya & Mutula, 2015). Trust is

an essential factor in good governance that must be built between citizens and the government by utilizing internet-based strategies(Alshehri & Drew, 2010). countries with higher levels of e-government implementation showed lower corruption rates, suggesting that increased transparency and citizen engagement through digital channels can deter corrupt practices (Adam, 2020; Máchová et al., 2018).

Cost, both financial and temporal, is often cited as a key factor in utilizing e-government services. Individuals benefit financially by saving on travel expenses, time off from work, and other resources that would otherwise be needed for in-person access to government services (Venkatesh et al., 2016). E-government also improves service quality by transforming the model, governments can integrate services and information easily and offer the vast majority of required services.

2.6. Service Quality in E-Government: Definition and Measures

Quality is one of the key factors for the survival of an organization. Organizations are shifting their focus from a product-oriented to a customer-oriented approach. To achieve a competitive advantage and surpass their competitors (Hossain et al., 2014). Quality is about meeting or exceeding customer needs and requirements. Many studies define service quality as it begins with customer needs and ends with customer satisfaction(Stefano et al., 2015). Service quality represents the gap between customers' expectations and the service performance that customers perceive (Satapathy et al., 2013).

While delivering better service is crucial to customers, determining how to accurately measure service quality poses a challenge. It's essential to have a reliable method for assessing service quality to pinpoint which service elements require enhancement, gauge the extent of improvement needed in each area, and assess the effectiveness of these improvement initiatives. Focusing on customer and service as a competitive advantage can provide sustainable market leadership and enhance service quality, leading to customer satisfaction, market share, and profitability (Kandampully & Kandampully, 2007). It's important to recognize that unlike the quality of products, which is quantifiable through factors like durability and defect count, the quality of service is more intangible and is most effectively measured through surveys that assess customer perceptions of the service. Service quality can be evaluated by assessing customer’s expectations

and perceptions of Performance level for a variety of service attributes (Parasuraman et al., 1985). When a company meets or exceeds customer expectations, it is perceived as delivering high-quality service. However, if it fails to meet these expectations, the company risks encountering dissatisfied and disappointed customers, which can lead to customer defection to competitors.

As with service quality, e-service quality has gained significant interest from researchers recently, owing to its relevance. This concept originates from the traditional service quality standards. Essentially, e-service quality is about the collective evaluation and opinion of consumers on the effectiveness of e-service delivery in an online environment(Alanezi et al., 2011). (Parasuraman et al., 1985) defined service quality as a difference between customer expectations and perceptions of service. In general, service quality is defined under various perspectives, including the customer perspective, service performance, customer expectations, and perceptions of service, and it has generally been explained as the difference between the expected and perceived service. Therefore, service quality can be defined as the measure of how well a delivered service matches the customers' expectations and the collective effect of service performance, which determines the user's degree of satisfaction with the service.

2.7. Theoretical Frameworks Related to Service Quality

2.7.1. SERVQUAL Model

SERVQUAL model is a widely recognized and standard method to measure service quality based on its five dimensions. (Parasuraman et al., 1988) initially proposed ten dimensions of service quality in the SERVQUAL model, applicable to any service. These dimensions included Tangibles, Reliability, Security, Competence, Responsiveness, Understanding the Customer, Courtesy, Credibility, Access, and Communication. Subsequently, for the sake of conciseness and improved scale dimensionality and reliability, the model was streamlined to five dimensions: tangibles, reliability, responsiveness, assurance, and empathy.

- **Tangibles**: includes appearance of personnel, physical facilities and equipment's
- **Reliability**: The service provider 's ability to provide accurate and dependable services

- **Responsiveness**: A firm ‘s willingness to assist its customers by providing fast and efficient service performance.
- **Assurance**: Knowledge and courtesy of employees, as well as their ability to inspire trust and confidence
- **Empathy**: Caring, individualized attention provided to the firm ‘s customers

Conducting a thorough analysis and measurement of the five dimensions of SERVQUAL is a critical approach to understanding and improving service quality. SERVQUAL, a widely recognized service quality framework, stands for Service Quality and is based on the perception gap between customers' expectations and the actual service provided.

2.7.2. WebQual

A method called WebQual was put up by (Loiacono et al., 2002) to measure the quality of websites using twelve different dimensions. Interviews with web designers and users helped researchers construct this model. The WebQual methodology developed a website quality metric based on findings from the general theoretical frameworks of the Technology Acceptance Model and the Theory of Reasoned Action. This model gives researchers a clear knowledge of TAM and even refines it to boost its diagnostic capacity. It also gives researchers a verified and accurate measure of the quality of websites. The model considers factors like usability, design, information quality, and reliability(Loiacono et al., 2007). These dimensions are assessed through user surveys that measure perceptions and experiences with the website, allowing organizations to identify strengths and weaknesses in their online presence.

2.7.3. A multiple-item scale model (e-GovQUAL)

(Papadomichelaki & Mentzas, 2013) proposed e-GovQUAL model is a specialized adaptation of the traditional GovQUAL model, specifically designed to evaluate the quality of electronic government services. This model extends the principles of service quality measurement from the broader GovQUAL framework to the digital context, addressing the unique aspects of online government service delivery. The e-GovQUAL model typically includes several key dimensions that mirror those in the SERVQUAL model but are customized for electronic services. These include tangibles (the user interface design and accessibility of online services), reliability (the

consistency and dependability of online services), responsiveness (the speed and effectiveness of government responses to online inquiries or problems), assurance (security, privacy, and trust in electronic transactions), and empathy (the extent to which online services are user-centric and cater to individual needs).

By focusing on these dimensions, e-GovQUAL offers a comprehensive tool for assessing the effectiveness and quality of e-government services from the citizens' perspective. It recognizes the growing importance of digital channels in public service delivery and the distinct expectations users have for online interactions with government entities. The model is not only a tool for evaluation but also a framework for continuous improvement, allowing government agencies to identify specific areas where their online services can be enhanced. In the era of digital transformation, e-GovQUAL provides valuable insights into how government services can be optimized to meet the evolving demands of a digitally engaged citizenry, ultimately leading to greater satisfaction and trust in government institutions.

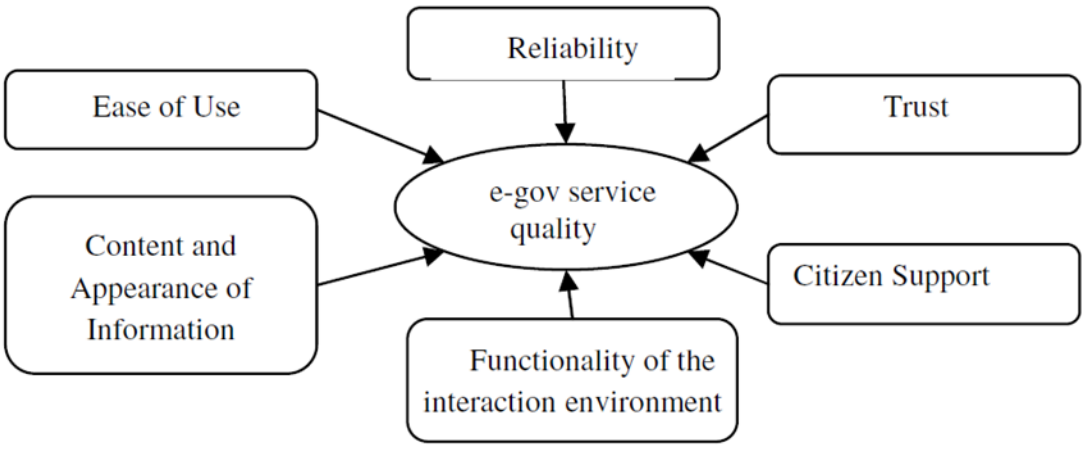


Figure 2.2 E-GovQual: Conceptual model for e-government service quality,

source (Papadomichelaki & Mentzas, 2013)

2.8. Root Cause Analysis (RCA)

Root Cause Analysis (RCA) is a systematic process aimed at identifying the fundamental reasons behind failures or problems within systems or processes(Lee et al., 2017). Originating in the mid-20th century and gaining prominence through Total Quality Management (TQM) and continuous improvement methodologies, RCA focuses on uncovering underlying issues rather than merely addressing symptoms(Shaqdan et al., 2014). Key methodologies include the Five Whys Technique, Fishbone Diagram (Ishikawa), Failure Mode and Effects Analysis (FMEA), and Pareto Analysis. Each method offers unique approaches to problem-solving, from iterative questioning to visual mapping and statistical analysis. RCA is widely used across various fields, including healthcare, manufacturing, information technology, and public administration. In healthcare, it improves patient safety by identifying the root causes of medical errors, while in manufacturing, it enhances product quality by addressing process inefficiencies. In IT, RCA helps diagnose system outages and security breaches, and in public administration, it addresses service delivery failures and administrative inefficiencies, particularly in e-government services.

Despite its effectiveness, RCA faces several challenges, such as potential bias in the analysis process and the resource-intensive nature of the method. Ensuring the sustainability of corrective actions and integrating RCA into organizational culture are critical for its success. Bias can lead to a focus on immediate causes rather than deeper systemic issues, while resource demands require time, expertise, and stakeholder collaboration. Nevertheless, RCA remains a vital tool for organizations seeking to improve processes, quality, and outcomes(Shaqdan et al., 2014). By systematically identifying and addressing root causes, RCA helps prevent recurrence, enhance efficiency, and foster a culture of continuous improvement. As organizations across various fields face complex challenges, the application of RCA is integral to achieving sustainable solutions and driving progress.

2.9. Challenges of e-government in developing countries

Electronic government is often acclaimed as a progressive path for governments globally to enhance efficiency and improve service provision for both citizens and businesses. Consequently, e-Government has become more than an option, but a necessity for nations striving for improved

governance. The advantages of embracing e-governance are significant, including efficient and effective government operations, increased participation, transparency, enhanced service delivery, and substantial reduction in corruption, to list a few. Despite these potential benefits, the implementation of e-government still presents challenges, particularly in many developing countries, especially in Africa. According to (Bojang, 2020) most of the problems of developing countries are the adoption of these new technologies and the unwillingness of bureaucrats to accept innovations.

In many African nations, a majority of the population is unable to reap the benefits of e-government, primarily due to inadequate internet connectivity, the high expense of access, and a shortage of essential resources and skills among the users of these systems(Vereinte Nationen, 2018). Developing countries face a multitude of challenges in the digital realm, including the digital divide, lack of capable human capacity, financial constraints, low ICT infrastructure, and issues related to legislation and policy(Heeks & Bukht, 2018; Makoza, 2019). According to (Samsor, 2021) Developing countries commonly face several challenges, such as insufficient ICT literacy, underdeveloped infrastructure, and a pronounced digital divide between the rural poor and the urban middle class. Concerns about data privacy and security are prevalent, alongside the lack of comprehensive ICT policies and legislation. There is a notable absence of ICT culture within the government and traditional economic sectors. Questions about the government's sustained financial support for ICT initiatives, the level of e-government awareness, and the readiness of ministries to share information are significant. Moreover, there is a lack of ICT leadership beyond technology-focused ministries, resistance to change, a historical deficit in intergovernmental coordination, and minimal stakeholder participation. These issues represent just a few of the many challenges identified.

2.10. E-government Initiatives in Ethiopia

The Government of Ethiopia, realizing the importance of digitizing its services, has undertaken various initiatives over the years to digitize and improve access to government services. To initiate the process of digitalization, the Ethiopian Government created a five-year strategic and implementation plan for the period 2011 to 2015. The main goal of this plan was to establish a clear vision that aligned with key objectives, incorporating feedback from all stakeholders and

outlining methods to effectively communicate the digitalization goals both internally and externally. The e-government strategy was derived from Ethiopia National Growth (GTP I) and Transformation Plan and many projects have been initiated during the period.

The strategy selected 219 services to be digitized over time in a phased approach. These services were to be available to the public through a national e-portal, call center, ICT service centers, and mobile application. The strategy also highlighted six (6) core priority projects, including developing a National Payment Gateway, Enterprise Architecture Framework, Public Key Infrastructure, National Data Set, National Enterprise Service Bus, and National Integrated Authentication Framework. While implementing of the e-Government strategy (2011-2015), 168 services were integrated into the E-Services portal. However, the absence of backend integration and inter-departmental service coordination led to minimal adoption of these services by users. Consequently, to revitalize its digital service initiatives, the government formulated an enhanced e-government Strategy for 2015-2020. This updated strategy comprised six strategic plans, 39 nationwide programs, and 40 initiatives at the ministry/agency level. Additionally, it set a new goal to expand the offerings on the E-Services portal to 320 services by the year 2020.

Ethiopian e-Government Portal (E-Services): As a component of the initial e-Government Strategy, the Ethiopian Government introduced the E-Services portal (www.eservise.gov.et). This platform facilitated the delivery of services from Government to Citizen (G2C), Government to Business (G2B), and Government to Government (G2G). The primary objective was to enhance the government's efficiency and reduce costs by improving coordination among different government departments(Zeleke, 2018). The E-Services portal operates as an independent platform, serving as a primary interface for communication between customers and service providers. It features a basic workflow structure that allows service providers to process specific service requests. As of now, there is no technical integration between the portal and the internal backend systems of the service providers. Designed for bidirectional interactive communication, the portal enables customers to request services. Service providers can then review these requests and, if necessary, communicate with the clients through the portal. This communication may involve seeking clarifications, requesting additional information or documents, or instructing the client to make payments for the required government services.

WoredaNet: public network infrastructure, primarily aimed at providing the country's various government offices, especially at the district (woreda) level, with a means for data, voice, and video communication. It links more than 630 woredas (Belachew, 2010a). The network provides services such as email, internet access, video conferencing, and voice over IP (VoIP) telephony(Lessa, 2015). It's part of a broader initiative by the Ethiopian government to increase access to ICT (Information and Communications Technology) across the nation.

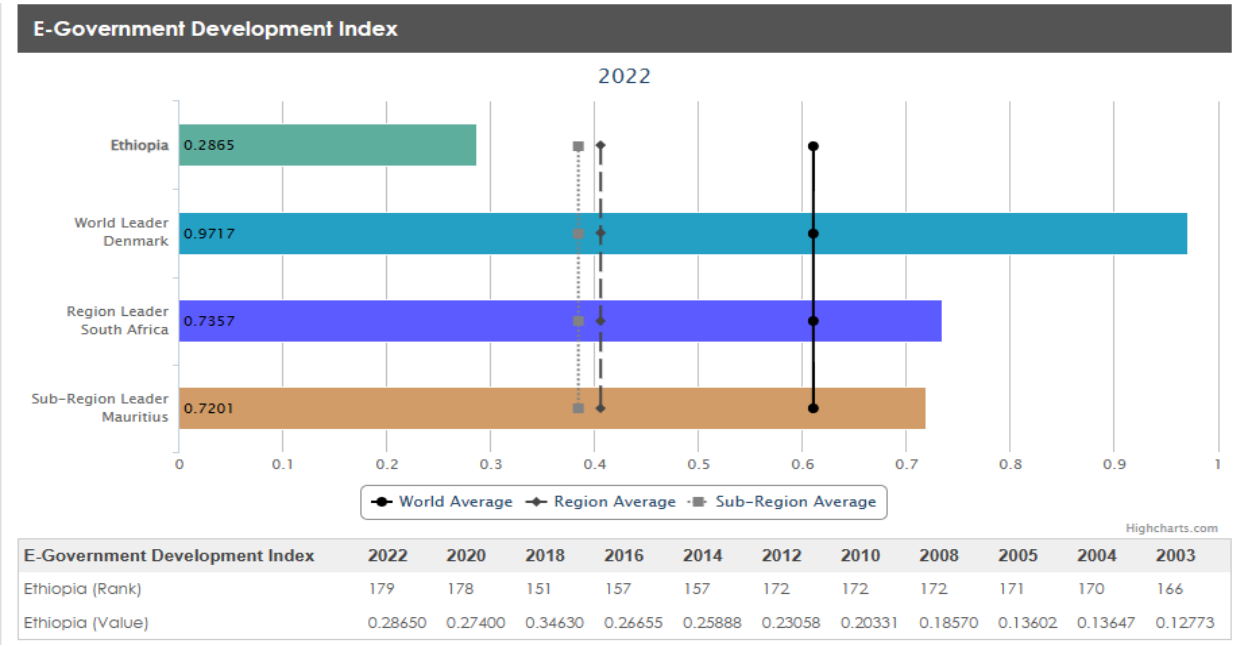
SchoolNet: designed to help the educational sector by providing digital resources and connectivity to schools across the country. Within this network, over 756 schools are connected, comprising more than 574 high schools and over 191 preparatory schools(Belachew, 2010a). This project is aligned with Ethiopia's broader goal of leveraging technology to improve education and promote digital literacy. aims to provide internet access to schools, especially in remote and rural areas, to bridge the digital divide and promote equal access to educational resources. It facilitates the distribution of educational content, including digital textbooks, instructional materials, and multimedia resources, to enhance the teaching and learning experience.

