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ETHIOPIAN CIVIL SERVICE UNIVERSITY

COLLEGE OF FINANCE, MANAGEMENT AND DEVELOPMENT

CUSTOMS ADMINISTRATION AND INTERRNATIONAL TRADE

Assessment of the Role of Information Technology in Enhancing Efficiency, Effectiveness and Transparency in Ethiopian Customs Commission, the case of Addis Ababa, Kality Branch office

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Master's Thesis Submitted to Customs Administration and International Trade department in Partial Fulfillment of the Requirements the for Masters of Arts in Customs Administration and International Trade

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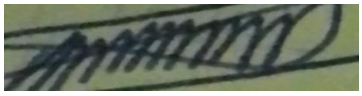
Declaration

This is to declare that the thesis/dissertation entitled **"Assessment of the role of Information Technology in Enhancing Efficiency, Effectiveness, and Transparency in Ethiopian Customs, Kality Customs Branch Office**", submitted in partial fulfillment of the requirements for the requirement of Master of Arts in Department of Customs Administration and International Trade of , Ethiopian Civil Service University, is a record of original work carried out by me and has never been submitted to any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

Name: Abebe Fetene Mulie Date 27/5/2025 Signature 

Dedication

First and foremost, I dedicate this work to Almighty God, whose grace, wisdom, and strength have guided me through every step of this journey. Without His blessing, this research would not have been possible.

I also dedicate this thesis to my beloved family whose unconditional love, support, and constant prayers have been my greatest source of inspiration and perseverance.

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Approval of Dissertation after Defense

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Customs Administration and International Trade

As members of examiners, we examined this dissertation/thesis entitled "Assessment of the Role of Information Technology in enhancing Efficiency, Effectiveness, and Transparency in Ethiopian Custom Commission, the case of Kality Customs Branch Office." We here by certify that the thesis dissertation is accepted for fulfilling the requirements for the award of the degree of "Masters of Arts in Customs Administration and International Trade."

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Chair person's signature Date

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Supervisor Signature Date

Name: 

Acknowledgement

First of all, I would like to thank God for giving me the Chance and health to do this work. Nexst, I would like to express my deepest gratitude to Dr. Delessa Daba who has been giving me his constructive and consecutive advises while I was doing my research.

Finally, I would like to thank my family and colleagues who have been by my side and helped me during my study. I would also like to thank all parties directly or indirectly involved in this study for their cooperation.

Contents

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Lists of Acronyms

WCO: World Customs Organization

ICMS: Integrated Customs Management Systems

ICT: Information Communication Technology

KRA: Kenya Revenue Authority

RECTS: Regional Electronic Cargo Tracking Systtem

URA: Uganda Revenue Authority

CAS: Customs Automation Systems

ASYCUDA: Automated Systems of Customs Data

UNCTAD: United Nation Conference on Trade and Development

AEO: Authorized Economic Operators

ECMS: Electronic Customs Management System

ESW: Electronic Single Window

ECC: Ethiopian Customs Commission

TAM: Technology Acceptance Model

NPM: New Public Management

ACMS: Automated Customs Management System

WTO: World Trade Organization

UNECE: United Nations Economic Commission for Europe

ECTS: Electronic Cargo Tracking System

NSW: National Single Window

MNSW: Multinational Single Window

RFID: Radio Frequency Identification

GPS: Global Positioning Systems

CSF: Critical Success Factor

ESLSE: Ethiopian Shipping and Logistics Services Enterprise

AWB: Air Way Bill

Abstract

This study assessed the role of Information Technology in enhancing efficiency, effectiveness, and transparency within the Ethiopian Customs Commission. In recent years, the Customs Commission has implemented systems such as ASYCUDA World and the Electronic Single Window in an effort to modernize operations and align with international trade standards. Despite these advancements, concerns remain regarding inconsistent system use, limited staff capacity, infrastructure challenges, and the actual impact of IT on reducing delays, errors, and corruption. By using mixed-method approach, the study collected data through structured questionnaires and in-depth interviews with customs department team leaders. The findings indicate that IT systems have contributed to faster clearance, improved accuracy, and increased visibility in customs procedures. However, challenges such as limited user training, infrastructure instability, and low public awareness continue to hinder full realization of these benefits. The study recommends enhancing system integration, capacity building, and benchmarking regional best practices to strengthen digital customs reform in Ethiopia.

Chapter One

1.Introduction

1.1 Background of the study

The background information takes us back to the history of customs practices in Ethiopia in different times. It helps us to compare our current customs practice with the ancient one. I tried to state the background of Ethiopian Custom practices. During the Emperor Menelik II era (late 19th and 20th), Ethiopia began formalizing Customs as part of modern state formation, (Bahru Zewde,2002).

In 1957, Ethiopia Established a modern Customs System under the Ministry of Finance to regulate imports and exports, (Ethiopian Customs Commission,2020).

The Ethiopian Revenue and Customs Authority (ERCA)) was formed in 2008 to improve efficiency and transparency to combat smuggling.

The Ethiopian Customs Commission was formed in 2019, is now the core body under the Ministry of Revenues, focused on automation and transparency (MoR,2019).

‘’ASYCUDA (Automated System for Customs Data) World by UNCTAD which a modern platform was introduced to modernize Customs procedures’’ (UNCTAD,2014).

Between the 1990s and 2000s, the Ethiopian Customs System underwent reforms under the Ethiopian Revenues and Customs Authority (ERCA) and was transformed into modern era and has brought improvements in new technology adoption and in revenue collection.

‘’ASYCUDA (Automated System for Customs Data), a UNCTD system, was introduced to automate processes. In 2019, ERCA was replaced by the Ethiopian Customs Commission which falls under the Ministry of revenue to enhance performance, transparency and efficiency,’’ (Tagel Tesfaye,2017 & Ethiopian Business View 20190).

‘’Moreover, ASYCUDA was a semi-automated system that lacked integration with other systems and was not enough to fulfill the demands of customers. As a result, it was replaced by Electronic Customs Management System (ECMS) in 2018.The project for this system was launched in 2016 and started

implementation in 2018 in all customs branches. Electronic Customs Management System (ECMS) is a digital platform or software application used by customs authorities to manage and automate various customs processes and procedures. According to Webb Fontaine Group, (n.d.), The key features of the system are: The system automates import and export transit operations, generates T1s from Djibouti ASYCUDA World system transit declarations, controls transit bonds, and lodges airport electronic manifests using IATA XML and Cargo IMP standards. It also features a comprehensive dynamic risk management system and complex manufacturing raw material processing monitoring'' (MoR,202o).

The Ethiopian Customs Commission (ECC) was established in 2018, has undertaken several initiatives to modernize its operation throughout IT adoption. The key systems such as Automated Systems for Customs Datta (ASYCUDA) and the Electronic Single Window (ESW), aimed at streamlining Customs procedures and facilitating trade.

A study by Tagel Tefaye(2022) highlighted increasing instances of corruption within the ECC, attributing this to pressures for revenue generation and close relationships between officials and clients. The study emphasized the need for enhanced transparency and accountability mechanisms to combat corrupt practices; however, challenges persist.

Additionally, Belete Biazen Bezabh's(2017) research on data mining techniques to support customer relationships management within the Ethiopian Revenue and Customs Authority (ERCA).His study demonstrated the potential of IT in improving Customer classification and service delivery ,indicating a positive impact on operational efficiency.

2.Customs in Kenyan Context

The history of Kenya's administration began under British Colonial rrule with the creation of the East African Customs Union in 1910 which included Kenya,Uganda and Tanganyika (Himbara,1994).After independence in1963,Customs functions continued under the Ministry of Finance.

''The Kenyan Revenue Authority (KRA) was established in1995 through the KRA act (cap469) to streamline and automate tax and customs systems (KRA,1995), Kenya implemented ASYCUDA++ and later upgrading to the Integrated Customs Management System (ICMS) and Electronic Single Window System to improve efficiency and transparency (KRA.2019). The innovations like scanner technologies and the Regional Electronic Cargo Tracking System

(RECTS) have enhanced border control.''

Kenya has made significant strides in automating its Customs processes. The Kenyan Revenue (KRA) implemented the Integrated Customs Management System (ICMS) to consolidate cargo clearance processes.

Askah Moraa Omosa (2020) studied the effect of systems automation on Customs revenue performance in Kenya and found that digital platforms significantly improved revenue collection and reduced human error. Specifically, it examined the effects of Scanner Technology, Cargo Tracking Systems and Integrated Customs Management System (ICMS).

Kilonzietal (2019) on effect of Customs Administration Strategies on Cross-border Logistics Efficiency had examined Customs strategies along Kenya's borders and concluded that IT interventions enhanced logistics efficiency and reduced cross-border trade delays. Generally, Kenya's success is attributed to early IT adoption, real time data sharing, multi-agency integration and strong training and change management programs.

