THE IMPACT OF LOGISTICS AND TRANSPORTATION INFRASTRUCTURE ON SUPPLY CHAIN EFFICIENCY IN RWANDA

A CASE STUDY OF JBL LOGISTICS GROUP

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BBMR/2023/67332

A Research Project Submitted in Partial Fulfillment for the award of a degree in Bachelor of Business Management (Procurement Specialization) of Mount Kigali University

MAY 2026

DECLARATION

This Research study is my original work and has not been presented to any other Institution. no part of this research should be reproduced without the authors' consent or that of Mount Kigali University.

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Approval by the Supervisor

This research has been submitted with our approval as The Mount Kigali university supervisors.

Names: Mr. Ngunjiri Samuel

Sign_____ Date _____

DEDICATION

This research project is dedicated to my family for their continuous encouragement, support, and prayers throughout my academic journey. Their patience, sacrifice, and motivation inspired me to complete this work successfully.

I also dedicate this work to all students and researchers who are interested in logistics, transportation, and supply chain management in Rwanda and beyond.

ACKNOWLEDGEMENT

I thank Almighty God for granting me wisdom, strength, and good health throughout the preparation of this research project.

I would also like to express my sincere appreciation to my supervisor for the professional guidance, corrections, and encouragement provided during the entire research process.

Special appreciation goes to Mount Kigali University lecturers for the knowledge and skills they provided throughout my studies.

Finally, I thank all respondents who participated in this study and my family and friends for their moral and emotional support.

ABSTRACT

The study examined the impact of logistics and transportation infrastructure on supply chain efficiency in Rwanda, with evidence from selected supply chain stakeholders in Kigali. The study was motivated by the increasing challenges faced by organizations in ensuring effective supply chain performance despite government investments in transportation infrastructure and logistics development. The study adopted a descriptive research design. Data were collected from 30 respondents including procurement officers, transport operators, warehouse staff, and supply chain personnel from selected organizations operating in Kigali. Purposive sampling technique was used to select respondents with knowledge and experience in logistics and supply chain operations. Primary data were collected using structured questionnaires, while secondary data were obtained from books, journals, and institutional reports. The findings revealed that transportation infrastructure significantly influences supply chain efficiency. Factors such as road conditions, transportation costs, fuel prices, and border clearance procedures were found to affect delivery reliability, operational costs, and movement of goods. The study further established that logistics challenges such as poor coordination, limited technology adoption, inventory management problems, and high operational costs negatively affect supply chain performance. The study concluded that both logistics systems and transportation infrastructure play a major role in determining supply chain efficiency in Rwanda. Effective supply chain performance requires improvements in logistics coordination alongside investment in transportation infrastructure. The study recommends that the government should continue improving road infrastructure and transport systems while organizations should invest in technology and strengthen logistics coordination to improve efficiency.

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LIST OF ABBREVIATIONS AND ACRONYMS

BBM	Bachelor of Business Management
ICT	Information and Communication Technology
MININFRA	Ministry of Infrastructure
RRA	Rwanda Revenue Authority
RTDA	Rwanda Transport Development Agency
SCM	Supply Chain Management
SPSS	Statistical Package for Social Sciences
APA	American Psychological Association
GDP	Gross Domestic Product
JIT	Just-In-Time
ICT4D	Information and Communication Technology for Development
UNCTAD	United Nations Conference on Trade and Development
WB	World Bank

