THE IMPACT OF DIGITAL CLEARING AND FORWARDING SYSTEMS ON THE PROCUREMENT CYCLE: A CASE STUDY OF TRANSTAR LOGISTICS HUB

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DECLARATION

As per the University Values of Integrity and diligence. I have not received any unauthorized assistance while working on this paper. I **ABEL ENAU** declare that the work is authentically mine and to the best of my knowledge, it contains no traces of plagiarism or any other unethical practices. The only work used has already been published by other persons has been purely for reference purposes.

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APPROVAL

I hereby certify that the research report titled **"THE IMPACT OF DIGITAL CLEARING AND FORWARDING SYSTEMS ON THE PROCUREMENT CYCLE"** has been submitted by ABEL ENAU of REG NO. S23B12/011 for examination with my full approval as the University supervisor.

Sign.....

Date.....06/05/2026.....

MR DUNCAN TUMUHAMYE
SUPERVISOR

DEDICATION

This study paper is dedicated to my dear Parents who have continuously supported me through this course both financially and who never stop trying to see that I receive and education

I pray that the heavenly father would reward them for their generosity and love shown to me.

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ABSTRACT

The effects of digital clearing and forwarding systems on the performance of the procurement cycle at Transtar Logistics Hub was the topic of this study. The study was centered on the use of digital tools particularly e-Customs systems, Electronic Cargo Tracking Systems, e-payment platforms, Uganda Electronic Single Window (UESW) and systems integration. The study was based on the Technology-Organization-Environment (TOE) Framework which explains how technological, organizational and environmental factors affect the outcomes of digital transformation.

A single case study design using mixed-methods was employed. A questionnaire, interview and document analysis methods were used to gather data from 41 respondents in procurement, logistics, clearing and forwarding, finance and IT operations. Data were processed descriptively and analyzed qualitatively by making themes and quantitative data by Pearson correlation.

The findings showed that DCP systems have the benefits of optimizing the efficiency of procurement cycles in terms of procurement cycle time, transparency, audit trails, operational costs and risk reduction. The majority of respondents felt these ERP systems, electronic cargo tracking and e-Customs platforms had a positive impact. But statistics revealed that system reliability was not strongly correlated with the performance measures indicating that technology is not necessarily the solution to efficiency improvements.

Other obstacles that were identified in the study included limited systems integration, poor digital skills, cybersecurity issues, and lack of ICT infrastructure. It finds that success in digital transformation requires other organizational attributes such as employee training, process alignment, management support and system interoperability. A continuous programme of digital skills training, better systems integration, improved cybersecurity and greater investment in ICTs are recommended for improved procurement performance in the study.

CHAPTER ONE

1.0. INTRODUCTION.

This chapter sets up a case study to explore the effect of digital clearing and forwarding systems on the procurement lifecycle for Transtar Logistics Hub. It sets the stage for the transition with logistics, explains the ongoing issue of procurement inefficiencies despite implementation of digital technology, and describes the objective of the study to determine this nexus. The chapter lays out in detail objectives and related research questions guiding the investigation into the impact of the interaction of e-Customs platforms, real-time tracking and systems integration on cycle time, compliance and cost effectiveness. It details the scope of the study, provides justification for that study in both its academic and practical context, and introduces TOE (Technology-Organization-Environment) framework which provides a theoretical basis for the investigation, thus providing a context for a focused examination of digitalization as it relates to increasing procurement efficiency in an organization.

1.1. Background to the Study.

Procurement efficiency is the basis of competitiveness and service delivery globally. Ongoing inefficiencies such as protracted approvals, delayed documents, or huddles of information also compromise the value for money and operational consistency ideals (World Bank, 2023). Over 30% of global transportation is delayed at customs because of inefficiencies such as manual processing, inadequate stakeholder coordination, and incomplete data exchange, according to the World Customs Organization (WCO). Disruptions will not only increase costs but also affect efficiency and performance in the public and private sectors. Logistics and procurement-related hurdles of this magnitude have been common within EAC for quite some time. Such revolutionary trade facilitation initiatives include the creation of a Single Customs Territory (SCT), Automation System for Customs Data (ASYCUDA) and Regional Electronic Cargo Tracking Initiatives of the RECTS system that have been adopted by the EAC to address these challenges. The initiatives were meant to foster interoperability by

eliminating redundancies and providing predictable clearance schedules at border crossings. Uganda has shown its leadership in making purchase reforms by the Public Procurement and Disposal of Public Assets (PPDA) Act, Cap. 205, and 2023. Regulations, challenges persist. The importer may encounter delayed clearance, inconsistency in documents and coordination problems between clearing and forwarding and the company's internal procurement (PPDA, 2024). However, Uganda's strategy for solving this problem is to use the latest technologies via Uganda Electronic Single Window (UESW), which is run by the Uganda Revenue Authority (URA) and also electronic cargo tracking for effective monitoring and smooth data exchange. The process is referred to as digitalization of clearing and forwarding with e-customs, automated data exchange, e-payment and cargo monitoring integration into the logistics and procurement system and consequently, this is not the only sphere that is digitalizing.

The objective here is to increase efficiency and precision by reducing reliance on manual work and combining stakeholder's collaboration. It is expected that organizations such as Transtar Logistics Hub will have faster procurement process, reduced costs and better compliance with the regulations. The framework used in the current study is Technology Organization Environment (TOE) Framework (Tornatzky & Fleischer, 1990). According to this model, the adoption of innovation technologies depends on technology readiness, organization readiness and environment. Although previous studies have examined the impact of e-procurement in Uganda, the influence of digitalization of clearing and forwarding on efficiency of the procurement cycle has not been explored sufficiently.

1.2. Statement of the Problem.

Therefore, an effective procurement process is bound to have timely deliveries, transparency, cost-effectiveness and accurate documentation of all items because these are the necessary ingredients in ensuing that the best value is attained and processes work seamlessly (World Bank, 2023; PPDA, 2024; OECD, 2019). In logistics-rich procurement systems, the clearing and forwarding processes are crucial in determining these performance outcomes due to customs clearance acceleration, accuracy of

documentation, and coordination with the internal procurement functions. To shorten procurement lead times, reduce operational redundancies and ensure regulatory conformity, digital solutions like e-Customs systems, Single Window platforms, electronic cargo management, and automated data transfer are implemented to reduce the need for human staff interaction and improve real-time visibility (UNCTAD, 2019; World Customs Organization, 2020; World Bank, 2021). Within Uganda, the development of these systems should strengthen the compliance with Public Procurement and Disposal of Public Assets (PPDA) rules as a result of better traceability and more accurate documentation of PPDA operations (PPDA, 2023). Yet, despite the uptake of digital tools of clearing and forwarding, procurement delays and excessive transaction costs, discrepancies in documentation and compliance challenges even at the interface of clearing agencies and internal purchase systems constitute challenges that companies in Uganda still experience (World Bank, 2023; UNCTAD, 2019).

The expected efficiency benefits of digital transformation initiatives can often be thwarted by fragmented system integration, weak digital skills and sporadic system down-time. Existing studies to date have focused on e-procurement and digital customs reforms in Uganda, but mainly examine public sector mechanisms and macro-level trade facilitation results or outcomes with restricted empirical reference to firm-level digital transformation in clearing and forwarding on company-level firms and direct implications for procurement cycle (Saunders et al., 2019; Creswell & Poth, 2018). This sets the stage for a knowledge gap related to what impact specific practices of digital clearing and forwarding have had on lead time, compliance, cost efficiency, and risk exposure at the very organizational level. Thus, this study aims to fill this gap by investigating the correlation between digital transformation in clearing and forwarding and procurement cycle performance at Transtar Logistics Hub.

1.3. Purpose of the Study.

The aim of this study was to evaluate the digital transformation of the clearing and forwarding on the procurement cycle, with an emphasis on Transtar Logistics Hub.

1.4. Objectives of the Study.

1.4.2 Specific Objectives.

- To study the relationship between the digital clearing and forwarding (e-Customs/Single Window, real-time cargo tracking), then the procurement cycle efficiency at Transtar Logistics Hub.
- How systems integration and data visibility between Transtar Logistics Hub-Clients affects process compliance within the procurement cycle is thus important.
- To assess the effect on procurement-related expenditures and risk of clearing and forwarding by digital transformation at Transtar Logistics Hub.

1.5. Research Questions and Hypotheses.

1.5.1 Research Questions.

- How do digital clearing and forwarding systems (e-Customs/Single Window and real-time tracking) impact procurement cycle time and delivery performance at Transtar Logistics Hub?
- How does systems integration and data visibility between Transtar Logistics Hub and its clients affect process compliance within the procurement cycle?
- How does digital transformation of clearing and forwarding impact procurement-related costs and risks at Transtar Logistics Hub?

1.5.2 Research Hypotheses.

- The digital clearing and forwarding systems (e-Customs/Single Window and real-time tracking) impact procurement cycle time and delivery performance at Transtar Logistics Hub.
- Enhanced systems integration and improved data visibility between Transtar Logistics Hub and its clients significantly improve process compliance within the procurement cycle.
- The digital transformation of clearing and forwarding significantly influences procurement-related costs and risks at Transtar Logistics Hub.

1.6. Scope of the Study.

1.6.1. Content scope.

This study looked at the use of digital transformation techniques in areas such as clearing and forwarding in relation to procurement cycle performance metrics which include lead times, delivery dependability, cost effectiveness and compliance.

1.6.2. Geographical Scope.

The study took place at Transtar Logistics Hub, Kampala, Uganda and it can be extended to other similar logistics facilities within the East African Community (EAC).

1.6.3. Time Scope.

The study spanned the years 2020 to 2025, a period marked by the implementation of digital reforms under PPDA (2023) alongside regional trade facilitation systems.

1.7. Justification of the Study.

1.7.1. Academic Justification.

With the help of the TOE, the study contributed to the academic body of knowledge in examining digital innovations in clearing and forwarding that influence the efficiency of the procurement cycle process. This is a critical research area that has not been explored before in the context of developing countries.

1.7.2. Practical Justification.

These findings helped the logistics manager, procurement officer and C& F firms such as Transtar Logistics Hub understand how to use technology to improve efficiency, improve compliance and provide more transparency. These findings assisted in aligning systems and resolving and operational bottleneck issues.

1.7.3. Policy Justification.

Policy makers and regulating bodies (URA and PPDA among others) benefited from this study through analysis of implementation gaps within digital systems and also with recommendations on how to improve digital integration and enforcement.