3. Customs in the Context of Ugandan

''Uganda's Customs service began during British colonial rule and were integrated into the East African Customs Union in the early 20th C''(Tangri,1999).

''Post-independence, Customs functions were placed under the Ministry of Finance until the Uganda Revenue Authority (URA) was established in 1991 by the Act(cap196) as a semi-autonomous government agency responsible for tax and Customs administration through the URA statue'' (URA,2020).

''In Uganda, automation began with ASYCUDA++ in early 2000s, and later upgraded to ASCUDA World. Uganda's Revenue Authority (URA) digitized key Customs functions to improve transparency and border efficiency. It replaced the fragmented departments under the Ministry of Finance and aimed to improve efficiency and curb corruption'' (Kangace,2005).

Nabeta & Lilian (2019) on Adoption of Automation by URA and its Effectiveness in Tax Administration, analyzed the impact of IT automation on revenue and found significant reduction in tax evasion and transaction costs.

Natabazi (2021) on Combating Corruption through Trade Facilitation in the EAC. Academia. educ, emphasized that trade facilitation tools like AEO programs and ECTS increased transparency and reduced clearance times at Uganda's borders.

4.Customs History of Tanzania

Sheriff (1987), integration of an East African Commercial Empire into the World Economy. In the pre-colonial period, coastal cities like Kilwa, Bangamoyo and Zanzibar were the key centers for goods like ivory, spices and slaves. While formal Customs systems did not exist, local rulers-imposed trade duties and tribute.

German East Africa (1885-1919) introduced structured Customs administration to regulate imports and exports and generate revenue for the colonial state.

‘’After World war I, British colonial rule took over under a league of Nations mandate and Tanganyika became part of the East African Customs Union (EACU) in 1917, alongside Kenya and Uganda.’’ (Hazlewood,1979).

After independence in 1961, customs operations were administered under the Ministry of finance Tanganyika and Zanzibar united to form Tanzania in 1964.Customs services for both mainland and Zanzibar were later unified. Tanzania continued as part of the East African Community until its collapse in 1977.Afterward, the country reestablished its own national Customs system.

Tanzanian Revenue Authority (TRA) was created under Act.No.11or 1995, became operational in 1996 to manage and modernize tax and Customs operations. The main goal was to reduce inefficiencies, increase revenue and dress corruption.

‘’In the late 1990s and early 2000s, Tanzania adopted ASYCUDA++ World for end-to-end digital processing of Customs declarations (TRA,2015). There was an introduction of risk management systems, direct trader input and cargo scanning technology to streamline Customs and minimize smuggling.’’

1.2 Statement of the Problem

Despite the growing adoptions of Information Technology (IT) within the Ethiopian Customs Commission, concerns remain regarding the extent to which these technologies have effectively enhanced operational efficiency, service delivery effectiveness and transparency.

Tekeba Girma (2020) assessed the performance of the Ethiopian Customs Commission concerning import trade facilitation, focusing on wheat and Palm Oil importers and highlighted the challenges such as delays in Customs processing and limited integration between It systems, which hinder the effectiveness of IT implementation in Customs operations.

Getahun Shiferaw (2022) evaluated the implementation of the electronic Single Window service at ModJo Customs Branch office. The study found that while the system had benefits like reducing service delivery time and improving communication, challenges such as communication gaps and the need for stakeholder collaboration remained.

Samuel Eshetu (2015) in his research on the challenges and prospects of e-government within the Ethiopian Revenue and Customs Authority's Large Tax payers' office, revealed that despite investments in automating tax assessment and collection systems, the changes were not harmonized with the national e-government plan, limiting their effectiveness in enhancing transparency and efficiency.

Tewelde Gebresilasse (2024) focused on the effect f Customs automation on cargo clearance efficiency at Addis Ababa Kality Customs Branch office. The study found while automation had the potential to improve efficiency challenges such as inadequate IT experts impeded its effectiveness.

These researchers provide valuable insights into the implementation and impact of information technology within the Ethiopian Customs Commission. Their findings can serve as a foundation for further studies aimed at enhancing efficiency, effectiveness and transparency through IT solutions in Customs operations.

1.3 Research Questions

1.3 Research Questions

1.What is the role of Information Technology on the operational efficiency of the Ethiopian

Customs activities?

2.How effective are the current Information technology tools in customs service delivery and compliance?

3.What role does Information technology play in promoting transparency and accountability in Ethiopian Customs Commission?

4.What are the challenges that hinder the full implementation of Information technology in customs operations?

1.4 General Objective

To assess the role of Information Technology in enhancing the efficiency, transparency, and effectiveness of the Ethiopian Customs Commission.

1.4.1 Specific Objectives

1.To assess the role of Information Technology on operational efficiency in customs processes.

2.To evaluate the effectiveness of Information Technology tools in customs service delivery and compliance.

3.To identify the role of Information Technology in promoting transparency, accountability and reducing corruption.

4.To identify the challenges facing in full implementation of Information Technology in Customs operations, in Kality Customs branch office.

1.5 Significance of The Study

This study is significant as it provides an in-depth evaluation of how information technology contributes to enhance the efficiency, effectiveness, and transparency of Customs Operations in Ethiopia. The findings will serve as valuable resources for policy makers, Practitioners scholars by offering practical recommendations to strengthen Customs automation systems. Moreover, the comparative insights from regional peers will assist in benchmarking and improving Ethiopia's trade facilitation strategies in alignment with regional and international standards.

1.6 Scope of the Study

This study is primarily focused on assessing how information technology (IT) systems influence on efficiency, effectiveness and transparency of operations within the Ethiopian Customs Commission.

The study is conducted within Kality Customs Branch office workers of the Ethiopian Customs Commission, particularly those who use automated systems such as ASYCUDA World, Electronic Single Window, and Customs Valuation and Clearance systems.

1.7 Limitation of the Study

Although this study provides valuable insights into the role of information technology in enhancing efficiency, effectiveness, and transparency within the Ethiopian Customs Commission, different limitations were encountered. First, the study was limited to kality Customs Branch office and may not fully represent the experience of all customs stations nationwide. Second, due to time and resource constraints, the research relied heavily on self-reported data through questionnaires and interviews, which may be subjected to bias or limited disclosure. Third, the study focused on internal staff perspectives, excluding external stakeholders such as importers, exporters, and clearing agents who also interact with customs IT systems. Lastly, challenges related to access to recent performance data and system logs constrained the ability to conduct a detailed longitudinal analysis of IT system impact over time.

1.8 Operational Definitions of Key Terms

There key very useful operational words that are used in this study. The definitions are given here below one by one.

1.Information Technology (IT)

Information technology refers to the use of computerized systems and digital platforms such as ASYCUDA World, Electronic Single Window, Cargo Tracking systems, and digital payment solutions adopted by the Ethiopian Customs Commission to automate and manage Customs operations.

2.Efficiency

Efficiency is the extent to which Customs operations are performed with minimal time, cost, and resource usage. It is measured by indicators such as clearance time, reduction in paperwork, automation of routine tasks, and speed of communication between departments.

3.Effectiveness

Effectiveness refers to the degree to which Customs objectives are met through IT systems. It includes improvements in accuracy of customs declarations, reduction in errors, enhanced coordination, and improved service delivery to stakeholders.

4.Transparency

Transparency is defined as the openness and accountability in Customs processes facilitated by IT. It includes the availability of information to stakeholders, audit trails, reduced human discretion, and a decrease in opportunities for corruption or informal payments.

5.Customs Operations

Customs operations refer to the range of activities carried out by customs officials, including inspection, clearance valuation, documentation risk assessment, and duty collection, as regulated by national and international trade laws.

6.Familiarity with Customs IT Systems

Familiarity is the level of knowledge, training, and comfort that customs employees have with using digital systems such as ASYCUDA, Single Window, and electronic payment portals. It is measured through self-reported ability and prior training participation.

1.9 Organization of the paper

This paper contains five chapters. The first chapter includes, background of the study, statement of the problem, research questions, objectives of the study, significance of the study, scope of the study, operational definitions. The second chapter also contains review of related Theoretical and literatures, review of empirical literature, research gap, and conceptual framework. The third chapter explains research methodology, description of the study area, research paradigm, design an approach, types and sources of data, sampling design, data collection instruments data validity

and reliability, methods of data analysis, and ethical considerations. The fourth chapter contains results and discussions. The last part also includes summary, conclusions, and recommendations.

Chapter Two

2.Review of Related Literature

This paper is grounded in several prominent theoretical models that explore the intersection of information technology and organizational performance in public sector and institutions such as customs authorities.