2.11. Ethiopia E-Government Survey Report

The UN E-Government Survey is a biennial benchmarking report issued by the United Nations Department of Economic and Social Affairs (UNDESA). It evaluates the digital government environment in 193 UN member states. As a composite indicator, the report compares the eGovernment performance of these countries. The survey assesses both the E-Government Development Index (EGDI) and the E-Participation Index (EPI). The EGDI measures a country's readiness and capacity to use online technology for public service delivery, considering three components: Online Service Index (OSI), Telecommunications Infrastructure Index (TII), and Human Capital Index (HCI). The EPI, on the other hand, is a comprehensive framework assessing citizen engagement through three facets: E-information, E-consultation, and E-decision-making.

The 2022 edition of the report reveals that the worldwide average for the E-Government Development Index (EGDI) has increased from 0.5988 in 2020 to 0.6102 in 2022. Europe leads the ranking with an average EGDI of 0.8305, with Scandinavian nations exemplifying the pinnacle

of e-Governance. In contrast, Africa ranks the lowest, with an average EGDI of 0.4054. Additionally, Ethiopia has shown a declining trend in its performance in recent reports.



E-Government Development Index	2022	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Ethiopia (Rank)	179	178	151	157	157	172	172	172	171	170	166
Ethiopia (Value)	0.28650	0.27400	0.34630	0.26655	0.25888	0.23058	0.20331	0.18570	0.13602	0.13647	0.12773

Figure 2.3 Ethiopia EDGI index source : https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/58-Ethiopia

In the three components of the E-Government Development Index (EGDI), Ethiopia's performance was notably weak in the Telecommunications Infrastructure Index (TII). Despite an improvement in the TII score across the last three EGDI reports, it remains considerably low, largely attributed to underdeveloped telecommunications infrastructure and limited internet penetration. For the Online Service Index (OSI), Ethiopia's score in 2022 was 0.37300, a substantial decrease from its 2018 score of 0.63190. This decline is primarily due to a significant drop in E-Participation, which fell from 0.5730 in 2018 to just 0.1932 in 2022.

Table 2.1 Ethiopia's EGDI score in 2022

EGDI COMPONENTS	2022 SCORE	2020 SCORE	2018 SCORE
OSI	0.37300	0.36470	0.63190
TII	0.15010	0.11940	0.09760
HCI	0.33640	0.33780	0.30940

Several factors have been identified as contributing to the challenges faced by countries like Ethiopia, which are positioned at the lower end of the e-government pyramid. These include an internal digital divide, a lack of emphasis on digital initiatives by senior government officials, challenges in transforming entrenched bureaucratic cultures, delayed responses in implementing policies, and the high costs associated with developing Information and Communication Technology (ICT) infrastructure. These issues collectively hinder the advancement of e-government services in such countries.

2.12. Conceptual Framework

The eGovQual framework is used as a crucial conceptual tool for diagnosing the root causes of e-government service quality failures. This framework is structured to assess various dimensions of e-government services, such as service quality, information quality, system quality, and user satisfaction. By evaluating these dimensions, the eGovQual framework enables a comprehensive understanding of the factors that contribute to the success or failure of e-government service quality. For instance, service quality failure might be a result of inadequate user feedback mechanisms or poor service design, which directly impacts user satisfaction and public trust in e-government services. Similarly, information quality issues, such as outdated or irrelevant content, can lead to misinformation and reduced usability of the services. System quality failures, including technical glitches or lack of accessibility, further exacerbate the problem by hindering user interaction with the e-government platforms. The eGovQual framework, therefore, serves not only

as a diagnostic tool but also as a guide for continuous improvement, allowing governments to identify specific areas needing attention and develop targeted strategies for enhancing the overall quality and effectiveness of their e-government services. By systematically addressing these root causes, e-government initiatives can achieve higher levels of efficiency, transparency, and citizen engagement, thereby fulfilling their intended objectives more effectively.

The researcher chose the eGovQual method as its conceptual framework, incorporating additional variables identified by various scholars as factors affecting in the quality of e-government services, to address the research question.

Table 2.2 Conceptualized factors

No	Name	Source
1	Infrastructure limitation	McDermot et al., 2022, World Bank
2	Legal and Regulatory Frameworks	Park et al., 2016
3	Digital Literacy and Public Awareness	Kanaan, 2013

Infrastructure limitation

Infrastructure limitations, such as inadequate fund allocation, lack of skilled workforce, and information gaps, significantly affect e-service quality in developing countries (Garad & Qamari, 2021; Mudawi et al., 2020). These limitations can lead to key failure factors in infrastructure projects, including insufficient planning, unrealistic estimates, poor stakeholder communication, bureaucracy, insufficient ground investigation, and inadequate project delivery systems (McDermot et al., 2022).

Legal and Regulatory Frameworks

The successful implementation of e-government services is contingent upon the presence of a clear legal and regulatory framework. (Duisenkul et al., 2023) acknowledges the need for a legislative and regulatory framework for the quality of e-government services. It tackles a number of e-government issues, such as information quality, national security, and privacy effect evaluations. In order to collect, maintain, or distribute personally identifiable information, government agencies must do privacy impact assessments. It also highlights how crucial high-quality information is to e-government services. A legislative and regulatory framework for the quality of e-government services can also take into account the six elements of a quality digital government as outlined in the OECD Digital Government Policy Framework(The OECD Digital Government Policy Framework, 2020). Therefore, to guarantee the confidentiality, security, and caliber of e-government services, a legislative and regulatory framework is necessary.

Digital Literacy and Public Awareness

Digital literacy may have a role in the poor quality of e-government services. Lack of digital literacy may make it difficult for citizens to use and access e-government services, which could result in poor service quality (Abdulkareem & Mohd Ramli, 2021; Chohan & Hu, 2022; Da Silva et al., 2023). In areas where citizens are not familiar with digital tools or the internet, the adoption and effective use of e-government services can be challenging. The low adoption rate of e-government services can indeed be considered a quality failure, as it reflects a lack of understanding and trust in the program (Bayaga et al., 2020).

The inclusion of Legal and Regulatory Frameworks, Digital Literacy and Public Awareness, and Infrastructure Limitation in the conceptual framework for measuring e-government service quality (eGovQual) in Ethiopia is crucial due to the unique challenges and context of the region. The Legal and Regulatory Frameworks variable addresses the foundational elements necessary for the functioning of e-government services. While trust is essential, it primarily concerns users' perceptions of security and reliability. Legal and Regulatory Frameworks go beyond this by ensuring compliance with standards, protecting user data, and enforcing policies, which are vital for maintaining service quality and accountability. Digital Literacy and Public Awareness is another critical variable. Although ease of use is a component of service quality, it is significantly

influenced by the users' ability to understand and navigate digital platforms. Enhancing digital literacy improves user competency, making e-government services more accessible. Additionally, public awareness campaigns increase knowledge about these services, encouraging their adoption and engagement. Providing necessary training and support further impacts user experience and satisfaction. Infrastructure Limitation directly affects the functionality and performance of e-government services. This variable addresses aspect such as network connectivity, technological resources, and the maintenance and upgrading of infrastructure. Reliable internet access and quality hardware and software are essential for the consistent availability and effectiveness of online services. Regular updates and maintenance ensure that the infrastructure can support new functionalities and handle increasing user loads.

These three variables are integral to a comprehensive evaluation of eGovQual, addressing foundational aspects that influence the effectiveness, accessibility, and reliability of e-government services. Their inclusion in the conceptual framework allows for a holistic approach to identifying and addressing the root causes of quality failures in e-government services in Ethiopia.

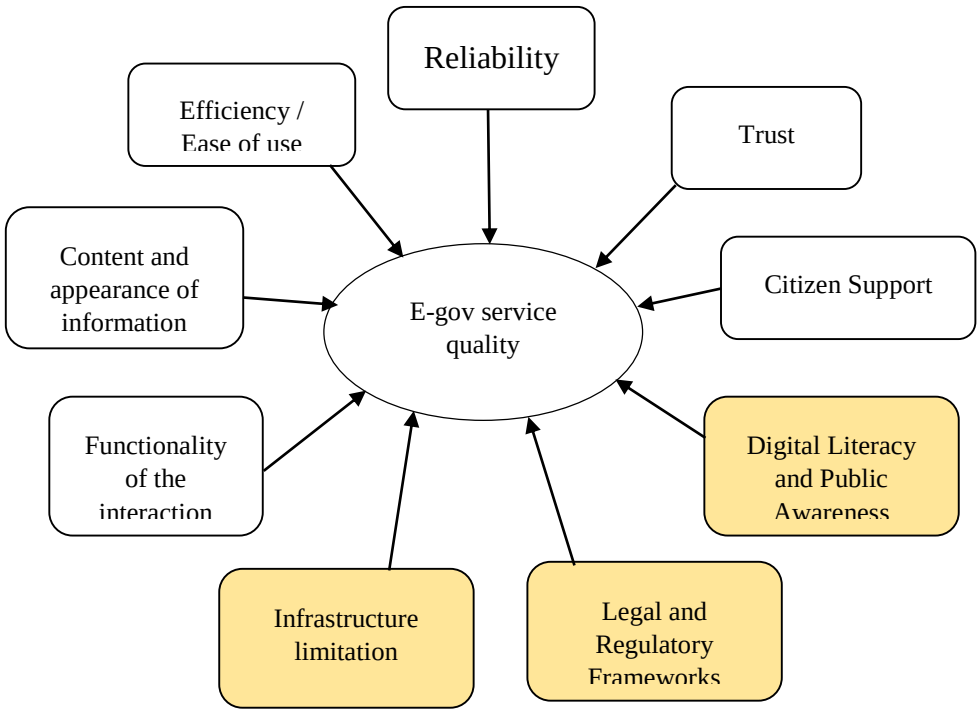


Figure 2.4 Adopted and modified conceptual framework for the study

2.13. Review of Related Works

Several scientific research studies worldwide have delved into the quality of e-government services. However, there appears to be a lack of literature specifically addressing the root causes of failures in e-government service quality. Instead, most of these studies concentrate on evaluating e-service quality from various angles, exploring different aspects and dimensions of service delivery in the digital government domain, but not necessarily pointing out the fundamental reasons for service shortcomings or failures.

A case study by Wijatmoko (2020) has explored various aspects of e-government service quality. The study used a survey with questionnaires based on the e-Govqual dimensions. These dimensions include efficiency (service convenience), trust (consumer confidence), reliability (usability or service capabilities), and citizen support (helping consumers with their problems) IPA (importance-performance analysis) was used to analyze the data. This method helps in identifying attributes that need improvement to enhance community satisfaction. It assesses the conformity between the expectations of service users and the actual performance of public services . The study found a slight gap between the performance and public expectations of e-government services. The IPA analysis identified areas needing improvement, particularly in the 'Concentrate Here' quadrant, which includes attributes like prompt replies to user inquiries, maintaining the confidentiality of personal data, and ensuring detailed information on the e-Government site. The study concludes that overall, the quality of e-government service from the user's perspective was found to be good enough and met citizen needs or expectations according to the e-GovQual framework but needs continuous improvement. The study's focus on a single ministry may limit the generalizability of the findings to other contexts or e-government services.

Frehiwot (2023) studied how the dimensions of e-government service quality - efficiency, reliability, trust, and support - affect customer satisfaction. Data was gathered through a self-administered online survey, with 362 participants selected using stratified random sampling. The research utilized statistical tools like Pearson's correlation coefficients and multiple linear regression for analysis. The study revealed a significant positive relationship between all dimensions of e-government service quality and customer satisfaction. Notably, the dimension of 'support' had a particularly significant impact on customer satisfaction. This implies that

improvements in service quality can lead to increased customer satisfaction. The findings offer valuable insights for authorities involved in e-government development, especially in the area of online e-trade systems. Moreover, the study contributes to existing literature on e-services and guides future e-government-related studies and projects. The study was focused on the Ethiopian context and the specific e-trade site of MOTI, limiting the applicability of findings to other e-government platforms or different cultural contexts.

A novel classification system for e-commerce service failures is developed, categorizing them into information, functional, and system failures (Tan et al., 2016). Each category has distinct dimensions and characteristics. This classification is based on synthesizing existing literature on e-service and system success. The study extends Expected Disconformity Theory (EDT) to differentiate among disconfirmed outcome, process, and cost expectancies as major consequences of e-commerce service failures. It aims to understand how different types of service failures impact consumers' evaluations of e-commerce websites. The theoretical model constructed is empirically validated using descriptive accounts of actual occurrences of e-commerce service failures. This validation helps in understanding the real-world applicability of the proposed classifications and their impact on consumer expectations. It provides insights into how information and functional failures are associated with disconfirmed outcomes and process expectancies, respectively. System failures, however, do not significantly affect consumers' disconfirmed expectancies, which contradicts initial predictions.

The study focuses on evaluating the Czech national e-procurement tool, Národní Elektronický Nástroj (NEN), from the perspective of public administration employees (Špaček & Špačková, 2023). This perspective is particularly valuable as scholarly research on e-procurement, similar to e-government, has been limited and predominantly focused on adoption/non-adoption rather than quality evaluation. Key findings from the research, which involved two questionnaire surveys (175 responses in 2020 and 128 in 2022), indicate that as of 2022, significant gaps still existed in the quality of NEN as perceived by public employees. These employees were particularly critical of NEN's performance, specifically its speed and ease of use. However, they evaluated other dimensions like design, complexity, and user support more positively. It was noted that the user support received the best evaluations in both surveys. The study reveals that while most public employees found NEN's functionalities sufficient for their contracting authorities, they were less

positive about functionalities intended to ease their work within the system. This includes the adequacy of templates for simplifying e-procurement, generation of information and documents for control purposes, and search capabilities within NEN.

This study examines and describes the experience of e-government service quality, analyzes how expectations of e-government service quality are formed, and explains the impact of e-government service quality on citizens' trust and continuous use (Dodeen, 2019a). A qualitative approach is used, including interviews with 20 users of e-government servicesin Jordan. The research also incorporates secondary data from government websites to understand the types and functions of e-government services offered. The study reveals the quality of e-government services was found to be influenced by several factors, including the ease of use, reliability, responsiveness, and security of the services. These factors played a critical role in shaping the overall satisfaction of citizens with e-government services. Additionally, trust of citizens in e-government services was closely linked to their perceptions of service quality.

Table 2.3 Review of related works

Author	Objective of the Study	Method	Key Findings	Limitation
Wijatmoko (2020)	assess the quality Ministry of Law and Human Rights DIY e-Government service using e-GovQual dimensional framework as a best practice.	Quantitative approach	The study revealed gaps between the performance of e-Government services and public expectations. Particularly, attributes related to prompt replies to inquiries, maintaining confidentiality of personal data, and detailed information display were identified as needing improvement.	The study does not compare the findings with other e-Government services, either domestically or internationally, which could provide a broader context for understanding the quality of services.