1.8 Significance of the Study.

To Practitioners

The study offered an evidence-based perspective into the effects of technology use on lead times, reliability and compliance in clearance and forwarding processes and consequently on procurement support.

To Policymakers

The research contributed to the improvement of digital trade policies to facilitate their improvement of e-Customs, UESW, tracking, and e-payment systems.

To Academia

This research established fundamental research interests on procurement and logistics digitalization, laying the framework for questions.

To Future Researchers

It laid the ground for a range of more empirical investigations on digitalization, logistics, and procurement performance and opened the possibility of further enhancement.

1.9. Limitations and Delimitations.

1.9.1 Limitations.

- Restrained access to sensitive organizational data which hindered the breadth of analysis, affecting the results of the research.
- System downtime and data inconsistencies affected the accuracy of digital performance records.

- Respondent bias arose due to self-reported data. This distorted the data received, hence affecting the results of the research.

1.9.2 Delimitations.

- This study was relevant only to Transtar Logistics Hub and was specifically focused on the import-related procurement processes performed by digital C&F systems. This ruled out other logistics players and competing logistics firms.

- Non-digital procurement processes were excluded.

1.10. Theoretical and Conceptual Framework.

1.10.1 Theoretical Framework: Technology-Organization-Environment (TOE) Framework.

The study employs the Technology Organization Environment (TOE) Framework from Tornatzky and Fleischer (1990).

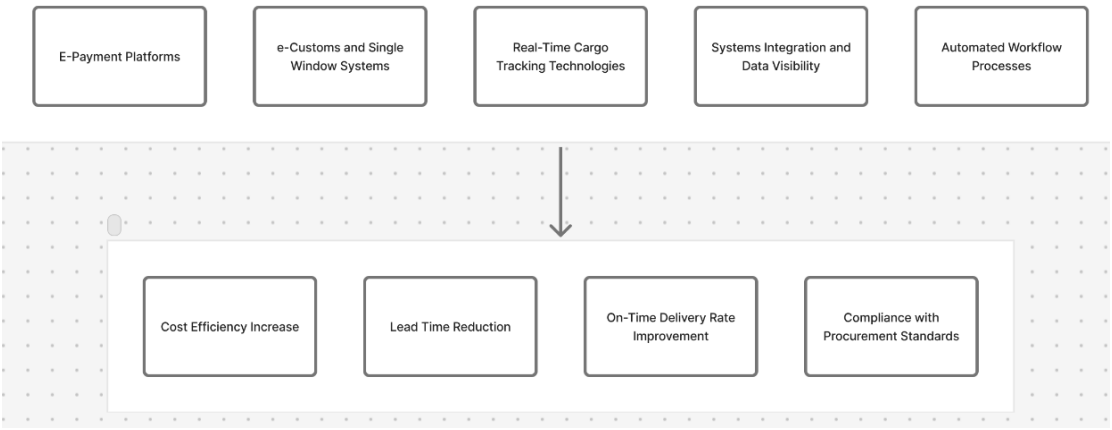
This model indicates that the adoption of technology by institutions is affected by three external factors as follows: Technology Context- the presence of technologies, the compatibility of the technologies, functional use of the technologies, and perception of usefulness of the technologies (e-customs, e-e-payments, cargo tracking and single window). The technologies determine the extent to which Transtar Logistics Hub may operate to minimize clearance delays in this study. Organizational Context. This also addresses internal preparedness, management support, human resource capacity, digital literacy, and structural operations of Transtar Logistics Hub.

It is the performance of these organizational factors that drive the degree to which digital systems are embedded into procurement processes. Environmental Context.

These issues involve regulations like PPDA rules, competition in the industry, technological infrastructure, and regional trade policies under the EAC. External aspects also influence the implementation and use of digital C&F tools by institutions.

The TOE framework is suitable for this study as it offers a broader context of information for understanding how technological, organizational, and environmental variables are intertwined in the introduction and success of digital transformation practices adopted in clearing and forwarding.

Conceptual Framework



The conceptual framework presented a relationship between Digital Transformation in Clearing and Forwarding as Independent Variable (IV) and Procurement Cycle Performance as Dependent Variable (DV). Digital transformation is depicted in the diagram by using five technological elements: e-payment platforms, e-customs and single window systems, real-time cargo tracking technologies, systems integration and data visibility, and automated workflow processes. All these features together characterize the future of clearing and forwarding methods in today's supply chains.

The model identifies that the integration and implementation of these digital tools affect the effectiveness and reliability of the procurement process. By doing so, not only does the interaction between these technologies increase transparency, faster documentation and clearing processes, data flow, and less manual operations. This reduces the chances

of errors, delays, and inefficiencies often associated with paper-based and poorly organized systems.

Therefore, enhancement in digital transformation is expected to result in positive procurement performance represented in the dependent variable. A few of these are faster lead times, better on-time provision, cheaper costs and better adherence to procurement standards.

Together, these results suggest a more flexible, sustainable, and efficient buying process.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The second phase in the case of Transtar Logistics Hub includes a detailed literature review based on the literature available in relation to digital transformation and the effects it brings to the operations of the clearing and forwarding company in terms of the procurement process performance. The structure of the literature review is highly geared towards the objectives of Chapter One in order to build a conceptual and analytical framework. This chapter begins by defining the important concepts revolving around the current research topic, then discusses the Theory of Technology Organization Environment (TOE) as the guiding theoretical framework for conducting this study. This chapter will discuss the results of empirical works undertaken on various topics like e-Customs, real-time tracking, system integration and their impacts on procurement processes. Finally, the chapter concludes with the gaps found in theory and practice that provide justification for the current research to be conducted.

2.1. Key Definitions

2.1.1 Digital Transformation

Digital transformation is the systematic implementation of sophisticated digital technologies in organizational processes in order to increase efficiency, transparency, and responsiveness (Vial, 2019). For clearing and forwarding, this means reprogramming customs clearance, cargo tracking, and documentation via platforms including e-Customs, Single Window systems, e-payments with automated data exchange as well. In the context of this study, digital transformation is operationalized based on the adoption level of the technologies, their integration into the workflows and their perceived impact on process speed and accuracy for Transtar Logistics Hub.

2.1.2 Clearing and Forwarding (C&F)

Clearing and forwarding includes logistics activities which allows transportation of goods from one country to another such as customs paperwork, compliance with regulation, coordination of freight and final delivery (Thai, 2013). Inefficiencies in C&F are reflected by the procurement lead time, cost, and compliance, therefore the area which becomes the focus of this study's scope.

2.1.3 Procurement Cycle

Planning, sourcing, ordering, clearing, receiving and verification are the sequential phases of the procurement cycle (Handfield et al., 2015). In C&F terms, cycle time, delivery reliability, and cost efficiency are key determinants in import-dependent contexts.

2.1.4 E-Customs and Single Window

E-Customs software permits to file customs declarations and processing in electronic form. Single Window systems enable traders to record standardized information once for the use of several regulatory agencies (Grainger, 2014). In Uganda, there s also the Uganda Electronic Single Window (UESW) which facilitates cross-border customs, tax and regulatory approvals thereby influencing procurement cycle time (Objective One).

2.1.5 Real-Time Tracking of Cargo Logistics

The live cargo tracking gives us a sense of where the cargo is and in what area it currently is on the move in place. Tools are systems such as Uganda's Electronic Cargo Tracking System (ECTS) that assist in improving predictability, minimizing delays, and minimizing transit risks (Helo & Hao, 2017), supporting Objective One.

2.1.6 Systems Integration and Data Visibility

Systems integration is the ability to integrate systems between digital platforms for more seamless communication whereas data visibility is the ability to find up to the minute, accurate information on procurement and

logistics systems (Laudon & Laudon, 2020). Purpose 2 studies the influence of these on compliance - these are key concepts here.

2.1.7 Procurement Cycle Performance

Procurement cycle performance is a measure of the performance of procurement processes in delivering goods and services against scheduled targets for accuracy, regulatory compliance, cost efficiency, and the minimization of risk (Lysons & Farrington, 2016). In this article, we describe the dependent variable as the time taken to implement lead times and the compliance rates, cost optimization rates, and risk exposure indicators in this study.

2.2. Theoretical Review

The research is based on the Technology Organization Environment (TOE) Framework (Tornatzky & Fleischer, 1990) which indicates that technology innovation adoption is influenced by three related contexts:

Technological Context: Access to technology (e-Customs, tracking systems, and other digital payment platforms), compatibility and usefulness.

Contextual Analysis: Organizational context-management of Transtar Logistics Hub, supportive external environment, digital competencies, operational processes and available resources. Environmental Context: External actors such as PPDA regulations, EAC trade policies, competitive pressures and technological infrastructure among others.

TOE theory is most suitable for this research in that it provides a holistic approach that enables us to comprehend the way the C& F digitalization process which can be described as technological innovation is taken up and implemented in a specific organization environment driven by internal competence and external forces.

Although TOE is extensively used in explaining technology adoption, this research proposes a key modification to it by extending it into the evaluation of its effectiveness after implementation and assessing the extent to which it has been utilized to enhance performance. This modified TOE approach can prove useful in explaining why certain technologies may

generate varying efficiency gains in different organizations and address the theory-practice of TOE in operational performance in developing countries.

2.3 Objectives to Review Based on the Concept of Study.

2.3.1 Digital Clearing and Forwarding Systems and Procurement Cycle Efficiency.

This study will focus on the impact of electronic systems used for clearing and forwarding processes such as: Electronic Customs (e-Customs) system, Single Window system and real-time cargo tracking system on the procurement process time and delivery performance of Transtar Logistics Hub. Procurement process efficiency as indicated in this study includes reduction in lead time, speed of customs clearance process, scheduling of deliveries. The digitalization of customs administration worldwide has always been seen as a significant contributor to international business. As Grainger (2014) writes, electronic customs systems decrease redundancy in customs procedures by promoting pre-arrival information processing, automated hazard screening and digital declaration submission which speeds up the clearance process. Moreover, UNCTAD (2019) notes that Single Window systems shorten import processing times by consolidating various regulatory approvals in one digital platform.

