



MASTER DEGREE IN STRATEGIC MANAGEMENT - DIGITAL PROGRAM

COURSE OF: ORGANIZATIONAL DESIGN AND CHANGE

**REDESIGNING ORGANIZATIONAL STRUCTURE THROUGH TECHNOLOGY-
ENABLED SUPPLY CHAIN IMPROVEMENTS: A CASE STUDY OF ETHIOPIAN
TRANSFORMER FACTORIES**

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ACADEMIC YEAR: 2024/2025

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Acknowledgement

I would like to express my deepest gratitude *to* Wagwago Business Group for generously covering my flight expenses, which greatly supported the success of my journey. My sincere appreciation also goes to Mr. Hagos G/gergis, CEO of Wagwago Business Group, for his continuous encouragement and leadership. I am equally thankful to Mr. Abiy Haile for his financial support, and to Mr. Tsegabu Derar & Hailu Kebede for his valuable consulting and guidance.

I am profoundly grateful to my professors, Prof. Mario Bagiletto and Prof. Leila Ahmad Pour, for their insightful comments, guidance, and encouragement throughout this work.

Above all, my heartfelt appreciation goes to my beloved wife, Rahwa Tafere, for her unwavering love, patience, and encouragement, and to my wonderful children, Kaleb Ataklti and Mariana Ataklti, whose presence inspires me every day.

Declaration

I hereby declare that this thesis entitled “*Redesigning organizational structure through Technology-Enabled Supply Chain Improvements: A Case Study of Ethiopian Transformer Factories*” is my original work and has not been submitted, in whole or in part, to any other university or institution for the award of a degree or any other academic qualification. All sources of materials used in this thesis have been properly acknowledged.

This research was conducted under the supervision of **Prof. Mario Bagiletto** and **Prof. Leila Ahmad Pour**, to whom I am sincerely grateful for their guidance, constructive feedback, and support throughout the study.

I affirm that the content of this work is the result of my own effort, and I take full responsibility for any errors or omissions that may remain.

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List of Acronyms

AI	Artificial Intelligence
DIT	Diffusion of Innovation Theory
DSC	Digital Supply Chain
EEG	Ethio Engineering Group
EPEI	Ethiopian Power Engineering Industry
ERP	Enterprise Resource Planning
IoT	Internet of Things
METEC	Metal and Engineering Corporation
NPC	National Planning Commission
RBV	Resource Based View
SCM	Supply Chain Management
SPSS	Statistical Package for the Social Sciences
TAM	Technology Adoption Model
TCSCC	Current Supply Chain Challenges
TCROS	Company Overall Redesign Organizational Structure
TFTAT	Future Technology Adoption and integration
TIORS	Technology Impact on Redesigning organizational structure
TOC	Theory of Constraints
VIF	Variance Inflation Factor

Abstract

With a particular focus on Ethiopian transformer manufacturing companies, this thesis critically examines how technological advancements in supply chain management can act as a catalyst for organizational restructuring. These businesses are under increasing pressure to update their internal structures and operations in a world where digitalization is quickly changing industry standards in order to stay competitive both domestically and internationally. The report highlights the ongoing difficulties these manufacturers face, which hinder their operational effectiveness and responsiveness. These difficulties include drawn-out customs procedures, strained supplier relationships, and antiquated procurement procedures.

Integrating digital technologies like Enterprise resource planning (ERP), Artificial intelligence (AI), Inventory Management, Internet of Things(IoT) has a potential to streamlined the supply chain process and it also have the power to restructure the organizational design. So the research's focus was in four Big companies which are Wagwago Electric, Ethiopian Engineering corporation, Advantage Transformer and Addis Transformers selected by considering their import and supply chain volume by employing a Mixed Methods of case study approach using a structured surveys and interviews with the logistics and supply chain mangers, supervisors and officers of the selected companies and analyzed using regression analysis to see the relationship of the selected variables To ensure analytical accuracy, the thesis applies methodological triangulation, integrating both quantitative and qualitative insights from the survey and interview data..

The introductory chapter frames the research problem, delineates key questions and objectives, and articulates the urgent need for reform in the face of technological and operational bottlenecks, the subsequent literature review situates the study within established theoretical frameworks including the resource – Based View , contingency theory and the technology acceptance Model while identifying a significant gap despite the proliferation of research on supply chain digitalization in developed economics , its organizational implications in African manufacturing contexts remain insufficiently explored.

Methodologically, the study details the research setting, sampling strategies, data collection instruments and ethical considerations. The analysis reveals that the adoption of digital

technologies significantly improves supply chain visibility, coordination and responsiveness. these operational gains, in turn, precipitate deeper structural changes such as decentralization of decision making, enhanced cross functional collaboration, and a greater reliance on data driven strategies.

Regression analysis demonstrates that the likelihood of future technology adoption is the strongest predictor of successful organizational restructuring, followed by the current severity of supply chain challenges and the direct impact of technology-enabled improvements. The findings position digital transformational and technology adoption as a core driver of organizational change, rather than a peripheral enhancement. Additionally, factors such as leadership commitment, employee training, and comprehensive change management emerge as essential enablers of successful transformation.

The thesis concludes by proposing a strategic framework tailored for Ethiopian transformer manufactures, emphasizing the alignment of digital innovation with organizational redesign. This framework advocates a phased approach conducting diagnostic assessments, selecting appropriate technologies realigning organizational structures and instituting ongoing performance monitoring. Through this model, firms can enhance productivity, build resilience and establish a competitive footing in both regional and international market.

In sum, this research advances the strategic management literature by bridging the gap between supply chain digitalization and organizational design within the emerging economies. It offers actionable insights for policy makers, industry practitioners and scholars interested in the complex dynamics of technology driven organizational change. The study not only highlights the substantial challenges faced by the Ethiopian transformer sector but also outlines a clear pathway for transformational progress through strategic digital integration.

CHAPTER I

INTRODUCTION

In today's fast-changing business environment, supply chain management has become a key factor determining the competitiveness of manufacturing companies. The increasing demand for efficiency, cost reduction, and adaptability has led organizations to explore technology-driven solutions to enhance their supply chain processes. This transformation is driven by factors such as globalization, the rise of e-commerce, and the increasing complexity of supply networks, which compel companies to optimize operations, improve supply chain visibility, and respond quickly to market changes and disruptions.

This is particularly relevant in developing economies like Ethiopia, where manufacturers face a unique set of challenges that can amplify the complexities of supply chain management. In addition to the global pressures mentioned above, Ethiopian manufacturers often grapple with underdeveloped infrastructure, limited access to information and communication technologies, regulatory complexities, and constraints in areas like logistics and procurement. These challenges can hinder their ability to compete effectively in both domestic and international markets, impeding economic growth and industrial development.

Given the critical role of transformers in the energy sector, improving supply chain operations in Ethiopian transformer factories can significantly impact economic and industrial growth. A well-functioning transformer industry is essential for electrification, infrastructure development, and overall economic progress. Therefore, addressing the supply chain challenges faced by these factories is of paramount importance.

This study aims to analyze how technology-enabled supply chain improvements can optimize operations and enhance organizational performance by streamline the organizational structure within Ethiopian transformer factories. By examining a case study of Four Ethiopian transformer factories, the research will explore the potential for redesigning organizational structures to better integrate digital tools and data-driven decision-making. The findings will contribute to the broader discourse on supply chain transformation in emerging markets, offering insights for policymakers, industry leaders, and researchers. Ultimately, this research seeks to provide a framework for

Ethiopian transformer manufacturers to leverage technology in overcoming sector-specific obstacles and improving their competitiveness within the global economy.

1.1 Background of the Study

Supply chain management (SCM) plays a crucial role in the success of manufacturing firms by ensuring the efficient movement of goods, services, and information from suppliers to end-users (Christopher, 2016). With advancements in digital technology, companies worldwide have started adopting automation, data analytics, and artificial intelligence to optimize their supply chain operations (Ivanov et al., 2019). Leading firms globally are adopting flexible organizational models, utilizing real-time data analytics and cloud technologies to reduce silos, support just-in-time inventory, and facilitate strategic alignment (Melnyk et al., 2014). Industry 4.0 has transformed global supply chain structures, enabling agile organizations with digital tools and smart manufacturing. This agility is now a strategic requirement for global market competition (Strange & Zucchella, 2017).

Technology-enabled supply chain management (SCM) in developed countries like the US, Germany, and Japan has improved operational efficiency, reduced bureaucracy, and faster delivery times (Pozo et al., 2015). Enterprise resource planning (ERP) systems like SAP and Oracle integrate supply chain activities with financial and HR management, enhancing decision-making and machine learning, requiring collaborative organizational cultures (Ivanov et al., 2017). Firms in developing countries are adopting hybrid models, combining centralized policy control with decentralized operational decision-making, to enhance scalability and flexibility in dynamic environments (Kamalahmadi & Parast, 2016).

Africa's supply chains are undergoing rapid technological advancement, with digital platforms for procurement, tracking, and customer relationship management being gradually introduced, especially in South Africa, Kenya, and Nigeria (Fjeldstad et al., 2021). African manufacturing sectors are transitioning towards process-oriented structures, integrating technology and requiring collaboration across departments through shared digital platforms, despite rigid hierarchies (Mutula & van Brakel, 2006). However, Developing countries are embracing technology in SCM, despite challenges like infrastructure, digital literacy, and capital investment, but mobile

technologies and cloud computing improve communication and visibility (Dağdeviren & Erturgut, 2024) .

However, many developing countries, including Ethiopia, still struggle with inefficient logistics, high import costs, and outdated procurement systems (Gebrehiwot & Kassa, 2021).

A supply chain is the entire network of individuals, organizations, resources, activities, and technologies involved in the creation and distribution of a product, from the procurement of raw materials to the delivery of the final product to the consumer (Handfield & Nichols, 1999). It includes all key activities such as procurement, manufacturing, transportation, warehousing, distribution, and customer service, along with the information and financial flows that facilitate these activities (Chopra & Meindl, 2019).

Ethiopia's manufacturing sector, including transformer factories, is expanding under industrial development strategy, but supply chains are inefficient, fragmented, and reliant on manual processes (Cuevas et al., 2013). Ethiopian factories are implementing ERP systems, digital inventory control, and automated procurement platforms to reduce lead times and inventory costs, necessitating realignment of organizational roles and responsibilities (UNIDO, 2019). Ethiopian transformer factories demonstrate potential for technology-enabled SCM reforms, despite challenges like skilled personnel shortages and infrastructure issues, to enhance productivity and competitiveness. The Ethiopian transformer manufacturing sector is heavily dependent on imported raw materials, which creates additional complexities in supply chain management. The delays in customs clearance, fluctuating foreign exchange rates, and logistical bottlenecks affect production timelines and overall business performance (Tadesse, 2020). Furthermore, the lack of advanced supply chain technologies and fragmented communication between suppliers and manufacturers exacerbate inefficiencies (Abebe & Worku, 2018).

To address these challenges, technology-enabled solutions such as blockchain for transparency, artificial intelligence for demand forecasting, and digital procurement systems are gaining attention globally (Kshetri, 2018). While some Ethiopian firms have started adopting digital tools, there is limited research on their impact on redesigning organizational structures for improved efficiency (Negash, 2022). This study seeks to bridge this gap by analyzing the potential of technology-driven SCM enhancements in the Ethiopian transformer manufacturing sector.

By integrating technological advancements into supply chain processes, Ethiopian manufacturers can improve efficiency, reduce costs, and streamline their structure can strengthen their organizational performance. This research will contribute valuable insights for businesses, policymakers, and academics seeking to modernize Ethiopia's manufacturing sector through digital transformation.

1.2 Statement of the Problem

Technology is driving supply chains globally, enhancing performance through real-time data analytics and automation systems, but also disrupting traditional organizational structures and requiring new management methods (Dağdeviren & Erturgut, 2024). Firms are transitioning from hierarchical to data-centric structures, promoting agility and efficiency. However, realigning these structures in response to technological innovations remains a challenge (Christopher, 2016). MNCs like ABB, Siemens, and General Electric have integrated ERP systems, AI, and IoT to improve supply chains and workflows, but face challenges in adapting organizational culture and reskilling employees (Melnyk et al., 2014). Despite having a strong digital infrastructure and highly qualified workforces, companies find it difficult to strike a balance between corporate governance, control, and compliance with technological adoption, particularly in global supply networks (Strange & Zucchella, 2017).

When it comes to using technology to improve supply chains, developing nations confront structural obstacles that result in inefficiencies, misunderstanding, and duplication since digital technologies are not properly integrated (Dağdeviren & Erturgut, 2024). Lack of institutional support and organizational frameworks, which results in inflexible bureaucratic processes and delayed decision-making, is the primary issue in developing countries rather than the availability of technology (Kamalahmadi & Parast, 2016). Furthermore, developing countries often lack skilled human capital, leading to technological underutilization and poor alignment between technology adoption and structural redesign (Mutula & van Brakel, 2006).

Technological underutilization is significantly more severe throughout Africa. The manufacturing sector lags behind in terms of technology-enabled supply chain management (SCM), despite the fact that digitization efforts have increased in industries like banking, retail, and logistics. Due to their heavy reliance on human labor, the majority of African manufacturers find it challenging to

benefit from contemporary supply chain technologies (World Bank, 2021). Rigid communication lines, centralized control, and a lack of interdepartmental collaboration are characteristics of top-heavy organizational models, which are typically used by African businesses. When supply chain innovations are introduced into these kinds of structures, they frequently cause misalignment, in which the technology does not provide the anticipated advantages because of a poor structural fit (UNIDO, 2021). The difficulties are made worse by the absence of digital infrastructure, organizational adaptability, and institutional policy frameworks. The effectiveness of digital supply chain systems is compromised when related structural reforms are not implemented, resulting in operational bottlenecks and inefficiencies (Agyabeng-Mensah et al., 2020).