Frehiwot (2023)	assess the impact of e-government service quality dimensions in the e-trade sector on achieving customer satisfaction.	Quantitative Approach	The study identified a significant positive relationship between all e-government service quality dimensions (efficiency, reliability, trust, and support) and customer satisfaction.	Single approach, the result of the study specifically related to e-trade site of MOTI
Tan et al., 2016)	The study explores how failures manifest on e-commerce websites and their impact on consumers	Literature review	information and functional failures are typically associated with disconfirmed outcome and process expectations, respectively. Surprisingly, system failures do not significantly affect consumers' disconfirmed expectations, which contradicts initial predictions.	It is based on the literatures only
Špaček & Špačková, 2023	explore public administration employees' perceptions of the quality of the Czech national e-procurement tool (NEN)	Mixed approach (qualitative and quantitative)	The findings from the 2022 survey showed that public employees perceived some improvements in NEN's usability compared to 2020. However, they were critical of NEN's intuitiveness, ease of understanding for new users, and accuracy of information and instructions.	
(Dodeen, 2019)	explore the quality of e-government services in Jordan from the perspective of citizens (users)	Qualitative approach and Secondary data from the e-	ease of use, reliability, responsiveness, and security of the services are factors in e-government service quality	The study focuses on citizen expectations and experience. It doesn't asses

		government website		e-services quality failure

Table 2.4 e-GovQual dimensions/attributes Source: (Papadomichelaki & Mentzas, 2012)

Dimensions	**Attributes**
Ease of Use (navigation, personalization, technical efficiency)	Website structure Customized search functions Site-map Set up links with search engines Easy to remember URL Personalization of Information Ability of customization
Trust (Privacy, Security)	Not sharing personal information with others Protecting anonymity Secure archiving of personal data Providing informed consent Use of personal data Non repudiation by authentication the parties involved Procedure of acquiring username and password Correct transaction Encrypting message Digital signatures Access control
Functionality of the interaction Environment (Support in completing form)	Existence of online help in forms Reuse of citizen information to facilitate future interaction Automatic calculation forms Adequate response format
Reliability	Ability to perform the promised service accurately In time service delivery Accessibility of site Browser system compatibility Loading / transaction speed
Content and Appearance of information	Data completeness Data accuracy and conciseness Data Relevancy Update Information Linkage Ease of understanding/interpretable data Colors Graphics Animation Size of web pages
Citizen support (Interactivity)	User friendly guidelines Help pages Frequently Asked Questions Transaction tracking facility The existence of contact information Problem solving Prompt reply to customer inquires Knowledge employees Courtesy of employees Ability employees to convey trust and confidence

CHAPTER THREE

RESEARCH DESIGN AND METHODS

Overview

In this chapter, the research design and methods used for data collection and analysis are explained in detail. The chapter presents the research design, research technique, and validity and reliability of the study. The chapter also includes the procedures followed during the research to answer the research question and achieve the study objective.

3.1. Research Design

Research design and methodology are crucial components of the research process, as they provide a framework for conducting a study and gathering data systematically (Sharma et al., 2023). They help researchers plan and execute their research projects in a structured and rigorous manner. Research design refers to the overall strategy or plan that outlines how a research study will be conducted. It encompasses decisions about the research approach, data collection methods, data analysis techniques, and the timeline for the study (Indu & Vidhukumar, 2020).

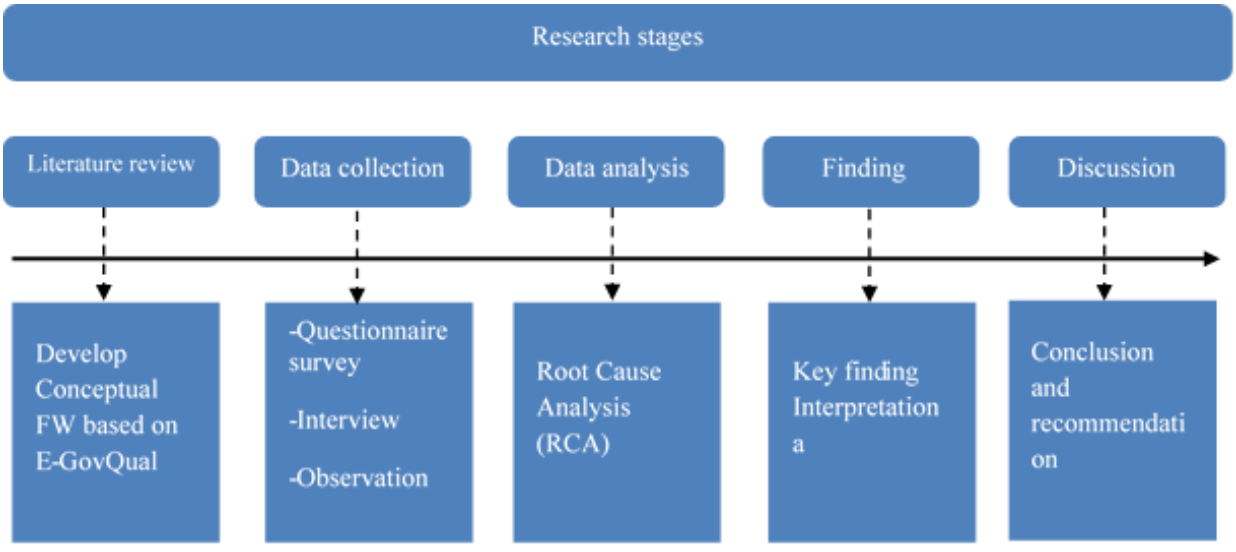


Figure 3.1 Research design

3.1.1. Research Approach

There were several research approaches, and the choice of approach depended on the nature of the research question, the available resources, and the goals of the study(Tharsika & Pratheepkanth, 2020). The research utilized a sequential explanatory design mixed approach. It strategically integrated rigorous quantitative and qualitative methods to offset the limitations of exclusively using one type of method. Quantitative research used measurable and quantifiable data for explanation and analysis (Cárdenas, 2019). The researcher used a quantitative approach to understand the root causes of e-government service quality failure from the customer's perspective. A quantitative approach helps in understanding the root causes of issues by providing data-driven insights that identify patterns and trends through numerical data, ensuring objectivity by minimizing researcher bias with measurable data, and enabling statistical analysis to validate results and test hypotheses. It facilitates comparative analysis by comparing the impact of different variables, supports scalability by analyzing large datasets for comprehensive understanding, and allows trend analysis to identify changes over time. Additionally, it helps in prioritizing root causes by ranking factors based on their impact and supports predictive modeling to forecast future outcomes and guide proactive measures. Qualitative data is employed to gain a detailed and nuanced understanding, complementing the results obtained from quantitative data collected from e-government service customer. Quantitative data provides a broad overview of trends and patterns, revealing the extent and nature of issues within the service. However, it often lacks the depth needed to fully understand the underlying causes and contextual factors influencing these trends.

3.1.2. Research Strategy

Research strategy is another important component that provides overall direction in research. researchers might choose various research strategies that are available for selection. Some of them are case study, exploratory, experimental, action research, ethnography, grounded theory, narrative, and survey research. Selection of the research strategy should be based on the nature of the research questions, whether the study focuses on contemporary or historical eventsv (Yin, 2012). Since this research aims to identify the root causes of e-government service quality failure exploratory research is employed.

To understand the root causes of e-government service quality failure, survey questionnaires are deployed with closed-ended questions to collect data from a large number of users. In-depth, semi-structured interviews with key stakeholders involved in the provision of quality e-government services, such as IT staff, government officials, and policy-makers to explore the insights, attitudes, and perceptions of the service providers regarding the challenges and failures in delivering high-quality e-government services.

3.1.3. Study Setting

While the intended demographic for this research included all customers associated with the 25 Ethiopian government offices using the MInT-run E-Services portal and other ministries that had their own developed digital platforms, examining the entire group often proved challenging due to time limitations and manageability concerns. Consequently, employing sampling methods, where a representative segment of the larger population was analyzed, became important in such scenarios. This study chose four government offices from among 25 service providers offering 343 online government services through Ethiopia's government portal (www.eservices.gov.et). The selection was based on several key factors: accessibility and usage statistics of their e-services portal and the high number of users for their services.

The chosen offices were selected for their high level of accessibility through the e-services portal, ensuring users can easily navigate and utilize the services provided. High usage statistics were considered to identify which offices had the most active engagement from users, indicating significant reliance on these services. Additionally, the volume of users interacting with these services provided a rich dataset for analyzing user experiences and evaluating service quality and effectiveness. By focusing on offices that are heavily utilized and accessible, the study ensures that the findings are representative of the broader e-government service landscape in Ethiopia, allowing for comprehensive analysis and improvements across other services. This approach maximizes the potential impact of the study's findings, leading to significant enhancements in service delivery and benefiting a large portion of the population.

The majority of government agencies and ministries were located in the capital city, Addis Ababa, which presented a logistical advantage for the researchers, as it simplified the process of data collection, stakeholder interviews, and any necessary follow-ups. The study selectively chose customers of the Ministry of Innovation and Technology, the Ministry of Revenue, the Public Servant Social Security Agency, and the Ethiopian Construction Agency. The National Data Center Ethiopia (NDCE) in the Ministry of Innovation and Technology (MInT) was included since the e-government services were deployed in NDCE, and the ministry had a mandate on Information and Communications Technologies (ICTs) and was also a platform provider for E-services.

- **Ministry of Innovation**

The Ministry of Innovation and Technology of Ethiopia is a government body responsible for overseeing and guiding the country's innovation and technology sector. Its primary mandate is to help technological advancement and innovation to support Ethiopia's growth and development goals. The ministry is tasked with formulating policies, strategies, and programs to promote the integration of science, technology, and innovation into the national development plan. This includes encouraging research and development, supporting technological entrepreneurship, improving IT infrastructure, and enhancing digital literacy and skills across the population. The ministry plays an important role in building a knowledge-based economy and ensuring that Ethiopia leverages technology and innovation as key drivers of socio-economic progress. Currently, the ministry is using the national e-services portal to provide issuance of ICT Company Certificate of Professional Competency.

- **Ministry of Revenue**

The FDRE (Federal Democratic Republic of Ethiopia) Ministry of Revenue is a government institution in Ethiopia responsible for the collection of national taxes and duties. Its main functions include tax policy formulation, tax administration, and customs control. The ministry uses e-tax and complaints portal services provided online.

- **Public Servant Security Agency (PSSA)**

The FDRE (Federal Democratic Republic of Ethiopia) Public Servant Social Security Agency (often abbreviated as PSSSA) is an Ethiopian government agency. It's primarily focused on managing the social security of public servants in Ethiopia. The agency is tasked with ensuring the welfare of public servants by administering pension funds, overseeing retirement benefits, and handling related social security services. They aim to provide these services efficiently and sustainably to support public servants during their retirement years or in the event of disability. Currently five (5) services are available online on the e-services portal these are, Registration of Active Public Employees for Social Security Services, Registration of Public Organizations for Social Security Services, Replacement of Pension Allowance Receiving Card and Payment Control Card, Information Desk and Customer service, and Application for Change of Address of Pension Allowance Payment Station.

- **Ethiopian Construction Authority**

Ethiopian Construction Agency (ECA) is a government organization that regulates, streamlines, and builds capacity in the construction industry. The authority is committed to providing regulatory services to enhance industry competitiveness and ensure projects are completed on time, within budget, and up to standard, without compromising environmental and social well-being. So far twenty-five (25) services are provided online on the e-service portal.

3.1.4. Case selection and study participant

Sampling, a fundamental technique in statistical analysis, involved the selection of a specific subset of observations from within a broader population. This method was important as it empowered researchers to infer and make generalizations about a larger group by carefully examining a smaller, yet representative segment of that group (Turner, 2020). The importance of sampling lay in its ability to provide a comprehensive understanding of the wider population without the necessity to study every individual member, thereby optimizing resources and time.

In this particular study, a strategic approach to sampling, known as random sampling for quantitative and purposive for qualitative, was employed. Purposive sampling helped ensure that we included studies representing a wide geographic spread, rich data, and a focus that closely

resembled our synthesis objective(Ames et al., 2019). The focus of this study was to unravel and gain a clear understanding of the quality failures encountered in e-government services. To achieve this, the research involved a carefully structured selection process, targeting customers from four (4) distinct government offices. These individuals were chosen through a systematic and random procedure, ensuring that the sample was both representative and unbiased. To gather the requisite data, a well-designed survey, comprising a series of questionnaires, was systematically disseminated among the chosen participants. The questionnaires were crafted to elicit detailed information and insights about the individuals' experiences and perceptions regarding the quality of e-government services.

Furthermore, the study incorporated a series of in-depth interviews. These interviews were intended to engage key informant stakeholders who held key positions and possessed substantial knowledge about the e-government service spectrum. The stakeholders included, but were not limited to, esteemed officials from the Ministry of Information Technology (MInT), representatives from the E-Services portal, and high-ranking personnel from four notable government ministries and public departments. These interactions were poised to provide a multifaceted perspective on the quality of e-government services, thereby enriching the study with diverse viewpoints and expert insights.

3.2. Research Technique

For this study questionnaire were used to get an understanding of quality failure from customers and interviews, job observations, and participation were used to conduct on service providers. Both unstructured and structured interviews were conducted to get appropriate data. The researcher also participated in direct observations at e-government service centers.

3.2.1. Research Ethics

It was highly recommended that researchers adhered to ethical considerations throughout the investigation process, especially when the study was conducted within a real organization (Caruana, 2015). This study ensured that all gathered information and respondent interactions were handled ethically. Furthermore, proper acknowledgment was given to all referenced resources. As (Chen et al., 2018) suggested, ethical considerations such as consent, confidentiality, and privacy

had to be addressed from the proposal-writing phase through to the final document submission. This study consistently considered these ethical issues from its inception to its completion, including the submission of all required documents to the university. Following agreements made with participants, all collected information and documents were kept anonymous.

3.2.2. Data Collection

This section focuses on data collection methodology to make data available for analysis. The research implemented a multi-faceted approach to comprehensively understand the challenges users face while using e-government services, thereby identifying underlying issues from the user's perspective. Initially, a survey questionnaire systematically distributed to customers associated with the chosen organization. This survey is designed to elicit detailed responses about the specific difficulties these users encounter while interacting with e-government services.

To enrich the data and provide a multifaceted perspective, in-depth interviews were conducted with different stakeholders involved in the provision of e-government services. These interviews aim to get understanding of the challenges and processes from the viewpoint of those directly involved in service delivery. Participants for these interviews included e-service experts, caseworkers, and other key stakeholders. Specifically, information communication specialists from the Ministry of Information Technology (MInT), the National Digital Communication Experts (NDCE), and other relevant stakeholders that are identified as primary sources for these insightful interviews as the e-service platform provider and owner on the deployment of the e-service portal.

Moreover, the research methodology includes onsite observations and active participation at an e-government support center. Secondary data were collected from a literature review and document analysis for a better understanding of the causes.

3.2.3. Sample Size Determination

The researcher used Yamane’s formula (1967) to determine the sample size from the population, ensuring a 95% confidence level and a deviation factor of less than 5%. The formula is given by:

$$\mathbf{n} = \frac{N}{1 + Ne^2}$$

Where: n = Sample Size

N = Total Population Size

e = the level of precision/ degree of error expected (0.04)

For this research, the total population considered is the 218,000 registered customers on the www.eservices.gov.et portal.

n= N/1+Ne $^{=}$ 218,000/1+218000(0.04)^2 = 623

From the above calculation, it can be understood that the number of participants of subjects for the target population size is determined to be 623.

3.2.4. Instrument Development

In this study, which follows a mixed approach methodology, a questionnaire derived from various researchers is adopted. Most of the research constructs are adopted from a multiple-item scale model e-GovQUAL (Papadomichelaki & Mentzas, 2013). The study also incorporates three additional constructs that are derived from related literature on e-government service quality. These are infrastructure limitations, legal and regulatory framework, and Digital Literacy and Public Awareness. Some modifications have been made to capture the context of the study. The study made every effort to adhere to the ethical considerations of research. Participants were notified that their involvement in the study would be entirely voluntary. When preparing the survey questionnaire, care was taken to ensure that the demographic section avoided overly personal questions. The survey is structured into two main sections: The first aims to gather information on the demographic attributes of participants, including age, gender, and level of education. The second section is designed to capture the underlying reasons for the quality failures in e-government services, by employing a five-point Likert scale for responses. The questionnaire is organized as follows: (1) Demographic information is collected through multiple-choice questions that require a single response for variables such as age, gender, education level, and experiences with the internet and e-government services. (2) The survey utilizes close-ended questions on a

five-point Likert scale, ranging from "strongly disagree" to "strongly agree," with "neutral" serving as the midpoint, to get participants' perspectives on each topic.

Categorizing variables into qualitative and quantitative types allows for a comprehensive understanding of e-government service quality by leveraging the strengths of both research methods. Qualitative variables include infrastructure limitation, legal and regulatory frameworks, and digital literacy and public awareness. Infrastructure limitations often require detailed descriptions and context-specific insights, best captured through qualitative methods such as interviews or focus groups. This approach allows for a deeper understanding of the specific challenges and nuances related to infrastructure issues. Legal and regulatory aspects are complex and context-dependent, requiring the exploration of detailed policy documents, regulations, and stakeholder perspectives, which are best suited for qualitative analysis. Digital literacy and public awareness can vary widely among different populations, and qualitative methods help capture the variations, perceptions, and specific barriers people face in accessing and using e-government services.