This eliminates repeated data entry and it reduces interaction between the user and the system, which tends to be the cause of delays and documentation mistakes. From the operation side, these systems have effect on targeted stages of the procurement process. E-Customs also enable early import documentation submission in the ordering and shipment phase. Automated validation at the clearance step minimizes the number of inspection clogs. Through the delivery stage, real-time cargo tracking creates delivery predictability and enables clearing agents and procurement departments to work together more effectively. According to Helo and Hao (2017), “Real-time tracking technologies improve the visibility of the supply chain and thus reduces uncertainty and improves delivery reliability,” a key function of procurement management. In the East African Community (EAC),

digital reforms, for example the Single Customs Territory (SCT) and the Regional Electronic Cargo Tracking System (RECTS), have considerably reduced border delays and transit time variability. These reforms also reflect quantifiable macro level gains in cargo dwell time and in cross-border movement. Yet for all the systemic gains described, those improvements do not clearly signal "decisions to improve procurement cycle performance at the firm level," as such regional numbers suggest. The Uganda Electronic Single Window (UESW) under Uganda Revenue Authority (URA) has played a role in facilitating document submission and cooperation among government agencies in Uganda. According to Public Procurement and Disposal Unit (PPDA,2024), there has been increased speed and transparency in the clearance process. However, most of the available literature has been driven by policies; the focus has been placed more on the national trade facilitation outcome rather than firm performance.

It is essential to point out that most have viewed the relationship between digital systems adoption and efficiency improvement from the perspective of consistency. Such an assumption overlooks the internal differences. As argued within the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990), the technological environment (reliability, interoperability, automation capacity, etc.) does not work in a vacuum. Its impact on procurement cycle time is shaped by the organizational context, such as staff digital skills, internal workflow redesign, managerial support, and alignment between clearing agents and procurement officers. In situations, even where e-Customs systems are operational, cycle time reductions may not be realized unless staff was properly trained, or if digital outputs were not integrated within internal procurement planning systems. Likewise, real-time tracking tools might offer visibility, but without parallel decision-making mechanisms, the informational advantage might not be reflected in faster deliveries. This points to the fact that digital technologies are enabling mechanisms rather than reflexive performance-related determinants. As such, the gap in literature is empirical and contextual. There was a scarcity of firm-level quantitative data assessing statistically the association between digital clearing system and

procurement cycle performance indicators (lead time and delivery reliability). Contextually, there is scant information regarding how private logistics firms in Uganda, specifically those positioned at the interface of customs systems with client procurement departments convert this digital capability into an operational advantage. This study seeks to address this gap by a case study on Transtar Logistics Hub. It presents us with a sample from which we will determine whether there is a significant effect that digital clearing and forwarding systems have on procurement cycle effectiveness and the degree to which this relationship depends on the TOE framework. Rather than focusing on macro-level trade figures, this research looks at the effects of digital transformation in Uganda's private logistics sector through a micro-level operational perspective.

2.3.2 Digital Transformation, Cost Effectiveness and Reducing Risks.

The study is intended to examine the influence of digital C& F systems on the cost and risk profiles in procurement at Transtar Logistics Hub. The sources of cost during procurement activities include charges for storage services, demurrage fees, inefficiency in documentation, penalties related to compliance and delays in clearance of consignments. Cost and risk sources include frauds, loss of documents, delayed cargo and penalties related to regulations. Based on existing studies, it can be achieved using digital technologies. According to Karamagi (2020), electronic customs management reduces clearance time and therefore decreases costs in terms of storage and demurrage charges. Similar findings were revealed in Mckinsey (2022) reports on digitalization of cargo shipping. In particular, it was found that automation increases reliability, accuracy and transparency in tracking and documenting consignment information thus reducing the likelihood of fraud and penalties for non-compliance. Digitalization is expected to provide better opportunities to control costs and minimize uncertainties associated with operations. Yet. In most cases, advantages of digital systems were analyzed for industries or countries as a whole. There is limited research on firm-level costs and risk advantages of digitalization. Real consequences can be variable depending on how well the systems are

developed, used and incorporated into daily activities. Under the Technology–Organization–Environment (TOE) context (Tornatzky & Fleischer, 1990), costs and risks are conditioned not only by the technology background (technological context of digital tools), but also by internal capabilities (staff skill and process alignment (organizational context)), as well as external drivers (customs penalties, regulatory enforcement and market competition in environmental context).

Together, these aspects frame the extent to which digital transformation results in tangible benefits in terms of savings and exposure to related risks. Hence, although digital C&F systems are perceived as reducing cost and risk, there is a situational gap as to how and to what extent these improvements are realized in private logistics firms in Uganda. The purpose of this study is to explore how digital transformation is determining procurement-related costs and risks at the strategic level and to provide firm-level evidence to back up or to contradict current beliefs.

2.4 Research Gap.

Data collected from these studies identified a number of interconnected gaps that the present work aims to fill. While the Technology Organization Environment (TOE) framework has been widely used in previous studies focused on technology adoption, its application to explaining post-adoption performance outcomes in logistics and procurement settings is scarce, especially in Uganda's private sector. These studies are focused largely on public sector e-procurement systems or macro-level trade facilitation projects, and little evidence exists at the firm level regarding the impact of digital clearing and forwarding systems on procurement cycle performance in private logistics companies. Furthermore, there is a large lack of literature that highlights the benefits and consequences of using digital tools to drive organizational efficiency and does not provide a comprehensive explanation for variation in effectiveness depending on similar technology investments made by firms.

This gives rise to an explanation gap which requires a model able to explain the interplay of technological efficiency, organizational preparedness, and environmental strain mechanisms. In addition, there is very little academic

attention paid to the logistics industry in Uganda which includes private companies such as Transtar Logistics Hub which operate in the critical space linking logistics to customs systems and customer's purchasing.

With its relevance to the context of Transtar Logistics Hub, this research bridges various research gaps through the use of a new TOE framework to evaluate the effects of digital clearing and forwarding systems on the performance of procurement cycles and provides context-bound and understanding insights that connect theory and practice and ultimately further the understanding of both academic and managerial needs.

CHAPTER THREE.

RESEARCH METHODOLOGY.

3.0 Introduction.

This chapter describes the approach taken to research the effect of the digital clearing and forwarding (DC&FA) system on procurement cycle at Transtar Logistics Hub. The methodological approach is developed to systematically respond to the research questions and objectives presented in Chapter One so that the study will generate credible, valid and contextually relevant findings. More specifically, this chapter describes the research approach, study population, sampling procedures, data collection methods, and analysis techniques in the study. Furthermore, it also describes the measures to maximize validity, reliability, trustworthiness, and ethical compliance. Through offering a clear and rigorous methodological landscape, this chapter lays the foundation for this analysis of the correlation between digitalization and procurement cycle performance in Uganda's private logistics industry.

3.1 Research Design

This study adopted a mixed research design within a single-case study context which focused on Transtar Logistics Hub. This mix of quantitative and qualitative methods gave us a complete understanding where we found the research problem. The case-study design was especially well suited to the study of complex phenomena of organizations as it can be used to merge objective patterns with a detailed background explanation (Yin, 2018). This is the case because we are looking for a deeper knowledge on how and why digital clearing and forwarding affect procurement cycle performance in a particular organizational context.

Procurement effectiveness in logistics contexts was influenced by the interdependencies of technological, organizational, and environmental circumstances, which should be examined best in the context of the logistics operations themselves. The quantitative part involved a questionnaire that has been developed and distributed to the procurement

officers, logistics team members and clearing agencies associated with Transtar Logistics Hub. The purpose was to test empirically the formulated hypotheses and gain practical insights into the correlation between digital clearing and forwarding platforms and procurement cycle indicators (lead time, compliance, cost efficiency and risk).

The qualitative component involved semi-structured interviews with key informants, namely senior executives, IT system administrators, selected clients and document analysis. It creates opportunities for exploring experiences, attitudes and interdependencies which cannot be fully covered by purely quantitative data. In particular, this allows for understanding system integration difficulties, organizational variations (Creswell & Poth 2018).

The triangulation of mixed methods through quantitative and qualitative approaches strengthened the validity of the study since the results of one method supported, elucidated, or strengthened findings of the other (Johnson & Onwuegbuzie, 2004). A qualitative approach also highlighted the limitations of quantitative approaches. Thus, this mixed-method-case-based design was congruent with the study's goal of producing both empirical relationships and explanatory inferences grounded on the adapted TOE framework.

3.2 Research Population and Sampling

3.2.1 Study Population.

This study population included the individuals, data sources involved in, or affected by, the buying, clearing and sending activities at Transtar Logistics Hub. This population comprised internal organizational actors and external client representatives, and pertinent transactional data. More precisely, the population was made up of:

Transtar Logistics Hub internal staff, i.e., procurement officers, logistics coordinators, clearing and forwarding agents, IT support personnel, Transtar senior management. For client-side representatives; specifically, Procurement and supply chain officers of firms that utilized Transtar's import logistics services regularly. Transaction data was generated

transactions involving procurement and delivery carried out by Transtar, 2020-2025.

3.2.2 Sampling Techniques and Data Sample Size.

The utilization of such techniques made the research design both representative and informative. The use of stratified random sampling techniques were employed for the quantitative survey. Stratification of the population according to the specific function served by each person ensures proper representation of the most important stakeholders. According to Yamane (1967), using the formula for finite populations with a 95% confidence level and a 10% margin of error yields a sample size of about 60 people drawn from both internal personnel and clients.

A purposive sampling method was used for the qualitative interviews to select the informants who possessed rich data on digital clearing and forwarding systems and who, with direct experience and technical knowledge can also provide additional perspectives on the process. Around 10–15 key informants were included: the Head of Logistics or Digital Transformation Lead at Transtar, senior management in procurement and logistics, clearing and forwarding staff using digital tools, IT and systems integration professionals, and procurement managers from strategic client organizations. Snowball sampling might be used to select other participants involved in any relevant area if this is desired (Patton, 2015).

3.3 Data Collection Methods.

Triangulation and analytical depth were enhanced by three corroborating methods while data collection was carried out.

3.3.1 Survey Questionnaire.

Quantitative data was gathered using a structured and self-administered questionnaire. The instrument was structured into sections according to study variables and objectives. Section A covered demographic and organizational data characteristic of respondents. Section B measured the

independent variable digital transformation in clearing and forwarding as used in e-Customs and involves e-Payment's system, real-time monitoring and the systems integration.

Section C measured dependent variables in the procurement cycle by using lead time, delivery reliability, compliance and efficiency as performance indicators to assess purchasing cycle performance. We considered moderating factors from TOE in Section D for determining factors that may be identified in technology readiness and organizational support, to include environmental pressures. Technology readiness was determined and to evaluate such moderating factor from TOE framework. The questionnaire was pilot-tested for clarity and relevance before full deployment. Internal consistency reliability was verified with Cronbach's alpha, and content validity is tested at the expert level.

