

THE ROLE OF TRANSPORT MANAGEMENT SYSTEMS IN IMPROVING LOGISTICS EFFICIENCY: A CASE STUDY OF LINK BUS SERVICES

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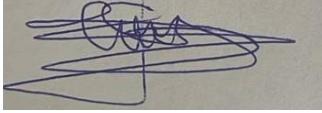
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Declaration

I, **Shiyemba Nissi**, declare that this dissertation with the title “*The role of Transport Management Systems in Improving Logistics Efficiency: A Case Study of Link Bus Services*” is my original work and has not been presented for a degree or any other academic award in any University or Institution of learning.

Signature

A rectangular box containing a handwritten signature in blue ink. The signature is stylized and appears to be 'S. Nissi'.

Date: ...20/04/2026

Approval

This is to certify that the research report by **Shiyemba Nissi**, of Registration Number **M23B12/105**, entitled “*The role of Transport Management Systems in Improving Logistics Efficiency: A Case Study of Link Bus Services*”, has been carried out under my supervision and is hereby approved for submission to the School of Business in partial fulfilment of the requirements for the award of the Bachelor of Procurement and Logistics Management degree of Uganda Christian University.

A handwritten signature in black ink, appearing to read 'Pamela Nagawa', with a stylized flourish at the end.

Signature:

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Ms. PAMELA NAGAWA

Dedication

This dissertation is dedicated to all procurement and logistics practitioners in Uganda, particularly those in the transport and passenger services sector, who tirelessly work to modernize operations, reduce inefficiencies, and deliver reliable, affordable services to millions of passengers every day.

Acknowledgement

First and foremost, I give glory and honour to the Almighty God for His unfailing love, wisdom, and good health that enabled me to complete this dissertation successfully.

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May God richly bless you all.

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List of Abbreviations

EAC: East African Community

ERP: Enterprise Resource Planning

GDP: Gross Domestic Product

MoWT: Ministry of Works and Transport

NDP III: National Development Plan III

PPDA: Public Procurement and Disposal of Public Assets Authority

RBV: Resource-Based View

SPSS: Statistical Package for the Social Sciences

TLB: Transport Licensing Board

TMS: Transport Management Systems

UBOS: Uganda Bureau of Statistics

UNRA: Uganda National Roads Authority

VRIN: Valuable, Rare, Inimitable, Non-substitutable

Abstract

This paper has discussed the importance of use of Transport Management Systems (TMS) in enhancing the efficiency of logistics of the Link Bus Services which is a leading passenger transport company in Uganda. Although digital tools are increasingly used in the transport industry, there is a paucity of empirical demonstrations regarding the actual benefits of TMS components of vehicle/bus tracking, route optimisation, fleet management and carrier (driver/ Schedule) management to on-time performance, cost reduction and passenger satisfaction in developing countries.

The study was based on the Resource-Based View (RBV) theory and followed the descriptive case study design. The primary data were gathered using our self-administered questions, to 38 purposely sampled employees (95% response rate) who were the immediate participants in the logistics operation at the Link bus services. Analysis of the data was done by descriptive statistics (means and standard deviations) and Pearson correlation in SPSS.

Results indicated high positive perceptions in all the TMS components, and a composite mean of 4.13 (SD = 0.68) on 5-point Likert scale. Vehicle/bus tracking had the highest score (mean = 4.24) and then fleet management (mean = 4.13). The positive and statistically significant relationships were observed between all components and the overall logistics efficiency ($r = 0.76$ to 0.81 , $p < 0.01$), which proves that all four TMS elements are mutually supporting. Nevertheless, the respondents noted that there are still constant problems such as network instability, lack of training, hardware breakdown and high maintenance charges.

The research finds that TMS is an important intervention at improving the logistics efficiency of Link Bus Services through increased visibility, optimisation and resource utilisation, which explains the RBV assumption of technological resources duly integrated to generate sustainable competitive advantage. Suggestions comprise network infrastructure upgradation, institutionalisation of periodic training of the staff, and the creation of specific TMS support. It is promoted that policymakers should create national TMS standards and also provide incentives on digital adoption in the passenger transport industry.

The results have been added to the current sparse body of knowledge on the use of TMS in passenger transport sector in Uganda and offer a practical perspective towards transport operators who want to revamp operations as per Vision 2040 and NDP III.