Quantitative variables include reliability, trust, citizen support, efficiency/ease of use, content and appearance of information, and functionality of the interaction. Reliability can be quantified through metrics such as system uptime, error rates, and user satisfaction scores, measured using surveys and statistical analysis. Trust in e-government services can be quantified through user surveys and trust indices, allowing for statistical comparison and trend analysis. Citizen support levels can be measured through surveys assessing user experiences and satisfaction with support services, which can be quantitatively analyzed. Efficiency and ease of use can be assessed through user feedback surveys, task completion times, and usability testing, providing quantifiable data. Content and appearance of information can be evaluated using standardized checklists and user ratings, providing quantifiable metrics on content quality and appearance. Functionality can be measured by assessing the completeness and accuracy of transactions, user satisfaction with functionalities, and system performance metrics. By categorizing these variables appropriately, the framework can leverage the strengths of both qualitative and quantitative research methods to provide a comprehensive understanding of e-government service quality.

The selection of variables for quantitative and qualitative analysis in this study on the root causes of e-government service quality failure is strategically based on their inherent characteristics and the type of insights they can provide. Quantitative analysis is well-suited for variables such as Reliability, Trust, Citizen Support, Efficiency, Content and Appearance of Information, and Functionality of the Interaction because these aspects can be directly measured through structured surveys. These surveys yield numerical data that can be statistically analyzed to identify patterns and trends. Such quantitative measures allow for the assessment of service consistency, user trust levels, support effectiveness, ease of use, satisfaction with information quality, and overall functionality, providing concrete, measurable evidence of service quality. This quantitative data can be effectively gathered from customers who interact with the e-government services, offering a clear picture of the user experience and satisfaction.

On the other hand, qualitative analysis is more appropriate for examining Infrastructure Limitation, Legal and Regulatory Frameworks, and Digital Literacy and Public Awareness. These variables require a deeper exploration to understand the underlying causes and contextual factors that quantitative measures might not fully capture. Qualitative methods, such as interviews and focus groups, offer the ability to gather detailed narratives and explanations from stakeholders, uncovering the complexities and barriers related to infrastructure, legal issues, and digital literacy. This approach allows for a nuanced understanding of these complex issues, providing rich, detailed insights into the context and experiences of both users and providers. Service providers, in particular, can offer valuable perspectives on these qualitative aspects, as they are directly involved in the implementation and maintenance of e-government services. By combining quantitative data from customers and qualitative insights from service providers, the study can achieve a comprehensive understanding of e-government service quality failures, leveraging measurable evidence from quantitative data and contextual depth from qualitative data.

3.2.5. Data analysis

The analysis was conducted using quantitative methods. Initially, the data was entered and cleaned using SPSS software, version 25. Univariate analyses were employed to describe the characteristics and demographics of the study participants, providing a detailed overview of the sample population.

In qualitative research, unstructured forms of data, such as textual data from observation notes and interview transcripts, are primarily collected. Thematic analysis, a widely used analytical method in qualitative research, focuses on analyzing respondents' experiences, views, truths, and understandings. Its objective is to identify themes or patterns (Maguire & Delahunt, 2017). For this research, thematic analysis was employed to interpret respondents' audio records within the context of the identified conceptual framework.

According to (Braun & Clarke, 2006) six-step process for thematic analysis, the following strategy was adopted for data analysis in this research:

Step 1: Familiarize Yourself with the Data: The researcher extensively read through interview transcripts and observation notes to become thoroughly familiar with the collected data. Initial notes were made to capture early impressions and understanding.

Step 2: Generate Initial Codes: The researcher systematically coded and organized relevant pieces of data into meaningful categories. This step reduced a large volume of data into smaller, manageable chunks of meaning.

Step 3: Search for Themes (Patterns): The researcher examined the generated codes to identify the most relevant ones and organized them into broader themes that were pertinent to the research question.

Step 4: Review Themes: The initial themes identified in Step 3 were reviewed, modified, and developed. The researcher re-read the data associated with each theme to ensure they made sense, were supported by the data, and were distinct. This step also involved checking for themes within themes and identifying any additional themes present in the data.

Step 5: Define Themes: The researcher defined each theme by understanding its essence and any sub-themes. This involved analyzing how sub-themes interacted and related to the main theme, how themes related to each other, and determining the relative importance of each theme.

Step 6: Write Up the Results: In the final stage, the researcher described the identified categories and their connections. Interpretations were written up, and the results were discussed to provide a comprehensive understanding of the data.

To identify the root causes, the RCA (Root Cause Analysis) method is applied. The most suitable RCA methods for this situation would be the "5 Whys" and the "Fishbone (Ishikawa) Diagram" methods. Both are commonly used in quality management and problem-solving(Santen et al., 2019).

3.3. Validity and Reliability

This section concerns how the validity and reliability of the data will be verified. Validity and reliability are the attributes that measure the quality of research. They address issues regarding the quality of data and the appropriateness of the method used. Validity is concerned with whether the measuring instrument measures the quality or behavior that it is intended to measure and is a measure of how well the measuring instrument performs its function (Sürücü & Maslakci, 2020). Reliability is the consistency and stability of the measurement over time. A reliable measure gives the same results when repeated under identical conditions. A reliability test helps to ensure consistent results of the internal measures. The reliability of the questionnaire will be tested using statistical software SPSS.

The data collected using interviews was documented to maintain its reliability. The responses from the interviews were transcribed and shared with the participants for validation, to secure authentic, credible, and persuasive results. This approach helps the researcher to maintain precision and minimize any subjective or biased interpretations.

3.4. Chapter Summary

In this section, the research design and procedures on how to address the research objectives have been discussed. The research approach, research strategy, sampling method, data collection methods, data sources, validity and reliability, and data analysis processes have been well presented. A mixed approach is used to get e-government service quality failure root causes from both the customer and the service provider. A questionnaire is deployed to users of e-government services to get their side of view and interviews are held with service providers, case workers, e-

government experts, and key stakeholders. This chapter conceptualized all the methods that the researcher intends to use. A case study has been used as a research strategy. Purposive sampling has been employed for the selection of relevant respondents. As a qualitative approach, interviews, observations, participation, and document reviews have been employed to collect relevant data for the study. Thematic analysis has been employed to analyze the collected data. Finally, root causes analysis is applied to determine the root causes of quality failure in e-government services in Ethiopia. The next chapter presents the data presentation, analysis, and discussion of the study findings.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION

4.1. Overview

This chapter presents a comprehensive analysis and interpretation of the findings derived from the study on the root causes of E-Government service quality failure in Ethiopia. The investigation employed a mixed-methods approach, incorporating both quantitative and qualitative data collection methods, to provide a holistic understanding of the underlying issues impacting the quality of E-Government services. By synthesizing the results from surveys, interviews, and case studies, this chapter delves into the primary factors contributing to service quality failures and discusses the implications of these findings for policy-making, strategic planning, and practical interventions aimed at enhancing E-Government services in Ethiopia.

Survey questionnaires were distributed via email to 1000 e-government services customers in both Amharic and English using Google Forms. A total of 546 responses were received, resulting in a response rate of 54.6%. Out of these, 21 questionnaires were discarded due to missing values exceeding 15% or missing more than 4 items. Consequently, 525 usable responses were deemed valid for further data analysis. Following the verification of the questionnaires, the collected data was analyzed using SPSS version 25 to explore the results for further discussion and recommendations based on the findings. In addition to the questionnaire, observation techniques and interviews were also employed to enhance the information gathered from the target population of the selected organization. For the presentation of results, frequency and percentage were displayed in table form. Frequency tables are one of the most basic tools for displaying descriptive statistics, making it easier to view and understand the data.

4.2. Respondents Demographic Characteristics

The demographic information includes data from individuals who use e-government services, coming from various organizations. It covers details about the respondents, including their job title, gender, level of education, and e-government services experience.

4.2.1.Distribution of respondents by Gender

The research determined the gender makeup of the participants, revealing that a significant portion, 68.4%, were male, while 30.9% were female.

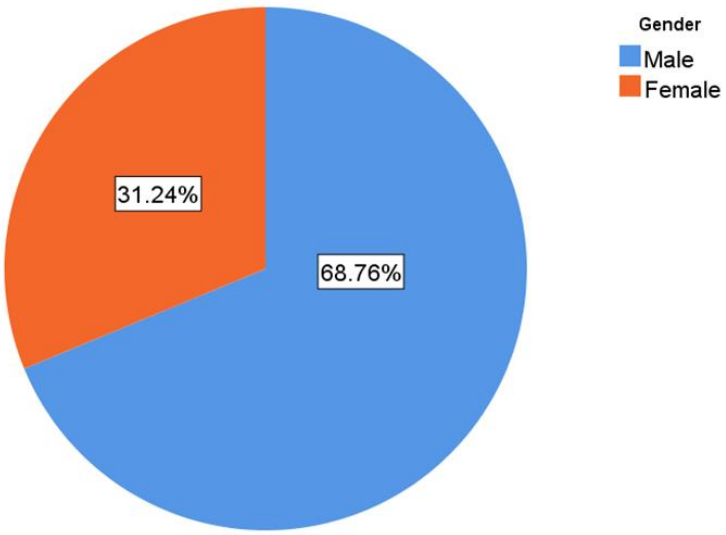


Figure 4.1 Gender of Respondents

Table 4. 1 Distribution of respondents by gender

Gender		
Gender	Frequency	Percent
Male	361	68.8
Female	164	31.2
Total	525	100%

4.2.2.Distribution of Respondents by Educational Status

The research took into account the educational qualifications of participants, as detailed in Table 4.2. A significant portion, 45.3%, held bachelor's degrees. Additionally, 41.9% had earned master's degrees, while 5.9% of respondents held Ph.D. 2.5% possessed at least a diploma, 2.3% Completed High School and 2.1% Secondary School completed, indicating a highly educated group of respondents. This suggests that the participants were adequately informed and could easily address the research queries.

Table 4.2 Distribution of Respondents by Educational Status

Educational Status		
Educational Status	Frequency	Percent
Secondary School	11	2.1
High School	12	2.3
Diploma	13	2.5
Degree	238	45.3
Masters	220	41.9
PhD	31	5.9
Total	525	100.0

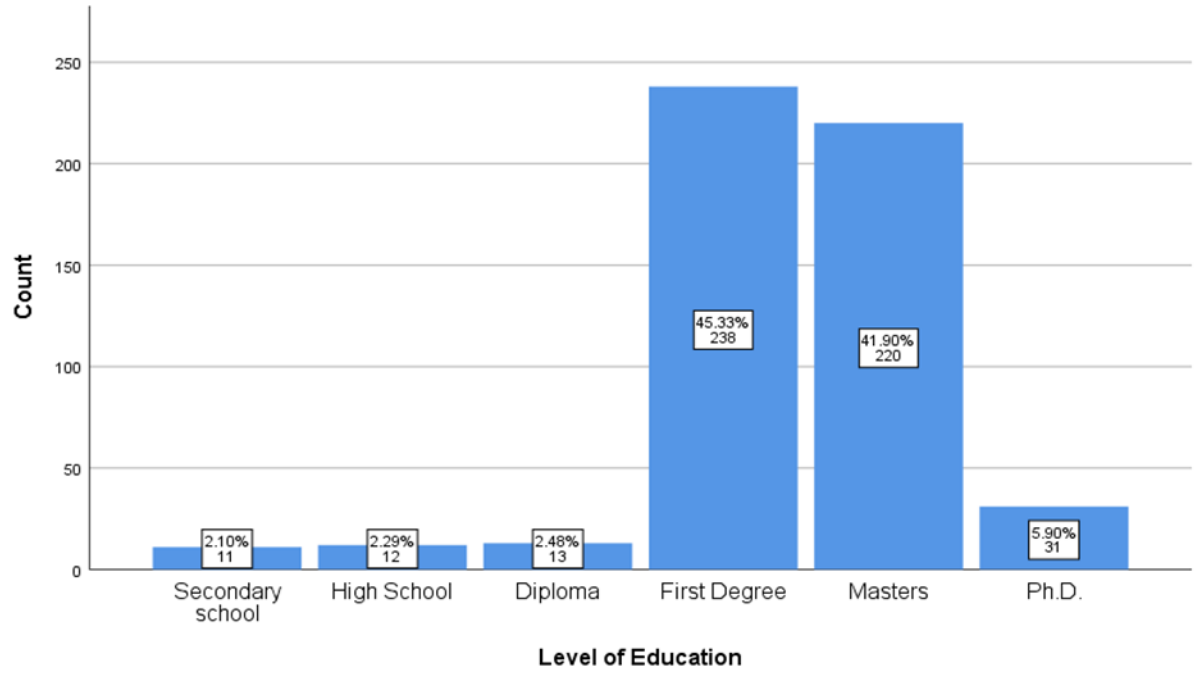


Figure 4.2 Respondent educational status

4.2.3.Computer Knowledge

In a survey assessing computer knowledge among participants, 7 individuals (1.3% of the total) displayed poor computer knowledge, representing the smallest group with minimal understanding of technology. A larger group of 51 participants (9.7%) had fair computer knowledge, indicating basic understanding with likely gaps. A substantial segment of 128 participants (24.4%) demonstrated good computer knowledge, showing a strong base level of competency. The largest category comprised 188 participants (35.8%), who were rated as having very good computer knowledge, suggesting significant comfort and proficiency. Additionally, 151 participants (28.8%) exhibited excellent computer knowledge, highlighting a high level of expertise and ease with technology.

Table 4.3 Computer knowledge

General Computer Knowledge		
Computer Knowledge	Frequency	Percent
Poor	7	1.3
Fair	51	9.7
Good	128	24.4
Very Good	188	35.8
Excellent	151	28.8
Total	525	100.0

4.2.4. E-government services experienced

With 247 responses, or 24.2% of the total and 47.4% of cases, INVEA is the most often used e-service among respondents, indicating that it is also the most desired. With 211 responses, MORETAX is in second place behind INVEA, accounting for 20.7% of the total and 40.5% of instances, indicating its extensive use. With 185 replies, or 18.1% of the total and 35.5% of cases, the "OTHERS" category is also quite significant since it demonstrates a significant utilization of a range of other services. On the other hand, MFA receives the fewest responses—52—and accounts for only 5.1% of the total and 10% of cases, making it the least used or favored service.

Table 4.4 E-government services experienced by the respondent

E-government services experienced by respondent		
Services used	**Frequency Percent**	**Percent**
PSSSA	68	6.7
ECA	80	7.8
MINT	70	6.9
MFA	52	5.1
MORETAX	211	20.7
INVEA	247	24.2
MOTRI	107	10.5
OTHERS	185	18.1
Total	1020	100.0

4.3. Quantitative Data Analysis Presentation

To assess the root causes of e-government service quality issues, a five-point Likert scale is utilized, gathering user feedback from government service customers. where 1= "Strongly Disagree", 2="Disagree", 3= “Neutral”, 4= "Agree" and 5 = "Strongly Agree", capturing a spectrum of user satisfaction levels. This approach helps identify specific areas needing improvement—where scores near 1 indicate critical concerns, and those closer to 5 highlight strengths in service delivery. By analyzing these responses, the study aims to pinpoint both

significant flaws and best practices in e-government services, facilitating targeted enhancements to meet public expectations effectively.

Table 4.5 Result of reliability testing

No	Variables	Cronbach Alpha
1	Trust	0.830
2	Reliability	0.838
3	Citizen Support	0.897
4	Efficiency	0.859
5	Content & Appearance of Information	0.847
6	Functionality of The Interaction Environment	0.752

4.3.1.Trust

The table presents survey data on user trust in an e-government site across four specific items: secure archiving of user data, secure acquisition of usernames and passwords, usage of provided data only for the submitted reasons, and maintaining the confidentiality of personal data. The responses are categorized into five levels of agreement: strongly disagree, disagree, neutral, agree, and strongly agree. For the secure archiving of data, the highest proportion of respondents are neutral (39.0%), with 24.4% strongly agreeing. Similarly, for the secure acquisition of usernames and passwords, 36.2% are neutral, and 25.3% strongly agree. Regarding the use of data only for the intended reasons, neutrality also dominates (34.7%), with 22.3% strongly agreeing. Finally, for the maintenance of personal data confidentiality, 40.0% of respondents are neutral, and 20.0% strongly agree. Overall, the total scores indicate that the largest proportion of respondents tend to be neutral (37.47%) on these trust-related issues, followed by strong agreement (23%) and agreement (20.42%).