3.3.2 Semi-Structured Interviews.

Semi-structured interviews were used to elicit qualitative findings regarding the experiences that participants have with the digital clearing and forwarding systems. The interview guide outlined experiences of implementing systems, perceived effects on procurement workflows, integration and skill challenges, as well as the impact of regulatory and environmental factors including URA requirements and client expectations. Interviews were audio-recorded using transcripts with the participants' permission, and transcribed verbatim for systematic analysis.

3.3.3 Document Analysis.

Document analysis was applied while complementing primary data and grounding this with context. Reviewed documents covered documentation related to clearance time and procurement cycle length, information related to policy and SOPs within organizations on digital systems and documentation concerning PPDA rules, URA guidelines and EAC trade facilities. Such documents help triangulate the study results and boost their validity.

3.4 Data Analysis Procedures

3.4.1 Quantitative Data Analysis.

Data on quantitative matters was analyzed in SPSS (Version 28). Descriptive statistics (frequencies, percentages, means, standard deviations) were employed to summarize respondents' characteristics and the main variables. Pearson correlation was applied to test relationships between digital transformation components and procurement performance indicators and multiple regression analysis is applied to test the study hypotheses (H1, H2 and H3). Differences among respondent groups were examined by using t-tests or ANOVA, where applicable.

3.4.2 Qualitative Analysis of Data.

Based on Braun and Clarke (2006) qualitative data from interviews and documents was analyzed using thematic analysis. These included getting familiar with the data, coding it, developing a theme, reviewing themes, and refining topics. The analysis was guided by adapted TOE framework, featuring themes organized around technological, organizational and environmental features which impacted performance in the procurement cycle.

3.4.3 Integration of quantitative and qualitative research conclusion.

At the last analytical level, overall quantitative and qualitative results were combined to develop the extensive meta-inferences. Patterns and relationships were identified by quantitative findings and the explanation of these patterns was attributed to qualitative findings. As the relationship between system integration and compliance was an established statistically significant indicator, then it was explored further through interviews of stories shared in the narratives outlining problems of integration or a supportive practice. This integrated methodology gave greater robustness to the study of its explanatory power.

3.5 Validity, Reliability, and Trustworthiness.

Quantitative validity and reliability were secured via expert review, literature-based measurement items, reliability testing conducted using Cronbach's alpha. The qualitative trustworthiness was also maintained in accordance with Lincoln and Guba's (1985) criteria (credibility), dependability, confirmability, and transferability, which was secured through triangulation, audit trails, reflexivity and context description.

3.6 Ethical Considerations.

The study complied with ethical standards. Ethical approval was sought from the respective university ethics committees and Transtar Logistics Hub. Data were all collected under conditions of confidentiality and anonymity. Participants provided informed consent. A study of this sort tried to avoid imposing any influence and ensures that participation was always respectful.

CHAPTER FOUR.

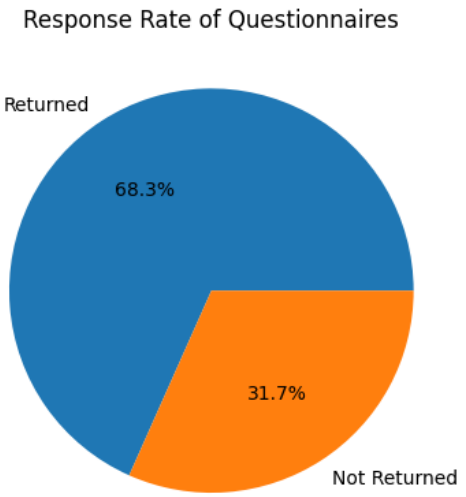
DATA ANALYSIS, INTERPRETATION AND PRESENTATION

4.0 Introduction.

This chapter includes the analysis of data from 41 participants at Transtar Logistics Hub. The aim is to investigate the effect of digital clearing and forwarding systems on the procurement cycle, as directed in the study objectives and hypotheses presented in Chapter One. The chapter commences with the response rate and then the demographic features of the respondents. Descriptive statistics, for each variable, including digital system usage, integration level, perceived impacts on cycle time, transparency, audit trails, cost reduction, risk reduction, and the results from the performance improvement are discussed. Then, inferential statistics (Pearson correlation) are applied to assess the three research hypotheses. Qualitative analysis of open-ended recommendations is finally presented with summary of key findings.

4.1 Response Rate.

60 questionnaires were administered to Transtar Logistics Hub staff and client representatives. Of these, 41 participants carried out the survey and returned the questionnaire with response rate of 68.3%. Mugenda and Mugenda (2012) maintain that over 60% response rate is more than sufficient to accept for analysis. Thus, the response rate attained is sufficient and validates the findings.



4.2 Demographic Characteristics of Respondents

Respondents were asked to indicate their role at Transtar Logistics Hub and their experience in clearing and forwarding or procurement activities.

Table 4.1: Demographic Profile of Respondents

Characteristic	Frequency	Percent
Role		
Procurement Officer	19	46.3
Logistics Officer	6	14.6
Clearing & Forwarding Officer	8	19.5
Operations Manager	3	7.3
IT/System Administrator	2	4.9
Finance/Accounts Officer	1	2.4
Other	2	4.9
Total	**41**	**100.0**
Experience		
Less than 1 year	13	31.7
1–3 years	16	39.0
4–6 years	9	22.0

Characteristic	Frequency	Percent
7–10 years	2	4.9
Above 10 years	1	2.4
Total	**41**	**100.0**

The majority of respondents were Procurement Officers (46.3%), followed by Clearing & Forwarding Officers (19.5%) and Logistics Officers (14.6%). This distribution guarantees that opinions sought are those of people who are directly engaged in procurement and clearing activities. As for experience, the majority of respondents (39.0%) had between 1-3 years of experience while 1.7% had less than one year. This combination of relatively inexperienced and moderately experienced employees provides a balanced perspective n digital technology utilization.

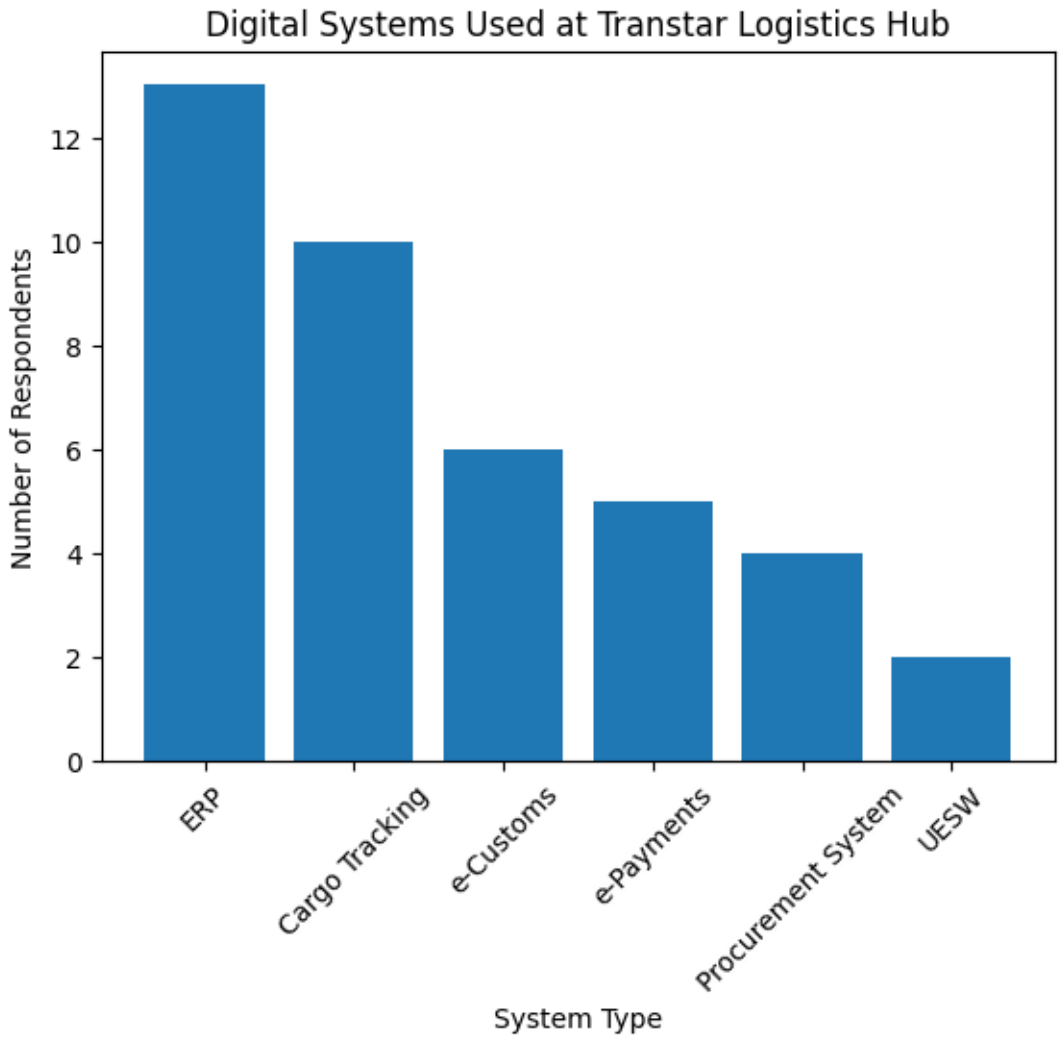
4.3 Descriptive Analysis of Study Variables

4.3.1 Digital Systems Used

Respondents were asked to specify their use of digital systems. The distribution is presented in Table 4.2.

Table 4.2: Digital Systems Used

System	Frequency	Percent
ERP system	13	31.7
Electronic Cargo Tracking System	10	24.4
e-Customs	6	14.6
e-Payment platforms	5	12.2
Procurement Management System	4	9.8
Uganda Electronic Single Window (UESW)	2	4.9
None	1	2.4
Total	**41**	**100.0**



ERP system is the most used system (31.7%), then Electronic Cargo Tracking (24.4%), and thirdly, Customs (14.6%). This is an indication that various kinds of technology have been used at Transtar Logistics Hub with emphasis placed on enterprise resources planning and cargo visibility.

4.3.2 Integration Level

Respondents evaluated the extent to which digital systems are integrated with client procurement or ERP systems. The findings are presented in Table 4.3.

Table 4.3: Level of Systems Integration

Integration Level	Frequency	Percent
Fully integrated	10	24.4
Partially integrated	30	73.2
Not sure	1	2.4
Total	**41**	**100.0**

The majority (73.2%) reported that their systems are only partially integrated while 24.4% indicated full integration. This suggests that although digital tools are available with client systems remains a challenge.