DEFINITION OF KEY TERMS

Logistics	Logistics refers to the planning, implementation, and control of the movement and storage of goods and services from the point of origin to the final consumer in an efficient and cost-effective manner.
Transportation Infrastructure	Transportation infrastructure refers to physical facilities such as roads, bridges, transport routes, and border systems that support the movement of goods and services.
Supply Chain Efficiency	Supply chain efficiency refers to the ability of an organization to deliver goods and services in a timely, reliable, and cost-effective manner while meeting customer needs.
Warehouse Management	Warehouse management refers to the process of organizing, controlling, and monitoring storage activities to ensure efficient handling and movement of goods.
Transport Networks	Transport networks refer to interconnected transport routes and systems that facilitate the movement of goods from one location to another.
Inventory Management	Inventory management refers to the process of controlling and maintaining stock levels to ensure the availability of goods while minimizing storage costs.
Customer Satisfaction	Customer satisfaction refers to the level at which customers' expectations regarding service delivery, reliability, and product availability are met.
Logistics Costs	Logistics costs refer to expenses associated with transportation, warehousing, inventory handling, and distribution activities within the supply chain.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This chapter presents the background of the study, statement of the problem, objectives of the study, research questions, scope of the study, significance of the study, and organization of the study.

1.1 Background of the Study

Globally, logistics and transportation infrastructure play a crucial role in enhancing supply chain efficiency and competitiveness. Logistics costs account for approximately 8% of GDP in developed economies, while countries with well-developed logistics systems report up to 15% lower supply chain operating costs (World Bank, 2023). Efficient transportation infrastructure can reduce lead times by up to 20%, lower inventory holding costs, and improve delivery reliability, all of which are essential for organizational performance and competitiveness (Chopra & Meindl, 2019).

In Africa, logistics inefficiencies remain a major challenge, with logistics costs accounting for 30% to 50% of the final cost of goods nearly four times the global average (World Bank, 2023). Poor road infrastructure, border delays, and fragmented transport systems increase freight costs by about 40% compared to other developing regions (UNCTAD, 2022). These inefficiencies cost African economies approximately 2% of GDP annually and continue to hinder regional trade integration under the African Continental Free Trade Area (AfCFTA), where intra-African trade remains low at about 15% of total exports (African Development Bank, 2022).

In Rwanda, these challenges are more pronounced due to its landlocked position. The country relies heavily on transport corridors through Kenya, Tanzania, and Uganda for more than 90% of its imports and exports. Cargo movement along the Northern Corridor from Mombasa to Kigali takes approximately 14 to 21 days, with border delays contributing up to 30% of total transit time (TradeMark East Africa, 2022). According to the World Bank Logistics Performance Index (2023), Rwanda ranks 91st out of 139 countries, scoring 2.8/5.0 for infrastructure quality and 2.6/5.0 for logistics competence. At the enterprise level, 67% of

businesses report transportation delays as a major operational challenge, while 54% cite high freight costs as a barrier to growth (Rwanda Private Sector Federation, 2022).

JBL Logistics Group, operating within Rwanda and the wider East African region, is directly affected by these logistics constraints. The company is involved in freight forwarding, customs clearance, warehousing, and last-mile distribution, all of which are impacted by transportation delays, high logistics costs, and infrastructure inefficiencies. These challenges negatively affect supply chain efficiency and service delivery performance. Therefore, this study examines the impact of logistics and transportation infrastructure on supply chain efficiency at JBL Logistics Group, contributing empirical evidence to address existing gaps in the Rwandan logistics sector literature.

1.2 Statement of the Problem

Despite Rwanda's significant investments in logistics and transportation infrastructure through road network expansion, transport policy reforms, and regional trade facilitation initiatives under the African Continental Free Trade Area (AfCFTA), supply chain inefficiencies continue to affect organizational performance in the country (African Development Bank, 2022; World Bank, 2023). These inefficiencies are reflected in persistent challenges such as transportation delays, high logistics costs, unreliable delivery systems, and weak coordination among supply chain actors, which negatively impact operational efficiency and customer satisfaction (Rwanda Private Sector Federation, 2022; World Bank, 2023). Rwanda still ranks 91st out of 139 countries on the Logistics Performance Index, indicating ongoing weaknesses in infrastructure quality and logistics competence (World Bank, 2023). Although existing studies have examined logistics systems and transportation infrastructure separately, limited research has focused on their combined effect on supply chain efficiency in Rwanda. This creates a knowledge gap in understanding how these factors jointly influence organizational performance. Therefore, this study seeks to examine the impact of logistics and transportation infrastructure on supply chain efficiency in Rwanda, with a case study of JBL Logistics Group.