Table 4.6 Trust of the user in e-government services

No	**Item under Trust**	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	Data provided by users in this e-government site are archived securely	19 3.6%	74 14.1%	205 39.0%	99 18.9%	128 24.4%	525 100%
2	Acquisition of username and password in this e-government site is secure	27 5.1%	66 12.6%	190 36.2	109 20.8	133 25.3%	525 100%
3	Data provided in this e-government site are used only for the reason submitted	24 4.6%	81 15.4%	182 34.7%	121 23.0%	117 22.3%	525 100%
4	The e-services portal maintains the confidentiality of the use of personal data	26 5.0%	84 16.0%	210 40.0%	100 19.0%	105 20%	525 100%
	Total score	4.57%	14.52%	37.47%	20.42	23%	100%

4.3.2.Reliability

The table summarizes user feedback on various aspects of an e-government service site, categorized under the reliability domain. For the statement regarding the site's availability and accessibility, 46.5% of respondents disagreed, while 17.3% strongly agreed. When asked about the timeliness of services, 37.9% disagreed, and 14.1% strongly agreed. Regarding the speed of page downloads, 38.7% of respondents disagreed, and 17.3% strongly agreed. For compatibility with default browsers, 27.4% strongly agreed that the site works properly, while 20.6% disagreed. Lastly, in terms of service accuracy, 37.3% disagreed, and 15.4% strongly agreed. Overall, the data reflects varying levels of user satisfaction, with disagreement percentages generally higher, indicating areas for improvement in site reliability.

Table 4.7 Reliability

No.	Items under Reliability	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	This e-government service site is available and accessible whenever you need it	71 13.5%	244 46.5%	71 13.5%	48 9.1%	91 17.3%	525 100%
2	This e-government service site provides services on time	108 20.6%	199 37.9%	90 17.1%	54 10.3%	74 14.1%	525 100%
3	e-Government site's pages are downloaded quickly enough	90 17.1%	203 38.7%	92 17.5%	49 9.3%	91 17.3%	525 100%
4	This e-government site works properly with your default browser	38 7.2%	108 20.6%	112 21.3%	123 23.4%	144 27.4%	525 100%
5	The services are accurately provided as promised	69 13.1%	196 37.3%	129 24.6%	50 9.5%	81 15.4%	525 100%
	Total	14.3%	36.2%	18.8%	12.32%	18.3%	100%

4.3.3.Citizen Support

The table presents user feedback on the citizen support provided by employees of an e-government service. When asked if employees showed sincere interest in solving problems, 40.6% disagreed, while 14.1% strongly agreed. Regarding employees' knowledge to answer questions, 30.5% disagreed, and 13.7% strongly agreed. In terms of prompt replies to inquiries, 39.0% disagreed, and 11.4% strongly agreed. For the ability to convey trust and confidence, 34.7% disagreed, while 10.9% strongly agreed. Overall, the percentages reflect a significant portion of users expressing dissatisfaction with the support provided, highlighting the need for improvements in employee training and responsiveness.

Table 4.8 Citizen support

No.	Items under Citizen Support	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	Employees showed a sincere interest in solving users' problem	90 17.1%	213 40.6	96 18.3%	52 9.9%	74 14.1%	525 100%
2	Employees have the knowledge to answer users' questions	85 16.2%	160 30.5%	153 29.1%	55 10.5%	72 13.7%	525 100%
3	Employees give prompt replies to users' inquiries	113 21.5%	205 39.0%	116 22.1%	31 5.9%	60% 11.4%	525 100%
4	Employees can convey trust and confidence	92 17.5%	182 34.7%	153 29.1%	41 7.8%	57 10.9%	525 100%

	Total	18.1%	36.2%	24.7%	8.5%	12.5%	100%

4.3.4.Efficiency

The table outlines survey efficiency on the reliability of an e-government site, capturing users' opinions on four distinct aspects: site structure clarity, search engine effectiveness, customization to users' needs, and the appropriateness of displayed information. Overall, the responses indicate mixed perceptions among users. For example, about 31.2% disagreed that the site's structure was clear and easy to follow, reflecting a notable concern about navigational ease. Similarly, a significant portion of respondents were neutral (29.3%) regarding the search engine's effectiveness, suggesting ambivalence about its utility. Customization to individual needs and the appropriateness of information detail also received varied feedback, with 31.0% disagreeing on customization adequacy and 28.4% on information detail, pointing towards a need for improvements in personalization and content relevance. Across all categories, there seems to be a slight inclination towards disagreement or neutrality, with totals showing 12.1% strongly disagreeing and 29.0% disagreeing on the assessed reliability aspects. These figures highlight an overall trend of dissatisfaction or ambivalence toward the site's functionality and user-centric design, underscoring areas for potential enhancement to meet user expectations more effectively.

Table 4.9 Efficiency

No.	Items under Efficiency	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	This e-government site's structure is clear and easy to follow	47 9.0%	164 31.2%	97 18.5%	99 18.9%	118 22.5%	525 100%
2	This e-government site's search engine is effective	45 8.6%	134 25.5%	154 29.3%	101 19.2%	91 17.3%	525 100%
3	This e-government site is well-customized to individual users' needs	81 15.4%	163 31.0%	115 21.9%	73 13.9%	93 17.7%	525 100%
4	The information displayed on this e-government site is appropriately detailed	81 15.4%	149 28.4%	113 21.5%	87 16.6%	95 18.1%	525 100%
	Total	12.1%	29.0%	22.8%	17.1%	18.9%	100%

4.3.5.Content & Appearance of Information

The table presents survey results regarding users' perceptions of the content and appearance of an e-government service across six different attributes: completeness, accuracy, updating, relevance,

understandability, clarity of graphics, color, animation, and size. Each attribute was evaluated on a five-point Likert scale ranging from "Strongly disagree" to "Strongly agree." For instance, regarding the completeness of the content, 10.9% of respondents strongly disagreed, while 17.3% strongly agreed. Accuracy of information saw a balanced perspective with both 5.7% strongly disagreeing and 18.3% strongly agreeing. The updating of information was more contentious, with 37.7% disagreeing. Information relevance received a notably positive response, with 35.6% strongly agreeing. The understandability of information on the portal was considered adequate, with 23.4% strongly agreeing. Lastly, the clarity of graphics and other visual elements received a mixed review, with 23.6% strongly agreeing on their clarity. The overall percentages across all categories indicate a diverse range of user satisfaction levels, highlighting areas of strength and opportunities for improvement in the e-government service's content and presentation.

Table 4.10 Content & Appearance of Information

No.	Items under Content & Appearance of Information	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	The content of the e-government service is complete	57 10.9%	178 33.9%	136 25.9%	63 12.0%	91 17.3%	525 100%
2	The information on the e-service site is accurate	30 5.7%	117 22.3%	186 35.4	96 18.3%	96 18.3%	525 100%
3	Information on the e-service portal is updated	44 8.4%	198 37.7%	141 26.9%	64 12.2%	78 14.9%	525 100%

4	Information e-service portals are relevant	13 2.5%	48 9.1%	124 23.6%	153 29.1%	187 35.6%	525 100%
5	Information on the e-service portal is easy to understand	32 6.1%	149 28.4%	117 22.3%	104 19.8%	123 23.4%	525 100%
6	Graphics, Color, Animation, and Size of the e-service portal are clear	49 9.3%	135 25.7%	127 24.2%	90 17.1%	124 23.6%	525 100%
	Total	7.1%	26.2%	26.4%	18.1%	22.2%	100%

4.3.6.Functionality of the Interaction Environment

The table presents survey results concerning user perceptions of the functionality of an interaction environment, distributed across five options: Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree. It encapsulates three distinct aspects: the presence of online help forms for complaints, the use of features to facilitate future interaction, and the adequacy of response formats. For the first item, about the online help form for complaints, a notable 40.0% of respondents disagreed with its effectiveness, while only 17.5% agreed or strongly agreed, indicating a significant area for improvement. In contrast, the use of features to facilitate future interactions received a more balanced distribution of opinions, with 39.0% of participants feeling neutral, and nearly equal proportions agreeing (14.5%) and strongly agreeing (14.1%) as those who disagreed (32.4%). This suggests a divided opinion on this aspect, highlighting an opportunity for enhancements to make these features more appealing or useful to users. Lastly, the adequacy of response formats garnered considerable critique, with 37.1% of respondents disagreeing and only 19.4% in agreement, pointing to dissatisfaction with how responses are presented or managed within the environment. Overall, the survey reveals critical feedback with average disapproval

(33.0%) surpassing approval (21.8%) across the board, suggesting areas where the interaction environment could be significantly improved to meet user expectations and preferences.

Table 4.11 Functionality of Interaction Environment

No.	Items under Functionality of the Interaction Environment	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
1	There is an online help form for complaint	111 21.1%	210 40.0%	112 21.3%	41 7.8%	51 9.7%	525 100%
2	use of features to facilitate future interaction	55 10.5%	115 21.9%	205 39.0%	76 14.5%	74 14.1%	525 100%
3	Adequate response format	78 14.9%	195 37.1%	150 28.6%	42 8.0%	60 11.4%	525 100%
	Total	15.5%	33.0%	29.7%	10.1%	11.7%	100%

4.4. Qualitative Data Analysis

Qualitative data analysis utilizes thematic analysis. The findings from the interviews are presented in narrative form and are organized according to the questions asked during the interviews, as follows:

Infrastructure

The chief manager of infrastructure has explained that the physical servers currently being utilized are equipped with hardware that is both outdated and inadequate. This has led to numerous performance issues with the E-Services portal. Additionally, these servers are approaching their storage capacity limits, which has contributed to occasional outages and server crashes. As a result,

data center technicians frequently need to perform manual reboots to maintain system operations. The Perago infrastructure team has reported difficulties in acquiring the necessary server specifications to properly support the e-services application. Moreover, there has been a neglect in the maintenance of network infrastructure. Consequently, the e-services applications are now operating on a public network instead of the more secure Woreda Net. This shift significantly increases the vulnerability and poses a major security risk for the entire e-services application. Additionally, the infrastructure is currently unable to cope with the increased demand placed on it by the service provider, further complicating the situation.

The infrastructure manager said

"*the hardware provided to support e-services is obsolete, doesn't meet the requirement with computing capacity, lack of high availability, bandwidth problem"*

Perago infrastructure team said

"…Lack of resources, we can't get appropriate server requirements to operate the e-services application as expected and lack of network infrastructure maintenance, now e-services applications run on the public network instead of using woreda net, this is very venerable/security hole for our entire e-services application"

User Experience

The consultant explained designing user-friendly e-government platforms that meet the needs of all users involves several major challenges. Integrating critical systems like the National Digital Identity and digital payment options is crucial for streamlined user experiences but often lacks implementation. The absence of a universal single sign-on system forces users to manage multiple credentials, increasing complexity. Moreover, e-government platforms suffer from poor user interface design, featuring complex navigation due to numerous services in the portal, and a lack of mobile compatibility, which limits accessibility, especially in mobile-prevalent regions. Adding to these challenges is the lack of mechanisms for collecting user feedback, which is essential for adapting and improving the platform based on actual user needs. Addressing these challenges requires a focus on technical integration, intuitive design, continuous assessment of user

experience, and implementing feedback systems to ensure the platform is inclusive and accessible to a diverse user base.

"*Integrating systems such as payment options presents significant challenges. Consolidating a large number of services on a single platform can make it difficult for users to find the specific services they need. Additionally, establishing a mechanism to gather feedback is another challenge*"

Training

Caseworker A explained caseworkers and supervisors generally had the digital literacy needed to handle requests via the E-Services portal. While there were no formal training materials provided by the service providers, new caseworkers typically learned through on-the-job training by observing their colleagues. **Caseworker B** explained the training for caseworkers is not enough and primarily focuses on administrative procedures and how to handle business process forms. Currently, when a user complains due to a functionality failure caseworkers do not have the authority or capability to resolve these issues immediately. Instead, these issues are escalated to a consultant, and the resolution process can take several days, often leading to customer dissatisfaction. Additionally, the turnover of caseworkers poses another challenge. When a caseworker leaves, finding and training a replacement frequently involves a significant delay. This transition period is exacerbated by inadequate knowledge transfer and insufficient training for new employees, which further impacts service continuity and effectiveness.

"Caseworkers have received some admin training, but not enough. They cannot assist users if they are not properly trained"

Performance monitoring

The e-Gov application team leader has explained there are no structured mechanisms for monitoring the performance and quality of e-government services is evident, leading to challenges in identifying and addressing issues. Problems are typically addressed reactively, relying on user complaints or system failures as triggers for action. However, this reactive approach lacks efficiency and may result in prolonged service disruptions. There is a clear need for the

establishment of comprehensive monitoring frameworks to enable proactive issue detection and data-driven decision-making for continuous service improvement.

"*We don't have a performance monitoring mechanism in place; instead, issues are identified when there is a system glitch or customers raise complaints*"

Legal Framework

As per the statement provided by the Digital Economy CEO, the absence of a comprehensive legal framework significantly hampers the delivery of e-government services. Despite the Ministry of Innovation and Technology (MInT) being tasked with spearheading ICT policies and plans in Ethiopia, its authority to enforce these directives across other government entities remains ambiguous. Legal documents, including the Negarit Gazette of the Federal Democratic Republic of Ethiopia Proclamation No.1263/2021, Communications Service Proclamation No. 1148/2019, and Electronic Transaction Proclamation No. 1205/2020, fail to clearly define MInT's mandate and powers in facilitating e-government services. While efforts have been made through the E-Transaction Proclamation to address e-government initiatives, the absence of a Digital Economy Council and delayed approval of necessary regulations hinder effective implementation. Additionally, the lack of standardized principles and oversight limits MInT's ability to drive uniformity and interoperability among disparate digital platforms, further exacerbating the challenge of delivering e-government services efficiently.

Digital Literacy

The CEO of the digital economy explained the challenges associated with the limited digital literacy among e-government service users. This lack of awareness is a significant factor contributing to the reluctance of many individuals to use e-services. To address this issue, the ministry is taking proactive steps not only for users of e-government services but also for the broader national level. A new initiative has been launched to develop and distribute digital content tailored to the needs of various communities, aiming to enhance digital understanding and engagement across the country.

Table 4.12 Thematic analysis

Category	Themes	Codes	Quotes
Infrastructure	Outdated Hardware	outdated hardware, inadequate equipment, performance issues, server crashes, manual reboots	The hardware provided to support e-services is obsolete, doesn't meet the requirement with computing capacity...
	Storage and Capacity Issues	storage capacity limits, outages, server crashes	These servers are approaching their storage capacity limits...
	Network Vulnerabilities	public network, security risks, lack of network maintenance, Woreda Net	...e-services applications run on the public network instead of using Woreda Net...
	Resource Limitations	lack of resources, inadequate server specifications, demand exceeding capacity	We can't get appropriate server requirements to operate the e-services application as expected...
User Experience	Complex Navigation and Design	user interface design, complex navigation, mobile compatibility issues	...suffer from poor user interface design, featuring complex navigation...
	Lack of Integration	digital identity, payment options, single sign-on, multiple credentials	Integrating systems such as payment options presents significant challenges...
	Feedback Mechanisms	absence of feedback systems, user needs, adaptability	Establishing a mechanism to gather feedback is another challenge.
Training	Inadequate Training	on-the-job training, lack of formal training materials, administrative procedures	Caseworkers have received some admin training, but not enough.

	Issue Escalation	limited authority, consultant reliance, delayed resolutions, customer dissatisfaction	Currently, when a user complains due to a functionality failure caseworkers do not have the authority...
	Turnover and Knowledge Transfer	turnover of caseworkers, delays in training replacements, insufficient training	The turnover of caseworkers poses another challenge...
Performance Monitoring	Lack of Structured Monitoring	absence of performance monitoring, reactive problem-solving, user complaints as triggers	We don't have a performance monitoring mechanism in place...
	Need for Proactive Monitoring	proactive issue detection, data-driven decision-making, comprehensive monitoring frameworks	There is a clear need for the establishment of comprehensive monitoring frameworks...
Legal Framework	Ambiguity in Authority	unclear MInT mandate, lack of enforcement authority, ambiguous directives	Its authority to enforce these directives across other government entities remains ambiguous.
	Lack of Standardization	absence of standardized principles, limited oversight, interoperability challenges	The lack of standardized principles and oversight limits MInT's ability to drive uniformity...
	Delayed Regulations	delayed approval of regulations, hindered implementation, Digital Economy Council absence	The absence of a Digital Economy Council and delayed approval of necessary regulations...
Digital Literacy	Limited User Awareness	limited digital literacy, user reluctance, awareness challenges	This lack of awareness is a significant factor contributing to the reluctance...
	Proactive Literacy Initiatives	digital content development, community-tailored	A new initiative has been launched to develop and

		content, national engagement	distribute digital content...