2.1 Theoretical Literature Review

1. Technology Acceptance Model (TAM)

Davis, (1989) introduced the technology acceptance model which emphasizes that the users are more likely to adopt new t3cnologies when they perceive them as beneficial to their performance and easy to use. For the ECC, understanding how stakeholders perceive new technologies, such as electronic customs management systems or automated clearance processes, is critical for successful implementation.

Jaleta and Tulu (2023), Applied TAM to assess how customs officers and logistics professionals embrace digital; tools and the finding technology adoption is driven largely by how practical and user-friendly the systems appear to these professionals.

According to Rajshri Chopde, Mahatanankoon, and Wen (2004), the likelihood of adopting a web-based service technology is influenced by different factors, including its flexibility, scalability, and service quality. The researchers emphasized that users are more inclined to adopt technologies that are adaptable to future needs, cost-efficient to integrate, and deliver reliable performance. Quality of service in particular, plays a crucial role in shaping user attitudes and intentions toward adoption, often outweighing other technical attributes.

Tomatzky and Fleischer (1990) Proposed that the adoption of innovation in organizations is shaped by three contextual dimensions: organizational, technological, and environmental. The organizational context includes factors like firm size, internal capabilities, and managerial structure. The technological context also refers to both current and emerging tools that are relevant to the organization. Finally, the environmental context involves market forces, regulations, and interactions with stakeholders. In customs settings, these three contexts influence the pace and success of IT adoption.

2. Diffusion of Innovation Theory

Rogers and Kincaid, (1981), highlighted that communication is not just about transferring information but about creating shared understanding. In customs operations, these insights help to explain how new technologies like electronic payment systems gain acceptance among users.

According to Rogers (1962), innovations Spread within a social system over time through communication channels. The likelihood of adoption is influenced by how the innovation compares to the existing practices in terms of advantage, simplicity, and compatibility.

3. Public Sector Reform and New Public Management (NPM)

New Public Management, advanced by Hood (1991) and later by Osborne and Gaebler (1992), advocates incorporating private sector management techniques into public services. It emphasizes outcomes, efficiency, decentralization, and accountability. In the customs context, these principles support digital reforms by focusing on performance measurement and customer-oriented service delivery through technology.

4. DeLone and McLean Information System Success Model

This model (DeLone & McLean,1992; revised 2003), on Information Systems success: The quest for the dependent variable, information Systems research,3(1) 60-95, assessed system success by using dimensions such as system quality, user satisfaction, and net benefits, offer a framework for evaluating ECC's IT tools. This model is particularly useful for evaluating the outcomes of IT implementations in public service.

5. Actor Network Theory (ANT)

ANT developed by Callon (1986) and Latour (1987), explores how both people and technologies interact to shape outcomes. In customs, this means that Systems like ASYCUDA and the staff who use it to form a network influence how well IT solutions perform*. In the context of IT adoption in Customs, ANT provides a Lense to examine how stakeholders, technologies and institutional factors collectively influence outcomes. In ECC, examining stakeholders-technology relations can reveal implementation barriers.*

2.1.2 Review of Concepts

1.Information Technology (IT) in the Public Administration

Information Technology refers to the application of digital tools and systems such as data bases, networks, automation software and online platforms to facilitate and enhance service delivery in public.

Heeks (2006), Implementing and Managing e-Government: An International text. SAGE Publications, defined IT as a tool that enhance service delivery in the public sector. In the Custom Context, IT includes tools for data processing, electronic declarations filling, Cargo tracking, and automation of clearance procedures.

2.Efficiency

According to pollitt and Boukaer (2011), Public Management System reform: Comparative analysis. Oxford University Press; Efficiency refers to optimal resource use to achieve results. (2011), IT can improve efficiency paper work and clearance delays. Systems like ASYCUDA help to streamline documentation and accelerate customs processing time.

3.Effectiveness

Effectiveness is the extent to which desired outcomes are achieved. In Customs, this means successful implementation of regulations, accurate inspections and goal fulfilment.

Ketti (2002), on the title Public Sector performance Measurement and Evaluation. Public Administration Review; noted that technology contributes to achieve institutional goals by improving accuracy and coordination. Customs operations benefit from reliable data and integrated processes.

4.E-Government

E-Government refers to the use of IT to enhance the access and delivery of government services to citizens, businesses and other arms of government.

UN (2020) defines e-government as using ICT to improve service access and delivery. Customs

platforms such as electronic portals and cargo tracking systems are part of this broader public sector digitization.

2.1.3 Enhancing Effectiveness through Technology

Revised Arusha Declaration (2003) supports automation in customs as a way to reduce corruption and increase accountability. Automated systems minimize discretion and generate logs for audits.

The WCO (2016), Customs Automation Trends. World Customs Organization Report; also supports the use of digital audit tools are useful to identify inefficiencies. Reducing face-to-face interactions can help to prevent informal payments and increase operational transparency.

Abraha Hiluf Berhe, (2017), The Journal of Economics and Sustainable Development stated that customs automation contributes positively to revenue performance. Effectiveness in customs administration involves achieving objectives such as compliance enforcement and revenue collection using advanced data analytics tools to identify smuggling trends and non-compliant traders.

Electronic Tracking tools like RFID and GPS enhance the monitoring of goods in transit, ensuring compliance with trade regulations, and block chain technology to ensure data integrity and enhances supply chain security, reducing fraud and misreporting.

2.1.4Transparency and Accountability in Customs

UNECE (2012), UN Trade Facilitation Implementation Guide: United Nations Economic Commission for Europe, identified transparency, harmonization, simplification, and standardization as a key to effective trade facilitation. Making regulations accessible and enabling stakeholder participation are very essential.

Digital customs tools such as electronic payment systems and data dashboards enhance transparency by reducing human bias and enabling real-time monitoring. These innovations help to build stake holder trust and streamline trade processes.

Technology can play a transformational role in customs institutions. Theoretical models like TAM, Diffusion of Innovation, and NPM offer insights into how adoption can be encouraged. When IT tools are effectively implemented, they ca improve public sector accountability, enhance

operational efficiency, and support trade facilitation efforts.

2.2 Empirical Literature Review

Empirical studies on technology adoption in customs administrations across Ethiopia and Africa provide valuable insights into its impact on efficiency, effectiveness, and transparency. This review focuses on empirical evidence related to the Ethiopian Customs Commission (ECC) while drawing comparisons from global practices to contextualize findings.

1.Efficiency

a. Electronic Single Window (ESW) Implementation

Getahun Shiferaw (2022), the implementation of the Electronic Single Window service at ModJo Customs Branch office and found that ESW contributed to reduce service delivery time and improved communication between Customs and stakeholders. However, challenges such as communication gaps and the need for stakeholder collaboration were identified.

Numia.B.J.(2021), the effect of automation of the Customs release process on Customs performance at the port of Mobassa in Kenya and the research revealed that improving system automation led to enhanced Customs performance, recommended the interconnection of systems among partner Government Agencies. including the Kenyan Revenue Authority in order to further improving f Efficiency.

Studies indicate that automated systems such as the Automated System for Customs Data (ASYCUDA) significantly improve customs efficiency. For instance, Tessema (2020), ASYCUDA implementation and clearance time in Ethiopia. Customs Modernization Paper, highlights that ASYCUDA implementation in Ethiopia reduced average clearance times from 5 days to 1.5 days, streamlining import/export processes. Similarly, the system minimizes human intervention, reducing errors and delays.

Asghar et al. (2014), Evaluation of the role of single window in facilitating the process of goods import in customs of Qazvin (Iran) province, and the result of the study found that single window reduced tariff barriers, was effective solution to facilitate business interactions, improved trade facilitation and facilitated clearance process in customs of Qazvin province (Iran).

Edvard et al. (2019), explored the environmental and logistical benefits of implementing National Single Window on National Single Window (NSW) systems in maritime Transportation The study highlighted that NSW adoption not only decreases administrative costs and reduces the need for physical documentation but also supports environmental sustainability by optimizing cargo flow. By minimizing port congestion and improving the coordination of data among involved stakeholders, these systems contribute to lower emissions of carbon dioxide efficient use of natural resources.

OECD (2005), noted that the successful implementation Customs of automation requires more than just new software; it depends on coordinated efforts including infrastructure readiness, staff training, and reliable power and communication systems. The report emphasizes that automation should be part of a boarder reform strategy, carefully planned and supported by the necessary institutional and technical foundations.

b. Customs Clearance Practice

Kaleab Taye (2023), on assessment of Customs clearance practice for Pharmaceuticals in Ethiopia, has identified inefficiencies in the clearance process, including delays and interruptions in the electronic system, gaps in the valuation system, and poor handling of Pharmaceuticals. These inefficiencies negatively impacted the timely delivery of essential medicines.

2.Effectiveness

a. Computerized Information Systems

The effectiveness of automation is more tangible when one compares customs clearance time between automated and paper-based systems. It saves time of clearance and brings fast release of cargo by using online sharing of evidence in customs offices at boarder areas. It also minimizes over-crowdedness of tracks at boarder areas since there is fast cargo scanning system through using scanning machines.