The circumstances in Ethiopia are a microcosm of these issues on a regional and worldwide scale. The nation's industrialization program has placed a high priority on expanding industries such as transformer manufacture; yet, many of these businesses still use antiquated, centralized organizational structures that are not appropriate for contemporary supply chain management (Cuevas et al., 2013). Despite recent initiatives to integrate barcode tracking, ERP systems, and basic automation tools in certain transformer manufacturers, these technologies are frequently deployed without changing cross-functional processes, roles, or reporting lines. As a result, companies deal with operational and technological misalignment, redundancy, and resistance to change (Cuevas et al., 2013). Furthermore, the majority of transformer plants in Ethiopia lack the know-how required to efficiently operate digital supply chain management systems. The lack of digital tool training among managers and operational personnel frequently results in system underperformance, misuse, and eventually disuse of deployed technology (UNIDO, 2021).

In Ethiopia, technologically integration is further restricted by a lack of adaptable leadership and organizational flexibility. Many businesses still prioritize command-and-control management approaches, which impede the decentralized and flexible decision-making needed in supply chains enabled by technology (Gebremariam, 2022). Ethiopian transformer manufacturers face challenges in integrating digital supply chain tools due to a lack of investment in organizational development and change management. This results in operational inefficiencies, supply delays, and high production costs. To improve competitiveness, Ethiopian transformer factories must redesign their structures to integrate technology-enabled supply chain improvements (Cuevas et al., 2013).

This study aims to explore how digital transformation can improve supply chain performance in Ethiopian transformer manufacturing companies and its impact on company organizational restructuring. It will assess the potential of integrated digital systems, enterprise resource planning (ERP), cloud-based logistics management, and predictive analytics in addressing supply chain inefficiencies. By redesigning the organizational structure through technology adoption, this research seeks to provide a model for optimizing supply chain operations, reducing costs, and enhancing overall performance in Ethiopia's manufacturing sector

1.3 Research Questions

1. How do existing supply chain inefficiencies affect the performance of Ethiopian transformer factories?
2. What are the potential benefits of Adopting digital technologies into the supply chain of Ethiopian transformer manufacturers?
3. How can technology-driven supply chain improvements contribute to redesigning the organizational structure of Ethiopian transformer factories?

1.4 Objectives of the Study

The objectives of the study are developed as follows:

1.4.1 General Objective:

The general objective of this study is to assess the impact of technology-enabled supply chain improvements on organizational restructuring in Ethiopian transformer factories.

1.4.2 Specific Objectives:

The specific objectives of the study are:

1. To identify key supply chain inefficiencies affecting Ethiopian transformer manufacturers.
2. To evaluate the role of Adoption digital technologies in enhancing supply chain operations.
3. To analyze how technology-driven supply chain improvements can lead to organizational restructuring.

1.5 Research Hypothesis

H0: Technology-driven improvements in supply chain management have no significant impact on the of organizational restructuring in Ethiopian transformer manufacturing companies.

H1: Technology-driven improvements in supply chain management have a significant impact on the of organizational restructuring in Ethiopian transformer manufacturing companies.

1.6 Significance of the Study

This research is significant for policymakers, manufacturers, and supply chain professionals in Ethiopia's industrial sector. By providing a structured approach to technology-driven supply chain improvements, the study aims to: Help Ethiopian transformer manufacturers minimize procurement delays and optimize operations. Offer practical solutions for digitalizing supply chain processes. Contribute to the academic discourse on supply chain digitalization in developing economies.

1.7. Scope and Limitations

The study will focus specifically on Ethiopian transformer manufacturing companies, offering insights applicable to similar industries. However, limitations may include restricted data access from private firms and reluctance to disclose supply chain inefficiencies.

1.8. Expected Outcomes

1. A comprehensive understanding of how poor organizational structures contribute to supply chain delays in Ethiopian transformer manufacturing.
2. A framework for integrating digital tools to enhance procurement and logistics efficiency.
3. A framework for using technology-based supply chain improvements to redesign organizational structure.
4. Actionable recommendations for policymakers and industry leaders to support supply chain transformation.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

Technology's incorporation into supply chain operations has had a big impact on how businesses set up their operations to stay flexible and competitive in ever-changing markets. Advances in digital technologies, including block chain, artificial intelligence (AI), the Internet of Things (IoT), and enterprise resource planning (ERP), are changing supply chain operations and organizational structures to become more customer-focused, flexible, and responsive, according to a growing body of research (Christopher, 2016; Ivanov et al., 2019). In the manufacturing sector, where efficient operations and real-time data are essential for efficiency and quality control, these changes are particularly important. In order to support integrated technological systems spanning procurement, production, inventory, and distribution, manufacturing enterprises' organizational structures, especially those involved in transformer manufacture, must change. In order to take advantage of technology efficiencies, scholars contend that flat, cross-functional, and decentralized architectures are necessary because traditional hierarchical structures frequently impede the smooth flow of information and decision-making across supply chain nodes (Lee et al., 2024). Due to limitations in infrastructure, finances, and human resources, the importance of digitalization in supply chain operations is expanding in developing nations like Ethiopia, but more slowly (Gebre-Mariam, 2022). However, sectors such as electrical manufacturing are realizing how important it is to rethink organizational structures in order to make room for intelligent supply chain models that boost productivity and competitiveness. Consequently, this chapter reviews the conceptual, theoretical and empirical literatures on supply chain enhancements made possible by technology and organizational structure. It discusses local events in Ethiopia, regional dynamics in Africa, and worldwide trends. It offers a conceptual basis for examining how transformer manufacturing might successfully reorganize their organizational structures to maximize supply chain performance.

2.2 Conceptual Literature

2.2.1 Supply Chain

A supply chain is a network of organizations, people, activities, information, and resources involved in moving a product or service from supplier¹ to customer. It encompasses everything from the sourcing of raw materials and components, through manufacturing and assembly, to warehousing, distribution, and ultimately, the delivery to the end consumer (Investopedia)

The movement of products, services, information, and funds within the supply chain network can be disrupted or obstructed by supply chain inefficiencies. These inefficiencies can seriously impair organizational performance and can arise at any stage of the supply chain, including procurement, production, warehousing, shipping, and customer service (Christopher, 2016). Even small delays in the delivery of raw materials or coordination errors can raise production costs and jeopardize competitiveness for transformer manufacturers, who operate in capital- and process-intensive sectors. A recurrent theme associated with manufacturing supply chain inefficiencies is inadequate demand forecasts. Businesses have stock outs or excess inventory when demand is not appropriately forecasted, which results in waste, higher holding costs, and unhappy customers. Due to their limited access to real-time market data and demand planning systems, Ethiopian transformer makers frequently face this challenge in a market with variable demand from the government and utility sectors (Christopher, 2016).

Another significant inefficiency is inventory mismanagement. High-value parts including TCROS per windings, insulating oils, cores, and switchgear must be produced in precise amounts for transformers. Production may be slowed down and capital lock-up increased by an ineffective inventory system that causes overstocking of some items and shortages of others (Slack et al., 2015). The absence of manual tracking systems and warehouse digitization, which are prevalent in Ethiopian industries, makes this problem worse. Another significant inefficiency is supplier unreliability. The majority of Ethiopian transformer producers acquire necessary components from overseas vendors. Production schedules are disrupted by delays brought on by port congestion, shortages of foreign money, or cumbersome customs procedures. Additionally, businesses become more reliant on foreign partners due to limited domestic supplier capacity, which weakens their ability to withstand global shocks (Ivanov et al., 2019).

Ethiopia's manufacturing supply chains have long-standing inefficiencies related to transportation and logistics. Lead times and logistical expenses are increased by inadequate road infrastructure, restricted rail access, and crowded ports like Djibouti. In comparison to imported transformers, which can be shipped more efficiently from economies with stronger infrastructure, this reduces the competitiveness of locally produced transformers (World Bank, 2020). Gaps in information flow and communication are also significant. When data flows consistently and reliably between manufacturers, suppliers, and customers, supply chains operate at their best. Ethiopian businesses usually work in silos, with departments working alone and sharing little information. This kind of disarray hinders precise planning, results in redundant work, and slows down reaction to shifting circumstances (Gebre-Mariam, 2022).

A major contributing factor to supply chain inefficiencies is the underutilization of technology. ERP systems, RFID tracking, AI for predictive analytics, and IoT for production monitoring are among the instruments used by businesses worldwide. However, because of their limited resources, lack of digital knowledge, or aversion to change, Ethiopian producers frequently use manual systems. This makes it more difficult for them to plan and streamline their supply chain activities. In Ethiopia, transformer manufacturers face challenges in supply chain management due to shortages of skilled professionals, fragmented regulatory systems, and inefficient customer relationship management. These issues result in higher input costs, reduced agility, and poor service delivery. Additionally, informal feedback mechanisms may not reflect customer needs, leading to mismatched outputs, lower satisfaction, and missed opportunities for customization (Cuevas et al., 2013).

2.2.2. Technology

The use of sophisticated IT tools, data analytics, automation, and intelligent systems to enhance supply chain visibility, coordination, efficiency, and responsiveness is referred to as digital technologies in supply chain operations. These technologies include cloud computing, block chain, artificial intelligence (AI), radio frequency identification (RFID), enterprise resource planning (ERP), and the Internet of Things (IoT) (Ivanov et al., 2019; Christopher, 2016). Supply chain digitization, which entails transforming manual, paper-based, or conventional procedures into digital formats, is one of the fundamental ideas in this field. All supply chain participants

suppliers, manufacturers, distributors, and customers can now communicate data in real time thanks to this transition, which enhances decision-making and transparency (Nguyen et al., 2018).

Another important idea is digital integration, which highlights the interconnectedness of various supply chain players and systems. To guarantee coordinated activities, for instance, an ERP system might include inventory, production, and procurement management. The goal of a digital supply chain is to minimize lead times and reduce redundancy by ensuring smooth communication between all nodes (Cagliano et al., 2015). Digital tools like block chain and RFID make it possible for visibility and traceability, which improve supply chain tracking and monitoring. These techniques decrease losses, cut down on errors, and promote accountability. This is particularly important in industries that are subject to regulations or that deal with expensive goods, such the production of transformers, where parts need to be meticulously tracked for quality control (Kache & Seuring, 2017).

Predictive abilities are also improved by digital technologies. Algorithms for artificial intelligence (AI) and machine learning may evaluate both historical and current data to predict demand, spot hazards, and maximize inventory. This enables businesses to react proactively to changes in demand and supply a notion known as "smart supply chains" (Choi et al., 2018). Robotics and automation increase production and logistical precision while reducing the demand for manual labor. Speed, safety, and efficiency are enhanced by autonomous cars, robotic arms, and automated warehouses. In order to lower operating costs, these technologies which are common in rich economies are being progressively introduced in emerging countries (Wamba & Queiroz, 2020). Data and application sharing over the internet is made easier by cloud-based solutions. Particularly for small and medium-sized businesses (SMEs) that cannot afford complex on-site infrastructure, cloud supply chain systems enhance accessibility, scalability, and collaboration (Mollenkopf et al., 2021).

Digital platforms facilitate synchronized forecasting and coordinated decision-making between businesses and their partners in the context of collaborative planning. To lessen the bullwhip impact and enhance supply chain alignment, the idea of Collaborative Planning, Forecasting, and Replenishment (CPFR) relies heavily on digital connectivity (Fliedner, 2003).

Digital supply chain operations are also incorporating sustainability. Businesses may monitor and lessen their environmental impact by using technologies like the Internet of Things (IoT) to

analyze energy consumption and carbon emissions. Businesses can better connect their operations with green supply chain goals by using data analytics and sustainability dashboards (Dubey et al., 2019). Lastly, resilience and adaptability have emerged as key concepts, particularly in the years following the COVID-19 pandemic. When disruptions occur, digital supply chains may immediately adapt by rerouting shipments, locating new suppliers, or modifying manufacturing schedules using real-time data. This improves long-term robustness as well as short-term flexibility (Pettit et al., 2010).

2.3 Theoretical Literature

2.3.1 Theory of constraints (ToC); according to Goldratt's (1990) this theory every system has at least one performance-limiting constraint, and managing and recognizing that constraint is essential to continual improvement. Obstacles in Ethiopian transformer manufacture could be regulatory hold-ups, production difficulties, or untrustworthy vendors.

2.3.2 The Resource Based View (RBV); underutilized or improperly configured resources are another way that the RBV paradigm contributes to the explanation of inefficiencies. According to RBV, businesses can gain a competitive edge by utilizing rare, precious, and unique resources (Barney, 1991). In this regard, businesses who do not make investments in or take use of supply chain technologies, like ERP or logistics systems, continue to be ineffective and uncompetitive.

2.3.3 The learn Supply Chain Theory; the goal of the Lean Supply Chain Theory is to reduce waste at every stage of the value chain. Overproduction, delays, excess inventories, and unused assets are examples of waste. According to lean theory, inefficiencies in Ethiopian transformer plants, like the storage of obsolete parts or frequent line stoppages, are caused by shoddy process design that leaves non-value-adding operations in place (Womack & Jones, 2003).

2.3.4 The System Theory; according to systems theory, which was first put forth by Von Bertalanffy (1968), every element of a supply chain is interconnected, and a malfunction in one portion has an impact on the entire system. Poor supplier performance highlights structural inefficiencies for Ethiopian manufacturers by affecting production deadlines, which in turn disrupt customer delivery.

2.3.5 Contingency Theory; according to contingency theory, external environmental variables determine the best organizational structure and procedures, including supply chain design. Manufacturers require supply chain systems that are flexible and adaptable in uncertain environments, such as Ethiopia's transportation sector or foreign exchange market. Rigid frameworks that are out of step with contextual circumstances frequently lead to inefficiencies (Donaldson, 2001). The Institutional Theory emphasizes how external institutions such as donors, government organizations, and industry standards have an impact on how businesses behave. Complying with intricate trade laws, donor-driven procurement guidelines, or state-directed input sourcing that is out of step with market efficiency can all cause inefficiencies for Ethiopian businesses.

The expense of conducting business across rigid boundaries is emphasized by Transaction expense Economics (Williamson, 1985). Due to a lack of infrastructure or legal protection, finding suppliers, negotiating contracts, and settling disputes can be expensive in Ethiopia. As a result, businesses generally rely on state-provided inputs or vertically integrate.