4.5. Fishbone (Cause and Effect) diagram

The simple fishbone diagram is the most basic and frequently used type. Its categories or sections are not predetermined, allowing you to customize it to suit your specific organization and situation. For example, if you are using it in a restaurant setting, your diagram will be different from one created for a manufacturing plant. This diagram facilitates the organization of the brainstorming process. The main categories of causes are placed on primary branches linked to the central spine, with various sub-causes branching off. To use this chart, position the problem at the forefront, and then populate the major branches accordingly.

The fishbone diagram presents a structured analysis of the factors leading to e-Government Service Quality Failure, categorizing the causes into Training, User Experience, Infrastructure, Digital Literacy, Performance Monitoring, and Legal Framework. It highlights specific issues such as insufficient training materials, complex system navigation, outdated hardware, underestimation of the importance of digital literacy, inadequate performance monitoring tools, and a lack of clear legislative mandates. This visualization serves as a tool to systematically identify and address the myriad challenges impacting the efficacy of e-government services.

Quantitative analysis plays a crucial role in complementing qualitative methods like the Fishbone diagram and the 5-why analysis in root cause analysis. While qualitative analysis helps in understanding the underlying reasons and context behind failures, quantitative analysis provides empirical evidence and measures the extent of these failures. Quantitative analysis offers statistical validation to the findings obtained from qualitative methods, ensuring that the results are representative of a larger population. It provides objective measurements of variables, such as reliability, efficiency, and trust in e-government services, which help create benchmarks and track improvements over time. Additionally, quantitative data can reveal patterns and trends that might not be evident through qualitative analysis alone, such as correlations between user demographics and their experiences with e-government services. This helps identify which groups are most affected by service failures. Furthermore, quantitative analysis aids in prioritizing issues based on their severity and impact, allowing for efficient resource allocation. For instance, if survey results

indicate that infrastructure limitations are the most significant factor affecting service quality, resources can be directed to address this issue first. Policymakers also rely on quantitative data to formulate evidence-based policies, providing the necessary metrics to evaluate the effectiveness of current policies and make informed decisions for future initiatives. In conclusion, quantitative analysis is essential for providing a comprehensive understanding of e-government service quality failures, offering empirical validation, objective measurements, and data-driven insights crucial for effective problem-solving and decision-making.

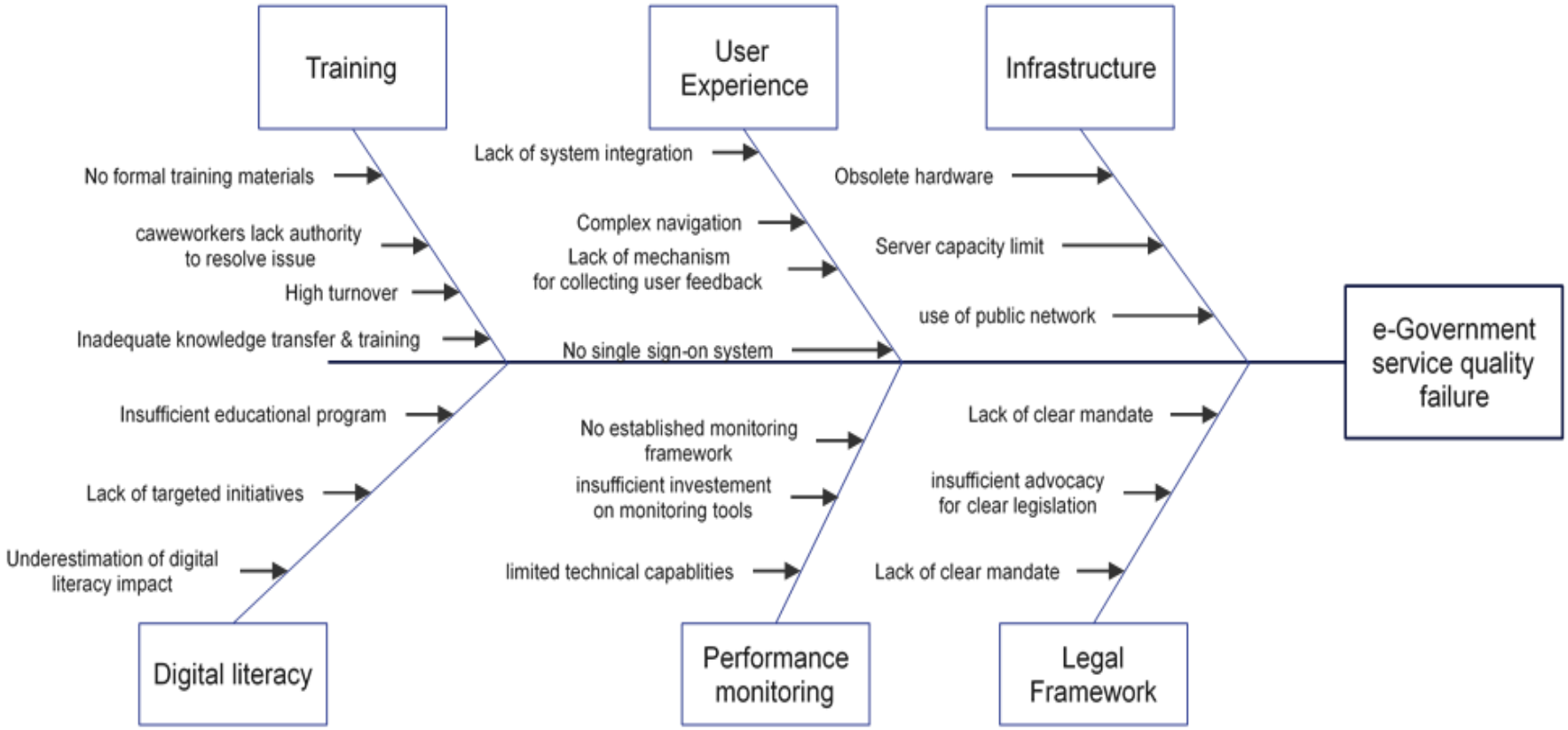


Figure 4.3 Fishbone diagram of E-government service quality failure

4.6. 5-Whys Analysis

The 5 Whys analysis, originally developed as a root cause analysis tool, has been adapted for use in IT project management and software development (Kohara, 2011). It is used to identify the root causes of problems and defects, and the number of iterations required to resolve an issue can vary (Selvaraj et al., 2018).

As we can see from this Fishbone diagram Infrastructure, Training, User Experience, Legal Framework, Performance Monitoring, and Digital literacy are identified as the primary causes of the E-Government service quality failure. Based on this all contributors are analyzed to obtain their root cause by asking the Whys as shown in the Table. This questioning continues until a root cause is identified for each contributor.

In a 5-Why analysis, the primary aim is to delve into the root causes of a problem by repeatedly asking "Why?" until the fundamental issue is uncovered. However, there is no strict rule that dictates stopping precisely at five whys. You should cease asking "why" when you reach a root cause that, if addressed, would prevent the problem from recurring. Additionally, if you gather enough information to take effective corrective action, or if further questioning fails to provide new or useful insights, it indicates that you may have reached a practical limit. Moreover, if the complexity of the problem increases without leading to clear or actionable insights, it suggests that alternative methods might be necessary. The goal is to identify a clear and actionable root cause, not merely to achieve a specific number of "whys."

Table 4.13 The root cause of e-government service quality failure analysis

Category	Why 1	Why 2	Why 3	Why 4	Why 5
Infrastructure	Obsolete servers	Budget constraints	Prioritization issues	Insufficient understanding of infrastructure needs	-

User Experience	Poor user interface design	Lack of user feedback	Insufficient collaboration between teams	Lack of emphasis on user-centered design	-
Training	No formal training materials	Lack of oversight in program development	Lack of understanding of training importance	-	-
Performance Monitoring	No established monitoring frameworks	Limited technical capabilities	Insufficient investment in monitoring tools	-	-
Legal Framework	Ambiguity in legal provisions	Inadequate stakeholder collaboration	Lack of clear mandates	Insufficient advocacy for clear legislation	-
Digital Literacy	Insufficient educational programs	Lack of targeted initiatives	Underestimation of digital literacy's impact	-	-

The root causes of the challenges listed in the table Table 4:11 can be largely attributed to a few fundamental issues affecting the quality of e-government services in Ethiopia

4.7. Discussion

The objective of this study was to explore the fundamental reasons behind the failures in the quality of e-government services and to suggest ways to address these underlying issues. The research focuses on the diverse root causes of e-government service quality failures in Ethiopia as identified through study. By incorporating both quantitative and qualitative data, the study aims to answer

the following questions: "What are the root causes of e-government service quality failures in the Ethiopian context?" and "How can these root causes be addressed?"

Research Question #1: What are the root causes of e-government service quality failures in the Ethiopian context?

Insufficient understanding of infrastructure needs

The use of obsolete servers can lead to numerous problems, including slower performance, increased vulnerability to cyber-attacks, and incompatibility with newer software. This issue often arises due to budget constraints, where limited financial resources restrict the ability to upgrade infrastructure. Such financial limitations may result from broader organizational priorities or financial mismanagement. These budget constraints are frequently caused by prioritization issues, where a misalignment of organizational priorities leads to insufficient attention and resources being allocated to infrastructure needs, often due to leadership decisions or strategic planning deficiencies. Ultimately, the root cause is an insufficient understanding of infrastructure needs, where a lack of knowledge or awareness among decision-makers about the critical role of infrastructure prevents timely upgrades and maintenance, stemming from inadequate technical expertise or communication gaps within the organization.

Lack of emphasis on user-centered design

A poorly designed user interface can frustrate users, making it difficult to navigate and accomplish tasks efficiently, thereby reducing user satisfaction and productivity. This issue often stems from a lack of user feedback mechanism, where developers are unaware of the issues users face, leading to persistent design flaws and unmet user needs. The absence of regular feedback is frequently caused by insufficient collaboration between design, development, and user experience teams, resulting in a disjointed product that doesn't adequately address user needs or preferences. Ultimately, the root cause is a lack of emphasis on user-centered design, where the product is not optimized for the end-user due to a focus on other priorities such as cost-saving or rapid deployment.

Lack of understanding of training importance

The absence of formal training materials can hinder effective learning and onboarding, leading to inconsistent knowledge and skills among users or staff. This issue often arises from lack oversight in program development, where the creation of a comprehensive training program is neglected. Such lack of oversight frequently stems from a lack of understanding of the importance of training. When the significance of training is underestimated, it fails to receive the necessary resources or attention, resulting in inadequate preparation and support for users or staff.

Insufficient investment in monitoring tools

The absence of established monitoring frameworks can lead to a lack of data-driven insights and an inability to identify and address issues proactively. This issue often arises from limited technical capabilities, where inadequate technical infrastructure or expertise hinders the development and implementation of effective monitoring systems, thereby reducing the ability to track and improve performance. Such technical limitations frequently stem from insufficient investment in monitoring tools. Without adequate investment in the necessary tools and technologies, monitoring capabilities are limited, preventing comprehensive performance evaluation and management. Therefore, the root cause is insufficient investment in monitoring tools.

Insufficient advocacy for clear legislation

Ambiguity in legal provisions can lead to confusion and inconsistency in compliance, enforcement, and implementation of regulations. This issue often arises from inadequate stakeholder collaboration, where the lack of cooperation among stakeholders such as government, industry, and the public results in fragmented and ineffective legal frameworks that do not adequately address the needs and concerns of all parties. Such fragmentation frequently stems from a lack of clear mandates, where the absence of specific and enforceable directives undermines the effectiveness of legal provisions, leading to inconsistent application and enforcement. Ultimately, the root cause is insufficient advocacy for clear legislation, where the lack of strong support for precise and robust laws results in legal provisions that are not comprehensive, reducing their efficacy in addressing the intended issues.

Underestimation of digital literacy's impact

The lack of comprehensive educational programs targeting digital literacy can leave large segments of the population without the necessary skills to effectively use digital tools and technologies. This issue often arises from the lack of targeted initiatives, where generalized approaches to digital literacy fail to address the specific needs of different demographics, such as older adults or underserved communities, leading to gaps in digital competency. Such inadequacies frequently stem from an underestimation of digital literacy's impact. When the importance of digital literacy is underestimated, there is insufficient investment and effort put into promoting and improving it, which hinders overall technological adoption and innovation.

Research Question #2: How can these root causes be addressed?

Addressing the root causes of e-government service quality failures in Ethiopia requires a multifaceted approach. To tackle the insufficient understanding of infrastructure needs, it is essential to conduct comprehensive assessments of the current IT infrastructure, improve budget allocation to prioritize these needs, enhance the technical expertise of decision-makers and IT staff, and foster better communication between technical teams and leadership. For the lack of emphasis on user-centered design, implementing user feedback mechanisms, promoting cross-team collaboration, adopting user-centered design principles, and conducting continuous user testing can significantly improve the user interface and overall user satisfaction.

In addressing the lack of understanding of training importance, developing comprehensive training programs, emphasizing training in strategic plans, and monitoring the effectiveness of these programs are crucial steps. To overcome insufficient investment in monitoring tools, it is vital to invest in advanced monitoring tools, enhance the technical infrastructure, and develop expertise in data analysis to effectively utilize these tools for system performance improvement.

Insufficient advocacy for clear legislation can be addressed by promoting stakeholder collaboration, clarifying legal mandates, and engaging in advocacy efforts for legislative reform to ensure robust and effective legal frameworks. Finally, the underestimation of digital literacy's impact can be mitigated by implementing targeted digital literacy programs, increasing investment in these programs, raising awareness of their importance, and collaborating with educational

institutions to integrate digital literacy into curricula. By taking these targeted actions, Ethiopia can significantly enhance the quality of its e-government services, leading to better user satisfaction and overall system efficiency.

Similarities and Differences with Prior Research

Similarities

Both this study and previous research in developing countries consistently highlight technological shortcomings as a significant barrier to successful e-government implementation. Studies such as those by (Alanezi et al., 2011; Al-Nidawi et al., 2018a) emphasize the necessity of robust IT infrastructure and reliable internet connectivity. Similar to the findings in Ethiopia, these studies underscore that inadequate technological infrastructure leads to inefficiencies and service delivery failures. Organizational issues such as bureaucratic resistance and lack of skilled personnel are common themes across studies. For example, (Joshi & Islam, 2018) found that organizational readiness, including effective training and change management strategies, is crucial for e-government success in developing countries. This aligns with the current study's findings that insufficient training for caseworkers and bureaucratic hurdles significantly impact service quality. Both this research and prior studies point to external factors like public awareness and digital literacy as critical determinants of e-government success. (Chohan & Hu, 2022) discussed the importance of cohesive ICT training programs to enhance digital competencies in e-government users, which resonates with the recommendations in this study for enhancing digital literacy among Ethiopian citizens and government employees.

Differences

This study uniquely focuses on Ethiopia's specific context, providing a detailed examination of the country's unique socio-economic and technological landscape. While prior studies, such as those by (Durickovic & Kovacevic, 2011b), have a broader scope that includes multiple developing countries, this research delves deeply into Ethiopia's specific challenges and opportunities, offering tailored solutions. The use of mixed methods (quantitative and qualitative) in this study provides a comprehensive view that combines user feedback and expert insights. This contrasts with some earlier studies like those by (Bojang, 2020), which primarily relied on qualitative

reviews and did not incorporate quantitative survey data as extensively. This methodological diversity allows for a more nuanced understanding of the issues and potential solutions. Additionally, this research emphasizes the need for updated regulatory frameworks specific to Ethiopia, which is less commonly highlighted in other studies. For example, the study by (Dodeen, 2019) focused more on service quality from a user perspective without delving deeply into the regulatory aspects. By addressing the need for comprehensive legal frameworks, this study provides a more holistic approach to improving e-government services.

4.8. Chapter Summary

This section effectively examined, presented, and discussed the mixed data that was gathered from the research participants. The underlying reason for the poor quality of e-government services has been identified and discussed. The important findings, recommendations, conclusions, limits, and next steps for this research will all be covered in the upcoming chapter.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Overview

This chapter thoroughly discusses the key findings, conclusions, study limitations, and recommendations. It also suggests future research directions, encouraging other researchers to expand this study into related or other domains.