1.3 Objectives of the Study

1.3.1 General Objective

To examine the impact of logistics and transportation infrastructure on supply chain efficiency in Rwanda, with a case study of JBL Logistics Group.

1.3.2 Specific Objectives

i. To assess the effect of transport infrastructure quality on supply chain efficiency at JBL Logistics Group.

ii. To determine how transport networks and facilities influence supply chain efficiency at JBL Logistics Group.

iii. To examine how warehouse management affects supply chain efficiency at JBL Logistics Group.

1.4 Research Questions

i. How does transport infrastructure quality affect supply chain efficiency at JBL Logistics Group?

ii. How do transport networks and facilities influence supply chain efficiency at JBL Logistics Group?

iii. How does warehouse management affect supply chain efficiency at JBL Logistics Group?

1.5 Significance of the Study

This study will be significant to policymakers as it will provide evidence on how logistics and transportation infrastructure influence supply chain performance, helping in the formulation of more effective transport and trade facilitation policies in the future. It will also be useful to supply chain practitioners, as it will identify key logistics challenges and provide insights that can be applied to improve operational efficiency, reduce delays, and enhance service delivery. Furthermore, the study will serve as a reference for future researchers and students by contributing to the existing body of knowledge and supporting further studies in logistics, transportation, and supply chain management.

1.6 Limitations of the Study

The findings of this study may be limited in terms of generalizability because it focuses on JBL Logistics Group, which operates under specific organizational structures, operational procedures, and market conditions that may differ from other logistics firms in Rwanda. Additionally, access to some operational data and strategic information may be restricted due to company confidentiality policies, which could limit the depth of analysis. The study is also influenced by the accuracy and honesty of responses provided by respondents, which may introduce response bias. Furthermore, external factors such as changes in government transport regulations and regional trade conditions during the study period may affect supply chain performance but remain beyond the researcher's control.

1.7 Scope of the Study

1.7.1 Content Scope

This study focused on logistics systems, transportation infrastructure, and supply chain efficiency, specifically examining how these factors influence operational performance within logistics operations.

1.7.2 Geographical Scope

The study was conducted in Kigali, Rwanda, where JBL Logistics Group operates and carries out its logistics and transportation activities.

1.7.3 Time Scope

The study covered the period from 2020 to 2025 in order to assess recent trends and developments in logistics and transportation infrastructure affecting supply chain efficiency.

1.8 Organization of the Study

The study is organized into five chapters. Chapter One presents the introduction of the study. Chapter Two presents literature review. Chapter Three discusses the research methodology. Chapter Four presents data analysis and discussion of findings. Chapter Five presents summary, conclusion, and recommendations

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter presents a review of related literature on logistics systems, transportation infrastructure, and supply chain efficiency. It includes theoretical literature, empirical studies, critical review and research gap identification, and the theoretical framework. The aim is to build a strong conceptual foundation for analyzing the impact of logistics and transportation infrastructure on supply chain efficiency

2.1 Theoretical Literature

2.1.1 Concept of Logistics

Logistics refers to the process of planning, implementing, and controlling the efficient flow and storage of goods and services from the point of origin to the final consumer. According to Waters (2003), logistics ensures that products are delivered at the right place, at the right time, and in the right condition. Recent studies further emphasize that modern logistics systems integrate transportation, warehousing, inventory management, and information flow to improve operational performance and supply chain resilience (Mehmood et al., 2024; Khare, 2024). Efficient logistics systems are therefore essential in reducing operational costs, improving service delivery, and enhancing customer satisfaction in competitive markets.

2.1.2 Transportation Infrastructure

Transportation infrastructure refers to the physical and organizational systems that support the movement of goods and services, including roads, railways, airports, and border facilities. Simchi-Levi et al. (2008) note that effective transport infrastructure is a key determinant of supply chain efficiency because it reduces delays and logistics costs. Recent research confirms that improvements in transport infrastructure significantly enhance logistics performance by enabling faster delivery, better connectivity, and reduced operational disruptions in supply chains (Bayraktar et al., 2024; Wong et al., 2024). Conversely, weak infrastructure increases inefficiencies, especially in developing economies where transport systems remain fragmented and costly.