The theory of supply chain resilience is becoming more and more significant in the aftermath of COVID-19. It emphasizes how well businesses can adjust to disruptions. Because of their centralized decision-making, lack of alternative suppliers, and inadequate risk assessment techniques, Ethiopian transformer makers frequently lack resilience (Pettit et al., 2010).

According to information processing theory, businesses need to match their ability to process information with the degree of uncertainty in their surroundings. Businesses require strong IT systems and communication procedures when there is a lot of unpredictability, like in Ethiopia's transformer sector. The absence or underutilization of such processes results in inefficiencies (Galbraith, 1973).

Lastly, the reasons Ethiopian businesses could not embrace technology-enabled supply chain systems are explained by Innovation Diffusion Theories and Technology Acceptance Models (TAM). The transmission of innovations that could reduce inefficiencies is delayed by cultural opposition, a lack of perceived utility, and a lack of leadership backing (Davis, 1989; Rogers, 2003).

2.3.6 Technology Adopted Model (TAM); Davis (1989) created the Technology Acceptance Model (TAM), which is fundamental to comprehending how users view and embrace digital technologies in supply chains. According to the paradigm, a technology's acceptance and use are determined by its perceived utility and usability. Employees and supervisors are more inclined to incorporate ERP or IoT platforms into their operations in supply chain contexts if they find them useful and easy to use.

2.3.7 The Diffusion of Innovation Theory (DIT): according to Rogers' (2003), innovative technologies proliferate inside a company or sector. It distinguishes between user categories (innovators, early adopters, early majority, late majority, and laggards) and stages (knowledge, persuasion, choice, implementation, and confirmation). Digitalization of the supply chain frequently relies on early adopters who promote new technologies and inspire laggards.

According to institutional theory, the adoption of technology is influenced by external institutional influences, such as industry standards, government regulations, or customer expectations. Ethiopian exporters are compelled to digitize their supply chains since, for instance, international buyers could need digital compliance systems for traceability (Scott, 2001). Last but not least, Stakeholder Theory advises businesses to take into account the interests of all parties involved in supply chain design, including suppliers, customers, communities, and regulators. Better communication and accountability to stakeholders are made possible by digital tools, particularly in industries that are socially and environmentally sensitive (Freeman, 1984).

2.3.8 Technology Acceptance Model (TAM): This model or theory is proposed by Davis in 1989, is an information systems theory that posits that an individual's acceptance and use of a new technology is primarily driven by their beliefs about its usefulness and ease of use (Davis, 1989). This model has been widely applied to understand technology adoption across various domains.

One of the central tenets of TAM is perceived usefulness, which Davis (1989) defines as "the degree to which a person believes that using a particular system would enhance their job performance." In essence, individuals are more likely to adopt a technology if they believe it will help them accomplish tasks more effectively or efficiently (Davis, 1989). When applied to the Ethiopian transformer manufacturing supply chain, the perceived usefulness of digital technologies would hinge on whether stakeholders believe these tools can genuinely address

existing inefficiencies, such as improving information flow, optimizing logistics, or enhancing quality control (as discussed previously).

The second key construct in TAM is perceived ease of use, which Davis (1989) describes as "the degree to which a person believes that using a particular system would be free of effort." This refers to the individual's perception of the effort required to learn and operate the technology (Davis, 1989). Even if a technology offers significant benefits, if it is perceived as too complex or difficult to use within the Ethiopian context, with its specific infrastructure and skill levels, its adoption is less likely (Davis, 1989). Factors like user-friendliness, availability of training, and the need for technical expertise significantly influence perceived ease of use.

According to TAM, both perceived usefulness and perceived ease of use directly influence an individual's attitude toward using the technology (Davis, 1989). A positive attitude, stemming from the belief that the technology is both helpful and easy to use, subsequently leads to a stronger behavioral intention to use the technology (Davis, 1989). This intention is considered a direct predictor of actual technology use.

Furthermore, TAM suggests that perceived ease of use can also indirectly influence behavioral intention through its impact on perceived usefulness (Davis, 1989). If a technology is perceived as easy to use, individuals may be more likely to explore its features and discover its potential benefits, thereby increasing their perception of its usefulness (Davis, 1989).

In the context of the Ethiopian transformer manufacturing supply chain, understanding these relationships is critical. For instance, even if a digital platform promises significant improvements in supply chain visibility (high perceived usefulness), its adoption might be hindered if it is perceived as too complex for the local workforce to learn and use (low perceived ease of use) (Davis, 1989). Conversely, a user-friendly technology might not be widely adopted if its benefits for improving job performance are not clearly evident to the stakeholders (low perceived usefulness) (Davis, 1989).

Therefore, when evaluating the potential role of digital technologies in this specific industry, it's essential to assess both the perceived usefulness in addressing local challenges and the perceived ease of implementation and use within the unique operational environment of Ethiopian transformer manufacturers (Davis, 1989). Factors such as infrastructure limitations, digital literacy

levels, and the availability of local support will significantly shape these perceptions and ultimately determine the success of technology adoption initiatives.

2.3.9 Network Theory: Digital technologies facilitate the creation of interconnected networks among supply chain partners. Network theory suggests that stronger and more efficient relationships within these networks can lead to improved information sharing, collaboration, and overall supply chain performance. In its essence, it provides a framework for understanding the interconnectedness of elements within a system and how these connections influence the system's behavior and outcomes (Wasserman & Faust, 1994). It focuses on the relationships or ties between entities, rather than solely on the attributes of the entities themselves. These entities can be individuals, organizations, technologies, or even components within a supply chain.

At its core, network theory examines the structure of these relationships, analyzing properties such as the density of connections, the centrality of certain nodes (entities), and the presence of clusters or subgroups (Wasserman & Faust, 1994). Understanding these structural elements can reveal critical insights into how information, resources, and influence flow within the network.

In the context of supply chains, including the Ethiopian transformer manufacturing supply chain, network theory can be particularly valuable. It allows us to move beyond a linear view of the chain and appreciate the complex web of relationships between suppliers, manufacturers, distributors, and other stakeholders (Borgatti & Li, 2009). By mapping these connections, we can identify key players, potential vulnerabilities, and opportunities for collaboration or improvement.

Digital platforms, IoT devices, and data analytics can enhance the visibility and responsiveness of the supply chain network for Ethiopian transformer manufacturers (Gulati, Nohria, & Zaheer, 2000).

Information Processing Theory: This theory posits that organizations process information to reduce uncertainty and make effective decisions. Digital technologies significantly enhance an organization's ability to gather, process, and disseminate information across the supply chain. For Ethiopian transformer manufacturers, technologies like ERP systems, supply chain management software, and data analytics can improve demand forecasting, inventory management, and logistics planning, leading to more informed decision-making (Galbraith, 1977).

2.4. Empirical Literature

Research in developing countries often highlights common supply chain challenges such as poor infrastructure (transportation, communication), limited access to finance, unreliable power supply, bureaucratic hurdles, and a lack of skilled logistics personnel (Mentzer et al., 2001; Seuring & Müller, 2008). Specific studies within the African context often point to issues with customs procedures, port congestion, and the informal nature of some supply chain activities (Ambe, 2013; Mangan & Christopher, 2005). When I come to my study often face tons of operational hurdles in Ethiopia with an apparent implication on linkage effects. Some of the factors identified by the sampled manufacturers align with findings of other works related to determinants of linkages denoted elsewhere in this paper. The key challenges identified for Ethiopian manufacturing firms is input supply linkages subsume low quality and productivity of raw materials (Gebremariam, 2021).

2.4.1 Industry-Specific Studies (Transformer Manufacturing): While specific studies on Ethiopian transformer manufacturing supply chains might be limited, research on electrical equipment manufacturing in other developing countries could provide relevant insights. These studies might reveal common challenges related to the sourcing of specialized materials (e.g., TCROS per, steel of specific grades), technology adoption in production and logistics, and quality control issues throughout the supply chain.

For instance, studies might point to the difficulties in securing specialized raw materials. Think about the specific grades of steel required for transformer cores or the high-purity TCROS per needed for windings. These materials often aren't readily available locally and necessitate international sourcing, which can introduce complexities related to lead times, currency fluctuations, and customs procedures (Lee & Tan, 2019).

Furthermore, research could shed light on the nuances of technology adoption in production and logistics within developing country manufacturing. This might include analyzing the rate of automation, the integration of digital tools for inventory management, or the efficiency of transportation networks. Studies might explore the barriers to adopting advanced technologies, such as the cost of investment, the availability of skilled labor to operate and maintain sophisticated equipment, and the adequacy of infrastructure (e.g., reliable power supply) (Mensah et al., 2021).

Finally, quality control across the entire supply chain is a persistent theme in manufacturing research, particularly in emerging economies. Studies might investigate issues related to the consistency of raw material quality from suppliers, the effectiveness of in-process quality checks during production, and the implementation of robust final product testing procedures. These studies could highlight the impact of inadequate quality control on product reliability and the competitiveness of local manufacturers (Silva & Oliveira, 2020).

2.4.2 Reports and Assessments on Ethiopian Manufacturing: Government reports, industry association publications, and international development organization assessments on the Ethiopian manufacturing sector may identify general supply chain bottlenecks and challenges faced by local industries, including access to foreign exchange for imports, logistics costs, and the regulatory environment (reports from the Ethiopian Ministry of Industry, the Ethiopian Chamber of Commerce and Sectoral Associations, the World Bank, or the United Nations Economic Commission for Africa).

2.4.3 Studies on Digital Transformation in Supply Chains: Integration of supply chain activities and the technologies to accomplish it have become competitive necessities in most industries. For example, one respondent to the pre-test survey wrote, “Our senior management have now come to realize that supply chain management will enhance our ability to be successful.” Another commented, “With almost daily technology advancement globally in every facet of the business, organizations need to synchronize by adopting and implementing new electronic commerce and supply chain technology in order to protect market share, not to mention improve market penetration” (Kirk, A., Curtis, M., & Thomas, M., Part E, p. 39). Thus, we developed a model on the antecedents of supply chain technology adoption. We theorize that firms with greater numbers of employees adopt more technologies perhaps to improve information management and activity coordination. Large organizations may have greater volumes of transactions, more geographically dispersed operations, more supply chain partners, and/or more information to manage and are thus would be more likely to adopt information technology systems to improve operational efficiency and very often lower cost (Kirk, A., Curtis, M., & Thomas, M., Part E, p. 39)

A significant body of literature explores the impact of various digital technologies (IoT, AI, blockchain, cloud computing, big data analytics) on supply chain performance across different

industries. These studies often highlight benefits such as improved visibility, increased efficiency, reduced costs, enhanced responsiveness, and better risk management (Dolgui et al., 2018, Ivanov et al., 2019, Homy).

2.4.4 AI and Global supply chain: Artificial Intelligence (AI) is demonstrating significant potential in enhancing global supply chain resilience and efficiency, particularly in times of disruption. As the thesis explains, supply chains are increasingly complex and data-heavy, making traditional manual management methods insufficient. AI-based solutions are now being deployed to handle large-scale data streams, turning them into actionable insights that improve decision-making, enable real-time visibility, and reduce operational costs. For instance, AI helps optimize supplier selection, predict maintenance needs, and enhance inventory and warehouse management, all of which contribute to faster and more accurate supply chain responses during crises such as the COVID-19 pandemic “AI-driven supply chain resilience and responsiveness” (Compagnone, 2022, p. 31–38). Furthermore, companies that implemented AI in supply chain processes were able to improve forecast accuracy, reduce waste, and strengthen their risk management strategies, demonstrating AI’s real economic and strategic impact on global supply chains “AI-enabled efficiency and risk resilience in supply chains.” (Compagnone, 2022, p. 36).

2.4.5 Digital supply chain and organizational structure: Empirical evidence from a study on private hospitals in Jordan shows that the adoption of digital supply chain (DSC) practices significantly influences organizational innovation by reshaping processes, communication channels, and decision-making frameworks. The study's quantitative analysis, which involved managers and IT staff across six hospitals, found strong positive correlations between digital supplier relationships, digital inventory management, digital service production systems, and digital customer (patient) relationships and the hospital’s ability to innovate its services and processes (Al-Hindi, 2022, p. 49). Regression analysis confirmed that these dimensions of the digital supply chain directly impact the capacity of organizations to generate new services, improve value creation, and drive process innovation. The research highlights how digitized supplier networks and inventory management systems reshape not only operational workflows but also stimulate structural shifts in organizational design, enabling better adaptability and collaborative decision-making. “Digital supply networks as drivers of organizational adaptability and collaboration” (Al-Hindi, 2022, p. 47–52).

The prevalence of supply chain inefficiencies in the manufacturing industry is confirmed by empirical research conducted in Ethiopia. Gebre-Mariam (2022), claims that Ethiopian manufacturers deal with issues like poor demand forecasts, long lead times, and untrustworthy suppliers. Low technological capability, inadequate infrastructure, and disjointed management systems are the main causes of these inefficiencies. According to a study conducted by Assefa and Tsegaye (2021) on manufacturers located in Addis Ababa, supplier relationship frameworks, customs clearance delays, and inventory mismanagement were prevalent across industries. This is consistent with the experiences of transformer producers, whose output is largely dependent on expensive, imported parts. Similar trends are found in international research on African supply networks. The majority of African manufacturers, according to Ambe and Badenhorst-Weiss (2012), do not have integrated logistics systems or the analytical tools required for effective demand and supply planning. Overstocking, unused manpower, and irregular supply schedules result from this.

According to the World Bank's 2020 study on Ethiopia's manufacturing competitiveness, industrial zones are unreliable in terms of utilities and connectivity. This raises the cost of logistics and delays inputs even more. Any interruption in transportation or electricity has a major impact on the continuation of manufacture for transformer companies. Ethiopian transformer manufacturing is further hampered by a lack of foreign exchange. According to a National Bank of Ethiopia (2021) empirical assessment, businesses must wait anywhere from six to twelve months to obtain foreign exchange. This causes delivery delays and idle capacity by interfering with the acquisition of Cold Rolled steel, silicon steel, and insulating materials. According to a survey by the Ethiopian Chamber of Commerce (2020), logistics and procurement were cited as the main supply chain obstacles by 74% of medium- to large-scale enterprises. Due to their reliance on regulated suppliers, transformer manufacturers were especially impacted.