Keywords: *Transport Management Systems, logistics performance, Vehicle tracking, route optimisation, fleet management, passenger transport, Uganda, Link Bus Services.*

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The study of the role of transport management systems in improving efficiency of logistics is presented in this chapter beginning by giving background of the study which includes the problem and the purpose, objectives and research questions which inform the study. More so, it discovers the breadth, premise, value, and conceptualization.

1.1 Background of the Research

Logistics efficiency refers to the ability of the institution to manage the flow of people, services, and information on time, in a cost-effective and reliable manner (Christopher, 2016; Ballou, 2004). The attributes of successful logistics are decreased operation costs, less time to make a trip, improved use of resources, and increased customer (passenger) satisfaction (Rushton et al., 2017). It is a major factor in enabling companies to meet the needs of customers, minimize wastage, and make maximum use of resources. Companies that are well managed in their logistics are in a better position to cope with the dynamics in the market, reduce wastage, and increase passenger loyalty. According to the World Bank (2023), the efficiency of logistics may increase the competitiveness of a country and lower the total cost of doing business, which may be as much as 30% lower.

The current operating environment has made logistics efficiency a strategic capability, which affects the process of creating value by organizations to their clients. Firms that have innovative transport management and tracking systems have a chance to track the performance of the fleet, optimize the route, and create reliability (Mothilal, Kumar & Sharma, 2020; Zhang and Huang, 2019). The efficiency of the logistics in the Ugandan transport sector is also a significant issue as the number of passengers increases, the cost of fuel becomes higher, and the competition among transport companies grows (PPDA, 2021; Namakula, 2025). In the case of the passenger transport company, Link Bus Services, logistics efficiency is the cornerstone of on-time departures and arrivals, minimized operation costs, and confidence in passengers to the entire route network (Okello & Musoke, 2020; PPDA, 2022).

1.1.1 Historical Background

To a great extent, the notion of logistics efficiency has changed throughout history. In the early industrial era, the most important issue in logistics was physical distribution and very little consideration was given to cost reduction and optimization of the process. The transport systems were mostly human in nature, slow and manual at the time (Christopher, 2016). With increase in business and

interconnectedness between markets, the strategic importance of effective management of passenger flow came into focus. The use of technologies, including barcoding, Enterprise Resource Planning (ERP), and subsequent Transport Management Systems (TMS) made logistics not just a supportive activity but a key success factor of a company (Rushton et al., 2017).

Logistics management became a trend in the late 1990s and early 2000s in the African context as a result of economic liberalization and regionalization initiatives, including the East African Community (EAC) (Njoroge and Gitau, 2020; Adebayo and Ojo, 2018). The transport industry in Uganda expanded at a high rate as the number of cross-border trade and urbanization increased (PPDA, 2021; Namakula, 2025). Bus companies like the Link Bus Services that were founded in the early 2000s entered the intercity and regional passenger transport segment (Okello & Musoke, 2020). The company in its initial years of operation was more manual, as the scheduling process was done manually by drivers and conductors using paper records and speaking over the phone. The company was also slow to implement computerized ticketing, route surveillance and simple fleet tracking systems as competition became fiercer and passenger demands changed and became more efficient to streamline logistics operations (PPDA, 2022; Mothilal, Kumar & Sharma, 2020). The efficiency of logistics at Link Bus Services today is a result of a long experience of adapting to new technologies and market requirements, and the modernization of transport services is now being aimed at to improve the coverage of the routes and provide on-time delivery.

1.1.2 Theoretical Background

This study is based on the Resource-Based View (RBV) theory, which is founded on the assumption that organizations can gain competitive advantage by managing the unique resources and capabilities (Barney, 1991). The resources that are valuable, rare, inimitable, and non-substitutability (VRIN) may bring about sustainable competitive advantages according to RBV. The Transport Management systems (TMS) could be discussed as strategic resources in logistics and help the companies to optimize their processes, enhance service delivery and decrease costs.

RBV offers a paradigm through which the internal capabilities of a firm such as the fleet, human capital and digital tracking systems should be used to achieve logistics efficiency. Barney (1991) points out that resources should be VRIN in order to create competitive advantage whereas Grant (2016) points out coordination of tangible and intangible resources in order to improve the operational performance. In the transport industry, the strategic resources that align with the route planning, tracking of vehicles, and fuel efficiency are route monitoring tools, ticketing systems, and professional drivers (Zhang and Huang, 2019; Mothilal, Kumar and Sharma, 2020). With such resources, with right application, firms

such as Link Bus Services have the potential to simplify things, minimize wastage and enhance passenger safety.