Studies in the Ethiopian context by Abebe and Tadesse (2021) reveal that electronic tracking systems, such as GPS-based cargo monitoring, significantly reduced transit time irregularities and loss of goods in

transit by 25%, improving compliance and supply chain effectiveness.

Melkamu Dessie Tamiru (2022), the impact of computerized information systems on tax collection at the Ethiopian Revenue and Customs Authority (ERCA) Adama Branch office, and the study concluded that the adoption of computerized systems improved tax collection efficiency by reducing errors and processing time.

Omosa, A.M (2022), on the effect of systems automation on Customs Revenue performance in Kenya and concluded that despite the costs associated with ICT infrastructure and training, the implementation of automation was crucial in achieving revenue growth and operational efficiencies.

According to WTO (2003), Trade Policy Review: New Zealand. Report and WTO secretariat and OECD (2205), International comparisons also show that EDI systems substantially reduce clearance times compared to paper -based methods as seen in countries like New Zealand, Chile, and Thailand.In Chile, the average customs clearance time was 2.2 hours (the maximum was 3 hours) with EDI processing, and 10.8 hours with the paper-based system (WTO CTG, 1998).

Arevalo (2002), the Philippines' project for computerizing tax and customs administrations during the period 1994-1999 also resulted in considerably reduced customs clearance time for EDI users compared to non-EDI users in the first quarter of 2002.

Rhodalyn, (2018), Assesses the impact of national single window on the competitiveness of Ghana's maritime sector on Tema port, the finding revealed that implementation of the National Single Window System (NSWS) brought a significant change in trade competitiveness through improved trade facilitation, reduction in cost, streamlining of procedures and modernization of customs operations in Ghana. Finally, the study suggested that effective implementation of measures to address improvement of the National Single Window System should be within the framework of global maritime industry standards.

APEC (2012), Customs transit declarations may now be submitted online in many nations, for example, by utilizing ASYCUDA's transit module. Furthermore, tracking and tracing of transit items in transit is made possible by contemporary IT technologies including radio frequency identification (RFID)-based automated cargo identification systems and monitoring systems based

on the Global Positioning System (GPS). These technologies improve the commerce supply chain's connectedness and visibility.

b. Enterprise Service Bus (ESB)

Mihret Tesfaye (2016), explored on the integration of applications using an open-source Enterprise Service Bus (ESB) at ERCA and she has demonstrated that ESB facilitated better interoperability between disparate systems leading to more effective service delivery.

Kilonzi, F.Odunga, R.&Kibet,Y(2019), explored on the effect of Customs administration Strategies on cross-border logistics efficiency in East African member countries, focusing on Kenya borders with Uganda and Tanzania. The study recommended policy harmonization and improved automated systems to enhance the identification of goods and reduce clearance times.

3. Transparency

a. Trade Facilitation Performance

Tekeba Girma (2020), the performance of Ethiopian Customs Commission (ECC) in facilitating import trade, focusing on Wheat and Palm Oil importers, and observed limited transparency and poor stakeholder communication reduced the effectiveness of trade facilitation at ECC.

An article from The East African (2015), reported that the automation of Uganda's Customs clearance system, including initiatives like the Authorized economic Operator (AEO) and the electronic Cargo Tracking System (ECTS), significantly eased cross-border trading and improved the country's global ranking in trade facilitation. The reforms led to a reduction in Customs clearance time from 41 hours in 2011 to less than 24 hours in 2015.

Gebremeskel and Alemayehu (2021), on the impact of National Single Window in Ethiopia, reported that Ethiopia’s national single-window system helped to lower transaction costs by 30% , and streamlining document submission.

‘’The customs administration has set a goal of releasing 95% of field declarations without immediate physical verification. The objectives are to increase transparency and fairness and, indirectly, to reduce customs processing time’’ (Steen Lindt and Wulf, 2004), ‘’as a result releasing

time downs from 18 days average to 10 days. Because of the unsatisfactory of rendering service, trade facilities.''

b. Corruption and Accountability

Ethiopia's Ministry of Transport, in collaboration with the AI institute, introduced a real-time cargo tracking system in 2004, by aiming to reduce theft and increase logistics efficiency.

Tagel Tesfaye (2017), on the challenges of public sector Leaders in Combating corruption, and revealed that increasing instances of corruption within ECC, attributed to pressures for revenue generation and close relationships between officials and clients. The study emphasized the need for enhanced transparency and accountability mechanisms to combat corrupt practice.

Mesfin (2020), on data mining techniques for customer classification, found that using data analytics tools for fraud detection in Ethiopian customs led to the identification of 15% more fraudulent declarations compared to traditional manual audits.

''Automation or computerization of Customs functions can improve efficiency and effectiveness and remove many opportunities for corruption. Automation can also increase the level of accountability and provide an audit trail for later monitoring and review of administrative decisions and the exercise of official discretion. Where possible automated systems should be, configured in such a way as to minimize the opportunity for the inappropriate exercise of official discretion, face-to-face contact between Customs personnel and clients and the physical handling and transfer of funds'' (Revised Arusha Declaration.2003).

Mellisa Ntabazi(2010), on combating corruption in Customs through trade facilitation within the East African Community, emphasized that automation of Customs procedures leads to increased transparency in the assessment of duties and taxes, substantial reductions in Customs clearance times, and predictability, all contributing to reduced opportunities for corruption.

Generally, the empirical evidence supports the view that IT contributes meaningfully to enhance efficiency, effectiveness, and transparency in customs administration. However, challenges such as gaps, limited system integration, and staff training deficiencies continued to affect full implementation.

2.3 Research Gap

A research gap refers to an area within a field of study that lacks sufficient exploration or understanding, highlighting the need for further investigation.in the context of African and Ethiopian philosophy, several scholars have identified such gaps, emphasizing areas that require deeper academic inquiry.

Therefore, based on the above theoretical and empirical literature on the role of Information Technology (IT) in enhancing efficiency, effectiveness and transparency in Customs administrations, specifically within the Ethiopian Customs Commission and more broadly across Africa, here is explanation of research gaps bellow.

1.Limitted Evidences in Ethiopian Context

While several Ethiopian studies such as Tekeba Girma, Getahun Shiferaw and Melkamu Dessie have assessed specific IT interventions such as Customs automation and electronic single window systems, and these works often focus on isolated branches(e.g.,Modjo,Kality,Adama) or narrow aspects (e.g., tax collection, cargo clearance, performance of import trade).

There is lack of comprehensive national -level studies assessing the integrated impact of IT on all three core variables: efficiency, effectiveness and transparency within the Ethiopian Customs Commission (ECC) holistically.

2.Limited Comparative and Longitudinal Studies

Most existing research is cross-sectional, capturing a snapshot of the current situation without tracking long -term outcomes or comparing pre-and post-implementation data across years. This limits the understanding os sustainable impacts of IT systems over time. Moreover, there is little comparative analysis between Ethiopia and similar African countries like Kenya,Uganda and Tanzania.which could provide valuable benchmarking insights.

3.Minimal of Use of Mixed Methods

The current literatures often rely on quantitative surveys or document analysis, while qualitative insights from customs employees and system users are underrepresented. This limits the depth of understanding regarding real world experiences with IT systems.

4.Lack of Comprehensive Evaluation

Only few studies simultaneously examine the three critical outcomes: efficiency, effectiveness and transparency in relation to customs IT systems. Most researches isolate one variable from (efficiency, effectiveness, and transparency), due to a fragmented understanding of IT's overall role.

5.Insufficient Comparative Perspective

‘’While regional neighbors like Kenya and Uganda have published more on IT-led customs reforms.’’ (Omosa2020; URA report), ‘’Ethiopia lacks comparative research that benchmarks its progress against regional best practices. despite participating in East African integration efforts.’’