Examples from Asia demonstrate how supply chains for transformers were enhanced by digital technologies. For instance, ABB India greatly improved service levels by implementing AI-based planning to minimize downtime and optimize parts buying (ABB, 2019). In contrast, such techniques have not been generally embraced by Ethiopian enterprises. Digital pilot projects have showed promise even in Ethiopia. Over the course of a year, Ethio-Engineering Group's ERP-based inventory control in certain divisions contributed to a 12% cost reduction. These programs

are still dispersed and not implemented consistently at all transformer facilities, though. For order tracking, warehouse management, and procurement, the majority of regional manufacturers employ paper-based or semi-digital systems. This makes it challenging to identify issues early on or to adjust operations dynamically problem that Gebre-Mariam (2022) and EEU procurement officers interviewed both endorse.

Lastly, although public-private partnerships to solve supply chain concerns are becoming more prevalent (e.g., Industrial Parks Development Corporation), they have primarily concentrated on food and clothing processing rather than electrical manufacturing, which has left transformer plants under supported and understudied.

Numerous studies conducted worldwide attest to the beneficial effects of digital technologies on supply chain effectiveness. AI and big data analytics enhance decision-making precision, shorten lead times, and maximize inventory in manufacturing supply chains, according to a study by Wamba and Queiroz (2020). According to Mollenkopf et al. (2021), companies who used cloud-based logistics platforms had 23% lower operating expenses and 18% higher delivery dependability than those that used traditional systems in a European setting. This demonstrates how supply chain performance is improved by having access to real-time information.

Choi et al. (2018) showed how manufacturers may reduce overproduction, prevent stockouts, and anticipate changes in demand with predictive analytics. Their study of American manufacturing companies revealed a clear link between customer happiness and AI-driven forecasting. ABB India increased overall plant efficiency in Asia by reducing machine downtime by 30% through the use of an AI-powered maintenance and supply scheduling platform. In order to compete internationally, manufacturers in nations like China, Malaysia, and Vietnam are implementing similar technologies.

Empirical research is starting to appear in Africa. For example, manufacturers which used ERP systems saw a considerable reduction in inventory holding costs and procurement cycle times, according to a 2016 study conducted in South Africa by Ambe. However, adoption was hampered by issues including inadequate internet infrastructure and a lack of training. Gebre-Mariam (2022) discovered that manufacturers in Ethiopia who used warehouse management systems or ERPs reported better coordination between their production, finance, and procurement departments. However, only a small percentage of businesses had completely digitalized their supply chains.

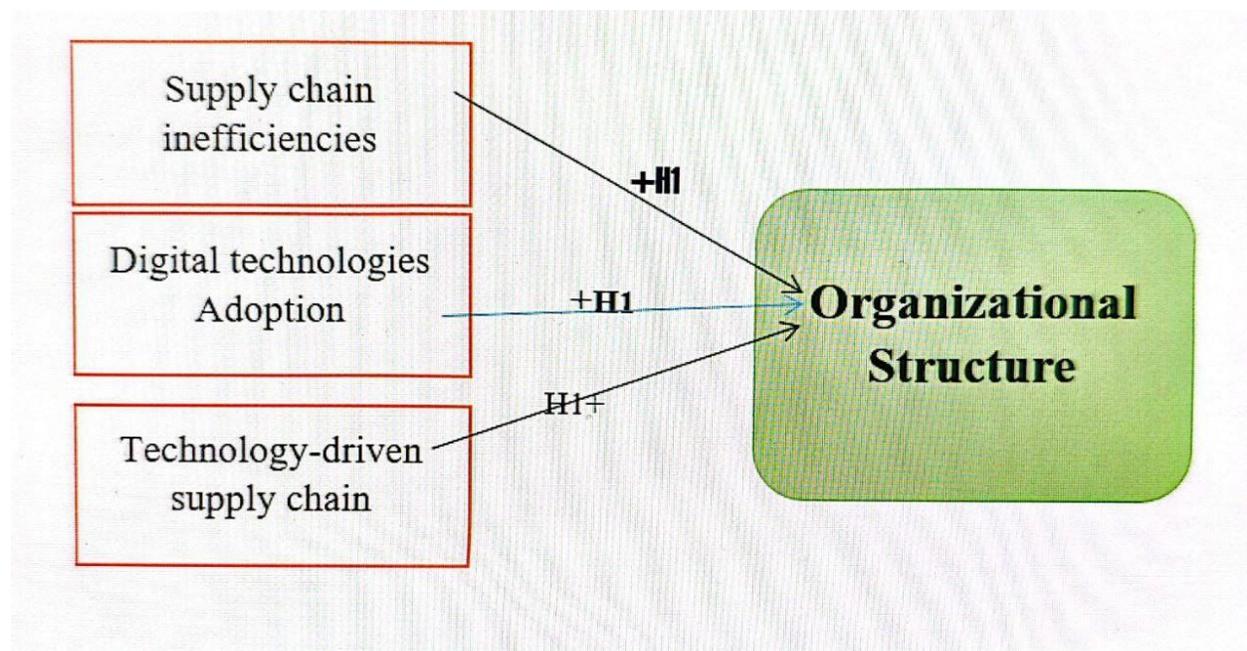
In several of its businesses, the Ethio-Engineering Group (EEG) has started digital transformation projects that are beginning to show promise. Within six months, a test ERP installation at one transformer unit allegedly improved supplier coordination timeframes by 21% and decreased inventory holding costs by 14%. Nonetheless, low digital maturity continues to be a problem for the majority of Ethiopian businesses. High expenses, a lack of ICT infrastructure, and a lack of technical experience are the main obstacles to the adoption of digital technologies, according to Assefa and Tsegaye (2021). Benefits like agility and traceability cannot be fully realized as a result.

2.5 Research Gap

Although the research on Ethiopia's inefficient supply chains is expanding, little attention is paid to the transformer manufacturing industry. The majority of research either focuses on fast-moving consumer goods, textiles, or agricultural inputs or they generalize throughout production, which leaves transformer-specific inefficiencies understudied. The relationship between organizational structure and Technology based supply chain design in Ethiopian firms has not received much empirical attention. It's still unclear how strict hierarchies or department silos impact procurement, customer delivery, and information flow particularly in transformer plants where collaboration is crucial. It is not widely known how digital technologies may help Ethiopian supply chains become more efficient. Although ERP, IoT, and AI are extensively researched worldwide, little is known about their application, performance results, and challenges in Ethiopian transformer production. Another overlooked topic is supplier relationship management and how it affects productivity in Ethiopia's transformer sector. Given the dependence on public and international procurement processes, more research is required to examine strategic sourcing and local supplier development tactics. Not much research has been done on how public procurement laws and exchange rates contribute to the continuation of inefficiencies in transformer manufacturing. Critical input imports are frequently delayed by government processes, but little is known about how these delays affect the overall operation of the supply chain. Although transportation and infrastructure problems are well known, firm-level solutions like using local suppliers, modular designs, or just-in-time tactics have not been sufficiently examined in the Ethiopian context. Comparative research is also lacking. Comparing the supply chains for transformers in Ethiopia with those in nations like Kenya, India, or South Africa may yield insightful information about how to overcome

inefficiencies in comparable economic environments. Lastly, it is uncommon to quantitatively model inefficiencies using methods like supply chain analytics, simulation, or queuing theory. The majority of Ethiopian research uses qualitative data, which results in a methodological flaw that limits optimization and prediction power. There is also a deficit in longitudinal studies. The majority of studies are cross-sectional, providing snapshots of inefficiencies without monitoring how businesses develop over time or react to shifts in the market and in policy. This restricts our ability to comprehend dynamic capacities or efforts at ongoing improvement.

2.6. Conceptual Framework



2.7 chapter Summery

This chapter explores how digital technologies are transforming supply chains and why that demands a redesign of traditional organizational structures especially in Ethiopian manufacturing.

It starts by defining key concepts like supply chain and technology. It explains how poor forecasting, supplier delays, and manual systems create inefficiencies in local transformer factories. Technologies like ERP, AI, IoT, and blockchain are introduced as tools that improve coordination, reduce waste, and increase responsiveness.

The chapter then reviews several theories that help explain these challenges and solutions. For example, the Theory of Constraints shows how bottlenecks slow down operations, while the Resource-Based View highlights how underused digital tools are missed opportunities. Other theories like Lean, Systems, and Contingency show how flexible, tech-enabled structures can better handle uncertainty and complexity.

Empirical studies from around the world and specifically from Ethiopia show that digital transformation improves supply chain performance. But the chapter also points out a gap: few studies focus on transformer factories, and even fewer link technology adoption to changes in organizational structure. There's a lack of research connecting technology adoption to changes in organizational structure. Most existing studies are general, not tailored to this sector, and they often rely on short-term observations without deep analysis.

Finally, the chapter presents a conceptual framework that connects supply chain problems, digital solutions, and organizational redesign

CHAPTER III

RESEARCH METHODOLOGY, FINDINGS AND DISCUSSIONS

Introduction

This chapter outlines the research methodology employed to explore the relationship between supply chain technology and organizational structure in Ethiopian transformer manufacturing companies. It covers the research design, sampling strategy, data collection methods, and ethical considerations. It also comprises the findings and discussions of the major findings.

3.1 Research Methodology

3.1.1 Description of the Study Area

Ethiopian transformer manufacturing facilities, which are an essential part of the country's economic and energy development strategy, are the subject of this study. Under its Homegrown Economic Reform Agenda and the 10-Year Development Plan (2021–2030), Ethiopia, a country in the Horn of Africa, has placed a high priority on energy infrastructure and domestic manufacturing. These plans seek to modernize the country's economy through digitalization, enhanced infrastructure, and industrial growth (National Planning Commission of Ethiopia [NPC], 2021). Transformer companies in Ethiopia, such the Metal and Engineering Corporation's (METEC) Ethiopian Power Engineering Industry (EPEI), manufacture the distribution and power transformers needed to grow the country's electrical infrastructure. Ethiopia wants to become a regional power exporter and provide universal access to electricity by 2030, and these factories are supposed to help with that (Ethiopian Electric Power, 2022). However, these factories confront significant supply chain inefficiencies, such as delayed procurement, mismanaged inventories, inadequate coordination, and insufficient integration of digital technologies, despite their important importance (Gebrehiwot & Tadesse, 2023; UNIDO, 2021). Furthermore, the majority of Ethiopian transformer manufacturing companies are governed by conventional, functionally divided organizational structures, which make it difficult to respond quickly to changing supply chain demands and maintain operational agility. Their capacity to successfully respond to market

and production demands is hampered by a lack of cross-functional integration, a lack of real-time data sharing, and an inadequate digital infrastructure (World Bank, 2022). According to Asfaw and Getachew (2024), in public industrial businesses, this organizational rigidity leads to delays, cost overruns, and decreases performance. Ethiopian firms have a rare chance to rethink their organizational structures in order to better connect their supply chains with technology, thanks to the recent push for digital transformation and Industry 4.0 adoption. Manufacturing companies throughout the world are using digital technologies including cloud-based platforms, advanced analytics, ERP systems, and the Internet of Things to create leaner, more flexible, and cooperative structures (Kamble et al., 2020; Bag et al., 2021). However, due to limitations in institutional preparedness, skills, and infrastructure, such adoption is still in its infancy in Ethiopia (UNCTAD, 2022). Therefore, this research area focused on transformer plants in Ethiopia offers a pertinent and significant framework for investigating how supply chain transformation driven by technology might serve as a driving force behind organizational reorganization. In the manufacturing sector of Sub-Saharan Africa, it also adds to larger discussions on industrial modernization and digital integration.

3.1.2. Research Design

According to Creswell and Creswell (2018), research design is the rational framework that directs the conduct of a study and help to guarantee the methodical gathering, evaluation, and interpretation of data in order to successfully solve the research problem. In order to test hypotheses or look at correlations between variables, a quantitative research design focuses on measuring variables using numerical data, statistical methods, and objective analysis (Saunders et al., 2019). It is frequently employed when identifying causal patterns or extrapolating results across populations is the goal. A qualitative research design, on the other hand, places more emphasis on comprehending phenomena from the viewpoints of participants using non-numerical data from sources including observations, interviews, and documentation. This design is especially helpful for thoroughly examining intricate behaviors, processes, or social situations (Yin, 2018). The sort of data needed, the study's goals, and the nature of the research questions all influence the decision between qualitative and quantitative approaches. A qualitative case study design is frequently the best suitable for research projects that want to investigate contextual and

process-driven insights, such as organizational change or technology adoption services (Bryman, 2021).

The study employed a mixed-methods approach, combining qualitative and quantitative research methods. The research design incorporated a case study approach, with descriptive and exploratory methods. This design enabled an in-depth investigation of how supply chain technology influences organizational structures within the selected companies. A case study approach was appropriate as it allowed for a focused examination of the complex interplay between technology adoption and organizational structure within a specific industry and context.

3.1.3. Sampling Design

According to Saunders, Lewis, and Thornhill (2019), a good sampling design minimizes bias and maximizes representativeness; it can be probabilistic or non-probabilistic, depending on the goals of the study and the available resources. Sampling design is the overall plan and strategy used to select a sample from the population; it describes how the sampling units are chosen and guarantees that the sample adequately represents the population (Etikan & Bala, 2017).

3.1.4 Population

The population is the whole set of people, things, or entities that a researcher wants to examine. All units that have the qualities of interest in the study are included. For instance, all registered transformer manufacturing companies in Ethiopia would be the population of a study looking at supply chain inefficiencies among Ethiopian transformer manufacturers. A population is "the totality of all units under consideration for research," according to Kothari (2004,p.55). It serves as the foundation for decisions about sampling (Creswell & Creswell, 2018).