4.3.3 Perceived Impact on Procurement Cycle Time

Participants were asked to indicate whether digital systems have reduced procurement cycle time. The findings are presented in the table below.

Table 4.4: Digital Systems Have Reduced Procurement Cycle Time

Response	Frequency	Percent	Mean	Std. Dev.
Strongly agree	21	51.2		
Agree	11	26.8		
Neutral	5	12.2		
Disagree	1	2.4		
Strongly disagree	3	7.3		
Total	**41**	**100.0**	**4.12**	**1.19**

Responses are scored; the average rating of 4.12 out of 5 indicates that most respondents believe that digitalization has reduced the procurement cycle. Only 9.7% of them disagreed or strongly disagreed. Such conclusion provides evidence, that digitalization accelerates the processing of things.

4.3.4 Transparency and Audit Trails.

Two items assessed the impact of digital systems on the transparency and fraud reduction. Responses are described in table 4.5

Table 4.5: Transparency and Audit Trail Effectiveness

Statement	Mean	Std. Dev.
Improved data visibility has enhanced procurement transparency	4.05	1.12
Digital audit trails reduce fraud and documentation errors	3.78	1.28

The mean scores for the two statements exceed 3.5 suggesting general consensus. Transparency is a highly rated quality (4.05 mean), while perceived fraud reduction is somewhat inferior (3.78 average score), implying that audit trail capacity can become more substantial.

4.3.5 Cost Reduction.

Respondents were invited to identify several aspects of costs and how digital systems have saved them. Table 4.6 gives the number of respondents who identified every cost type (multiple responses permitted).

Table 4.6: Cost Reduction Areas

Cost Type	Number of Respondents	Percent of Cases
Storage costs	14	34.1
Demurrage charges	7	17.1
Administrative expenses	13	31.7
Compliance penalties	14	34.1
No cost reduction	0	0.0
Total respondents	41	100.0

Storage costs and compliance penalties are the most often mentioned cost areas (each 34.1%), administrative expenses (31.7%) were the second most

cited. Importantly, for no respondent did the option of “No cost reduction” apply, indicating that all participants perceived a cost benefit from the digital systems.

4.3.6 Risk Reduction.

Respondents rated the statement “Digital systems have reduced financial risks associated with procurement delays.” Table 4.7 offers results.

Table 4.7: Financial Risk Reduction.

Response	Frequency	Percent	Mean	Std. Dev.
Strongly agree	12	29.3		
Agree	18	43.9		
Neutral	5	12.2		
Disagree	3	7.3		
Strongly disagree	3	7.3		
Total	**41**	**100.0**	**3.80**	**1.17**

The majority (mean 3.80) agree that financial risks were reduced using digital systems. But 14.6% disagreed with that, signifying that risk reduction wasn’t generally known to experience the same rate across all.

4.3.7 General Performance Increase.

Respondents evaluated the net effect of overall impact of digital transformation on performance in procurement cycle. Table 4.8 displays the findings.

Table 4.8: Comparative Performance of the Procurement Cycle.

Response	Frequency	Percent	Mean	Std. Dev.
Significantly improved	23	56.1		
Moderately improved	14	34.1		
Slightly improved	2	4.9		
Worsened performance	2	4.9		
Total	**41**	**100.0**	**3.41**	**0.81**

Over half (56.1%) noted significant improvement and 34.1% moderate improvement, with a mean of 3.41 out of 4. Only two respondents (4.9%) said their performance was worse. It would imply that perception of general digital transformation is generally quite positive.

4.4 Testing of Hypotheses.

Pearson product-moment correlation coefficients were calculated to validate the three research hypotheses. Results were deemed significant when $\alpha = 0.05$ was set (two-tailed). Correlations among the salient variables are summarized in Table 4.9.

Table 4.9: Correlation Matrix.

Variable	P	G	E	H	I	O	S	Cost Count
P (System reliability)	1							
G (Integration level)	-0.08	1						
E (Cycle time reduction)	-0.16	0.12	1					
H (Transparency)	-0.01	**-0.46**	0.21	1				
I (Audit trail)	-0.09	**-0.53**	0.19	0.70	1			

Variable	P	G	E	H	I	O	S	Cost Count
O (Risk reduction)	-0.06	0.08	0.25	0.34	0.32	1		
S (Overall improvement)	-0.26	0.14	0.33	0.28	0.29	0.49	1	
Cost Count (Number of cost reductions)	-0.14	0.11	0.18	0.20	0.23	0.31	0.22	1

NOTE: For a correlation that is significant at the 0.05 level (two-tailed). Critical r (df = 39) ≈ 0.308.

4.4.1 Hypothesis One.

H1: Digital clearing and forwarding systems (e-Customs/Single Window, real-time tracking) exert a major impact on procurement cycle time and delivery performance. The correlation between system reliability (P) and cycle time reduction (E) was r = −0.16 (p > 0.05), which means that there is no measurable adverse relationship. Likewise, relationship between P and total improvement (S) was r = −0.26 (p > 0.05). H1 of the model is not valid due to these results and the significant evidence of the non-significant relationship between perceived reliability of digital system and cycle time or overall performance is not available. Despite these descriptive statistics (Section 4.3.3) shows that the majority of respondents are in agreement that cycle time is reduced, which indicates that other aspects such as system characteristics and training may be influencing this reduction.

4.4.2 Hypothesis Two.

H2: System integration and increased data visibility provide tangible improvements in process compliance in the procurement cycle. Integration level (G) was negatively correlated with transparency (H) (r = -0.46, p < 0.05) and with the effectiveness of the audit trail (I) (r = -0.53, p < 0.05).

Both of these correlations are statistically significant but counter to the original hypothesis. This indicates that larger levels of interestedness are related to lower levels of perceived transparency and fraud. This counterintuitive finding may be due to the small number of fully integrated respondents (n = 10) and may also result from outliers (e.g., one fully integrated respondent rated transparency as 1). Integration can be viewed as good enough to satisfy compliance, but the organizational and human factors may be more important. So H2 is not supported: no positive relationship of expected significance was observed.

4.4.3 Hypothesis Three.

H3: Digital transformation in clearing and forwarding significantly impacts procurement-related costs and risks. The correlation between system reliability (P) and the number of cost reductions (Cost Count) was $r = -0.14$ ($p > 0.05$), and between P and risk reduction (O) was $r = -0.06$ ($p > 0.05$). Both are weak and insignificant. But in all cases the link between risk reduction (O) and total improvement (S) was significant and positive ($r = 0.49$, $p < 0.05$), as well as O versus Cost Count ($r = 0.31$, $p < 0.05$). As a result, those who feel that risk reduction is occurring tend to report a greater drop in cost too. So, at the level of digital system attributes, H3 is not supported at all as the independent variable (digital system reliability) does not correlate significantly with these outcomes. The gains could also be mediated by other variables like user competence or process redesign.

4.5 Qualitative Analysis of Recommendations.

The last open-ended question urged the respondent to submit advice for enhancing systems for digital clearing and forwarding. There are five broad themes that emerged from the thematic analysis of the data of 22 responses. Training and Skills Development (4.5.1) The top-mentioned theme (12 respondents) was increased training. Typical comments included:

“Proper skilling from a lower stage.”

“Train stakeholders on how to use them.”

“Companies need to be more efficient and focus more on training workers.”

"Training and professional skills."

This highlights that technology is not all that counts; there will need to be user competence in order for the benefits to be realized.

4.5.2 System Integration and Interoperability.

Several responses (8) indicated that better integration is needed: "Critical systems should have interoperable platforms connecting government entities to logistics companies." "Application of camera scanners for tracking effectively." "With the application of GIP systems which utilized in tracking." Enhanced sharing of information among the systems was seen as critical in preventing any manual intervention.

4.5.3 Advanced Technologies (AI, Blockchain)

Four respondents suggested the use of advanced or emerging technologies.

Use blockchain technology for secure and decentralized documentation purposes.

Adopt blockchain technology for permanent documentation and AI for compliance purposes.

Achieve improvements in interpreting and using AI technologies to clear and forward thereby reducing paperwork.

This shows that the respondents have awareness of emerging technological trends as well as a willingness to further automate processes.

4.5.4 Cybersecurity.

Two respondents highlighted the need to strengthen cyber security. One specifically noted: "Strengthening cyber security."

This reflects concerns related to data integrity and potential system vulnerabilities.

4.5.5 Investment and Infrastructure.

Two respondents called for increased investment stating: "There is a need to invest more for better results." This suggests that current resources may not be sufficient to ensure optimal system performance.

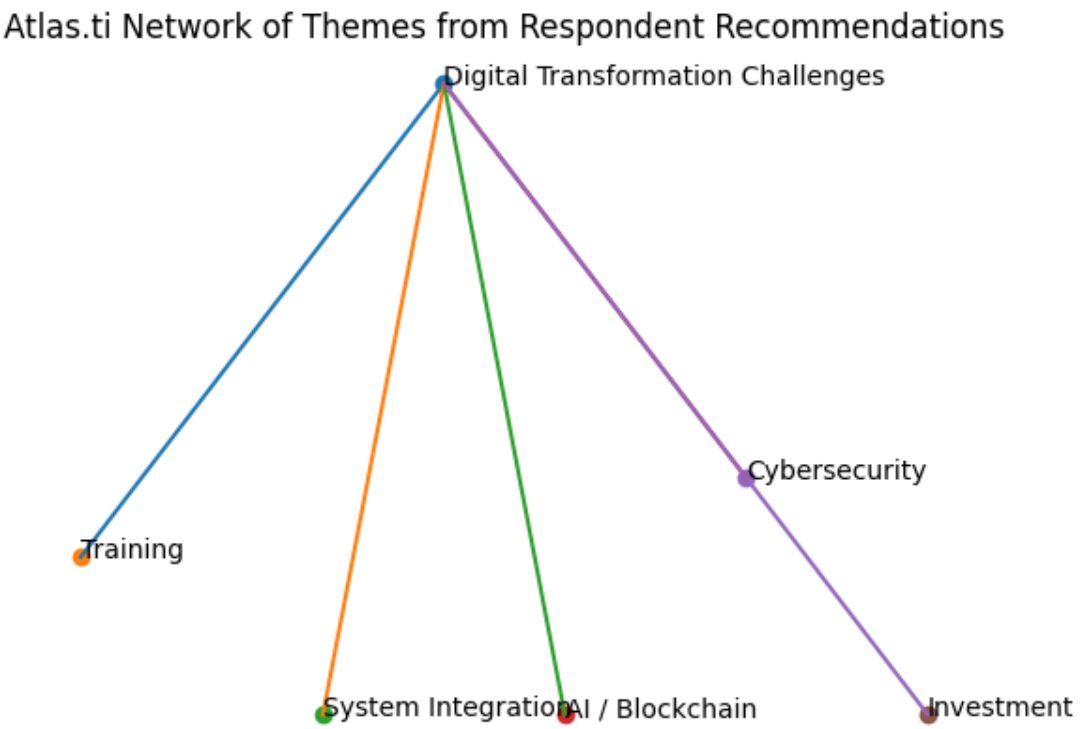
Overall, the qualitative findings align with the quantitative results, confirming a generally positive attitude toward digital system.