2.1.3 Supply Chain Efficiency

Supply chain efficiency refers to the ability of organizations to deliver goods and services in a timely, cost-effective, and reliable manner. Efficient supply chains are characterized by reduced operational costs, improved responsiveness, and high customer satisfaction. Recent literature highlights that supply chain efficiency is closely linked to logistics integration, transport reliability, and coordination among stakeholders (Lücker et al., 2024; Ataburo et al., 2024). Furthermore, modern supply chain systems must balance efficiency with resilience, especially in environments exposed to disruptions such as transport delays, infrastructure limitations, and global supply uncertainties.

2.2 Empirical Literature Review

2.2.1 Global Perspective

Global studies consistently show that transportation infrastructure and logistics systems are key determinants of supply chain efficiency. The World Bank Logistics Performance Index (Arvis et al., 2023) established that top-performing countries in logistics record 30% lower trade costs and 20% faster delivery times than poorly ranked nations. Aydas, Ross, and Parker (2020) further demonstrated that countries with efficient transport networks achieve up to 25% higher export volumes, attributing this advantage primarily to reduced freight costs and improved delivery reliability. Christopher (2016) similarly found that coordinated logistics management reduces supply chain operating costs by up to 15% while improving order fulfillment rates. More recently, Wang et al. (2024) reported that enhanced transport connectivity cuts average lead times by 22%, while Lücker et al. (2024) found that firms in well-connected transport environments experience 35% fewer supply chain disruptions. These findings collectively affirm that logistics infrastructure investment yields direct and measurable supply chain efficiency gains.

2.2.2 African Perspective

In Africa, inadequate transportation infrastructure remains the most significant constraint on supply chain efficiency. The African Development Bank (2022) estimates that infrastructure deficiencies cost the continent 2% of GDP annually and reduce firm productivity by up to 40% in severely affected economies. The World Bank (2023) reports that logistics costs

consume between 30% and 50% of product value across many African countries up to six times the global average of 8% severely undermining business competitiveness. Kshetri (2018) found that 72% of firms across six Sub-Saharan African countries experienced supply chain disruptions caused by poor road networks, while 65% reported logistics costs exceeding 30% of total operating expenses. Despite the potential of the African Continental Free Trade Area (AfCFTA) to grow intra-African trade from 15% to 25% of total exports, the African Development Bank (2022) warns that these targets remain unachievable without coordinated investment in cross-border transport infrastructure.

2.2.3 Rwandan Context

In Rwanda, empirical evidence points to transportation infrastructure as a critical bottleneck in supply chain operations. A survey by the Rwanda Private Sector Federation (2022) found that 67% of businesses considered transportation delays their primary operational challenge, while 54% identified high freight costs as a major growth barrier with logistics expenses averaging 28% of total operating costs in the manufacturing sector. Although Rwanda has improved its logistics environment, increasing paved roads from 19% in 2010 to 32% in 2022 and cutting customs clearance times by 40% through the Electronic Single Window system, it still ranked 91st out of 139 countries on the World Bank Logistics Performance Index (2023), scoring 2.8 out of 5.0 on infrastructure quality. At the firm level, Bwatete and Irechukwu (2024) found that transportation management practices explained 43% of the variance in supply chain efficiency among Rwandan manufacturing firms, while Mwizerwa and Akumuntu (2023) demonstrated that structured warehouse management systems yielded 30% improvements in order accuracy and 22% reductions in inventory holding costs, underscoring the role of logistics management quality in compensating for infrastructure limitations.