The study's participants were employees of logistics including executives from four Ethiopian transformer manufacturing companies. There are 628 workers total amongst these businesses: 156 from Wagwago Electric Transformer, 220 from Ethiopian Engineering Group, 132 from Advantage Transformer, and 120 from Adis Transformer. However, to remain at the actual respondents the study used 237 respondents, 51 logistics leaders from Wagwago Transformer, 111 from Ethiopian Engineering Group, 36 from Advantage Transformer, and 39 from Adis

Transformer that hold positions from technical staff to managers. This was to exclude those employees don't have a direct relationship with study.

3.1.5. Sample Frame

The actual list or database that the sample is taken from is known as the sampling frame. It could be a list of businesses, people, or any other study-related units. For example, in the context of the transformer supply chain, the Ethiopian Investment Commission's registration of transformer manufacturers may be used as a sample frame. To guarantee representative sample, a sampling frame needs to be precise and comprehensive (Bryman, 2016). It is "a list of all elements in the population from which the sample is selected," according to Babbie (2020). Hence the sampling frames of the study were the list of employees worked at Wagwago, Ethiopian Engineers Group, Transformer of Advantage and Addis Transformer.

3.1.6 Sample

Sample is the subset of the population selected for participation in the study. It should represent the characteristics of the larger population to allow for generalization of findings. For example, selecting 10 out of 25 transformer firms in Ethiopia for an in-depth study forms the sample. As per Creswell and Creswell (2018), a sample allows the researcher to gain insights without examining the entire population. A total of 237 samples were chosen for the investigation from four Ethiopian transformer manufacturing businesses based on three years of import data obtained from Ethiopian Customs, which provided objective indicators of each company's operational scale, supply chain involvement, and logistics intensity. 51 logistics leaders and technical staff from Wagwago Transformer, 111 from Ethiopian Engineering Group, 36 from Advantage Transformer, and 39 from Adis Transformer are specifically included in the sample. Because it focuses on those who are most knowledgeable and pertinent to the study's goals, this purposive sampling strategy is suitable for qualitative and leadership-focused investigations. The study intends to provide expert insights on the main supply chain inefficiencies and the part logistics leadership plays in influencing organizational reform in the transformer manufacturing industry by concentrating on this group.

3.1.7 Sample Selecting Techniques

Probability sampling and non-probability sampling are the two main categories into which sampling types can be divided. While non-probability sampling, which includes convenience and purposive sampling, does not provide such guarantees, probability sampling gives each element in the population a known and non-zero chance of selection (e.g., simple random sample, stratified sampling) (Sekaran & Bougie, 2016). The decision is based on the study objective and the resources that are available (Taherdoost, 2016). The precise procedures utilized to choose samples from the population are referred to as sampling techniques. Simple random sampling, systematic sampling, stratified sampling, and cluster sampling are typical methods for probability sampling. Purposive sampling, convenience sampling, and snowball sampling are methods for non-probability sampling (Saunders et al., 2019). Purposive sampling, for example, can be used to choose transformer company experts who are most knowledgeable about supply chain concerns (Etikan, Musa, & Alkassim, 2016).

Purposive sampling, a sort of non-probability sampling, was the suitable sampling method employed to choose the 237 respondents from the four transformer manufacturing companies. Instead of employing random selection, this method carefully chooses participants based on their roles, areas of expertise, and significance to the study goal. Since supply chain operations and organizational structure are at the heart of the research focus, logistics leaders above the division head level were specifically targeted in this study (Etikan, Musa, & Alkassim, 2016). Purposive sampling is particularly appropriate when the population of interest possesses specialized expertise or decision-making authority, or when the study aims to comprehend complicated processes (Palinkas et al., 2015). A total of 237 samples were chosen from the table: 51 respondents were chosen from Wagwago Transformer, 111 from Ethiopian Engineering Group, 36 from Advantage Transformer, and 39 from Addis Transformer factory. These people were specifically picked for the study because of their strategic responsibilities in supply chain management and logistics, which guaranteed the gathering of pertinent and thorough data.

3.1.8 Sample Size

The sample size was calculated using Yamane's formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = sample size

N= population size

e= Margin Error

$$n = \frac{584}{1 + 584(0.05)^2} = 584/2.46$$

$$n = \sim 237$$

After calculating the sample size for the study, the sample was distributed to the respondents based on Proportional sample selection techniques.

Table 3.1 Summary of the Sample Size

Company Name	Total Employees	Proportion	Sample Size × 237
Wagwago Electric	125	$125 / 584 \approx 0.214$	$0.214 \times 237 \approx 51$
Ethiopian Electric Power	275	$275 / 584 \approx 0.471$	$0.471 \times 237 \approx 111$
Advantage Transformers	88	$88 / 584 \approx 0.151$	$0.151 \times 237 \approx 36$
Addis Transformer Factory	96	$96 / 584 \approx 0.164$	$0.164 \times 237 \approx 39$
Total	584	1.00	237

3.1.9. Data Collection Methods

To ensure comprehensive and reliable results, both questionnaires and interviews were used for data collection, and triangulation was employed to cross-validate findings.

Questionnaires: Structured questionnaires were distributed to supply chain staff to collect standardized data on current practices, technological tools, and organizational setup. The questionnaires were designed to gather quantitative data on the extent of technology adoption, perceived supply chain performance, and organizational structural characteristics. In this study the study incorporated a combination of quantitative and qualitative data collection methods, with a total of 237 respondents participating in the research. Specifically, the questionnaire was distributed among four companies: Wagwago Electric, which had 51 respondents, followed by Advantage Electric with 36, Addis Transformers with 39 respondents and Ethio Engineering Group contributing the highest respondents with 111 respondents.

Interviews: Semi-structured interviews were conducted with supply chain department managers, supervisors, and selected employees to gain deeper insights into the use of technology and its organizational impact. The interviews provided qualitative data that complemented the quantitative data from the questionnaires, allowing for a richer and more nuanced understanding of the research questions. In this study In-depth interviews were done with five important people from these companies in addition to the questionnaire in order to learn more about their viewpoints and experiences. Three other firms each contributed one interviewee, with Wagwago Electric providing two. The use of new supply chain technologies and the companies' participation in global supply chains were better understood thanks to this mixed-methods approach.

Triangulation: The study applied methodological triangulation by comparing and cross-checking data obtained from questionnaires, interviews, and secondary documents. This process enhanced the accuracy and credibility of the research findings. Triangulation helped to mitigate the limitations of each individual data collection method and provided a more robust and well-supported analysis.

3.1.10. Data Analysis

Data was analyzed using thematic analysis to identify patterns and relationships, supported by descriptive statistics to summarize quantitative responses from questionnaires. The qualitative data from the interviews was analyzed thematically to identify recurring themes and patterns related to the impact of technology on organizational structure. The quantitative data from the questionnaires

was analyzed using descriptive statistics (e.g., means, frequencies) to provide an overview of the variables of interest, as well as inferential statistics (regression analysis) to test the hypothesized relationships. The triangulated data allowed the researcher to confirm findings from multiple perspectives, increasing the study's reliability and validity.

3.1.11. Ethical Considerations and Protocols

The study adhered to the following ethical principles and protocols

- ❖ **Informed Consent:** All participants were fully informed of the research purpose, and their participation was voluntary. Participants were provided with detailed information about the study, including its objectives, procedures, and potential risks and benefits, and they were assured that their participation was entirely voluntary.
- ❖ **Confidentiality:** Personal and company information was kept confidential and used solely for academic purposes. All data was anonymized to protect the identity of the participants and their respective companies.
- ❖ **Right to Withdraw:** Participants could opt out of the study at any stage without any consequences. Participants were informed of their right to withdraw from the study at any time, without penalty.
- ❖ **Data Security:** Collected data was stored securely, and only the researcher had access. All data, including both questionnaires and interview transcripts, was stored in password-protected electronic files.

Interview Protocol

Research Title:

Redesigning organizational structure through Technology-Enabled Supply Chain Improvements: A Case Study of Ethiopian Transformer Factories

Researcher:

Ataklti Nega Gebrehiwot

Purpose of the Interview:

The purpose of this interview protocol is to gather insights from logistics, sourcing and supply chain professionals in the Ethiopian transformer manufacturing sector. Their perspectives will help identify current organizational challenges, supply chain practices, and opportunities for improvement of organizational structure through technology enabled solutions.

Interview Details

The interview consists of 5 sections which are introduction, Background information, consent, the main body and closing and I do expect a qualitative narrative data from the interview.

Interviewees:

- A Logistics Manager, From Ethiopian Engineering Corporation
- A Chief Corporate Logistics, From Wagwago Electric
- A Sourcing and Documentation Manager from Wagwago Electric
- A General logistics Manager from Advantage Transformer
- A Logistics Manager from Addis Transformers

Mode of Interview: face to Face and through zoom online

Date(s): **03/05/2025, 10/05/2025**

Duration: Approximately 30 Minutes each

3.1.12. Research Rules and Procedures

The following rules guided the research process:

- ❖ Company selection was based on the level of foreign procurement Involvement and supply chain activity.
- ❖ Data collection focused solely on supply chain and logistics departments and related
- ❖ Both questionnaires and interviews were used for primary data collection.
- ❖ Triangulation was applied to validate data.
- ❖ Ethical standards were maintained throughout the research.
- ❖ Findings were reported objectively and transparently.

3.2 Data Analysis

This chapter presents the analysis of both quantitative and qualitative data gathered to assess the impact of technology-enabled supply chain improvements on organizational structure in selected Ethiopian transformer manufacturing companies. The data includes structured survey responses analyzed through coding schemes for SPSS, and qualitative insights from five semi-structured interviews.

3.2.1 Descriptive Analysis

Response Rate

Table 3.2 Response Rate for the Questionnaires

Questionnaires			Disqualified		
Distributed	Returned questionnaires'	Responses	Qualified	Disqualified	%
237	230	97.05%	230	0	100

Source: survey result, 2025

The response rate for a set of questionnaires given to a sample group is shown in Table 3.2. A high response rate of 97.5% was achieved by returning 230 of the 237 questionnaires that were distributed. This suggests that most respondents actively participated in the survey, indicating a high level of interest or relevance in the subject matter. According to the data, there were no disqualified responses and all returned questionnaires were qualified, meaning they satisfied the requirements for analysis.

Given that all of the responses were qualified, the table demonstrates how successful the questionnaire distribution process was. This implies that those who returned their questionnaires fully participated because the questions were understandable and pertinent. A well-structured survey that effectively collected the desired data without causing substantial misunderstandings or confusion among respondents is indicated by the lack of disqualified responses. All things considered; this table's findings are a good reflection of the research approach used.

3.2.2 Demographic Data of Respondents

Gender of respondents

As it displayed in Table 3.3 below, the numbers of male respondents are 186 (80.9%) and the female respondents 44 (19.1%) respectively. This shows that the male respondents were taken the largest portion in this survey. Even though there were differences in the gender of respondents, the researcher was not based on any one particular gender.

Table 3.3. Gender of Respondents

S/n	Gender	Frequency	Percent	Cumulative Percent
1	Male	186	80.9	80.9
2	Female	44	19.1	100.0
Total		230	100.0	

Source, survey result, 2025

Education level of Respondents

The level of qualification of the respondents is shown in table 4.4 below;

Table 3.4. Qualification of Respondents

	Frequency	Percent	Cumulative Percent
BA/BSC Degree	185	80.4	80.4
MA/MSc Degree	45	19.6	100.0
Total	230	100.0	

Source, survey result, 2025

The frequency distribution table's 3.4. data provides important new information about the respondents' educational backgrounds. A significant majority of the 230 participants, or 185 people, have a BA/BSC degree, making up 80.4% of the sample. This suggests that the respondents share a core level of education, as evidenced by the high incidence of college degrees among the group. On the other hand, 45 respondents, or 19.6%, had an MA/MSc degree, indicating a lesser percentage of the population with advanced education. With the valid percentages completely matching the overall percentages and no missing data, the cumulative percent verifies that every

participant is present. This distribution gives a thorough picture of the educational landscape within the surveyed group by highlighting the sample's predominance of undergraduate education while simultaneously acknowledging the existence of advanced degree holders.

3.2.3 Respondents Company Name

Table 3.5. Respondents Company Name

S/n	Company Name	Frequency	Percent	Cumulative Percent	No. of Interviewees
1	Wagwago Electric	51	22.2	22.2	2
2	Ethiopian Engineering Group	107	46.4	38.3	1
3	Advantage Transformers	35	15.3	55.7	1
4	Addis Transformer Factory	37	16.1	100.0	1
	Total	230	100.0		5

Source, survey result, 2025

The survey sample's company name frequency distribution provides important information about how different firms are represented in the market. Ethiopian Engineering Group was the most common employer among the 230 respondents, with 107 people, or 46.4%, naming it as their employer. Given its established presence and operating capacity, Ethiopian Engineering Group supremacy indicates that it plays a vital role in the industry. 51 respondents, or 22.2% of the total, mentioned Wagwago Electric, which came in second with a respectable market share. Despite being smaller, Advantage Transformers and Addis Transformer each had 35 (15.3 %) and 37 (16.1%) replies, respectively, and are significant industrial segments. As can be seen from the cumulative percentage column, these four businesses together make up the whole sample, demonstrating a concentrated market environment where a small number of major firms have a substantial impact on total employment. This distribution emphasizes the sector's competitive dynamics as well as the importance of particular businesses in influencing market trends. And the

researcher interviewed 5 respondents from Wagwago transformer 2 and each one from the other companies.

Table 3.6. Role of Respondents in the Company

Position	Frequency	Percent	Cumulative Percent
Technical staff	45	19.6	19.6
Supervisor	121	27.8	47.4
Manager	64	52.6	100.0
Total	230	100.0	

Source, survey result, 2025

A comprehensive picture of the organizational structure in the sample is given by the positions held by the survey participants. The position of supervisor is the most represented among the 230 participants, with 121 people, or 52.6% of the total. This sizeable percentage shows that management positions predominate in the organizational structure, indicating that leadership and decision-making responsibilities within the workforce are probably prioritized. Subsequently, 64 respondents, or 27.8%, identified as managers, underscoring the significance of intermediary roles that connect management and operational workers. On the other hand, with 45 employees, or 19.6% of the sample, technical workers make up the smallest group. The total distribution is the result of the cumulative percentages, which verify that every position is taken into consideration. This research highlights a hierarchical structure with a preponderance of managerial positions, suggesting a possible emphasis on supervision and leadership in the organization's activities.