4.6 Summary of Findings.

The analysis of 41 responses from Transtar Logistics Hub yields several key summary points.

Demographic profile:
Most of the respondents are procurement officers (46.3%) with 1–3 years working experience (39.0%).
Digital systems use: Expect more (31.7%) of the respondents to use an ERP system, as well as 24.4% of the survey participants with similar experience and electronic cargo tracking.
Integration: 24.4% systems are fully integrated while 73.2% are partially integrated.
Perceived impacts: High agreement that digital systems can reduce cycle time (mean 4.12), enhance transparency (mean 4.05), and reduce risks (mean 3.80). Cost savings are reported in storage, penalties, and administration areas. Overall Performance: 90.2% of participants suggested a significant or moderate improvement of procurement cycle.

Hypothesis testing: None of the 3 hypotheses were positively correlated with respective hypothesis, in the expected direction. The study also found that the level of integration had a negative influence on compliance perceptions; this is evidence that integration alone is not expected to lead to transparency and audit trails improvements.



Training, system integration, advanced technologies, cybersecurity, and investment were highlighted as areas for improvement. These results suggest that although digital transformation in Transtar Logistics Hub is generally regarded as a positive factor, the expected relationship between specific digital system characteristics and procurement performance is not evident. The mediational effects of organizational, user capability, and system integration may be further examined.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter Five discusses the findings from Chapter Four, conclusions are drawn on the evidence, and practical recommendations are made. The chapter is designed to meet each of the three research aims in a structured manner, through synthesizing the findings (qualitative and quantitative) of this research with the theoretical framework for the analysis, the Technology-Organization-Environment (TOE) Framework (Tornatzky & Fleischer, 1990) and the previous literature. Meaning & Implication The themes revealed by the procurement and logistics practitioners' participation in Transtar Logistics Hub are interpreted here. 5.3 Conclusion is provided, recommendations are recommended, actionable advice is proposed as well as recommendations for policy, practice and in the future

5.2 Summary of Key Findings.

Before we discuss, the summary of the findings from Chapter Four is useful here to briefly summarize them up to Chapter Two.

5.2.1. Objective One,

investigated digital clearing and forwarding system (e-Customs, Single Window, e-Cargo, Real-time cargo tracking) and procurement cycle productivity. Descriptively, 78 percent agreed that digital systems reduce procurement cycle time, while 90.2 percent reported meaningful or medium performance improvement. Inferential analysis of H1 data suggested a weak, and non-significant relation between system reliability and cycle time reduction; only in fact a correlation was observed ($r = -0.16$, $p > 0.05$), implying H1 was not supported.

5.2.2. Objective Two,

evaluated how systems integration and data visibility influence process compliance. Descriptively, transparency (mean = 4.05) and audit trail effectiveness (mean = 3.78) were rated positively. However, counter-intuitively, integration level was negatively correlated with transparency (r

= -0.46, p < 0.05) and audit trail effectiveness (r = -0.53, p < 0.05), meaning H2 was not supported in the expected direction.

5.2.3. Objective Three,

investigated the effect and risks of procurement-related digital transformation (CS) in the sector. Descriptively, all respondents mentioned at least some form of cost reduction (storage costs 34.1%, compliance penalties 34.1%, administrative expenses 31.7%), and risk reduction was positively rated (mean = 3.80). Correlations, however, were not found between system reliability and cost reduction (r = -0.14) and risk reduction (r = -0.06) which indicated that H3 was not supported at the level of digital system attributes. The qualitative recommendations were on training, system integration, advanced technologies (AI, blockchain), cybersecurity and investment, etc.

5.3 Discussion of Findings

5.3.1 Digital Clearing and Forwarding Systems and Procurement Cycle Efficiency.

The descriptive results reveal that the digital clearing and forwarding systems are mostly positively viewed by respondents from Transtar Logistics Hub, particularly ERP systems (31.7%), electronic cargo tracking (24.4%), and e-Customs (14.6%) as positively affecting procurement cycle efficiency. The mean of 4.12 (cycle time reduction) and that 90.2% of survey participants indicated an overall improvement of at least “significant” (or “moderate”) are in correspondence with global evidence from Grainger (2014) and UNCTAD (2019), which found that Single Window systems and electronic customs eliminate procedural duplication and clearance time-frames. The result is also consistent with local data from the East African Community (2022) which show that the Single Customs Territory (SCT) and the Regional Electronic Cargo Tracking System (RECTS) have significantly reduced both border delays and transit time variation.

However, the inferential results painted a more nuanced and theoretically significant picture. There is no stronger or significant association between the reliability of the system's performance and cycle time reduction ($r=-0.16$, $p>0.05$). This supports the earlier observation that simply having reliable digital systems does not necessarily translate into efficiency gains in procurement cycle improvement. According to the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer 1990), this suggests that the technological context should not be viewed in isolation. Its impact on cycle time is shaped by the organizational context including (1) employees' digital literacy, (2) organizational process redesign and managerial support, (3) cooperation between clearing agents and procurement officers and (4) environmental factors such as regulatory pressure and client demand.

The qualitative statements of the respondents help to enhance this understanding. For example, the first most critical theme related to skill training and development (12 respondents) states that for dependable digital solutions, there must be the proficiency of users in order to attain efficiency from their usage. Other comments including "appropriate skill training from the beginning" and "companies should invest more in employees' training for efficiency." Fit within the organizational dimension of the Technology Organization and Environment (TOE) model. This conclusion addresses the issue raised in the literature review regarding differences in efficiency outcomes despite the use of similar digital technologies. According to the TOE perspective, the key explanation is that organizational readiness (skills, processes and management support) together with environmental factors (such as regulatory alignment and client integration) shape hoe effectively technology translates into performance.

The study also rejects technological determinism, which assumes that merely adopting information technology will automatically lead to efficiency gains. Instead, it supports a socio-technical perspective that emphasizes the

integration between technology and organizational capabilities in producing varied outcomes (Heeks,2022). For this reason and others, the fact that only 24.4% of respondents reported full system integration and 73.2% reported partial integration, goes to show why the expected direct effect was not observed. Partial integration leads to manual workarounds, duplication of data, and coordination failures which are the cost of digital systems. (Digital efficiency gains in this regard could be negated by inefficient manual workarounds.)

5.3.2 Systems Integration, Visibility of Data and Process Compliance

Objective Two results are remarkably interesting and theoretically profound. Descriptively, participants believed that the digital system added transparency (mean = 4.05) as well as audit trails to decrease fraud and documentation mistakes (mean = 3.78). These perceptions are in line with works by Laudon and Laudon (2020) that suggested that it enhances audit trails and embeds validation mechanisms in addition to Atuhaire (2022) that digital procurement platforms enhance regulatory compliance by automating workflows.

However, the Inferential findings indicated that integration level and transparency were negatively correlated ($r = -0.46$, $p < 0.05$) and integration level was negatively correlated with audit trail effectiveness ($r = -0.53$, $p < 0.05$) despite the expected findings. That means respondents who reported "fully integrated" systems have a lower level of transparency and weaker audit trails in comparison with those who reported "partially integrated" systems. Several explanations, founded on the TOE framework are reasonable.

The first implication is that users of fully integrated systems have higher expectations of these systems. The full integration of systems means that users expect seamless, error-free and real time visibility once integration is achieved. Any deviations from accuracy such as delays or system inconsistencies become more noticeable and frustrating which can

negatively affect perceptions of transparency. In contrast, users of partially integrated systems may have lower expectations and may find manual workarounds more acceptable. Secondly, given the small sample size (n=10 fully integrated respondents), the results may include outliers. The correlation matrix shows that one fully integrated respondent rated transparency as "1", this disproportionate response within a small sample could distort the overall correlation.

Third and more significantly, the implication of this finding is that technical integration alone does not guarantee process compliance. The TOE framework recognizes that organizational context such as workflow design, role clarity, supervision mechanisms and management commitment play an equally critical role. While integration provides the technical capacity for compliance, its actual realization depends on organizational factors including clear standard operating procedures, regular compliance audits and staff training in data integrity and accountability. Where these capabilities are weak, integration may instead expose compliance gaps and weaken perceived adherence. However, evidence from Transtar Logistics Hub shows that this relationship is conditional on organizational capabilities. As noted by Teece, Pisano and Shuen (1997), "resources and systems of an integrated type must be coupled with organizational routines and managerial capabilities to create value.

Considering the qualitative insights on "system integration and interoperability" rom right respondents along with the key recommendation that "Crucial systems must be built on an interoperable platform that connects government agencies with private logistics providers. "It becomes clear that practitioners view integration as having both benefits and potential drawbacks. The suggestion to adopt "blockchain technology for secure, decentralized record-keeping" reflects an intuitive awareness that current integration approaches may have limitations in fully ensuring data integrity and transparency.

5.3.3 Digitization of Digital Transformation, Cost Effectivity, and Mitigation of Risks.

The descriptive results are primarily positive for Objective Three. At least one area of cost reduction was reported by all 41 respondents (100%), with storage (34.1%), compliance penalties (34.1%) and administrative expenses (31.7%) as the most common among the costs. Risk reduction score was a 3.80, where 73.2% agreed or strongly agreed that digital systems reduce financial risk for procurement delay. These results agree with Karamagi (2020) that digital customs tools reduce clearance period, storage period, and demurrage costs, and McKinsey's (2022) analysis showing that digital tracking and automatic documentation minimize fraud risks, as well as compliance fines.

However, the inferential results still reflect a nuance. Correlations between system reliability and cost reduction ($r = -0.14$, $p > 0.05$) and between system reliability and risk reduction ($r = -0.06$, $p > 0.05$) were weak and non-significant. This indicates that those who rated system reliability high were not statistically more likely than low rated people to report cost or risk reduction in terms of systems. However, positive significant correlations were identified between risk reduction and overall improvement ($r = 0.49$, $p < 0.05$) and between risk reduction and cost reduction count ($r = 0.31$, $p < 0.05$), suggesting that when risk reduction is perceived, the perception of risk reduction can also predict more cost reductions and a better overall performance.