2.3 Critical Review and Research Gap Identification

The reviewed literature from global, African, and Rwandan contexts consistently shows that logistics and transportation infrastructure are key determinants of supply chain efficiency. Globally, studies such as Arvis et al. (2023), Christopher (2016), and Wang et al. (2024) demonstrate that well-developed transport systems reduce logistics costs, shorten lead times, and improve delivery reliability. In Africa, evidence from the World Bank (2023), African

Development Bank (2022), and Kshetri (2018) indicates that weak infrastructure and high transport costs significantly disrupt supply chain operations and reduce competitiveness. In the Rwandan context, studies by the Rwanda Private Sector Federation (2022), Bwatete and Irechukwu (2024), and Mwizerwa and Akumuntu (2023) confirm that transport delays, high freight costs, and limited logistics efficiency continue to affect business performance.

Despite these contributions, several research gaps remain. First, most global and regional studies focus on logistics performance at a macro or national level, with limited emphasis on firm-level supply chain efficiency. Second, studies conducted in Rwanda mainly concentrate on specific sectors such as manufacturing and agro-processing, with little attention given to logistics service providers who play a central role in supply chain operations. Third, there is no known study that has specifically examined the supply chain efficiency challenges faced by JBL Logistics Group, despite its key role in freight forwarding, warehousing, customs clearance, and distribution services in Rwanda and the East African region.

Therefore, this study addresses these gaps by providing firm-level empirical evidence on the impact of logistics and transportation infrastructure on supply chain efficiency at JBL Logistics Group, thereby contributing to the limited literature on logistics service providers in Rwanda

2.4 Theoretical Framework

This study is guided by three main theories that explain the relationship between logistics systems, transportation infrastructure, and supply chain efficiency. These theories provide a strong foundation for understanding how infrastructure and logistics operations influence overall supply chain performance.

2.4.1 Systems Theory

Systems Theory, developed by Ludwig von Bertalanffy in 1968, explains that organizations function as interconnected and interdependent systems where each component influences overall performance. In the context of supply chains, logistics activities such as transportation, warehousing, and inventory management are closely linked. A failure or inefficiency in one component, such as transportation delays, can disrupt the entire supply chain system, leading to increased costs and reduced efficiency.

2.4.2 Supply Chain Management Theory

Supply Chain Management (SCM) Theory emphasizes the integration and coordination of activities among suppliers, manufacturers, transporters, and customers to achieve efficient flow of goods and information. According to Mentzer et al. (2001), effective coordination within the supply chain improves operational efficiency, reduces costs, and enhances customer satisfaction. This theory is relevant to the study as it highlights the importance of collaboration and integration in achieving supply chain efficiency.

2.4.3 Institutional Theory

Institutional Theory, developed by Meyer and Rowan (1977), explains how organizational behavior is shaped by external structures such as government policies, regulations, and institutional frameworks. In logistics and transportation, government investment in infrastructure, trade regulations, and transport policies significantly influence how organizations operate. This theory is relevant to this study because it explains how the external environment in Rwanda affects logistics performance and supply chain efficiency.