5.2. Summary of key findings

E-government services face multiple challenges including outdated infrastructure, poor user experience, inadequate training, insufficient performance monitoring, gaps in legal frameworks, and shortcomings in digital literacy. Obsolete hardware and limited server capacity, driven by budget constraints, compromise the robustness and security of services, reflecting a broader lack of understanding of infrastructure needs at the leadership level. Additionally, e-government platforms are plagued by complex navigation and lack of integration due to insufficient emphasis on user-centered design, resulting in decreased public engagement. The effectiveness of these services is further hindered by the absence of formal training for caseworkers, and a lack of structured frameworks to monitor service performance, both stemming from neglected oversight and limited investment. Legal ambiguities and a comprehensive legal framework are lacking, often due to insufficient advocacy for clear legislation and inadequate stakeholder collaboration. Lastly, the importance of digital literacy is often underestimated, resulting in inadequate educational programs that fail to meet the specific needs of various demographics, thus limiting the effectiveness of e-services. These issues collectively stem from a series of root causes including insufficient technical expertise, prioritization issues, and lack of clear mandates, which need to be addressed to enhance the quality and effectiveness of e-government services.

In analyzing these issues, tools like the 5-Whys and Fishbone Diagram are employed to uncover multiple layers of causation and to categorize the complex factors impacting service quality into six main categories: Infrastructure, User Experience, Training, Legal Framework, Performance Monitoring, and Digital Literacy.

The implications of these quality failures are significant as they affect user satisfaction, trust, and the overall efficiency of government operations. Recommendations to mitigate these issues include upgrading technological infrastructure, enhancing user interface design, implementing comprehensive training programs, establishing clear legal mandates, investing in performance monitoring tools, and improving digital literacy programs.

For policymakers and administrators, it is crucial to address these root causes with targeted interventions to enhance the effectiveness, reliability, and satisfaction associated with e-government services. By improving infrastructure, legal frameworks, and digital literacy, as well as focusing on user experience and performance monitoring, the overall performance and trust in e-government services can be substantially improved.

5.3. Conclusion

The comprehensive analysis of e-government service quality failure in Ethiopia reveals a multi-faceted issue underpinned by technological, organizational, and environmental challenges. Quantitative data analysis demonstrated significant variability in perceptions of trust, reliability, citizen support, efficiency, content appearance, and functionality of the interaction environment among e-government service users. Key findings indicated a moderate level of trust but highlighted substantial areas for improvement in reliability, citizen support, efficiency, and particularly functionality. Qualitative insights underscored the critical role of a clear legal and regulatory framework, performance monitoring, digital literacy, public awareness, and training in influencing the effectiveness and user satisfaction of e-government services.

The study identified the absence of specific legislation for enforcing e-government policies, reactive management of e-services, issues of digital literacy and public awareness, and insufficient training for caseworkers as root causes impeding the quality and efficiency of e-government services in Ethiopia. These findings suggest a complex interplay of internal and external factors that constrain the potential of digital governance to enhance public service delivery and citizen engagement.

To effectively enhance the quality of e-government services in Ethiopia and address the identified challenges, a comprehensive approach encompassing legislative, operational, educational, and infrastructural reforms is essential. It is recommended that comprehensive legislative reforms be

implemented to clearly define the powers and responsibilities of the Ministry of Innovation and Technology (MInT), including the establishment of a Digital Economy Council to ensure coordinated and standardized digital service adoption across government entities. A shift towards proactive performance monitoring strategies for e-services platforms is crucial to ensure optimal operation and user experience. This should be complemented by nationwide campaigns to improve digital literacy and public awareness about the benefits and availability of e-government services, targeting inclusivity across all demographics. Additionally, the development and implementation of structured training programs for caseworkers are paramount to enhance service delivery quality. These programs should encompass customer service skills and technical knowledge necessary to efficiently navigate e-government platforms. Emphasis on user-centric design and development, involving citizens in the creation process of e-government services, will ensure these services meet user needs and preferences, thereby increasing adoption rates and satisfaction. Finally, significant investments in ICT infrastructure and internet connectivity are necessary to support the reliable delivery of e-government services across the country, ensuring accessible and efficient digital governance for all citizens.

5.4. Study Limitation

Scope Limitation: The research focused primarily on federal e-government services, which may not fully capture the nuances of regional or local e-government initiatives that could have different challenges and dynamics.

Data Collection Constraints: The study's data collection was confined to four specific government offices, which may limit the generalizability of the findings across all branches of government or to other countries with different e-government frameworks.

Methodological Constraints: The study predominantly used surveys and interviews, which can be subject to biases such as self-reporting bias or non-response bias. This may affect the depth of insights into less quantifiable aspects of service quality failures.

Technological Dynamics: The rapidly changing nature of technology and digital services means that the findings might become outdated quickly, as new technologies and user expectations evolve.

Limited Stakeholder Perspectives: While the study did include various stakeholders, the perspectives of all relevant groups, including more diverse user demographics, may not have been fully represented.

5.5. Recommendation

Based on the identified limitations and the overall findings of the study on e-government service quality failures in Ethiopia, here are some recommendations that could help improve e-government services:

1. **Enhance Technological Infrastructure**: Invest in updating and maintaining technological infrastructure to support robust and secure e-government platforms. This includes server upgrades, secure networks, and integrated software solutions to handle increased traffic and ensure data security.
2. **Improve User Interface Design**: Focus on user-friendly design for e-government websites and apps to enhance accessibility and ease of use. Simplify navigation, ensure consistency in design, and provide clear instructions to help users complete tasks efficiently.
3. **Expand Training Programs**: Develop comprehensive training programs for both users and government employees. For users, focus on increasing digital literacy to enhance their ability to use e-services effectively. For employees, provide regular training on the latest technologies and customer service best practices.
4. **Strengthen Legal Frameworks**: Update or establish clear legal frameworks and policies that support e-government initiatives. This includes privacy protections, data security regulations, and standards for electronic transactions to build trust among users.
5. **Implement Performance Monitoring Systems**: Develop and implement a robust performance monitoring system for e-government services. This system should track service availability, user satisfaction, and system security, providing real-time data to quickly address and resolve issues.
6. **Promote Stakeholder Engagement**: Engage a broader range of stakeholders in the planning and implementation stages of e-government projects. This should include not only

government personnel and IT experts but also end-users from diverse backgrounds to ensure the services meet the needs of all citizen groups.

7. **Research and Development Investment**: Allocate resources for ongoing research and development to keep pace with technological advancements and evolving user needs. This could involve partnerships with tech companies, academic institutions, and international bodies specializing in digital governance.
8. **Public Awareness Campaigns**: Conduct widespread public awareness campaigns to educate citizens about the availability and benefits of e-government services. This can increase usage rates and encourage a shift from traditional in-person interactions to more efficient online services.

These recommendations aim to address the core issues identified in the study, fostering an environment where e-government services are not only more efficient and reliable but also more inclusive and user-centric.

5.6. Future work

Building on the findings and limitations of the study on e-government service quality failures in Ethiopia, future research could explore several areas to deepen understanding and enhance the effectiveness of e-government services. Here are some potential directions for future work:

- This research focuses specifically on the quality and root causes of failures in e-government services in Ethiopia. Future research could extend this work by exploring the quality and failure root causes of other e-service sectors in Ethiopia, such as e-commerce, e-health, and e-education, to provide a more comprehensive understanding of the overall e-services landscape.
- This research is conducted on the e-government services portal; it would be beneficial to also conduct a root cause analysis on other e-service platforms. This expanded scope could provide a more comprehensive understanding of the systemic issues and commonalities that may exist across different e-service platforms.

- Comparative studies involving multiple sectors could offer broader insights and contribute to the development of more robust and generalized strategies for improving e-service quality across the board.

These areas of future work would not only extend the current research but also contribute to a broader understanding of how to effectively implement and manage e-government services to meet the needs of a diverse population.

REFERENCES

Abdulkareem, A. K., & Mohd Ramli, R. (2021). Evaluating the Performance of E-government: Does Citizens' Access to ICT Matter? *Pertanika Journal of Social Sciences and Humanities*, *29*(3). https://doi.org/10.47836/pjssh.29.3.03

Abu-Shanab, E., & Harb, Y. (2019). E-government research insights: Text mining analysis. *Electronic Commerce Research and Applications*, *38*, 100892. https://doi.org/10.1016/j.elerap.2019.100892

Adam, I. O. (2020). Examining E-Government development effects on corruption in Africa: The mediating effects of ICT development and institutional quality. *Technology in Society*, *61*, 101245. https://doi.org/10.1016/j.techsoc.2020.101245

Agbozo, E., & Spassov, K. B. (2018). Establishing Efficient Governance through Data-Driven e-Government. *Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance*.

Alanezi, M. A., Mahmood, A. K., & Basri, S. (2011). Conceptual model for measuring e-government service quality. *2011 IEEE Conference on Open Systems*, 411–416. https://doi.org/10.1109/ICOS.2011.6079243

Almutairi, F., Thurasamy, R., & Yeap, J. A. (2020). Historical Development of E-Government in the Middle East. *International Journal of Recent Technology and Engineering*, *8*(5), 748–751.

Al-Nidawi, W. J. A., Al-Wassiti, S. K. J., Maan, M. A., & Othman, M. (2018a). A review in E-government service quality measurement. *Indonesian Journal of Electrical Engineering and Computer Science*, *10*(3), 1257–1265. https://doi.org/10.11591/ijeecs.v10.i3.pp1257-1265

Al-Nidawi, W. J. A., Al-Wassiti, S. K. J., Maan, M. A., & Othman, M. (2018b). A review in E-government service quality measurement. *Indonesian Journal of Electrical Engineering and Computer Science*, *10*(3), 1257–1265. https://doi.org/10.11591/ijeecs.v10.i3.pp1257-1265

Alshehri, M., & Drew, S. (2010). *Challenges of e-Government Services Adoption in Saudi Arabia from an e-Ready Citizen Perspective*. https://figshare.utas.edu.au/articles/journal_contribution/Challenges_of_e-Government_Services_Adoption_in_Saudi_Arabia_from_an_e-Ready_Citizen_Perspective/22944389/1

Amanbek, Y., Balgayev, I., Batyrkhanov, K., & Tan, M. (2020). Adoption of e-Government in the Republic of Kazakhstan. *Journal of Open Innovation: Technology, Market, and Complexity*, *6*(3). https://doi.org/10.3390/joitmc6030046

Ames, H., Glenton, C., & Lewin, S. (2019). Purposive sampling in a qualitative evidence synthesis: A worked example from a synthesis on parental perceptions of vaccination communication. *BMC Medical Research Methodology*, *19*(1), 26. https://doi.org/10.1186/s12874-019-0665-4

Apleni, A., & Smuts, H. (2020). An e-Government Implementation Framework: A Developing Country Case Study. *Lecture Notes in Computer Science (Including Subseries Lecture*

Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), *12067 LNCS*(April 2020), 15–27. https://doi.org/10.1007/978-3-030-45002-1_2

Balaraman, P. (2018a). ICT and IT Initiatives in Public Governance − Benchmarking and Insights from Ethiopia. *Business Ethics and Leadership*, *2*(1), 14–31. https://doi.org/10.21272/bel.2(1).14-31.2018

Balaraman, P. (2018b). ICT and IT Initiatives in Public Governance − Benchmarking and Insights from Ethiopia. *Business Ethics and Leadership*, *2*(1), 14–31. https://doi.org/10.21272/bel.2(1).14-31.2018

Bayaga, A., Kyobe, M., & Ophoff, J. (2020). Criticism of the role of trust in e-government services. *2020 Conference on Information Communications Technology and Society (ICTAS)*, 1–6. https://doi.org/10.1109/ICTAS47918.2020.233973

Belachew, M. (2010a). E-Government initiatives in Ethiopia. *ACM International Conference Proceeding Series*, *October 2010*, 49–53. https://doi.org/10.1145/1930321.1930332

Belachew, M. (2010b). E-Government initiatives in Ethiopia. *ACM International Conference Proceeding Series*, *October 2010*, 49–53. https://doi.org/10.1145/1930321.1930332

Bojang, M. B. S. (2020). *Challenges and Successes of E-Government Development in Developing Countries: A Theoretical Review of the Literature*.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Cárdenas, J. (2019). *Quantitative Analysis: The guide for beginners*.

Caruana, S. (2015). *Ethical considerations when carrying out research in one's own academic institution*. https://www.semanticscholar.org/paper/Ethical-considerations-when-carrying-out-research-Caruana/85999e0c9b474271c867edf25b1fc1c49f2125ef

Chen, C., Schweiker, M., & Day, J. K. (2018). Ethics and Privacy. In A. Wagner, W. O'Brien, & B. Dong (Eds.), *Exploring Occupant Behavior in Buildings* (pp. 287–306). Springer International Publishing. https://doi.org/10.1007/978-3-319-61464-9_11

Chohan, S. R., & Hu, G. (2022). Strengthening digital inclusion through e-government: Cohesive ICT training programs to intensify digital competency. *Information Technology for Development*, *28*(1), 16–38. https://doi.org/10.1080/02681102.2020.1841713

Da Silva, L. F., Zitkus, E., & Freire, A. P. (2023). An Exploratory Study of the Use of the Internet and E-Government by Older Adults in the Countryside of Brazil. *Information*, *14*(4), 225. https://doi.org/10.3390/info14040225

District, E. G. (2012). *E-GOVERNMENT: STRATEGIES FOR SUCCESSFUL E-PROCUREMENT*. https://api.semanticscholar.org/CorpusID:59486251

Dodeen, W. (2019). *Exploring the quality of e-government service from citizens' perspectives*. https://www.semanticscholar.org/paper/Exploring-the-quality-of-e-government-service-from-Dodeen/709f1878451d786a4dccca2b742c96671967d2b9

Duisenkul, A. G., Ospanova, D. A., Taigamitov, G. D., & Madykhan, S. M. (2023). Legal Regulation of State Electronic Services: Relevant Issues and Ways of Improvement. *Data Science Journal*, *22*, 15. https://doi.org/10.5334/dsj-2023-015

Durickovic, T., & Kovacevic, D. (2011a). eGovernment in the context of developing countries. *2011 Proceedings of the 34th International Convention MIPRO*, 1370–1375.

Durickovic, T., & Kovacevic, D. (2011b). eGovernment in the context of developing countries. *2011 Proceedings of the 34th International Convention MIPRO*, 1370–1375.

E-Government. (2015). [Text/HTML]. World Bank. https://www.worldbank.org/en/topic/digitaldevelopment/brief/e-government

Elbahnasawy, N. G. (2014). E-Government, Internet Adoption, and Corruption: An Empirical Investigation. *World Development*, *57*, 114–126. https://doi.org/10.1016/j.worlddev.2013.12.005

Frehiwot Tadesse, W. (2023). *IMPACT OF E-GOVERNMENT SERVICE QUALITY ON CUSTOMER SATISFACTION: CASE OF MOTI IN YEKA SUB CITY*.

Garad, A., & Qamari, I. N. (2021). Determining Factors Influencing Establishing E-Service Quality in Developing Countries: A Case Study of Yemen E-Government. *International Journal of Electronic Government Research*, *17*(1), 15–30. https://doi.org/10.4018/IJEGR.2021010102

Goal 9: Industry, Innovation and Infrastructure. (2019). *SDGO Collection*.

Heeks, R., & Bukht, R. (2018). Digital Economy Policy in Developing Countries. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3540027

Hossain, N. U. I., Nur, F., & Habib, Md. A. (2014). ACHIEVING COMPETITIVE ADVANTAGE THROUGH PRACTICING TQM TOOLS IN PHARMACEUTICALS COMPANY. *Journal of Mechanical Engineering*, *43*(2), 103–109. https://doi.org/10.3329/jme.v43i2.17834

Ibraheem, S., Al-Hawary, S., Saleh, &, & Al-Menhaly, M. (2016). The Quality of E-Government Services and its Role on Achieving Beneficiaries Satisfaction The Quality of E-Government Services and its Role on Achieving Beneficiaries Satisfaction Applied Study in Ministry of Interior of United Arab Emirates. *Type: Double Blind Peer Reviewed International Research Journal Publisher: Global Journals Inc*, *16*(11).

Indu, P. V., & Vidhukumar, K. (2020). *Research designs-an overview*.

Jain, P. (2017a). Utilization of E-Government Services. *Imperial Journal of Interdisciplinary Research*, *3*.

Jain, P. (2017b). Utilization of E-Government Services. *Imperial Journal of Interdisciplinary Research*. https://www.semanticscholar.org/paper/Utilization-of-E-Government-Services-Jain/1fa8ce8c65d31b60550db78d9647c4f538ae2dba

Javaid, M. A., & Arfeen, M. I. (2017). Impact of eGovernment on Citizen Satisfaction: A Case of Federal Government Agencies in Pakistan. *European, Mediterranean and Middle Eastern Conference on Information Systems*.