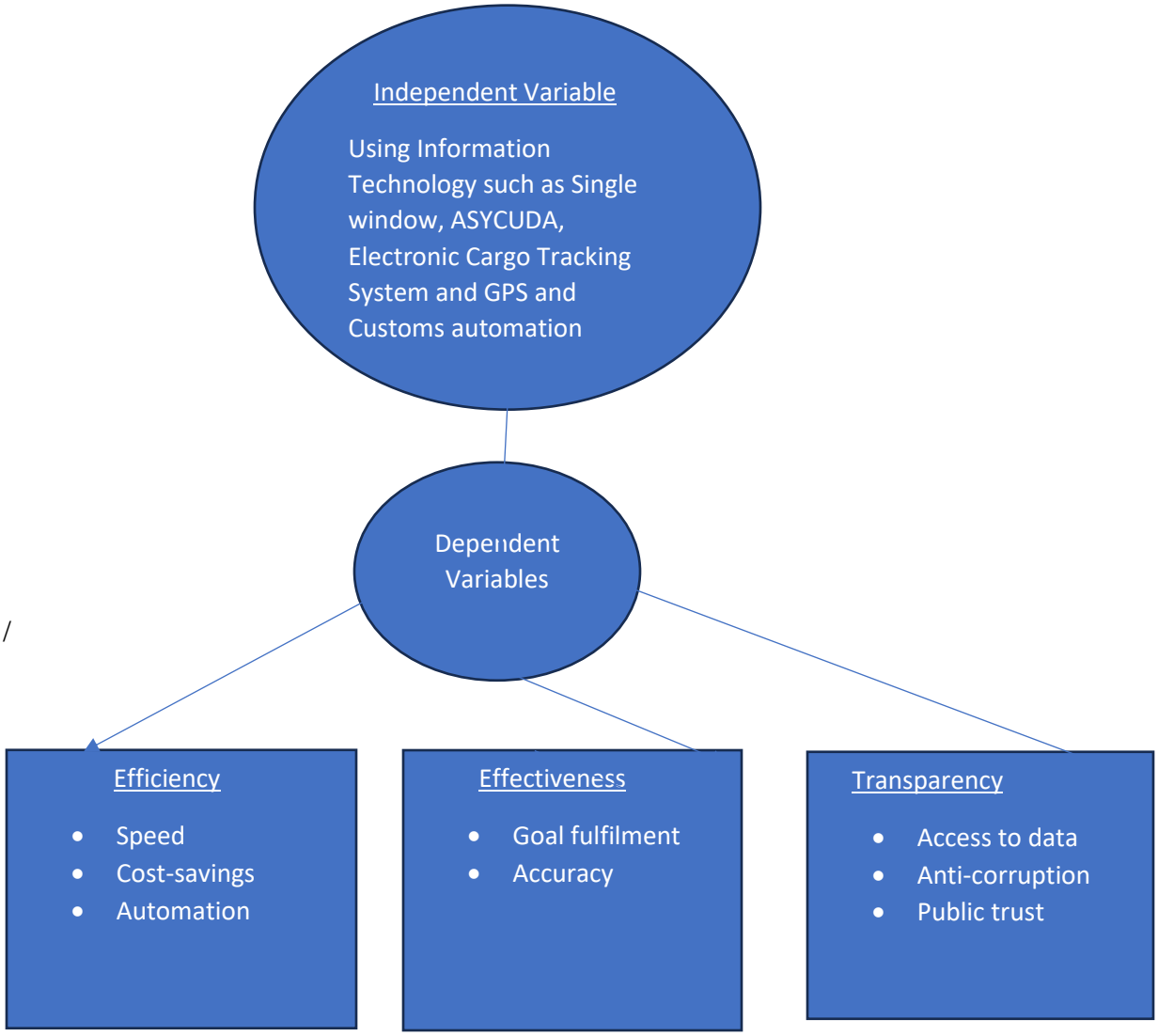
Totally. there is a clear need for a comprehensive, multi-dimensional, and mixed-method study that evaluates how IT system affect efficiency, effectiveness, and transparency in the Ethiopian customs commission. This study aims to fill that gap by combining quantitative data with qualitative insights from well-experienced customs workers in kality customs branch office.

2.4 conceptual frame work

A conceptual frame work is a research tool that helps researchers to organize and explain the main ideas, variables and relationships in the research study. It shows what the researcher is studying, why and how the key elements are related.

A conceptual frame work is a visual or written model that explains the relationship between variables in a research problem. It acts like a blue print for one study.

A Conceptual Framework Diagram



Chapter Three

Research Methodology

3.1 Description of The Study Area

The area of the study is Ethiopian Customs Commission, Kality Customs Branch office. Kality Customs Commission is found in Addis Ababa,Akaki Kality Sub-City specifically located around Saris Abo church, Bole Kality road. This branch office is very large because of its workers of and the largest dry terminal in the City of Addis Ababa.

3.2 Research Paradigm, Design and Approach

3.2.1 Research Paradigm

A research paradigm is a frame work that guides how research is conducted. It includes the researcher's beliefs about reality (ontology), how knowledge is acquired(epistemology), and the methods used to study a phenomenon(methodology).

As a researcher, I would follow methodological approach (research methods. Why because my research approach is mixed method approach which is quantitative method and qualitative method.

Surveys and Statistical analysis of efficiency and effectiveness metrics before and after information technology adoption, whereas qualitative methods through interviews with Customs office team leaders are used to understand their experience with information technology in Customs operations.

3.2.2 Research Design

Research design is a framework for doing one research. As a researcher I would like to use a Mixed-Methods Research design to describe the phenomena as it exists that would be gathered through questionnaire and interview. Because questionnaires allow me to gather measurable data (e.g., staff satisfaction or perceptions of technology). Interviews also provide deeper insights and explanations of patterns observed in the quantitative data.

3.2.3 Research Approach

A research approach refers to the plan and strategy for conducting a research study. It outlines how the researcher intends to collect, analyze, and interpret data to answer the research questions or

test hypotheses. The choice of a research approach depends on the nature of the research problem, objectives, and the type of data to be collected.

In this study I am going to use Mixed-Methods Approach to integrate numerical data with narrative insights. Quantitative approach focuses on numerical data and statistical analysis to measure and analyze variables. It uses instruments like surveys, experiments, or questionnaires with closed-ended questions and results can be presented in numbers, graphs and tables. Whereas qualitative research approach focuses on non-numerical data to explore deeper meanings, experiences, and phenomena which uses interviews, focus groups, and observations.

3.3 Types and Sources of Data

3.3.1 Types of Data

The types of data that I want to use in my study is primary data which are questionnaire and interview. I prepared a questionnaire to gather a detailed data from workers of Kality Customs branch office. I have also prepared structured interview questions for the team leaders of the branch Customs office in order to understand their experience with information technology in Customs operations.

3.3.2 Sources of Data

The sources of data are the workers of Kality Customs branch office that are going to be selected using Simple random sampling technique from the total population.

3.4 Sampling Design

3.4.1 Population and Sampling Frame

There are Nine hundred Fourty two (942) workers, Four hundred ninthy three females (493) and Four hundred forty nine male (449) in Kality Customs branch office.

3.4.2 Sample Unit

In research, a sample unit refers to the basic element or set of elements considered for selection in a sample. It is the unit about which data is collected during a study and may vary depending on the research objectives.

As William G.Zikmud (2003,7th Edition), in his Business research Methods Stating a sampling

unit is a single element or group of elements subject to selection in the sample.

Based on the above information the sample unit of my study are that an individual worker of Kality Customs branch office from the total amount of workers who are selected based on the sampling technique of the study.

3.4.3 Sample Size Determination

The sample size of the study is determined by a simple random sampling technique to give equal random chance for all workers of Kality Customs branch office workers. There are also eight team leaders of departments who are selected randomly.

3.4.4 Sampling Techniques and Sampling Procedure

For a given large population size a limited sample size is very important to conduct a study in a targeted research area. Why because taking the whole population is too difficult to conduct a study. Therefore, I decided to use the following sampling technique and procedure for my population sample.

According to Yamane (1967 2nd Edition), Statistics: An introductory analysis, sampling technique is a simplified formula used to determine sample size for a known population size with a desired margin of error. Due to this reason, I used his sampling technique in my study.

The sample size formula

$$n = N/1+N(e^2)$$

n= Sample Size

N= Total population

e= Margin of error (5% or 0.05)

$n= 942/1+942(.05)^2$

n= 942/1+942(0.0025)= 942/3.355= 942/3.355= 280.77 , n=281

3.5 Data Collection Instrument

The data collection instrument of this study is questionnaire and interview. I prepared a Likert Scale questionnaire to the population of the targeted sample size and Structured interview questions for Eight Team leaders of the Customs branch office.

3.6 Data Validity and Reliability

3.6.1 Validity

Validity refers to that the data collection tools accurately measure what they are intended to measure. Because of this my measurement tools accurately measured the objectives that I wanted to measure. To ensure the validity of the study, the data collection instruments were developed based on the literature review and expert Consultation. content and face validity were verified through review by Customs professionals. Reliability was addressed by pilot testing of the tools and assessing internal consistency. Triangulations of survey and interview data further enhanced the credibility and robustness of findings.

3.6.2 Reliability

The consistency and dependability of measuring methods are aspects of reliability. It focuses on the reliability and consistency of results of an evaluation or measurement throughout various intervals, environments, or circumstances. ‘’A trustworthy measurement shows that there is less chance that measurement mistakes or random variables would affect the final result’’ (Geoffrey etal.2005).

3.7 Methods of Data Analysis

Since I used both questionnaire and interview data, I analyzed the data using quantitative and qualitative method of analysis. Therefore, I used both quantitative and qualitative methods of data analysis.