2.5 Conceptual Framework

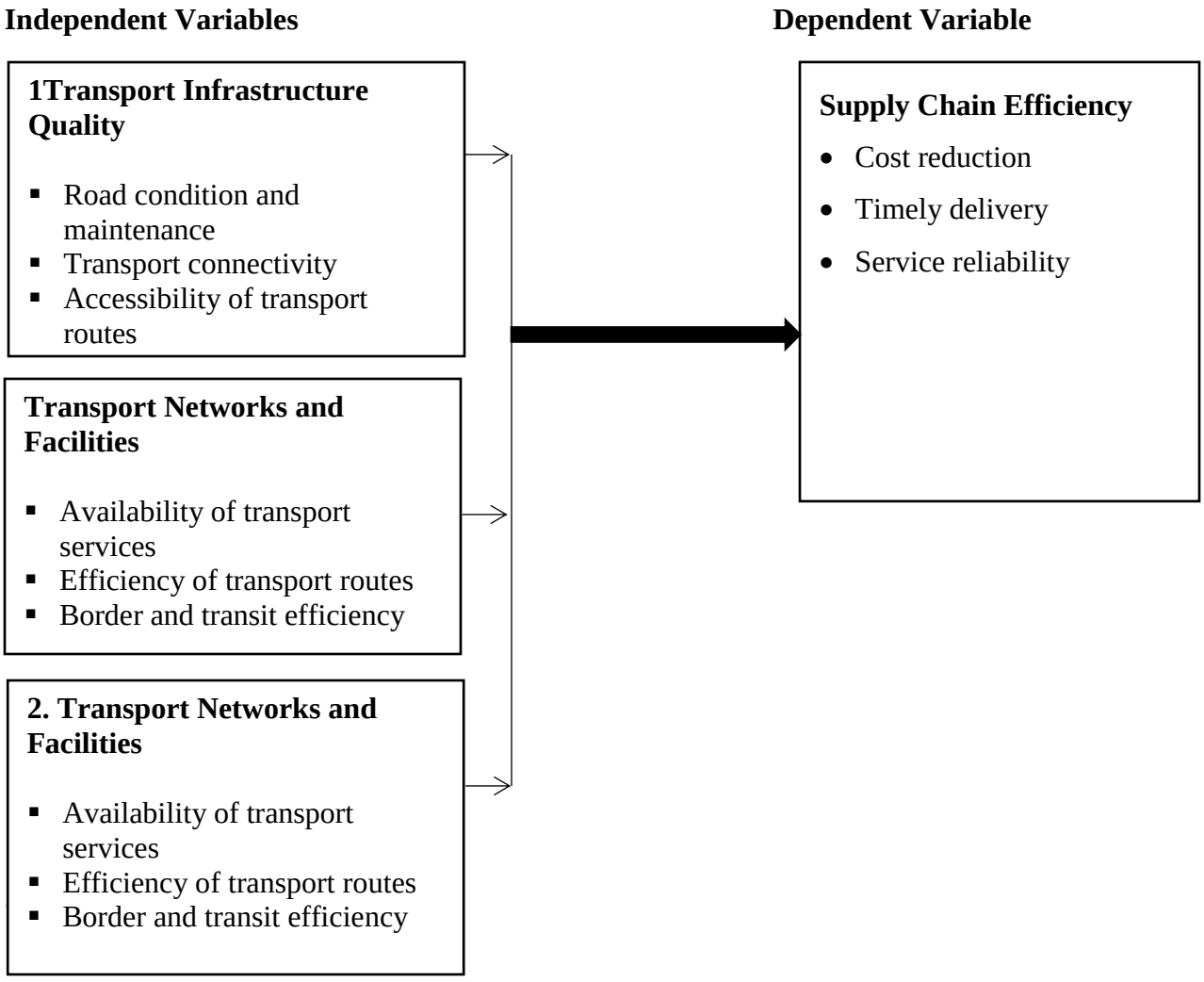

Figure 2. 1 Conceptual Framework

Source: Researcher, 2026

2.6 Summary

This chapter reviewed related literature on logistics systems, transportation infrastructure, and supply chain efficiency. The theoretical literature highlighted key concepts such as logistics, transport infrastructure, and supply chain efficiency, showing how they are interconnected in influencing organizational performance. The empirical literature review, drawn from global, African, and Rwandan studies, revealed that efficient logistics and well-developed transport infrastructure improve supply chain performance by reducing costs,

improving delivery time, and enhancing reliability. However, it also showed that many developing countries, including Rwanda, still face challenges such as transport delays, high logistics costs, and infrastructure limitations. The chapter further identified a research gap in the limited focus on the combined effect of logistics and transportation infrastructure at the firm level. Finally, the theoretical and conceptual frameworks were presented to guide the relationship between the study variables and support the analysis of supply chain efficiency at JBL Logistics Group.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the research methodology that will be used in the study. It includes the research design, study area, target population, sample design, data collection methods, validity and reliability of instruments, data analysis procedures, and ethical considerations. The purpose of this chapter is to explain how data will be collected, analyzed, and interpreted to achieve the study objectives.