3.2.4 Respondents Years of Experience

Table 3.7. How many years of experience do you have in the company

Year of experience	Frequency	Percent	Cumulative Percent
less than 1 year	88	38.3	38.3
1-3 years	90	39.1	77.4
4-6 years	34	14.8	92.2
6 years and above	18	7.8	100.0
Total	230	100.0	

3.3 Source, survey result, 2025

Important information about the experience levels of the workforce can be gleaned from the survey respondents' years of experience distribution. Ninety people, or 39.1%, out of the 230 participants who submitted experience data, had between one and three years of experience. This points to a comparatively young workforce that might be just starting out in their professions, which is likely to bring new ideas and openness to learning. Furthermore, 88 respondents, or 38.3% of the sample, had less than a year of experience, suggesting that there are a lot of beginners to the field. However, just 18 responders, or 7.8% of the total, have six years or more of experience, whereas 34 participants, or 14.8% of the total, have four to six years of experience. The sample's tendency toward very early career phases is highlighted by the cumulative percentages, which show that roughly 92.2% of the respondents have less than six years of experience. The workforce's potential for growth and development is highlighted by this distribution, as most employees are still learning the ropes in their particular industries.

3.3.1 Current Supply Chain Challenges (TCSCC)

Significant supply chain issues are preventing Ethiopian transformer factories from operating efficiently and driving up expenses. Delays in customs and transit that prevent products from being delivered on schedule make high logistics expenses an even bigger problem. Furthermore, an inability to track and monitor in real-time restricts supply chain visibility, making it challenging to effectively coordinate with suppliers and react quickly to interruptions. This inefficiency threatens the supply chain's general agility in addition to procurement procedures, underscoring

the urgent need for an organizational structure redesign that incorporates technology-enabled enhancements to increase coordination and cut costs.

Table 3.8. the Current Supply Chain Challenges in Redesigning Organizational Structure

No	Statement	Scale	Frequency	Percent	Cumulative percent	Mean	Standard deviation
1	Our company faces challenges due to an inefficient procurement process.	SA	54	23.5	23.5	1.96	0.76
		A	149	64.8	88.3		
		N	11	4.8	93.0		
		DA	15	6.5	99.6		
		SDA	1	0.4	100		
2	Delays in customs and transit negatively affect our supply chain	SA	41	17.8	17.8	1.99	0.72
		A	165	71.7	89.6		
		N	11	4.8	94.3		
		DA	10	4.3	98.7		
		SDA	3	1.3	100		
3	There is poor coordination with suppliers in our supply chain	SA	56	24.3	24.3	1.94	0.74
		A	146	63.5	87.8		
		N	13	5.7	93.5		
		DA	15	6.5	100		
		SDA					
4	High logistics costs are a major issue for our company	SA	58	25.2	25.2	1.88	0.66
		A	151	65.7	90.9		
		N	13	5.7	96.5		
		DA	8	3.5	100		
		SDA					
5	We lack real-time tracking and monitoring capabilities	SA	76	33	33	1.85	0.80
		A	131	57	90		
		N	5	2.2	92.2		
		DA	18	7.8	100		
		SDA					

According to the above table, there is broad agreement regarding the consequences of an ineffective procurement procedure when examining the supply chain issues Ethiopian transformer factories are currently facing. Survey results show that, with a mean score of 1.96, 88.3% of participants agreed with the assertion that the organization has problems with procurement inefficiencies. This implies that ineffective procurement methods are a common issue, frequently resulting in material sourcing delays and higher operating expenses. While there is some variation in the responses, as indicated by the standard deviation of 0.76, the general trend highlights the necessity of a reorganized strategy that incorporates more effective procurement techniques to improve supply chain performance.

Another significant issue was transit and customs delays, which 89.6% of respondents acknowledged had a detrimental impact on the supply chain. The participants' strong agreement that customs inefficiencies contribute to logistical issues, which might result in stock outs and production halts, as indicated by the mean score of 1.99. A very consistent view of this difficulty across the board is indicated by the standard deviation of 0.72. To lessen these delays' negative effects on the efficiency of the supply chain, better customs procedures and logistics planning are necessary.

With 87.8% of respondents agreeing that a lack of cooperation with suppliers reduces supply chain efficiency, the survey results further emphasize the issue. The average score of 1.94 indicates a strong conviction that improved connections and lines of communication with suppliers are essential. Although there is some variation, as indicated by the standard deviation of 0.74, the overwhelming sentiment emphasizes how crucial it is to restructure organizational structures to promote collaboration. Factories can increase the overall resilience and responsiveness of the supply chain by utilizing technology to better coordinate suppliers.

Finally, 90.9% of respondents confirmed the importance of high logistical costs, indicating that they continue to be a major concern. It is evident from the organization's mean score of 1.88 that logistical costs are a top priority. The 0.66 standard deviation indicates that participants strongly agreed on this point. It is clear that a technological revamp is required, especially when combined with the absence of real-time tracking and monitoring capabilities, as 33% of respondents pointed out. And from the interview the researcher finds that The Ethiopian manufacturers' struggles with issues like limited access to quality raw materials, outdated technology, and poor information flow,

as highlighted in the findings and the interview responses, exemplify this lack of essential resources and capabilities. So, from the data Redesigning the organizational structure to successfully address modern difficulties can be facilitated by lowering logistics costs and increasing supply chain visibility through the use of sophisticated tracking technologies and analytics.

3.3.2 Future Technology Adoption & Integration (TFTAT)

In order to improve supply chain efficiency, Ethiopian transformer factories' organizational structures must be redesigned with Future Technology Adoption and Integration (TFTAT) in mind. These factories may improve real-time tracking, procurement procedures, and supplier coordination by adopting cutting-edge technologies like block chain, artificial intelligence, and the Internet of Things (IoT). All supply chain participants can communicate and share data easily thanks to TFTAT, which speeds up response to market changes and helps make well-informed decisions. Additionally, incorporating predictive analytics helps lower logistics expenses and improves inventory management, which will eventually put these manufacturers in a better position to compete in a global market. In addition to streamlining operations, making TFTAT a strategic priority will encourage an innovative and adaptable culture within the company.

Table 3.9. Future Technology Adoption & Integration in Redesigning Organizational Structure

No	Statement	Scale	Frequency	Percent	Cumulative percent	Mean	Standard deviation
1	Adopting new technologies in the supply chain is essential for improving our organizational structure	SA	29	12.6	12.6	3.6	1.06
		A	141	61.3	73.9		
		N	14	6.1	80.0		
		DA	32	13.9	93.9		
		SDA	14	6.1	100.0		
2	Integration of supply chain technology strengthens coordination	SA	38	16.5	16.5	3.69	1.07
		A	138	60.0	76.5		
		N	13	5.7	82.2		
		DA	27	11.7	93.9		

	between different departments	SDA	14	6.1	100.0		
3	New supply chain technologies help optimize our workflows and reduce operational delays	SA	52	22.6	22.6	3.81	1.04
		A	130	56.5	79.1		
		N	9	3.9	83.0		
		DA	31	13.5	96.5		
		SDA	8	3.5	100.0		
4	Technology adoption in the supply chain increases our adaptability to market changes and disruptions	SA	60	26.1	26.1	3.81	1.11
		A	117	50.9	77.0		
		N	17	7.4	84.4		
		DA	22	9.6	93.9		
		SDA	14	6.1	100.0		
5	Supply chain technology integration supports more accurate and faster decision-making	SA	91	39.6	39.6	1.8	0.84
		A	105	45.7	85.2		
		N	19	8.3	93.5		
		DA	15	6.5	100		
		SDA					

According to 73.9% of respondents, Ethiopian transformer firms are well aware of the need to implement new technologies in the supply chain in order to improve organizational structure and efficiency. Despite some fluctuation reflected by the standard deviation of 1.06, the mean score of 3.6 demonstrates a strong belief in the transformative potential of technology. This opinion highlights the necessity of putting a strategic emphasis on incorporating state-of-the-art technologies that can improve operational efficiency, expedite procedures, and eventually boost production. Prioritizing technology developments will be essential to factories' long-term performance as they fight to stay competitive.

One important element in improving departmental cooperation has been found to be the incorporation of supply chain technologies. With a mean score of 3.69 and 76.5% of respondents agreeing, the data indicates that technology allows for improved collaboration and communication inside the organizational structure. Through improved coordination, information can move more

easily between teams, breaking down silos and encouraging a single method of problem-solving. This can result in more integrated operations. The notion that integrated technology is essential for maximizing supply chain performance is supported by the standard deviation of 1.07, which shows a consistent view of this benefit.

New supply chain technologies are also thought to be crucial for streamlining processes and cutting down on operational delays. With a mean score of 3.81, indicating broad agreement on the beneficial effects of technology on operational efficiency, a noteworthy 79.1% of respondents agreed with this proposition. Bottlenecks can be removed and overall productivity increased with the aid of these technologies, which streamline workflows and automate repetitive tasks. This viewpoint is widely held, as evidenced by the low standard deviation of 1.04, which suggests that integrating technology to address operational delays should be a top priority for enhancing supply chain dynamics.

Finally, the poll results, which indicate that 76.9% of participants agree with this statement, further highlight how using technology can improve flexibility to market changes and disruptions. A strong conviction in technology's ability to spur agility and responsiveness in the face of changing market conditions is indicated by the mean score of 3.81. Furthermore, supply chain technology integration facilitates quicker and more accurate decision-making, according to 85.2% of respondents, underscoring the significance of data-driven insights for successful leadership. This consensus, which has a standard deviation of 0.84, highlights how adopting technology strengthens an organization's strategic and tactical responsiveness to market opportunities and problems in addition to improving operational skills. The interviewers are also believing in the adoption of technology can improve the organizational structure.

3.3.3 Impact of technology-based supply chain on Redesigning organizational structure (TIROS)

Redesigning the organizational structure with technology-enabled supply chain enhancements has had a significant impact and improved overall responsiveness and efficiency. Cross-departmental collaboration has greatly increased thanks to supply chain technology, which has promoted a more integrated approach to operations that improves teamwork and communication. Technology has also been essential in increasing productivity by lowering bottlenecks and simplifying processes, freeing up teams to concentrate on key projects rather than being mired in inefficiencies.

Technology adoption has significantly improved the organization's capacity to react swiftly to shifts in the market, giving it the flexibility required to negotiate shifting circumstances and seize new possibilities. All things considered, these developments have improved operating capacities and set up the company for future expansion and competition.

Table 3.10. Technology Impact on Redesigning organizational structure

No	Statement	Scale	Frequency	Percent	Cumulative percent	Mean	Standard deviation
1	Technology-enabled supply chain improvements have made our organizational structure more efficient (EOS)	SA	64	27.8	27.8	1.83	0.66
		A	151	65.7	93.5		
		N	5	2.2	95.7		
		DA	10	4.3	100		
		SDA					
2	Supply chain technology has improved cross-departmental collaboration within the organization (CDC)	SA	56	24.3	24.3	1.87	0.67
		A	158	68.7	93		
		N	6	2.6	95.7		
		DA	9	3.9	99.6		
		SDA	1	0.4	100		
3	Technology in the supply chain has reduced bottlenecks and streamlined workflows (TRBN)	SA	55	23.9	23.9	1.99	1.50
		A	155	67.4	91.3		
		N	6	2.6	93.9		
		DA	12	5.2	99.1		
		SDA	2	0.9	100		
4	The adoption of supply chain technology has increased our ability to respond quickly to changes in the market (TIQMKCH)	SA	72	31.3	31.3	2.38	3.38
		A	139	60.4	91.7		
		N	7	3	94.8		
		DA	11	4.8	99.6		
		SDA	1	0.4	100		

According to the survey's findings, Ethiopian transformer factories' organizational structures are now far more efficient thanks to supply chain enhancements made possible by technology. The

mean score of 1.83 highlights the broad agreement on this benefit, with 93.5% of respondents believing that these enhancements make organizational structure more efficient. The low standard deviation of 0.66 indicates that participant' perceptions are consistent, indicating a shared understanding that implementing technology has improved organizational agility, streamlined procedures, and eliminated redundancies. Meeting the demands of a competitive market and guaranteeing the sustainability of operations depend on this transition.

Additionally, cross-departmental cooperation has significantly improved as a result of supply chain technological integration. A mean score of 1.87 indicates that a significant 93% of respondents said that technology has improved teamwork and communication across departments. The replies show a consistent conviction in the value of teamwork made possible by technology, with a standard deviation of 0.67. In addition to dismantling organizational silos, this improved collaboration makes it possible for a more unified approach to innovation and problem-solving, which increases the organization's overall efficacy and organizational structure stream ling.

With 91.3% of respondents believing that technological improvements have increased operational efficiency and structure streamline, the research also shows that technology has been crucial in removing bottlenecks and optimizing operations. The larger standard deviation of 1.50 implies some variety in participant experiences, while the mean score of 1.99 indicates a strong conviction in technology's potential to decrease inefficiencies. However, the general pattern shows a strong link between the use of technology and increased workflow effectiveness, freeing up teams to concentrate more on strategic projects and less on addressing operational challenges.

Lastly, the organization's structure to react swiftly to shifts in the market has been greatly enhanced by the implementation of supply chain technology. With a mean score of 2.38 and 91.7% of respondents agreeing with this statement, it is clear that technology gives the company the flexibility it needs to deal with changing market conditions. The overall consensus highlights the strategic significance of technology in improving responsiveness, even though the greater standard deviation of 3.38 might be due to differing degrees of experience or implementation success among departments. This skill is a crucial part of the revised organizational structure since it not only puts the company in a position to take advantage of new opportunities but also strengthens its resilience against possible disruptions.