3.7.1 Methods of Quantitative Data Analysis

Since I used Likert -Scale items in questionnaires, the data is ordinal and suitable for descriptive statistics to summarize the responses using mean, median, mode, standard deviation, frequency and percentage by using SPSS software.

3.7.1.1 Model Specification

In research, model is a simplified representation of systems, concepts or phenomenon used to explain, analyze, or predict real world behavior. Models help researchers to understand complex ideas by breaking them down into manageable components.

In this research, I used Mixed-Models for both questionnaire and interview data. It uses both quantitative and qualitative methods to provide a comprehensive analysis. **Crewell's (2014**) Mixed-Methods Model is one common approach which integrates qualitative themes with statistical findings.

3.7.1.2 Measurement of variables

There are dependent and independent variables in this study. The Independent variable is " use of Information **Technology (IT**) and the dependent variables are "**Efficiency, Effectiveness and Transparency**."

a. Measurement of Quantitative Component

In the measurement of quantitative component which is questionnaire, I measure the variables using Likert-Scale items 1-5 Scale.

The use of Information Technology reduces paper work in the customs processing. Therefore, it is confident to use IT system in Customs work.

Efficiency: Customs procedures are faster with IT Systems and it has reduced delays in processing of data.

Effectiveness: Using of Information systems in customs offices help to achieve organizational goals. The data from IT Systems is also accurate and reliable.

Transparency: Using of Information Technology in Customs makes Customs processes more open and auditable. It is also easier to trace transactions to It systems.

b. **Measurement of Qualitative Component in Interview**

I used thematic analysis for interview results and coded the variables of the research to present the result and then compared with the quantitative data results accordingly.

3.7.2 Methods of Qualitative Data Analysis (Structured Interviews)

The results of the interview are analyzed qualitatively and then compared with questionnaire data analysis by coding the variable: efficiency, effectiveness and transparency by showing the result in table.

3.8 Ethical Considerations

Ethical consideration in research refers to the moral principles that guide a researcher how to conduct his/her study, especially in how he /she treats participants handle data and report findings.

‘’Researchers must obtain voluntary, informed consent from participants after explaining the purpose, procedures, risks, and benefits of the study,’’ Dienel and Crandall (1978). ‘’Participants should be informed of their rights and no coercion should be involved in participation.’’

‘’Researchers must protect the identities and private information of participants,’’ Babbie (2018);Cohen,Manion,and Morrison(2018).

‘’Confidentiality must be maintained and data must be stored securely to prevent unauthorized access’’ (Cohen etal.,2018).

. Therefore, I would ensure for the participants of the research that the purpose of the study is only for academic gain of MA degree and their participation depends on well-informed consent. There is also anonymity and confidentiality of the participants in their participation

Chapter four

Findings and Discussions

4.1 Demographic Characteristics of Respondents

In research demographic information helps to understand the diversity of customs officers in terms of experience, and IT familiarity. It is also used to identify correlation (e.g., younger staff might adapt to IT systems more easily).

According to my study respondents, I have the following demographic information a based on the questionnaire that I distributed to them.

Demographic Information of the Research Respondents

Table.1

Demographic Variable	Category	Frequency	Percentage
Gender	Male	118	42%
	Female	163	58%
Age Group	20-29	72	25.6%
	30-39	109	38.8%
	40-49	69	24.6%
	50 years and above	31	11%
Year of Experience in Customs	Less than 5 Years	68	24.2%
	5-10 Years	105	37.4%
	11-15 Years	66	23.5%
	More than 15 Years	42	14.9%
Educational qualification	Degree	194	69%
	Masters	87	31%

Familiarity with Customs IT Systems	Low	41	17.1%
	Moderate	148	50.2%
	High	92	32.7%

Based on the above table the study sample included 281 Customs staff, with 58% of female and 42% of male. Most participants (40.9%) were in 30-39 age range. Nearly 38.4% are 5 to 10 years of experience. Educationally, a majority (69%) have a Bachelor degree, and 31% have master's degree. In case of Customs familiarity 81.1% of participants indicated moderate to high familiarity with ECC's operation systems and the rest 17.9% were not familiar.

4.2 Findings and Discussions of objectives

4.2.1 Findings of objective one

The finding and discussion of the first objective is presented below in table 2.The descriptive statistics shows the result of all respondents

1.Efficiency of IT in Customs Operations (n=281)

Table .2

Item	Statement	Mean	Median	SD	% Agree (4+5)	% Neutral (3)	% Disagree
1.1	Technology reduced Clearance time	4.32	4	0.73	87.2%	9.6%	3.2%
1.2	IT Minimized Paperwork	4.18	4	0.81	82.6%	12.5%	4.9%
1.3	Improved Coordination between Departments	4.05	4	0.85	79.3%	14.3%	6.4%
1.4	Reduced need for face-to-face interaction	4.25	4	0.77	84.7%	10.2%	5.1%
1.5	Enhanced speed of Customs Procedures	4.30	4	0.69	85.4%	11%	3.6%

4.2.2 Discussion of objective one

The results reveal a high level of agreement among respondents regarding the efficiency gains brought by technology in customs operations. The mean scores for this section range from 4.05 to 4.32 with a median of 4 across all items, and low standard deviations (0.69-0.85), indicating strong consensus.

The highest rated item was Technology reduced clearance time (mean=4.32, SD=0.730, with 87.2% agreement.

Similarly, enhanced speed customs procedures scored a mean of 4.30, which shows strong approval.

All the five items have agreement levels above 79% that indicated digital systems have significantly reduced processing time, minimized paperwork, and improved coordination across departments.

Generally, the findings confirm that the integration of technology has notably enhanced operational efficiency in the Ethiopian Customs Commission.

4.3 Findings and discussions of objective two

4.3.1 Findings of objective two

2. Effectiveness of IT in Customs Operations(n=281)

The finding and discussion of the first objective is presented below in table 3.

Table .3

Item	Statement	Mean	Median	SD	% Agree (4+5)	% Neutral (3)	% Disagree
2.1	Improved Documentation Accuracy	4.15	4	0.74	80.1%	13.1%	6.8%
2.2	Reduced Tariff/Duty Errors	4.10	4	0.76	78.9%	14.1%	7%
2.3	Helped to detect fraudulent activities	4.05	4	0.82	75.5%	15.8%	8.7%

2.4	Enhanced Communication with Stakeholders	4.12	4	0.80	79.4%	13.5%	7.1%
2.5	Training is sufficient	3.72	4	0.91	61.2%	22%	16.8%

4.3.2 Discussions of objective two

The effectiveness objective received generally positive feedback with mean scores ranging from 3.72 to 4.15 and median scores of 4 which indicates moderate agreement and consistency.

The top-rated items were improved communication accuracy mean 3.72 with only 61.2% agreement and relatively higher disagreement rate (16.8%).

This suggests that while technology enhances accuracy, there is error reduction, and clear communication. But there is clear gap in staff training which may limit the full realization of these benefits.

4.4 Findings and Discussions of objective three

4.4.1 Findings of objectives three

3. Transparency of IT in Customs Operations (n=281)

The finding and discussion of the first objective is presented below in table 4

Table 4

Item	Statement	Mean	Median	SD	% Agree (4+5)	% Neutral (3)	% Disagree
3.1	Improved Transparency	4.10	4	0.78	77.6%	15.2%	7.2%
3.2	Easier Shipment Tracking	4.05	4	0.82	75.1%	17%	7.9%
3.3	Reduced Corruption Via Digital Systems	4.18	4	0.77	81.4%	12%	6.6%
3.4	Improved Access to Regulations	3.95	4	0.85	70.6%	19.4%	10%

3.5	Reduced bias in decisions	3.88	4	0.89	67.3%	20.7%	12%

4.4.2 Discussions of objective three

This part also demonstrated there is positive perception with mean scores from 3.88 to 4.18 and median scores consistently at 4. Standard deviations were relatively low (0.77-0.89) indicates stable responses.

The strongest agreement was observed for reduced corruption via digital payments (mean=4.18, 81.4% agreement).

Improved access to regulations and reduced bias in decisions received slightly lower scores (mean=3.95 and 3.88, respectively).

The results confirm that technological integration in customs processes has improved transparency, particularly through digital payments and online tacking, through public access and bias reduction still have room for improvement.

4.5 Findings and Discussions of objective four

4.5.1 Findings of objective four

4.The Challenges of IT in Customs Operations (n=281)

The finding and discussion of the first objective is presented below in table 5.