3.1 Research Design

This study will adopt a quantitative research design using a case study approach. A case study design is appropriate because it allows an in-depth investigation of logistics and transportation infrastructure within a specific organization, in this case JBL Logistics Group. The quantitative approach will enable the collection and analysis of numerical data. In addition, the study will employ regression analysis to examine the effect of transport infrastructure quality, transport networks and facilities, and warehouse management on supply chain efficiency at JBL Logistics Group.

3.1.1 Research Setting

The study will be conducted at JBL Logistics Group, located in Kigali, Rwanda. The company is involved in freight forwarding, warehousing, customs clearance, and distribution services within Rwanda and the East African region. Kigali serves as the main logistics hub due to its strategic location and connectivity to regional transport corridors.

3.2 Target Population

The target population of this study will consist of employees of JBL Logistics Group who are involved in logistics and supply chain operations, including staff from transportation, warehousing, operations management, customs clearance, and customer service departments. These employees are selected because they possess relevant knowledge and experience related to logistics systems and transportation infrastructure within the organization. According to JBL Logistics Group records (2025), the total population of these employees is 90 staff members.

3.3 Sample Design

3.3.1 Sample Size

The sample size for this study will be determined using Yamane's formula (1967):

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

Where:

- n= sample size
- N= target population (90)
- e= margin of error (0.05)

Substituting the values:

$$n = \frac{N}{1+N(e)^2} = \frac{90}{1+90(0.05)^2} = 73$$

Therefore, the sample size for this study will be approximately 73 respondents.

3.3.2 Sampling Technique

The study will use a stratified random sampling technique to ensure that all key departments involved in logistics and supply chain operations are adequately represented. The target population will first be divided into strata based on departments, including transportation, warehousing, operations management, customs clearance, and customer service. After stratification, simple random sampling will be used to select respondents from each department to ensure fairness and reduce selection bias. This technique is appropriate because it allows equal representation of all relevant groups while improving the accuracy and reliability of the study findings.

3.4 Data Collection Methods

3.4.1 Data Collection Instruments

This study will use questionnaires and interviews as the main data collection instruments. Questionnaires will be used to collect quantitative data from employees because they allow the researcher to reach many respondents efficiently and ensure uniformity of responses for statistical analysis. Interviews will be conducted with selected key informants such as

managers to obtain in-depth qualitative information on logistics operations and supply chain efficiency. These instruments are appropriate because they complement each other by providing both numerical data and detailed explanations. The questionnaires and interview guides will be attached in the appendices.

3.4.2 Procedures of Data Collection

The researcher will first obtain an introductory letter and permission from JBL Logistics Group management to conduct the study. After approval, questionnaires will be distributed personally to selected respondents and collected after completion within an agreed timeframe. Interviews will be conducted with key informants through scheduled appointments at convenient times. Before data collection, the researcher will explain the purpose of the study and ensure voluntary participation of respondents.

3.4.3 Reliability and Validity of Instruments

Reliability:

Reliability will be ensured through a pilot test conducted on a small group of respondents who are not part of the final sample. This will help test the consistency of the instruments. In addition, Cronbach's Alpha will be used to measure internal consistency, where a coefficient of 0.7 or above will be considered acceptable, indicating that the instruments will produce consistent results if applied in a similar study.

Validity:

Validity will be ensured by developing the instruments based on the study objectives and reviewing them with the research supervisor and other experts to confirm that they measure what they are intended to measure. The instruments will also be pre-tested to identify and correct any unclear or misleading questions before final data collection. This will enhance content and construct validity of the study tools.

3.5 Data Analysis

Data collected from the field will be analyzed using both quantitative and qualitative methods. Quantitative data obtained from questionnaires will be coded and entered into the Statistical Package for Social Sciences (SPSS) for analysis. Descriptive statistics such as frequencies, percentages, means, and tables will be used to summarize the findings.