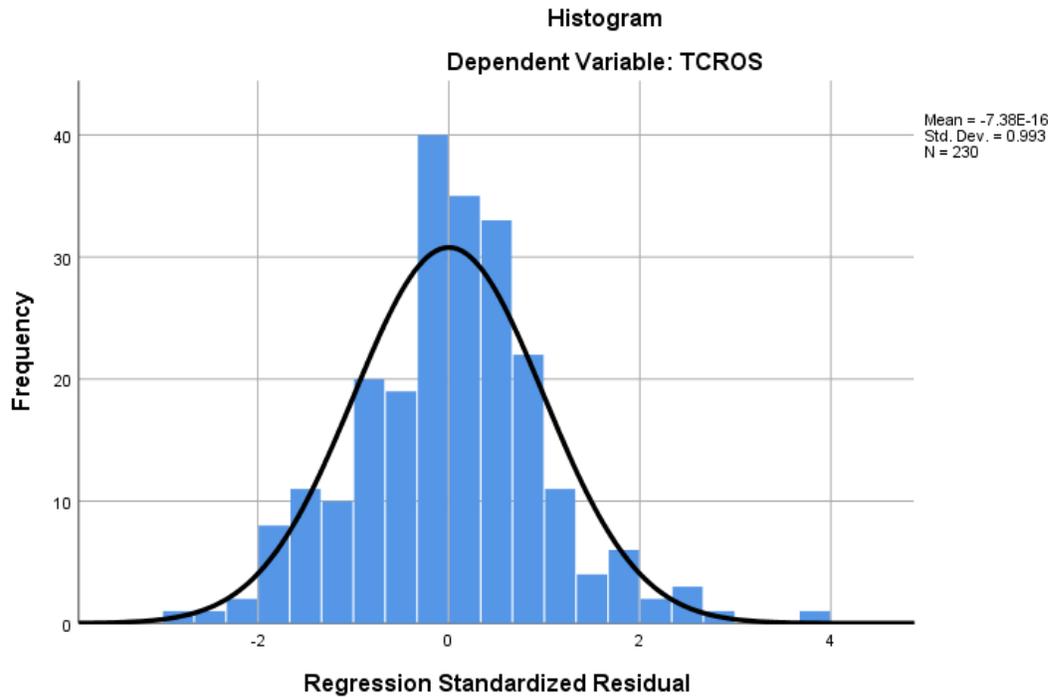
3.4 Tests and Statistical Analysis

To evaluate the validity and dependability of the data, the researcher used statistical significance tests, such as the multicollinearity, autocorrelation, and normality tests. The gathered information was compared to relevant tests. Correlation and linear multiple regression analysis were performed using SPSS version 29.

Normality is the measure of distribution of data around the center of all scores. Frequency distribution may come in many different shapes and sizes. Ideally, the data would be distributed symmetrically around the center of all scores. The same on both sides should draw the vertical line through the center of the distribution, which is known to be a normal distribution and characterized by the bell-shaped curve. This curve generally implies that majority of scores lie around the center of the distribution (Field, A., 2010).

To test the Normality of data, the researcher used the histogram and normal P-P plot of the regression standardized residual for the dependent variable and independent variables from the regression analysis.

Figure 3.1. Normal histogram chart of the regression standardized residuals.

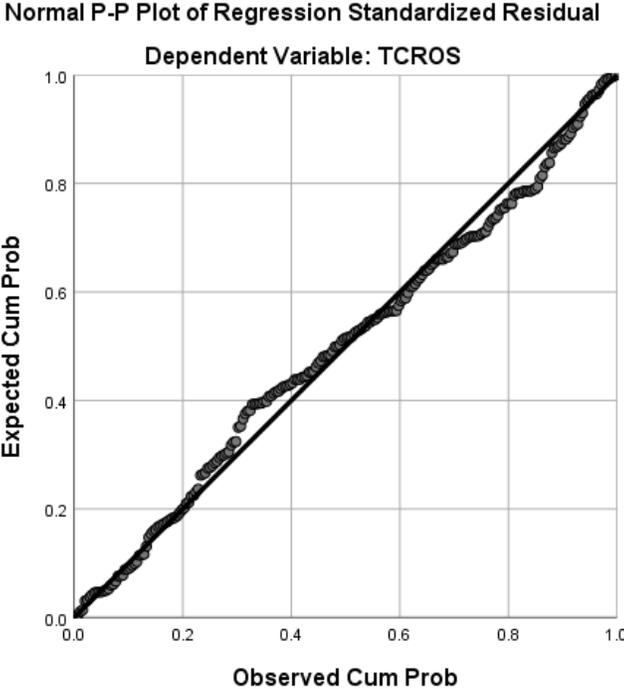


The distribution of the regression standardized residuals for the dependent variable, overall company redesigning organizational structure (TCROS), is shown graphically in the histogram. With most of the residuals grouped around the mean of 7.39616, the histogram's shape seems to be about normal. Since a normal distribution of residuals is a sign of a well-fitting model, this implies that the model's predictions are generally correct. A key premise in regression analysis is that the residuals are symmetrically distributed, which is supported by the presence of a bell-shaped curve covering the histogram.

The residuals show comparatively little variability around the mean, as indicated by the standard deviation of 0.953. The model's predictive ability is further supported by the low standard deviation, which indicates that for the majority of observations, the predicted values are near to the actual values. Furthermore, the residuals' range of -2 to 4 indicates that, although the majority of forecasts are very correct, there are some cases of both overestimation and underestimate. This finding emphasizes how crucial it is to take into account possible outliers or extreme numbers because they could affect how well the model performs overall.

In conclusion, the histogram offers important information about how well the regression model that was used to forecast TCROS worked. The model is successful in capturing the underlying link between the predictors and the dependent variable, as seen by the regression standardized residuals' roughly normal distribution and low standard deviation. To ensure that the model remains a trustworthy instrument for assessing business performance, additional research into particular instances that differ markedly from the expected values is necessary, as shown by the residuals' degree of variability.

Figure 3.2. Normal P-P plot of the regression standardized residual



A visual evaluation of the residuals' normality may be seen in the Normal P-P plot of the regression-standardized residuals for the dependent variable, Company's overall redesigning organizational structure (TCROS). The observed cumulative probabilities are plotted against the normal distribution-based expected cumulative probability. The plot's points show that the residuals are roughly normally distributed since they closely resemble the diagonal reference line. This alignment implies that the regression analysis's underlying normality assumptions are met, which essential for the reliability of inferential statistics is obtained from the model.

Furthermore, the P-P plot's near-linear relationship supports the validity of the regression model's predictions. Though the lack of notable deviations implies that the model's residuals do not show considerable skewness or kurtosis, deviations from the diagonal line at the extremes may reveal the presence of outliers or non-normality. This result strengthens the validity of the analysis's conclusions by demonstrating the model's resilience in capturing the association between the predictors and TCROS. All things considered; the Normal P-P plot is a useful diagnostic tool that confirms the suitability of the regression strategy used in this study.

3.4.1 Test of Multi Co Linearity

According to (Kothari, 2010), multi-collinearity exists if there is strong correlation between two or more independent variables in a regression model. No perfect linear relationship should be between two or more predictors. If there is perfect Collinearity between independent variables, it is impossible to obtain unique estimation of the regression coefficients because there is infinite number of combinations of coefficients that would work equally well. A multi collinearity problem is resulted from a high degree of correlation between independent variables.

In this study, assumption of data multicollinearity was checked by the Pearson correlation coefficient and Collinearity statistics. The value of Pearson correlation coefficient (r) among the independent variables of this study data were below 0.9. So, there was no substantial correlation between predictors, this implies there is no multi collinearity problem between them. This satisfies the multi factors affecting Redesigning organizational structure on the selected companies do not have multi co linearity problem and it is possible to obtain unique estimates of the regression coefficients.

Collinearity statistics value of Tolerance and Variance Inflation Factors (VIF) is also another means of checking multi collinearity (Field, A., 2006). The value of tolerance less than 0.02 and that of VIF above 10 reveals a multi co linearity problem. Based on this, the value of tolerance and VIF shown in the standardized regression coefficients on Table 3.11. below indicates that there is a minimum tolerance value of 0.911 that is above 0.02 and the maximum value of VIF is 1.097 which is less than 10, indicates that the independent variables are not highly correlated with each other, and hence, there is no problem of multi collinearity.

Table 3.11. Corelation tolerance

	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
TCROS	0.913	1.096
TCROS	0.998	1.002
TIROS	0.911	1.097

3.4.2 Test of Autocorrelation Assumption (Durbin-Watson Test)

Autocorrelation assumption (Durbin-Watson test) is the assumption of independent error reasonable test. Durbin-Watson used to test for serial correlation between errors. It varies between 0 and 4, the value of 2 implies the residuals are uncorrelated (Field, A., 2009)

A value above 2 indicates a positive correlation. Similarly, when there is no serial correlation, the expected value of the Durbin-Watson test statistics ‘d’ is approximately 2.0: positive serial correlation makes $d < 2.0$. And negative serial correlation makes $d > 2.0$. If the values of d are approximately less than 1.5 or great than 2.5 leads to suspect positive or negative serial correlation. If serial correlation is suspected, then the proposed multiple regression model is appropriate and same alternatives must be sought.

Keeping this in mind, the value of Durbin-Watson on model summary of regression analysis of this study is 1.65. So, the autocorrelation assumption has met certainly, because the value falls between 1.5 and 2.5.

3.4.3 Correlation Analysis

The researcher conducted Pearson’s correlation and used the correlation coefficients to measure the relation and direction of predictors and the dependent variable. The value ‘r’ lies between -1 and 1. Positive value of ‘r’ indicates positive correlation between the two variables (i.e., changes in both variables take place in the same direction). Whereas negative value of ‘r’ indicates negative correlation (i.e., changes in the two variables takes place in the positive directions). A zero value of ‘r’ indicates that there is no association between the two variables. When $r(+)$ 1, it indicates

perfect positive correlation and when it is (-) 1, it indicates utilization perfect negative correlation, meaning there by that is no variation in independent variable (x) explain 100% of the variations in the dependent variable(Y).

Table 3.12. The correlation analysis result of this study

		TCRO S	TCSCC	TFTA T	IROS
Pearson Correlation	TCROS	1.000	0.551	0.582	0.544
	TCSCC	0.551	1.000	0.018	0.295
	TFTAT	0.582	0.018	1.000	0.045
	TIROS	0.544	0.295	0.045	1.000
Sig. (1-tailed)	TCROS	1	0.000	0.000	0.000
	TCSCC	0.000	1	0.391	0.000
	TFTAT	0.000	0.391	1	0.250
	TIROS	0.000	0.000	0.250	1
N	TCROS	230	230	230	230
	TCSCC	230	230	230	230
	TFTAT	230	230	230	230
	TIROS	230	230	230	230

Significant relationships between the variables under study specifically, the company's overall Redesigning Organizational Structures (TCROS), current supply chain challenges (TCSCC), future technology adoption and integration (TFTAT), and the Impact of technology enabled supply chain on Redesigning organizational structure (TIROS) are revealed by the correlation analysis results shown in Table 3.12. TCROS has a positive association with TCSCC ($r = 0.551$), TFTAT ($r = 0.582$), and IROS ($r = 0.544$), according to the Pearson correlation coefficients. These values demonstrate the interdependence of TCSCC, TFTAT, and TIROS in promoting organizational success by indicating that when these metrics rise, so does the company's overall organizational structure. These results are further supported by the significance values (p-values), which reveal a one-tailed significance of 0.000 for all relationships involving TCROS. Improvements in the present supply chain issues, upcoming technology adoption, and current technology usage are expected to improve overall organizational structure and the performance, according to this, which shows a substantial statistical significance in the correlations between TCROS and the other variables. On the other hand, there is no relevant association between TCSCC and TFTAT in this context, as evidenced by the extremely low correlation between the two variables ($r = 0.018$) and

non-significant p-value of 0.391. This implies that although both might have an impact on overall organizational structure, they function separately.

Lastly, there is a moderate and statistically significant association ($r = 0.295$) between TIROS and TCSCC, suggesting that supply chain issues may affect how well organizational restructuring initiatives work. The small association ($r = 0.045$) between IROS and TFTAT, however, indicates that organizational redesign is not significantly impacted by technology adoption. All things considered, these correlation results highlight how crucial it is to address supply chain issues and embrace technology in order to boost business performance. They also point out areas that may require more research in order to fully comprehend the dynamics between these variables.

3.4.5 Regression Analysis and Hypothesis Testing

The researcher conducted a linear multiple regression analysis to establish the statistical significance relationship among independent variables (Impact of Technology on Redesigning Organizational Structure, Future Technology Adoption & Integration and Current Supply Chain Challenges.) and the dependent variable (company's Overall Redesigning Organizational Structure) using SPSS version 29 computer program. The regression analysis results were presented using regression model summary tables, analysis of variance (ANOVA) table, and beta coefficients table.

Model Summary

Table 3.13 Model explanation Summery

Mod e	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin- Watson
	0.879 ^a	0.772	0.769	5.28493	1.65
a. Predictors: (Constant), TIROS, TFTAT, TCSCC					
b. Dependent Variable: TCROS					

Where TCROS implies company's Overall Redesigning Organizational Structure, TIROS indicates Impact of technology enabled supply chain on Redesigning Organizational Structure, TFTAT indicates Future Technology Adoption & Integration and TCSCC imply Current Supply Chain Challenges.

The model summary offers a thorough summary of the regression analysis carried out to look at the variables affecting a business's overall organizational structure (TCROS). The dependent

variable and the predictors Impact on Redesigning organizational structure(IROS), Future Technology Adoption & Integration (TFTAT), and Current Supply Chain Challenges (TCSCC) have a strong positive relationship, as indicated by the correlation coefficient (R) of 0.879. This suggests that the factors taken together have a significant impact on company Redesigning organizational Structure. Since it suggests that improvements in these areas could result in improved overall Redesigning Organizational Structure, this strong correlation provides a great basis for additional investigation.

With an R Square score of 0.772, the model's predictors can account for roughly 77.2% of the variation in the business's overall Redesigning Organizational Structure. Given this high degree of explanatory power, it is likely that the variables selected are pertinent and useful in capturing the dynamics affecting Organizational Structure. Additionally, the model's robustness is confirmed by the Adjusted R Square value of 0.769, which supports the findings' dependability even when taking the number of predictors into consideration. These high numbers suggest that companies that concentrate on reorganizing their organizational structures, using new technology, and resolving supply chain issues will probably experience notable gains in overall operation.