With reference to the TOE framework, these findings indicate that the relation between digital transformation and cost/risk outcomes is indirect and controlled by other variables. Reliable digital systems do not automatically lead to decreased costs and risks. But they depend on how these systems are implemented, the internal processes surrounding them, and external regulations. For instance, an effective e-customs system can reduce demurrage costs only if staff are trained to prepare declarations promptly, internal approval workflows align with customs timelines and client procurement systems are integrated to provide the required

documentation on time. Without these institutional and technical environments, however, the best system still is no guarantee of bringing about cost or risk reductions.

The qualitative recommendations lend strong support to this interpretation. This is reflected in the emphasis on “training and professional skills” (12 respondents), indicating that human capability is crucial for realizing financial benefits. The recommendation to "implement blockchain technology for AI for predictive compliance" implies that respondents regard advanced technology as reducing risks, and state the existing systems as offering nothing but assistance, unable to solve the compliance uncertainty, which is the current state of compliance. The mention of "strengthening cyber security" (from 2 respondents) reflects an awareness that digital transformation brings with it new risks (data breaches, hacking into systems) at the same time as reducing those experienced by ordinary people such as document faults or missed clearance.

This finding addresses the gap in contextual knowledge found in the literature review. The existing studies often assume that digitalization automatically leads to simultaneous reductions in costs and risks. However, findings from Transtar Logistics Hub show that such benefits are not guaranteed after adopting digital systems; instead, they depend on complementary capabilities such as staff training, process redesign and effective system integration.

5.4 Conclusions.

From the above findings and discussions, the results are presented in relation to the research objectives and hypotheses.

5.4.1 Section 3: Conclusion on Objective One

Practitioners expect digital clearing and forwarding systems to have a positive impact on procurement cycle efficiency; however, this perception is not backed up with statistical relations between system reliability and cycle time reduction. The implication means that despite employees at

Transtar Logistics Hub's perception that digital systems reduce cycle times, we do not find any significant and measured correlation between the systems attributes and the efficiencies. The hypothesis 1 (H1) is therefore rejected in its assumed form. It can be concluded that digital technology is required and not sufficient to reduce cycle time in organizations however organization level factors of training, workflow design and user competence mediate the interaction between technology and efficiency.

5.4.2 Conclusion on Objective Two.

Integrating systems and having a clear view of data have the opposite of a simple linear relationship with compliance. Transparency and audit trails are positively rated descriptively. Inferring from the above, greater levels of integration will generally translate to lower perceived transparency and weaker audit trails. Paradoxically, the results indicate how technical integration that doesn't have the same organizational capabilities (such as clear procedures, monitoring and responsibility) does not ensure good compliance and indeed if integrated systems do not provide us with the visibility expected by users it can cause more frustration for the users. The second research hypothesis (H2) is rejected, as it should be if it goes in the expected positive direction. Integration, at bottom, is a necessary but insufficient condition for compliance; investment in organization routines, training, and monitoring are keys to unlocking compliance benefits.

5.4.3 Conclusion on Objective Three.

The digital transformation of clearing and forwarding is generally accompanied by considerable perceived cost reduction and risk reduction (100% of respondents mentioned at least one cost reduction area). But there is no significant direct relationship between system reliability and cost or risk. In contrast, risk reduction tends to be positively associated with overall performance and cost reduction and perhaps risk mitigation is the mechanism through which digital transformation generates value. The third research hypothesis (H3) is rejected in its direct sense yet is indirectly supported by the correlation between risk and performance outcomes.

While the digital system is responsible for cost and risk reduction, achieving these benefits demands organizational capabilities, and may operate through the mechanism of risk reduction.

5.4.4 Final Conclusion.

This paper presents a study that illustrates how the Technology-Organization-Environment (TOE) Framework can provide the lens through which digital clearing and forwarding systems have had a direct effect on procurement cycle performance at Transtar Logistics Hub. The general wisdom is that digital systems should not be perceived as stand-alone solutions that produce efficiency, compliance with policies, cost efficiency, and risk-minimizing capabilities, but as resources based in the technical environment and in an ecosystem of organizational and environmental factors to which it belongs. The difference between the descriptive findings which show positive views of digital transformation and the weaker or even contradictory statistical relationships indicates that simply adopting technology is not enough. Training, system integration, organizational processes and regulatory alignment are the key complementary capabilities that enable digital investments to be effective. It through these factors that investment in digital system is translated into improved procurement performance. This capability-based perspective moves beyond technological determinism by explaining why similar digital systems can produce different performance outcomes across firms and contexts.

5.5 Recommendations.

5.5.1 Policy and Practice Recommendations.

1. **Implement a Continuous Digital Skills Training Program That Is Required:**

Training and skills development was the most frequently mentioned recommendation (12 respondents), indicating that human capability is a key driver of effective digital system use. In collaboration with the Uganda Clearing Industry and Forwarding Association (UCIFA) and other industry stakeholders, Transtar Logistics Hub should implement mandatory and

continuous digital skills training for employees in procurement, logistics and clearing functions.

Specialized modules to support the varied needs of a procurement officer, clearing agents, logistics coordinators and finance staff.

Demonstrating, simulation-based sessions with real import scenarios not theoretical training.

Tracking of assessment and competencies with outcomes for non-completion.

This investment in human capital tackles the organizational context dimension of the TOE framework and promotes capability building towards value realization through digital systems.

2. **Focus on Internal and External Systems Must Seamlessly Integrate**.

Since 24.4% of respondents report full integration and 73.2% report partial integration, this demonstrates a serious technical bottleneck. Furthermore, the correlating negative impact of compliance perceptions to integration reflects those traditional approaches to integration may be becoming complex without transparency. Transtar Logistics Hub is urged to:

Ensure complete mapping of all data flows with internal ERP, client procurement systems, URA's UESW and cargo tracking platforms by performing a systems integration audit. Invest into an external middleware or develop a specific API to facilitate real-time bidirectional data exchange without re-entry.

Establish data validation rules at data integration touchpoints to raise red flags when a discrepancy exists before it results in delay or non-compliance.

Develop a central hub to view procurement, customs and logistics status of each shipment in a single dashboard.

Focus on integrating with critical consumers' ERP systems to automate document transfer and approval functions. These technical investments are designed to overcome the technological context of the TOE framework and address the existing partial operationalization impediments to effectiveness and compliance with the framework.

3. **Establish and Implement SOPs (Standard Operating Procedures) in Digital Workflows.**

The fact that the highest level of integration was also correlated with lower perceived transparency implies that mere technical integration is not enough or can be replaced with an organizational process that takes advantage of integration capacity. The suggestion for Transtar Logistics Hub is to establish, document and continuously maintain standard operating procedures (SOPs) that clearly define:

Uniform information entry standards to ensure consistency across all users and departments. Clear escalation procedures for handling integration breakdowns or data inconsistencies. Regular reconciliation of procurement, logistics and finance records on daily, weekly and monthly basis.

Checklists covering all required documentation to be completed before submission to customs or clients. Routine performance reviews supported by clearly documented corrective actions where gaps are identified.
These organizational investments reflect the organizational context dimension of the TOE model, translating technical integration into effective process compliance.

4. **Deploy Real-Time Performance Dashboards with Integrated Accountability Measures**

The fact that audit trail effectiveness (mean = 3.78) was rated lower than transparency (mean= 4.05) suggests that despite improved visibility audit trail functionality may be weaker, potentially indicating reduced

accountability. Transtar Logistics Hub should therefore develop real-time performance dashboards that monitor:

Cycle time indicators, including the duration from order receipt to customs clearance from clearance to delivery and from procurement initiation to final delivery.

Compliance metrics such as documentation error rates, the frequency of customs queries and audit trail completion ratios.

Cost indicators, including demurrage charges, storage costs and penalty payments incurred.

Risk metrics: number of shipments delayed, value of the goods at risk, and insurance claims. The dashboards should be accessible to relevant staff and management, including regular performance evaluations and accountability for departures from targets. In this way, the gap between audit trail availability and audit trail effectiveness is directly addressed by this recommendation.

5. **Involve Policymakers with Interoperability Standards (URA, PPDA, Ministry of Trade).**

Integration challenges go beyond the organizational level. The findings show that environmental context contributes to integration challenges on government platforms (UESW, e-Customs). Finally, Transtar Logistics Hub will strengthen through industry associations to engage the Uganda Revenue Authority (URA), the Public Procurement and Disposal of Public Assets Authority (PPDA), and the Ministry of Trade on the following initiatives:

Standardized API specifications for all government trade platforms for private sector to work in a consistent way. Use a sandbox to test integrations before a live deployment. A helpdesk and technical support for the private sector users experiencing integration issues. Stakeholder-

oriented forums for regular identification and resolution of interoperability challenges. For example, this environmental-level recommendation addresses external context and identifies the external context dimension of the TOE framework and provides that firm-scale digital transformation depends on the enabling legal and organizational enablers.

5.5.2. Future Research Directions.

This study offers valuable insights but it also highlights several areas that require further investigations.

1. Longitudinal Studies: Digital Transformation Outcomes

This cross-sectional study captured perceptions at a single point in time. Future research should adopt longitudinal designs that track the same organization over a period of two to five years as digital capabilities mature. Such studies could help address important questions such as how long it takes for investments in training to translate into measurable reductions in cycle time and whether system integration improves compliance as organizational routines evolve. How should technology, training, and process investment be arranged in an optimal sequence, and when?

2. Comparative Case Studies Across Logistics Firms

This investigation was based on one case (Transtar Logistics Hub). The prospective research ought to carry out comparative case studies in different clearing and forwarding companies with scale, specialization, and digital maturity. An area of future research might pinpoint best practice and contextual explanations of the circumstances of digital system underappreciation, allowing to have richer evidence for more industry-wide policy-making.

3. Testing Mediation and Moderation Effects in a Quantitative Context

The low yet non-significant direct correlations between system characteristics and performance outcomes, and those descriptive perceptions were positive suggests that there were mediation effects. We

propose that future research explore the hypothesis and test structural equation models where organizational capabilities (training, process redesign, management support) play a mediating role in the association of the digital system adoption and quality of the procurement cycle. Statistically, this would be consistent with the TOE framework view that organizational context acts as a mediator of technology-performance association.

4. Digital Integration Practices Among Suppliers and Clients

This study primarily focused on internal perspectives from staff at Transtar Logistics Hub. Further research should examine the experiences of suppliers and clients who interact with Transtar's digital systems. In particular, it should explore how clients perceive the transparency and reliability of digital integration as well as the challenges they face when aligning their procurement processes with Transtar's systems.