Table .5

Item	Statement	Mean	Median	SD	% Agree (4+5)	% Neutral (3)	% Disagree
4.1	Technology is user-Friendly	3.85	4	0.91	68.7%	20.4%	10.9%
4.2	Sufficient Technical Support	3.70	4	0.96	63.4%	22.6%	14%
4.3	Internet/Infrastructure is supportive	3.52	3	1.01	56.5%	18.0%	25.5%

4.4	Adequate investment in Modernization	3.48	3	1.08	53.7%	21.3	25%
4.5	Cybersecurity is Sufficient	3.60	4	0.97	59.8%	20.1%	20.1

4.5.2 Discussions of objective four

Responses to the challenges faced in implementing information technology were more mixed with mean scores ranging from 3.48 3.85. The lowest median scores 3 appeared in this section, specifically on infrastructure, and investment issues. Standard deviations were higher (up to 1.08), which shows greater variability in responses.

Technology is user friendly received highest mean (3.85) with 68.7% agreement.

Items like Internet/infrastructure is supportive (mean=3.52) and "Adequate investment in modernization''(mean=3.48) reflected lower agreement and higher disagreement rates (25.5%) and 25%).

These findings suggest that while technology itself is viewed as usable, its support systems such as infrastructure, technical support and investment remain key implementation challenges.

4.5.3 Discussions of Interview Data

Based on the interview questions, I prepared and provided for Eight (8) participants and the result is analyzed qualitatively. After qualitative analysis of the data based on the four research objectives, the result is triangulated with the quantitative result to cross check the two results. Therefore, below here is a qualitative analysis of the interview data structured by key themes: efficiency, effectiveness, transparency and challenges.

Thematic Analysis of Interviews (n=8)

1.General Insights

Interviewees include 7 Customs department team leaders and the 1 who is the manager of Kality Customs Branch office.

All participants agreed that technology has brought noticeable changes to Customs operations, particularly in Reducing delays and improving accuracy although there are some limitations.

2.Efficiency Information Technology

1.Improved Speed

Seven (7) respondents out of eight (8) respondents responded that Information technology significantly reduced Customs clearance time, especially for pre-declared goods. The participants replied that ASYCUDA has shortened our clearance process from days to hours.

2.Reduced Paper Work

Six (6) participants confirmed that customs automation has helped to eliminate most of paper work, through some manual steps remain for sensitive shipments. Most of the participants responded that automation avoids the burden of manual paper work/desk work and it saved the expense of paper,

3.Reduced Face-to-Face Interactions

Five (5) respondents from eight (8) respondents mentioned that there are fewer in-person meetings with clients due to online platforms like single window, electronic payment, and online data access.

3.Effectiveness of Information Technology

1.Accuracy of Documentation

All participants acknowledged that digital tools reduced errors in declarations and tariff classifications. They said that the system flags common mistakes automatically which is really helpful. Due to this reason, the effectiveness of customs work by using IT system increases from time to time.

2.Fraud Detection

Five (5) of respondents said that risk management systems are useful in detecting irregular patterns, but limited to high-volume imports due to lack of full integration. They stated that

information technology is very helpful to detect fraud in customs operations.

3.Training Gaps

Four (4) interviewees felt that training was insufficient, especially for older or newly hired staff members who are unfamiliar with digital tools in order to operate customs activities using digital tools.

4.Transparency in Customs

1.Increased Visibility

Six (6) participants believed that information technology has made the operational processes more transparent with clients now able to track status online. Because of this reason, technology increased the visibility of important issues in customs for customers and officials as a whole.

2.Reduced Corruption

Five (5) from eight (8) participants replied that digital payments and audit trails reduced opportunities for bribery, but warned that offline workarounds still exist in some areas. Due to the fact that the digital payment system has played a great role in the form of online payment, there is no more corrupted activity.

3.Access to Information

From eight (8), Only three (3) participants believed that the general public has sufficient access to Customs regulations through online portals. Most of them respondents have a doubt on this issue.

5.Challenges in Technology Implementation

1.Usability

Three (3) Respondents described those systems like ASYCUDA is not fully user-friendly, especially during updates. But, the majorities of interviewees agreed that it is user friendly.

2.Tecchnical Support

Five (5) interviewees reported delay in getting IT support, especially during system downtime. When the system is down, it interrupts the operational work for a few minutes till it turns up.

3.Infrastructure

Six (6) out of eight (8) participants of interview stated that there is unstable Internet and power supply hinder smooth operations, particularly during peak hours. Sometimes the internet interrupts our work during operation time.

4.Cybersecurity Concerns

Six (6) from the total respondents expressed their confidence in the security of Customs systems, while the rest cited risks of data loss or hacking.

Summary of key Themes from 8 Interviewees

Table.6

Theme	Major Insights
Efficiency	Clearance speed improves; paperwork reduced; in-person interaction declined
Effectiveness	Higher accuracy and fraud detection; training gaps exist
Transparency	Better tracking and audit trails; Public access to information still limited
Challenges	Infrastructure, training, usability, and Cybersecurity remain key concerns

Summary of Key Themes from 8 Interviewees

Summary of key Themes in Table

Table 7

Theme	Number of Respondents
Improved Clearance Speed	7
Reduced Paperwork	6
Reduced Face-to-Face Interactions	5
Improved Accuracy	8
Effective Risk Management	5
Adequate Training	4
Enhanced Transparency	6
Reduced Corruption	5
Public Access to Information	3
Good System Usability	3
Stable Infrastructure	2
Confidence in Cybersecurity	6

4.5.4 Mixed-Methods Triangulation of Quantitative and Qualitative Findings

Since I planned to use mixed method of data analysis at the methodology part, I triangulated the quantitative data and qualitative data one by one under each objective as follow below.

Objective 1: Efficiency in Customs Operations

Quantitative Summary

The survey results show strong agreement among respondents that technology has improved efficiency. For example, the highest mean score (4.32) was recorded for reduced customs clearance time.

Qualitative support

Interview participants echoed these findings. One customs officer stated: Before automation, clearance could take several days, but now days, with the new system, it is often done within hours.

Integration

Both the quantitative and qualitative findings confirm that technology has played a significant role in improving the efficiency of operations, particularly in reducing time and minimizing paperwork.

Objective 2: Effectiveness of IT in Customs

Quantitative Summary

The average responses were positive (mean, scores around 4.0) through training adequacy was rated lower (mean =3.72).

Qualitative support

Many interviewees agreed with this. One respondent noted that the technology itself is good, but all staff are not confident in using IT. Because of this reason more practical work is needed.

Integration

While technology enhances effectiveness, both data sources highlight a training gap, suggesting

that capacity building must be prioritized for sustainable results.

Objective 3: Transparency in Customs Operations

Quantitative Summary

Respondents largely agreed that technology has increased transparency (Mean= 4.03 overall) especially in reducing corruption and providing shipment tracking.

Qualitative support

Interviewees also emphasized transparency, by saying things like ‘the system logs every

transaction, so there is less room for bribes or favoritism.

Integration

The alignment between survey and interview results indicates a strong shared belief in technology's role in improving accountability and reducing corruption.

Objective 4: Challenges in IT implementation in Customs

Quantitative Summary

This area had lower agreement (Mean scores=3.5) with concerns over internet reliability and investment.

Qualitative Insights

The interviewees raised similar concerns. They said that sometimes the system crashes or slows down due to poor connectivity. All officers are also not equally equipped.

Integration

Both data sets reveal that while technology offers advantages, technical infrastructure and resources allocation remain challenges that hinder optimal implementation.

4.5.5 Triangulation of Both Findings Summary

In general, the quantitative data provided measurable evidence of the perceived benefits of Information Technology, while the qualitative interview data added context and depth. The two methods consistently pointed to the similar strengths (efficiency, transparency) and limitations (training, infrastructure), reinforcing the reliability of the study

Chapter five

5.summary, conclusions and recommendations

5.1 summary of findings

In this study, I used the mixed methodology design and approach, Simple random sampling technique to select the sample frame and the data is analyzed by using mixed method of data analysis and finally, I have drawn the following summary, conclusion, recommendations, and future research directions, here, below.

The reviewed literature underscores the significant potential of information technology in transforming Customs operations across Africa. In Ethiopia, Technologies such as the Electronic Single Window, Customs automation systems and Computerized tax platforms have shown promise in improving operational efficiency and service effectiveness. However, the transparency dimension remains underexplored with limited empirical studies addressing accountability and anti-corruption outcomes.

Empirical evidence from other African countries like Kenya, Uganda, and Tanzania confirms similar patterns: Automation generally improves Customs performance, speeds up clearance, and enhances revenue collection. However, challenges persist across the region, including weak systems integration. stakeholder resistance, infrastructure deficits and insufficient user training.

5.2 conclusions

This study concluded that:

1.According to objective one, the finding has shown that Information technology plays a vital role in improving the efficiency of Customs operations by reducing clearance times, systems have significantly reduced processing time, minimized paperwork, and improved coordination across departments by minimizing manual errors.