Overall, this model summary shows a strong relationship between the predictors and company performance, highlighting important areas for organizations to focus on to achieve enhanced operational success. This is supported by the Durbin-Watson statistic of 1.65, which is close to the ideal value of 2, which suggests that there is no significant autocorrelation in the residuals. The standard error of the estimate, reported as 5.28493, provides insight into the average distance that the observed values fall from the regression line, indicating the model's accuracy in predicting performance; a lower standard error would suggest better predictive capability; therefore, while the current value is acceptable, there may still be room for improvement in the model.

Table 3.14 Analysis of Variance (ANOVA)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21346.046	3	7115.349	254.752	.000 ^b
	Residual	6312.284	226	27.930		
	Total	27658.330	229			
a. Dependent Variable: TCROS						
b. Predictors: (Constant), TIROS, TFTAT, TCSCC						

The table's Analysis of Variance (ANOVA) results offer important new information about how the dependent variable, Total Overall company redesigning organizational structure (TCROS), and the predictors, Impact of technology enabled supply chain on Redesigning organizational structure (TIROS), Future Technology Adoption and Integration (TFTAT), and Current Supply Chain Challenges (TCSCC), relate to one another. The variability explained by the model is indicated by the regression sum of squares, which is reported as 21,346.046. This high number implies that the predictors as a whole explain a sizable amount of the variation in business organizational structure, which is corroborated by the total sum of squares of 27,658.330. The possible influence of the predictors Overall company redesigning organizational structure (OCROS) is demonstrated by the difference between these numbers.

One important measure of the model's overall importance is the F-statistic, which is 254.752. When compared to a model without predictors, a high F-value indicates that the regression model considerably enhances the dependent variable's prediction. In this instance, at least one of the predictors is statistically significant in explaining the variance in TCROS, as indicated by the F-statistic being significantly high. This is further supported by the associated significance value (p-value) of .000, which is significantly lower than the accepted cutoff of 0.05. This high relevance suggests that the model offers a solid foundation for comprehending the roles that TIROS, TFTAT, and TCSCC play in the overall operation of the business.

Additionally, the residual sum of squares, which represents the variation in TCROS that the model is unable to account for, is reported as 6,312.284. The average variability attributable to the model vs the error is shown by the regression's mean square (7,115.349) and the residual's (27.930). The

substantial disparity between these mean squares supports the predictors' ability to adequately explain Redesigning organizational structure variances. All things considered, the ANOVA results highlight the significance of TIROS, TFTAT, and TCSCC as major factors influencing business performance, indicating that focused advancements in these domains may result in appreciable gains in overall operational effectiveness. So, we can reject the Null Hypothesis (H0) and accept the alternative hypothesis which means the Future technology adoption, the supply chain challenges and then technology-based supply chain redesigning organizational structure have an impact on the dependent variable Overall company redesigning organizational structure (TCROS)

Table 3.15 Coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.909	1.971		-.461	.645
	TCROS	1.680	0.132	0.424	12.755	.000
	TCROS	1.595	0.091	0.557	17.504	.000
	TIROS	1.027	0.087	0.394	11.823	.000
a. Dependent Variable: TCROS						

The coefficients table offers crucial information about how each of the three predictors Impact of technology enabled supply chain on redesigning Organizational structure (TIROS), Future Technology Adoption and Integration (TFTAT), and current supply chain Challenges (TCSCC) contributes to the dependent variable, overall company redesigning organizational structure (TCROS) When all other variables are held constant, the unstandardized coefficients show how much TCROS changes when each predictor is increased by one unit. For example, TCSCC's coefficient is 1.680, meaning that for every unit increase in supply chain facilities, overall business Redesigning organizational structure rises by 1.680 units. This favorable correlation implies that resolving supply chain problems can greatly improve Redesigning organizational structure result. With the highest standardized coefficient in this instance (0.557), TFTAT appears to have the greatest influence on TCROS in comparison to the other variables.

This research highlights how important it is to embrace and integrate technology in order to improve overall business success and Redesigning Organizational Structure. The standardized coefficient for TIROS is 0.394, whereas the value for TCSCC is 0.424. Despite the fact that all of the predictors had p-values of .000, which suggests that they are statistically significant, the findings show that in order to, effectively, improve performance and organizational redesigning, firms must give priority to technology advancements.

Each predictor's t-values provide additional evidence of its importance in the model. A substantial correlation between TFTAT and TCROS is indicated by the high t-value (17.504), indicating that the impact of technology adoption is both statistically significant and practically important. Likewise, the significant t-values for TIROS (11.823) and TCSCC (12.755) support their contributions to the model. The results are strong and unlikely to have happened by accident, as demonstrated by the statistical significance of these predictors, which is shown by p-values of .000. Thus, these elements must to be taken into account by organizations as important forces behind Organizational Structure enhancement.

Remarkably, the constant term is not statistically significant ($p = 0.645$) despite being negative (-0.909). This suggests that the model forecasts a negative baseline Redesigning organizational structure when all predictors are zero, which might not be relevant in real-world scenarios. This finding, however, implies that the model is more about comprehending the contributions of TCSCC, TFTAT, and TIROS than it is about creating a meaningful Redesigning organizational structure baseline because the main focus is on the predictors. All things considered, the coefficients table shows how important each predictor is in affecting the overall Redesigning organizational structure of the business, offering useful information to businesses looking to improve their operational efficiency.

The following is the model specification for forecasting the overall Company's Redesigning organizational structure which is based on the regression findings shown in the coefficients table:

$$\text{TCROS} = -0.909 + 1.680 \times \text{TCSCC} + 1.595 \times \text{TFTAT} + 1.027 \times \text{TIROS}$$

When all other variables are held constant, the unstandardized coefficients in this model show how the TCROS changes for each unit increase in the corresponding predictor variables. The model would theoretically predict a no residing an organization if all predictors were equal to zero, as

indicated by the constant term of -0.909. This discovery provides a baseline from which the beneficial effects of the predictors may be evaluated, even if it may not have any practical significance. However, the main emphasis is on how TCSCC, TFTAT, and TIROS contribute to Redesigning Organizational Structure.

The Current Supply Chain Challenges (TCSCC) coefficient is 1.680, meaning that there is a 1.680 unit rise in TCROS for every unit increase in elements of SCC. This beneficial relationship emphasizes how crucial it is to solve supply chain problems in order to improve overall organizational structure. Future Technology Adoption and Integration (TFTAT), on the other hand, have the largest influence on TCROS, as seen by its highest coefficient of 1.595. This finding highlights that companies who prioritize the adoption of technology should anticipate notable enhancements in the overall Company's Redesigning Organizational Structure.

With a value of 1.027, the Impact of technology on Redesigning organizational structure (IROS) likewise makes a positive contribution to TCROS. The standardized coefficient of 0.394 and t-value of 11.823 show that despite having a somewhat smaller impact than TFTAT and TCSCC, it is still a major component of the entire model. This implies that improving business performance can also be greatly aided by efficient organizational restructuring. With p-values of .000, all predictors are statistically significant, demonstrating their dependability in elucidating TCROS differences.

All things considered, this model specification emphasizes how important TCSCC, TFTAT, and TIROS are in determining the overall Redesigning organizational structure of the business. Improvements in these areas are probably going to result in better Redesigning organizational structure results, according to the significant positive coefficients. Because these tactics together lead to better Redesigning organizational structure in a ruthless business climate, companies looking to maximize their operational effectiveness should concentrate on resolving supply chain issues, embracing new technologies, and putting effective organizational changes into place.

CHAPTER IV

CONCLUSION AND RECOMMENDATION

4.1 Introduction

This chapter summarizes the key findings of the study and presents actionable recommendations based on the analysis of how technology -enabled supply chain enhancements influence organizational restructuring in Ethiopian transformer manufacturing firms. Drawing from both quantitative and qualitative insights, the conclusions highlight the strategic importance of technology adoption, supply chain responsiveness, and structural agility. The recommendations aim to guide industry stakeholders in implementing effective interventions that support transformation and competitiveness in rapidly evolving market

4.2 conclusions

The impact of supply chain enhancements made possible by technology on company's overall redesigning organizational structure on Ethiopian transformer manufacturing firms in this chapter Participants' significant involvement is indicated by the high response rate of 97.5%, which reflects their keen interest in the survey's topic. A large percentage of managers and supervisors have bachelor's degrees, according to the demographic analysis, which is crucial for understanding the viewpoints that guide the research. These respondents' insights demonstrate how important education and experience are in determining the sector's organizational dynamics.

The important relationships between the variables under study are highlighted by the inferential analysis, especially through regression and correlation. According to the regression model summary, the predictors The Technology Impact of Redesigning organizational structure(IROS), Future Technology Adoption and Integration (TFTAI), and Current Supply Chain Challenges (TCSCC) explain roughly 77.2% of the variance in Company Overall redesigning organizational structure(TCROS). This is indicated by the strong correlation coefficient ($R = 0.879$). The necessity for focused interventions is further supported by the high R-squared value, which shows that gains in these areas can significantly improve company overall redesigning organizational structure.

Significant relationships between TCROS and the independent variables are also revealed by correlation analysis. For example, the positive correlation coefficients ($r = 0.582$ for TFTAT and $r = 0.551$ for TCSCC) indicate that firms tend to perform better overall as they solve supply chain issues and enhance their technology use. These correlations are statistically significant ($p < 0.001$), suggesting that the results are solid and should be taken into account when making strategic plans. The regression analysis's coefficients also show how each predictor affects overall Redesigning organizational structure in relation to the others. Interestingly, TFTAT has the highest standardized coefficient (0.557), indicating that the most important element in improving company overall redesigning organizational structure is technology adoption. Decision-makers should take note of this study since it highlights how important it is to give technology integration top priority in order to increase supply chain responsiveness and efficiency.

In conclusion, the results of both descriptive and inferential studies offer strong proof that strengthening company's overall redesigning organizational structures inside Ethiopian transformer manufacturing enterprises requires technology-enabled supply chain enhancements. Furthermore, interviewees confirmed the anticipated positive impacts of technology, stating it would have "a positive impact in company decision making and structural change" as well as "performance increment." This aligns with Information Processing Theory, which suggests that digital technologies enhance an organization's ability to gather, process, and disseminate information across the supply chain, leading to more informed and effective decision-making, ultimately contributing to structural adjustments and improved overall performance, as anticipated by the respondents and interviewees.

These businesses can greatly increase their operational effectiveness and competitiveness in a market that is becoming more globalized by tackling the issues that have been highlighted and concentrating on technology adoption. The knowledge gathered from this study not only guides present procedures but also establishes the framework for upcoming studies and sector-wide strategic projects.

4.3 Recommendations

The following suggestions are put out in light of the analysis's results in order to conform to the particular goals of the research:

1. Perform a thorough analysis of supply chain inefficiencies

A detailed analysis that pinpoints particular bottlenecks and inefficiencies in supplier coordination, logistics, and procurement is necessary to solve the major supply chain inefficiencies impacting Ethiopian transformer makers. Both quantitative measurements (like lead times and cost analysis) and qualitative insights (like employee feedback) should be included in this evaluation. Value stream mapping and root cause analysis are two techniques that can be used to streamline operations by facilitating targeted interventions and offering actionable insights.

2. Establish Digital Technology Pilot Programs

Implementing pilot initiatives that integrate cutting-edge technologies like Enterprise resource Planning (ERP), block chain, artificial intelligence, and the Internet of Things is advised in order to assess how digital technologies might improve supply chain processes. Particular topics like inventory control, real-time tracking, and predictive analytics ought to be the main emphasis of these programs. Manufacturers can collect empirical evidence of these technologies' efficacy by assessing their Redesigning organizational structure outcomes in a controlled setting. This evidence can then be used to support wider implementation throughout the business.

3. Develop a Framework for Technology-Driven Organizational Restructuring

Creating a thorough framework that combines organizational change management concepts with technology advancements is essential to examining how supply chain enhancements powered by technology can result in successful organizational restructuring. The framework ought to delineate optimal methodologies for harmonizing technology adoption with corporate objectives, including staff training initiatives and tactics for cultivating an innovative culture. It is also necessary to set up continuous evaluation procedures to determine how these modifications affect overall performance, enabling continued enhancement and adjustment to market conditions. Following these suggestions can help Ethiopian transformer manufacturers improve operations, deal with

supply chain bottlenecks, and reorganize their businesses to become more competitive and flexible in the global marketplace.

4. Limitations and Suggestions for Further Research

This study's concentration on a particular industry and geographic area limits its applicability, even if it offers insightful information about how technology-enabled supply chain improvements affect Ethiopian transformer makers. Additionally, the study uses data from surveys and interviews. Therefore, to improve the findings' relevance, future research should think about broadening the TCROS to encompass a wider range of manufacturing industries and geographic areas. A more dynamic understanding of these linkages across time may also be possible by integrating longitudinal research, which could offer deeper insights into the long-term implications of technology adoption on organizational Structure and supply chain efficiency.

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Annex 1

Regression Results

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.879 ^a	.772	.769	5.28493	1.402

a. Predictors: (Constant), TIROS, TFTAT, TCSCC

b. Dependent Variable: TCROS

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21346.046	3	7115.349	254.752	<.001 ^b
	Residual	6312.284	226	27.930		
	Total	27658.330	229			

a. Dependent Variable: TCROS

b. Predictors: (Constant), TIROS, TFTAT, TCSCC

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.909	1.971		-.461	.645		
	TCSCC	1.680	.132	.424	12.755	<.001	.913	1.096
	TFTAT	1.595	.091	.557	17.504	<.001	.998	1.002
	TIROS	1.027	.087	.394	11.823	<.001	.911	1.097

a. Dependent Variable: TCROS

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	(Constant)	Variance Proportions		
					TCSCC	TFTAT	TIROS
1	1	3.750	1.000	.00	.00	.00	.01
	2	.169	4.713	.02	.01	.04	.92
	3	.061	7.833	.01	.74	.26	.06
	4	.021	13.503	.98	.24	.69	.00

a. Dependent Variable: TCROS