Inferential statistics, including correlation and regression analysis, will be applied to examine the relationship between logistics and transportation infrastructure and supply chain efficiency. Qualitative data obtained from interviews will be analyzed thematically and presented in narrative form to support quantitative findings.

The regression model for the study will be expressed as:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where:

- **Y** = Supply Chain Efficiency
- **a** = Constant
- **β_1, β_2, β_3** = Regression coefficients
- **X_1** = Transport Infrastructure Quality
- **X_2** = Transport Networks and Facilities
- **X_3** = Warehouse Management and Capacity
- **e** = Error term

3.6 Ethical Considerations

The study will observe ethical research principles throughout the research process. Permission to conduct the study will be obtained from the relevant academic institution and JBL Logistics Group management before data collection. Informed consent will be sought from all respondents after explaining the purpose of the study and assuring them that participation is voluntary. Confidentiality and anonymity will be maintained by ensuring that respondents' identities and responses are not disclosed to unauthorized persons. The study will involve minimal risk to participants, and the information collected will be used strictly for academic purposes. In addition, all data collected will be securely stored and accessed only by the researcher and the supervisor.

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APPPENDICES

APPENDIX I: RESEARCH CONSENT FORM

Dear Respondent,

I am a student conducting a research study on "The Impact of Logistics and Transportation Infrastructure on Supply Chain Efficiency in Rwanda: A Case Study of JBL Logistics Group." You have been selected to participate in this study because of your experience and knowledge related to logistics and supply chain operations.

The purpose of this study is purely academic, and the information collected will be used only for research purposes. Your participation is voluntary, and you are free to decline or withdraw from the study at any time without any penalty or negative consequences.

All responses will be treated with strict confidentiality, and no personal identification such as names will be required. The researcher assures you that the information provided will be securely handled and will not be shared with any unauthorized persons.

By signing below, you indicate that you have understood the purpose of the study and voluntarily agree to participate.

Consent Declaration

I, _____, agree to participate in this research study. I understand that my participation is voluntary and that all information provided will remain confidential and used only for academic purposes.

Signature of Participant: _____ Date: _____

Signature of Researcher: _____ Date: _____

APPENDIX II: RESEARCH QUESTIONNAIRE

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (✔) the appropriate answer.

1. Gender

    a) Male

    b) Female

2. Age Group

    a) 18–25 years

    b) 26–35 years

    c) 36–45 years

    d) Above 45 years

3. Education Level

    a) Secondary Level

    b) Diploma

    c) Bachelor’s Degree

    d) Master’s Degree

    e) Other

4. Department

    a) Transportation

    b) Warehousing

    c) Operations

    d) Customer Service

    e) Customs Clearance

5. Work Experience

a) Less than 1 year

b) 1–3 years

c) 4–6 years

d) Above 6 years

SECTION B: TRANSPORT INFRASTRUCTURE QUALITY

(Please tick your level of agreement: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Statement	1	2	3	4	5
Road conditions affect transportation efficiency.					
Good transport connectivity improves logistics operations.					
Accessibility of transport routes influences delivery performance.					
Poor road infrastructure causes transportation delays.					
Well-maintained roads reduce transportation costs.					
Transport infrastructure improves movement of goods and services.					

SECTION C: TRANSPORT NETWORKS AND FACILITIES

(Please tick your level of agreement: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Statement	1	2	3	4	5
Availability of transport services improves supply chain operations.					
Efficient transport routes reduce delivery delays.					
Border and transit efficiency influence movement of goods.					
Reliable transport facilities improve customer service delivery.					
Transport networks support timely distribution of goods.					
Inadequate transport facilities increase operational challenges.					

SECTION D: WAREHOUSE MANAGEMENT AND CAPACITY

(Please tick your level of agreement: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

Statement	1	2	3	4	5
Adequate storage capacity improves inventory management.					
Inventory management systems improve operational efficiency.					
Warehouse organization improves service delivery.					
Proper warehouse management reduces product losses.					
Efficient warehousing improves timely delivery of goods.					
Warehouse technology enhances logistics operations.					