5. Application of Other Theoretical Perspectives

The TOE framework ha been useful in this study; however, incorporating additional theoretical perspective could provide further insight. An institutional perspective could help explain how regulatory and normative pressures from URA, PPDA and EAC influence digital adoption. Similarly, Actor-Network Theory could be applied to examine how human and non-human actors such as systems, documents and regulations interact within the clearing and forwarding network. This kind of theoretical pluralism would offer a deeper and more comprehensive understanding of this complex phenomenon.

5.6 Contribution to Knowledge

This study makes several contributions to both academic knowledge and professional practice.

Theoretical Contribution

From the TOE framework perspective, this study extends its traditional focus on technology adoption decisions to include the performance related effects to include the performance related effects on technology use. By conceptualizing digital systems as technological resources whose value depends on complementary organizational and environmental conditions the adopted TOE lens developed in this study offers a theoretical foundation for guiding future research on digital transformation in logistics and procurement.

Empirical Contribution.

The study provides strong firm specific evidence from Uganda's private logistic sector helping to address the contextual gap identified in the literature review. These findings add depth to the descriptive statistics, correlation analysis and qualitative themes within the mixed-methods approach offering insights that would not be captured through survey-only or case study- only designs. The notable result that 100% of respondents reported perceived cost reduction, despite the absence of a significant correlation with system reliability highlights the importance of considering both perceived outcomes and objective performance measures when evaluating digital transformation effects.

Methodological Contribution.

The mixed-methods case study grounded in the TOE framework demonstrates how qualitative methods can be integrated to examine organizational complexity. The structured combination of descriptive and inferential statistics alongside thematic analysis of open-ended responses offers a useful framework for similar studies in logistics, procurement and digital transformation research.

Practical Contribution.

Practitioner-driven findings provide a context-specific roadmap for improving digital transformation performance at Transtar Logistics Hub and

similar organizations, by grounding the recommendations in the lived experiences and insights of procurement, logistics and clearing personnel, the study bridges the gap between academic knowledge and practical application. This focus on training, building an integrated culture, SOPs, dashboards and policy engagement also offers practical recommendations for managers and policy makers.

5.7. Limitations of the Study.

Although this research offers promising information, a few limitations should be identified:

Single-Case Design.

Although the single logistics firm (Transtar Logistics Hub) allows for depth, the focus restricts transferability of findings. Such capability configurations affect particular dynamics at the same depth and density as firms vary in size, specialist area, level of digital maturity and level of client base.

Dependency on Self-Reported Information.

The study results are based on participants' perceptions and memory, which may be influenced by recall bias, social desirability effects, or attribution bias (attributing benefits to digital systems and harms to other effects). Triangulation with objective performance data (ie, real cycle time measures, log keeping of customs clearance, cost reports) would improve in future.

Cross-Sectional Snapshot.

The study assesses perceptions at one point and cannot follow the evolution of capacities and consequent outcomes. Longitudinal studies would help capture dynamic changes over time, including whether the observed negative relationship between integration and compliance strengthens or weakens as organizational practices evolve.

Fully Integrated Respondents (Small Subsample).

The contradictory correlation between system integration and compliance may have been influenced by the small number of fully integrated respondents (n=10), which increases the likelihood of outliers affecting the results. For more solid evidence, a larger-scale sample of fully integrated firms or longitudinal tracking of firms as they transition from partial to full integration would bolster the argument.

Exclusion of Objective Metrics of Performance Measurement.

Although the study reported perceived reductions of cycle time, cost, and risk, it did not have access to objective organizational records that could have been used to confirm these perceptions using the real performance data.

The investigation should aim for anonymized performance data to validate performance data through anonymous measurements. Overall, the research has met its goal and provides a solid foundation for understanding the influence of digital clearing and forwarding systems on procurement cycle performance at Transtar Logistics Hub and private logistics firms similar to it in Uganda with the same model.

5.8 Chapter Summary

This chapter has interpreted and discussed findings from Chapter Four against research objectives, TOE (theory, practice, and literature). This dialogue has shown that although practitioners have a positive opinion towards digital clearing and forwarding systems, the direct statistical associations between system characteristics and procurement cycle performance are weak, non-significant, or counterintuitive. Digital systems are essential, but this does not represent enough for efficiency advantages and the technology-performance relationship is also influenced by complementary organizational capabilities (training, processes,

management support) and an environment (regulatory compatibility, integration standards).

The recommendations, informed by practitioners, offer a pragmatic roadmap toward the facilitation of developing such capabilities through ongoing training, integrated systems, operational and standardized operating procedures, performance dashboards and engagement with policy. Conclusions dismissed the three research hypotheses in the original direct form but confirmed the relevance of digital transformation as an enabler under favorable organizational and environmental conditions.

The research makes theoretical (extending TOE to post-adoption performance), empirical (providing firm-level evidence from Uganda's private logistics sector), methodological (mixed-method-based case study integration) and practical (actionable recommendations) contributions. We acknowledge several limitations including the use of a single-case design, reliance on self-reported data. A cross-sectional snapshot and relatively small subsample sizes.

In conclusion, the study shows that realizing the full potential of digital clearing and forwarding systems depends not only on adopting digital technologies but also on developing strategic capabilities across technological, organizational and environmental dimensions. This insight extends beyond Transtar Logistics Hub and has broader relevance for the logistics and procurement sector in Uganda and more widely the East African region.

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APPENDIX 1. QUESTIONNAIRE (1)

This ssurvey is conducted by Abel Enau from Uganda Christian University aspart of a study at transtar logistics hub examining how digital, clearing, forwarding, and procurement system such as e- customs, the Uganda electronic single windows (UESW), and related platforms, affects procurement performance. All responses will be used strictly for academic purpose and handled with confidentiality. Participation is volutanry and greatly appreciated.

SECTION A: BACKGROND INFORMATION

1. State your position within the organization
2. How long have you worked in clearing/ forwarding/procument

   ☐Less than a year ☐1-3 years ☐ 4-6 years ☐above 6 years
3. Which systems do you use

☐ e-customs ☐UESW ☐cargo tracking ☐e-payments ☐ERP

☐Others:

SECTION B:DIGITAL SYSTEMS AND PROCESES

4. How are digital systems used in your work
5. In what ways have they affected clearance time ?
6. Do they improve accuracy and speed of documents? Explain
7. What challenges do you experience ?

   ☐Downtime ☐technical issues ☐poor coordination ☐high costs

   ☐others
8. How has cargo tracking improved your work
9. Do digitalsystems improve coordination among stakeholders?. Explain

SECTION C:INTEGRATION AND COMPLIANCE

10. How well are systems integrated with clients / ERP systems ?
11. What type of information is shared digitally?
12. Has digitalization improved transparency? Explain
13. Has it improved compliance with URA/PPAD regulations?
14. Have integration issues led to errors or risks?
15. How useful are digital audits

SECTIOND: COST AND RISK

16. How has digitalization affected cost (storage, demurrage, administration)?
17. Has it reduced delays or losses ? explain
18. Are there hidden cost associated with digital systems?
19. How do digital systems influence planning and decision-making?

SECTION E:KEY FOCTORS

20. What factors affect system performance?.
21. Does management adequately support digital system?
22. Are staff sufficiently trained?
23. How do regulations influenced system use?
24. Does ICT infrastructure affect performance?

SECTION F:OVERAKK VIEWS

25. Has digital transformation improved procurement performance ?
26. Which system has had the greatest?
27. What improvement would you recommend?
28. Any additional comments?

APPENDIX 2: INTERVIEW GUIDE

INTRODUCTION

This study is concerned with digital clearing, forwarding, and procurement systems such as e-Customs, Uganda Electronic Single Window (UESW), cargo tracking systems, e-payments, ERP systems, among others. The current interview is aimed at collecting data for the study from respondents at Transtar Logistics Hub.

Your participation is completely voluntary and any data collected during the interview process will be treated as highly confidential. It will only be used for academic purposes.

SECTION A: BACKGROUND INFORMATION

1. Could you describe your job within this organization in brief?

2. How long have you worked in clearing, forwarding, and procurement?
Less than 1 year 1-3 years 4-6years Above 6 years

2. What kind of digital systems do you use in your activities and how often do you use them?
   e-Customs UESW CargoTracking

SECTION B: IMPLEMENTATION OF DIGITAL SYSTEMS IN BUSINESS PROCESSES

4. In which ways are digital systems used in your day-to-day operations?

5. Based on your experience, what effects have these systems had on clearance times?

6. Have these systems helped improve the accuracy and speed of documentation? Why do you think so?

7. What difficulties do you face while using these systems?

8. How has cargo tracking impacted your efficiency
9.In what ways do digital systems enhance cooridition among supply chain stakeholders

SECTION C: INTEGRATION AND COMPLIANCE

9. How well are these digital systems integrated with client systems or ERP platforms
10. What types of information are typically exchange through these systems
11. Do you think digitalization has improvedtransparency in procurement and logistics processe? Please explain.
12. Has the use of digital system has improved compliance with regulatory bodies such as URA and PPDA? Please explain why**?**
13. Have you experienced any errors or risks arising from system integration issues?

14. How useful are digital audit trails in your operation

SECTION D: COST AND RISK MANAGEMENT

15. How has the use of digital systems affected operational costs such as torage, demurrage, and administrative expenses?.
16. Doyou believe digital systems have helped reduced delays or losses? Please explain
17. How do tthese systems influence planning and decision making in your role?.
18. Are there any hidden or unexpected costs associated with using these system?

SECION E: FACTORS AFFECT SYSTEM PERFORMANCE

19. What are the main challenges affecting the performance of digital systems in your organization?
20. To what extent does management support the use of digital systems
21. Do you think staff are adequately trained to use the system effectively
22. How do government regulations influence the use of these systems?
23. Inn your view, how does ICT infrastructure affect system performance?

SECTION F: OVERALL VIEWS AND RECOMMENDATIONS

24. Overall has digital transformation improved procurements performance in your organization? Why or why not ?.
25. Which system (e.g, e-customs, UESW, cargo tracking, ERP) has had the greatest impact on your work?
26. What improvements would you recommend to enhance the effectiveness of digital systems?.
27. Do you have any additional comments or insights regarding clearing and forwarding systems?

Thank you very much for taking the time to participate in the interview. Your insights and experiences are highly valuable to this study and will contribute significantly to understanding the role of digital systems in improving procurement performance. Your cooperation is sincerely appreciated.