Joshi, P. R., & Islam, S. (2018). E-Government Maturity Model for Sustainable E-Government Services from the Perspective of Developing Countries. *Sustainability*, *10*(6), Article 6. https://doi.org/10.3390/su10061882

Key, P., Set, N. D., Enterprise, N., & Bus, S. (2013). Executive Summary of the E-Government Strategy. -, 1–23.

Khanra, S., & Joseph, R. P. (2019). E-Governance Maturity Models: A Meta-ethnographic Study. *The International Technology Management Review*, *8*(1), 1. https://doi.org/10.2991/itmr.b.190417.001

Kohara, Y. (2011). *Why-why analysis with five Layers model for IT Projects Why-why analysis with five Layers methodology for IT Projects -Recommendation for both members and their organizations to solve problems together*- -. https://www.semanticscholar.org/paper/Why-why-analysis-with-five-Layers-model-for-IT-with-Kohara/f6eb06fdcc5d66f10492ebda2f51bd9ec7b07348

Lee, H.-J., Choi, E.-Y., Ock, M.-S., & Lee, S.-I. (2017). Guidelines for Performing Root Cause Analysis. *Quality Improvement in Health Care*, *23*(1), 25–38. https://doi.org/10.14371/QIH.2017.23.1.25

Lessa, L. (2015). *Sustainability FrameworkforE-government Success: The Caseof Woredanet Servicesin Ethiopia.*

Lessa, L., Negash, S., Belachew, M., & Ababa, A. (2016). *Emerging Issues and Prospects in African E-Government*. *January*. https://doi.org/10.4018/978-1-4666-9814-7.ch086

Lessa, L., & Tsegaye, A. (2019). Evaluation of the public value of e-government services in Ethiopia: Case of court case management system. *ACM International Conference Proceeding Series*, *Part F1481*(April), 21–26. https://doi.org/10.1145/3326365.3326369

Lindgren, I., & Van Veenstra, A. F. (2018). Digital government transformation: A case illustrating public e-service development as part of public sector transformation. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3209281.3209302

Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2002). *A Measure of Website Quality. Marketing Theory and Applications*. https://www.google.com/search?q=Loiacono%2C+Eleanor+T.%2C+Richard+T.+Watson%2C+and+Dale+L.+Goodhue.+2002.+WebQual%E2%84%A2%3A+a+measure+of+Web+site+quality.+In+AMA+Winter+Conference.+Austin%2C+TX.&rlz=1C1KNTJ_enET1084ET1084&oq=Loiacono%2C+Eleanor+T.%2C+Richard+T.+Watson%2C+and+Dale+L.+Goodhue.+2002.+WebQual%E2%84%A2%3A+a+measure+of+Web+site+quality.+In+AMA+Winter+Conference.+Austin%2C+TX.&gs_lcrp=EgZjaHJvbWUyBggAEEUYOdIBCzMwNTU0MDlqMGo3qAIAsAIA&sourceid=chrome&ie=UTF-8

Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2007). WebQual: An Instrument for Consumer Evaluation of Web Sites. *International Journal of Electronic Commerce*, *11*(3), 51–87.

Máchová, R., Volejníková, J., & Lněnička, M. (2018). Impact of E-government Development on the Level of Corruption: Measuring the Effects of Related Indices in Time and Dimensions. *Review of Economic Perspectives*, *18*(2), 99–121. https://doi.org/10.2478/revecp-2018-0006

MacLean, D., & Titah, R. (2022). A Systematic Literature Review of Empirical Research on the Impacts of e-Government: A Public Value Perspective. *Public Administration Review*, *82*(1), 23–38. https://doi.org/10.1111/puar.13413

Madariaga, L., Nussbaum, M., Marañón, F., Alarcón, C., & Naranjo, M. A. (2019). User experience of government documents: A framework for informing design decisions. *Government Information Quarterly*, *36*(2), 179–195. https://doi.org/10.1016/j.giq.2018.12.005

Maguire, M., & Delahunt, B. (2017). Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland Journal of Higher Education*, *9*(3), Article 3. https://ojs.aishe.org/index.php/aishe-j/article/view/335

Mahlangu, G., & Ruhode, E. (2021). *FACTORS ENHANCING E-GOVERNMENT SERVICE GAPS IN A DEVELOPING COUNTRY CONTEXT*.

Makoza, F. (2019). National ICT policy challenges for developing countries: A grounded theory informed literature review. *International Journal of Technology Policy and Law*, *3*(2), 107. https://doi.org/10.1504/IJTPL.2019.10026617

Malodia, S., Dhir, A., Mishra, M., & Bhatti, Z. A. (2021). Future of e-Government: An integrated conceptual framework. *Technological Forecasting and Social Change*, *173*, 121102. https://doi.org/10.1016/j.techfore.2021.121102

McDermot, E., Agdas, D., Rodríguez Díaz, C. R., Rose, T., & Forcael, E. (2022). Improving performance of infrastructure projects in developing countries: An Ecuadorian case study. *International Journal of Construction Management*, *22*(13), 2469–2483. https://doi.org/10.1080/15623599.2020.1797985

Mudawi, N. A., Beloff, N., & White, M. (2020). Issues and Challenges: Cloud Computing e-Government in Developing Countries. *International Journal of Advanced Computer Science and Applications*, *11*(4). https://doi.org/10.14569/IJACSA.2020.0110402

Nunes, S., Martins, J., Branco, F., Gonçalves, R. M., & Au-Yong-Oliveira, M. (2017). An initial approach to e-government acceptance and use: A literature analysis of e-Government acceptance determinants. *2017 12th Iberian Conference on Information Systems and Technologies (CISTI)*, 1–7.

Omar, K., Scheepers, H., & Stockdale, R. (2011). eGovernment Service Quality Assessed through the Public Value Lens. In M. Janssen, H. J. Scholl, M. A. Wimmer, & Y. Tan (Eds.), *Electronic Government* (pp. 431–440). Springer. https://doi.org/10.1007/978-3-642-22878-0_36

Papadomichelaki, X., & Mentzas, G. (2013). *A Multiple-Item Scale for Assessing E-Government Service Quality*.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research. *Journal of Marketing*, *49*(4), 41–50. https://doi.org/10.2307/1251430

Parasuraman, A., Zeithaml, V., & Berry, L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*. https://www.semanticscholar.org/paper/SERVQUAL%3A-A-multiple-item-scale-for-measuring-of-Parasuraman-Zeithaml/d26a2423f00ca372b424a029ae22521299f00ede

Pham, L., Limbu, Y. B., Le, M. T. T., & Nguyen, N. L. (2023). E-government service quality, perceived value, satisfaction, and loyalty: Evidence from a newly emerging country. *Journal of Public Policy*, *43*(4), 812–833. https://doi.org/10.1017/S0143814X23000296

Rao, V. R. (2011). Collaborative Government to Employee (G2E): Issues and Challenges to E-Government. *Journal of E-Governance*, *34*(4), 214–229. https://doi.org/10.3233/GOV-2011-0279

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

Santen, S. A., Grob, K. L., Monrad, S. U., Stalburg, C. M., Smith, G., Hemphill, R. R., & Bibler Zaidi, N. L. (2019). Employing a Root Cause Analysis Process to Improve Examination Quality. *Academic Medicine*, *94*(1), 71–75. https://doi.org/10.1097/ACM.0000000000002439

Satapathy, S., Mahapatra, S. S., Patel, S. K., & Mishra, P. D. (2013). Analysis of e-service of electricity utility provider: An Indian perspective. *International Journal of Logistics Systems and Management*, *15*(1), 18. https://doi.org/10.1504/IJLSM.2013.053236

Scholl, H. J. (2020). Digital Government: Looking Back and Ahead on a Fascinating Domain of Research and Practice. *Digital Government: Research and Practice*, *1*(1), 1–12. https://doi.org/10.1145/3352682

Selvaraj, K., Kumar, T. A., Balaji, K., Balasubramanian, P., & Banuprem, P. (2018, April 7). *ROOT CAUSE ANALYSIS OF DIMESION TOLERANCE AND MISALIGNMENT IN RADIAL DRILLNG OPERATION*. https://www.semanticscholar.org/paper/ROOT-CAUSE-ANALYSIS-OF-DIMESION-TOLERANCE-AND-IN-Selvaraj-Kumar/458023120b87ace4d7f3261a25cbfb39981d9bdb

Shaqdan, K., Aran, S., Daftari Besheli, L., & Abujudeh, H. (2014). Root-Cause Analysis and Health Failure Mode and Effect Analysis: Two Leading Techniques in Health Care Quality Assessment. *Journal of the American College of Radiology*, *11*(6), 572–579. https://doi.org/10.1016/j.jacr.2013.10.024

Shin, S. C., Ho, J.-W., & Pak, V. Y. (2020). Digital Transformation through e-Government Innovation in Uzbekistan. *2020 22nd International Conference on Advanced Communication Technology (ICACT)*, 632–639.

Solinthone, P., & Rumyantseva, T. (2016a). E-Government Implementation. *MATEC Web of Conferences*, *79*, 01066. https://doi.org/10.1051/matecconf/20167901066

Solinthone, P., & Rumyantseva, T. (2016b). E-Government Implementation. *MATEC Web of Conferences*, *79*, 01066. https://doi.org/10.1051/matecconf/20167901066

Špaček, D., & Špačková, Z. (2023). Issues of e-government services quality in the digital-by-default era – the case of the national e-procurement platform in Czechia. *Journal of Public Procurement*, *23*(1), 1–34. https://doi.org/10.1108/JOPP-02-2022-0004

Stefano, N. M., Filho, N. C., Barichello, R., & Sohn, A. P. (2015). A Fuzzy SERVQUAL Based Method for Evaluated of Service Quality in the Hotel Industry. *Procedia CIRP*, *30*, 433–438. https://doi.org/10.1016/j.procir.2015.02.140

Sugebo, T. M., & Sekhar, K. (2022). Current status, challenges, and opportunities of e-Government in Ethiopia: The case of Wachemo University. *Journal of Public Affairs*, *22*(2), e2432. https://doi.org/10.1002/pa.2432

Tharsika, K., & Pratheepkanth, P. (2020). A review of methodological choice: Research paradigm underpins. *3rd Research Conference on Business Studies (RCBS) - 2020, June*, 290–304.

The OECD digital government policy framework: Six dimensions of a digital government (OECD Public Governance Policy Papers 02; OECD Public Governance Policy Papers, Vol. 02). (2020). https://doi.org/10.1787/f64fed2a-en

Tremblay-Cantin, C.-A., Mellouli, S., Cheikh-Ammar, M., & Khechine, H. (2023). E-government Service Adoption by Citizens: A Literature Review and a High-level Model of Influential Factors. *Digital Government: Research and Practice*, *4*(1), 1–24. https://doi.org/10.1145/3580369

Turner, D. P. (2020). Sampling Methods in Research Design. *Headache: The Journal of Head and Face Pain*, *60*.

Van Den Boer, Y., Arendsen, R., & Pieterson, W. (2016). In search of information: Investigating source and channel choices in business-to-government service interactions. *Government Information Quarterly*, *33*(1), 40–52. https://doi.org/10.1016/j.giq.2015.11.010

Venkatesh, V., Thong, J. Y. L., Chan, F. K. Y., & Hu, P. J. H. (2016). Managing Citizens' Uncertainty in E-Government Services: The Mediating and Moderating Roles of Transparency and Trust. *Information Systems Research*, *27*(1), 87–111. https://doi.org/10.1287/isre.2015.0612

Vereinte Nationen (Ed.). (2018). *Gearing e-government to support transformation towards sustainable and resilient societies*. United Nations.

Wijatmoko, T. E. (2020). E-Government Service Quality Using E-GovQual Dimensions Case Study Ministry of Law and Human Rights DIY. *Proceeding International Conference on Science and Engineering*, *3*, 213–219. https://doi.org/10.14421/icse.v3.500

Yin, R. K. (2012). *Applications of Case Study Research*. SAGE Publications.

Zaffiro, G., & Mourgis, I. (2018). How digital life changes our personal economy—A market analysis. *Journal of Innovation Management*, *6*(1), 13–31. https://doi.org/10.24840/2183-0606_006.001_0003

Zautashvili, D. (2017). *E-government Maturity Model by Growth Level of E-services Delivery*. *6*(2).

Zeleke, Y. (2018). *Usability and Accessibility Model for E-Government Websites in Ethiopia*.

APPENDICES

Appendix A: Questionnaire Survey

Section 1: Demographic Information

Please tick (√) the appropriate box and select ONLY one item per question

1. Kindly indicate your gender

Male	Female

2. What is your age group?

18 – 25	26-32	33- 39	40 – 47	48 – 55	Above 55

3. Indicate your highest level of education

Secondary school	High school	Diploma		First Degree	Masters	Ph.D.

4. How do you describe your general computer knowledge?

Poor	Fair	Good	Very good	Excellent

5. What is your level of experience with the use of the e-government service?

Very little experience	Little experience	Moderate experience	Good Experience	Very good experience

6. Kindly indicate the method you use/used to access e-government services

Office computer	Mobile phone	Tablet	Laptop	Computer at cyber café	Community information center

Section 2: E-government service user

Please indicate your level of agreement with the statements provided. Please tick (√) the appropriate box and select ONLY one item per question

	Trust	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	Data provided by users in this e-government site are archived securely					
2	Acquisition of username and password in this e-government site is secure					
3	Data provided in this e-government site are used only for the reason submitted					
4	Maintain the confidentiality of the use of personal data					
	Reliability	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
5	This e-government service site is available and accessible whenever you need it					

6	This e-government service site provides services on time					
7	e-Government site’s pages are downloaded quickly enough					
8	This e-government site works properly with your default browser					
9	The services are accurately provided as promised					
	Citizen Support	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
10	Employees showed a sincere interest in solving users' problem					
11	Employees have the knowledge to answer users' questions					
12	Employees give prompt replies to users' inquiries					
13	Employees can convey trust and confidence					
14	Employees can convey trust and confidence					
	Efficiency	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
15	This e-government site's structure is clear and easy to follow					
16	This e-government site's search engine is effective					
17	This e-government site is well-customized to individual users' needs					

18	The information displayed on this e-government site is appropriately detailed					
	Content & Appearance of Information	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
19	The content of the e-government service is complete					
20	The information on the e-service site is accurate					
21	Information e-service portals are relevant					
22	Information on the e-service portal is easy to understand					
23	Graphics, Color, Animation, and Size of the e-service portal are clear					
	Functionality of the Interaction Environment	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
24	There is an online help form for complaint					
25	use of features to facilitate future interaction					
26	Automatic calculation on form					
27	Adequate response format					

Interview Questions

(For Service and Platform providers)

1. How do you assess the current state of the technology infrastructure supporting e-government services, and what are the primary challenges you face in maintaining it?
2. From your perspective, what are the major challenges in designing user-friendly e-government platforms that meet the needs of all users?
3. What training and support are provided to staff members responsible for the delivery of e-government services, and where do you see gaps?
4. What mechanisms are in place for monitoring the performance and quality of e-government services, and how are issues typically addressed?
5. How is your organization working to improve the digital literacy of users to ensure effective use of e-government services?
6. What mechanisms are in place for monitoring the performance and quality of e-government services, and how are issues typically addressed?
7. How do government policies and regulations impact the delivery and development of e-government services, and what changes would you recommend?
8. What measures are in place to ensure the security and privacy of user data, and how do you address potential breaches?

Appendix B: Support Letters to Concerned eservice provider organization

አዲስ አበባ ዩኒቨርሲቲ
የተፈጥሮ እና ኮምፒቲሽናል ሳይንስ ኮሌጅ
ኢንፎርሜሽን ሳይንስ ት/ቤት
አዲስ አበባ ኢትዮጵያ

ADDIS ABABA UNIVERSITY
College of Natural and Computational Science
School of Information Science
Addis Ababa, Ethiopia

Date:- March 13 , 2024
Ref: - ST/SIS/063/2024/16

To whom it may Concern

Dear Sir/Madam,

Student Ermias Getnet (ID.No GSE/2772/14) is a graduate student at the School of Information Science, Addis Ababa University. He is currently conducting a MSc. thesis research under the title "Root Causes of E-government Servics Quality Failure in Ethiopia".

I would like to thank you in advanced for all the assistance that you would provide to the student.

With Regards,

Dereje Teferi (PhD)
Head, School of Information Science

Tel. +251-1-122-91-91 P.O.Box. 1176 Fax. +251-1-1239729