2. In objective one, IT systems enhance effectiveness by improving staff performance, data accuracy, Clear communication, and process reliability. But there is clear gap in staff training which may limit the full realization of these benefits.

3.Under objective three, the results confirm that technological integration in customs processes has improved transparency, particularly through digital payments and online tacking, through

public access and bias reduction still have room for improvement.

4. Under objective four, the findings suggest that while technology itself is viewed as usable, its support systems such as infrastructure, technical support and investment remain key implementation challenges in customs office operational work

5.Summary of the findings of the four objectives under quantitative and qualitative data concluded that: the quantitative data provided measurable evidence of the perceived benefits of Information Technology, while the qualitative interview data added context and in-depth. The two methods consistently pointed to the similar strengths (efficiency, transparency) and the limitations (training, infrastructure, technical support, and investment) remain the key implementation challenges in customs office performance of operational works as a whole.

5.3 recommendations

Based on the study I have put the following recommendations to different concerned bodies to show more improvements in Customs efficiency, effectiveness and Transparency in Ethiopian Customs Commission.

1.Strengthen System Integration

ECC should work towards integration of all customs-related systems into a unified digital platform for seamless data sharing and reporting.

2.Capacity Building and Training

Continuous training and re-skilling of Customs officials are necessary to ensure effective use of IT tools and adaptability to new technologies.

3.Infrastructure Investment

The government should invest in IT infrastructure (Internet, hardware, backup systems) to ensure operations across all Customs branches.

4.Policy and Regulatory Support

Updating Customs regulations to support full automation, reduce discretionary powers, and enforce the mandatory use of IT in all clearance processes.

5.Benchmarking Best Practices

The ECC should learn from countries like Uganda and Tanzania by adopting tested regional innovations such as RECTS and expanding the use of electronic single windows.

6.Public- Private Collaboration

Engaging freight forwarders, importers, and logistics companies in IT upgrading and provide digital awareness Campaigns to enhance compliance and trust.

5.4 Future Research Direction

While this study has provided valuable insights into the role of information technology in enhancing efficiency, effectiveness, and transparency within the Ethiopian Customs Commission, several areas remain underexplored and present opportunities for future:

1.Impact of IT on Revenue Collection and Trade Facilitation

Future studies could focus specifically on the quantitative impact of IT adoption on Customs revenue performance and trade flow metrics, including cost-benefit analysis of IT investments in Customs.

2.Comparative Regional Studies

There is a potential to conduct a comparative analysis across East African countries (e.g., Kenya, Uganda,Tanzania,Rwada) to evaluate how differing IT systems and policy frameworks influence Customs performance under the East African Community framework.

3.Cybersecurity and Data Protection in Customs IT Systems

Given the increasing digitalization of Customs operations, future research could explore data security risks, system vulnerabilities, and the effectiveness of cybersecurity frameworks within ECC.

4.Private sector Integration and Compliance

Investigate how freight forwarders, importers, and other private sector actors interact with ECC's IT systems, and how these platforms influence user compliance, satisfaction, and service delivery.

5.Role of Artificial Intelligence and Machine Learning

As Customs administrations globally begin to experiment with AI-driven risk management and anomaly detection, future studies could explore the readiness and applicability of AI tools in the Ethiopian Customs context.

6.Longitudinal Studies

Conduct long-term evaluations to measure how IT interventions evolve over time and what institutional factors influence their success or failure.

To sum, future research should delve deeper into economic, technical, and social dimensions of IT integration in Customs to support evidence-based reforms and sustainable trade facilitation in Ethiopia and beyond.

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Annex-1

Ethiopian Civil Service University

College of Finance, Management and Development

Department of Customs Administration and International Trade

Dear Respondents,

I would like to thank you in advance for giving me 5-10 minutes of your valuable time to fill this questionnaire. This survey is designed to obtain practical data for the study entitled **"Assessment of the Role of Information Technology in Enhancing Efficiency, Effectiveness and Transparency in Ethiopian Customs Commission: Kality Branch office"** for the partial fulfillment of master's degree in Customs Administration and International Trade. The answers for the questions will be treated as anonymous and confidential and will be used only for academic purposes. For further information, you can contact **AbebeFetene,Tel: 0918009593**or email:**2014abebe.m@gmail.com**

Part 1: Background information

Please put "√" mark on the space below

1.1 Gender: Male ☐ Female ☐

1.2. Age (Years): Below 25 – 35 ☐ 35-49 ☐ 50 and Above ☐ ☐

1.3. Level of Education: Certificate ☐ Diploma ☐ BA/BSCM ☐ A/MSC& Above ☐

1.4. Work Experience in the sector (Years): Less than 1-5 ☐ 6-10 ☐ 11–20 More than 20 ☐

1.5 You Work at: Customs Commission ☐ Customs clearing company or Freight Forwarding Company ☐

1.6. Familiarity with Customs automation systems

Familiar ☐ Not familiar ☐ Neutral ☐

Part-2

Here are some Likert scale questions for assessing the role of Information technology in enhancing efficiency, effectiveness, and transparency in the Ethiopian Customs Commission. These questions can be rated on a 5-point scale.

(1. Strongly Disagree,2. Disagree, 3. Neutral, 4. Agree, 5. Strongly Agree).

1.Efficiency of Information Technology in Customs Operations

No.	Questions	1	2	3	4	5	Remark
1.1	Information Technology has significantly reduced the time required for customs clearance processes						
1.2	Automated systems have minimized paperwork and manual processing delays.						
1.3	The use of information technology has improved coordination between different customs departments						
1.4	Digital platforms have reduced the need for face-to-face interactions in customs transactions.						
1.5	5The introduction of new technologies has enhanced the overall speed of customs procedures.						

2.Effectiveness of Information Technology in Customs Operations

No	Questions	1	2	3	4	5	Remark
2.1	Information Technology has improved the accuracy of customs documentation and declarations.						
2.2	The use of digital systems has helped in reducing errors in tariff classification and duty assessment.						
2.3	Advanced technologies, such as risk management systems, have helped in detecting fraudulent activities.						
2.4	The integration of technology has enhanced communication between customs officers and stakeholders.						
2.5	Training programs on new customs technologies are sufficient for staff to use them effectively.						

3.Transparency in Customs Operations

No.	Questions	1	2	3	4	5	Remark
3.1	The use of electronic systems has improved transparency in customs transactions.						
3.2	Online tracking systems have made it easier for traders to monitor the status of their shipments.						
3.3	Digital payment systems have reduced opportunities for corruption in customs procedures.						
3.4	Public access to customs regulations and procedures has improved with technology.						
3.5	Automated decision-making systems in customs reduce bias and discretionary practices.						

4.Challenges in Technology Implementation

No.	Questions	1	2	3	4	5	Remark
4.1	The technology used in customs operations is user-friendly and easy to navigate.						
4.2	There is sufficient technical support available for addressing system failures or issues.						
4.3	Internet connectivity and infrastructure support the smooth operation of digital customs systems.						
4.4	There is adequate investment in modernizing customs technology.						
4.5	The level of cyber security in customs digital platforms is sufficient to protect sensitive data.						

Part-3 Here are also Interview questions to assess the role of Information Technology in enhancing efficiency, effectiveness, and transparency in the Ethiopian Customs Commission.

1. General Questions

1.Can you describe your role within the Ethiopian Customs Commission?

2.How has technology transformed customs operations in Ethiopia over the past few years?

3.What types of technologies are currently being used in customs procedures?

2. Efficiency Information of Technology in Customs Operations

1.How has the use of technology impacted the speed of customs clearance processes?

2.To what extent has automation reduced paperwork and manual processing delays?

3.What challenges do you face in using digital customs systems for operational efficiency?

4.Have digital platforms reduced the need for face-to-face interactions in customs transactions?

3. Effectiveness of Technology in Customs Operations

1.How has technology improved the accuracy of customs documentation and declarations?

2.Do you think digital systems have minimized errors in tariff classification and duty assessments?

3.How effective are risk management systems in detecting fraudulent activities?

4.What role does technology play in improving communication between customs officers and stakeholders?

5.Are staff members adequately trained to use new customs technologies? If not, what improvements are needed?

4. Transparency in Customs Operations

5.How has the introduction of electronic systems enhanced transparency in customs processes?

2.What impact has online tracked systems had on importers and exporters?

3.Do you believe digital payment systems have reduced opportunities for corruption in customs procedures?

4.How accessible are customs regulations and procedures to the public through technology?

5.To what extent do automation based decision-making systems reduce bias and discretionary practices?

5. Challenges of Information Technology Implementation in Customs

1.What are the major challenges in implementing and maintaining customs technologies?

2.How would you assess the adequacy of internet connectivity and infrastructure for customs operations?

3.Is there sufficient investment in modernizing customs technology? If not, what improvements do you recommend?

4.How well do current digital customs systems protect sensitive data and ensure cybersecurity?