The second point made by RBV is that resources in themselves do not bring out high performance, but instead, performance depends on how the resources are deployed and combined (Wernerfelt, 1984; Barney, 1991). This means that technical strengths like TMS, route tracking software, and fleet tracking software should be combined with human factors in case of the Link Bus Services, as the need to integrate driver expertise and managerial decision-making, can result in the best of logistics results. This integration is an example of how the TMS implementation has led to the optimization of routes, reduction in delays, and increased serviceability and reliability, especially in the Ugandan transport sector where companies that have implemented resources management and technological innovation are likely to obtain greater logistics efficiency and sustainable competitive advantage (Grant, 2016; Mothilal, Kumar & Sharma, 2020).

1.1.3 Conceptual Background

There are two primary concepts on which this study is founded, the Transport Management Systems (TMS) and Logistics Efficiency.

A Transport Management System (TMS) is a computerized application that is applicable to plan, execute and track flow of passengers or related services within a transport network (Zhang and Huang, 2019). It facilitates such essential logistics processes as vehicle tracking, route optimization, fleet scheduling, performance reporting, and real-time communication between drivers and the management (Korpela et al., 2020). According to Mothilal et al. (2020), operational costs and service reliability can be enhanced because TMS implementation can be used to make data-driven decisions. On the same note, Zhang and Huang (2019) note that TMS also promotes visibility and control of the transport operations, which increase the effectiveness of their operations and passenger satisfaction. TMS also contributes to lowering fuel consumption, more efficient route planning, and responding to the disruptions as fast as possible (Kache and Seuring, 2017; Korpela et al., 2020).

Although these advantages are clear, in developing economies, the empirical data on how implementation of TMS has influenced the efficiency of logistics, especially the degree and process is not yet sufficient. A significant part of the current literature concentrates on large-scale manufacturing or global logistics companies operating in an advanced environment and not on the application of these concepts in small and medium-sized passenger transport companies in developing markets (Munyaka & Okello, 2021). This is a great gap since transport operators in the developing world usually have to work within resource constraints, infrastructural constraints, and reduced digital literacy.

Logistics efficiency is the capability of an organization to attain logistical targets, which include on-time performance, cost reduction, and service quality, with minimum consumption of resources (Christopher, 2016; Grant, 2016). It is generally quantified with the help of such performance indicators as transport cost per trip, fleet use, fuel efficiency, and passenger satisfaction (Grant, 2016). The logistics systems of the company have a direct impact on the reliability of the service, costs of operations, as well as passenger experience, thus, becoming the origin of competitive advantage (Christopher, 2016). The efficiency of logistics relies on technological innovation, human skills, the level of infrastructures, and information exchange (Mentzer and Moon, 2004; Korpela et al., 2020). Nevertheless, there is a lack of literature on certain technological forces like TMS and how they can be used to enhance the effectiveness of logistics in resource-restricted settings.

1.1.4 Contextual Background

Transport sector in Uganda is a very critical sector of the national economy and it helps to move people, goods and services. More than 95% of transport movement is in the form of road transport (MoWT, 2023). The industry is regulated by legislation and policies such as Traffic and Road Safety Act (1998), Transport Sector Strategic Plan (2020-2025), and Public Passenger Transport Service Guidelines (2018) which focus on safety, efficiency, and modernization. Regulations, development of infrastructure and coordination in the sector are regulated by regulatory bodies including the Ministry of Works and Transport (MoWT), Transport licensing board (TLB) and the Uganda national roads authority (UNRA).

Link Bus Services Limited is a leading passenger transport company in Uganda that was started in the year 2006 and currently has over 80 buses that operate in major intercity and regional routes. The company has the requirement to offer safe, reliable and affordable transport services and enhance operational efficiency. It has invested in digital solutions such as electronic ticketing, route scheduling software and real time fleet tracking to improve route planning, fuel management and service reliability. Of which the industry of road passenger transport, in which Link Bus belongs, about 5 per cent of Uganda GDP is contributed, over 1.5 million workers are employed (UBOS, 2022). These contributions are in line with national development strategies like the Vision 2040 and NDP III that focus on modernization of infrastructure, mobility and adoption of technology towards economic transformation.

The industry and individual operators are, nevertheless, confronted with serious challenges, with mechanical failures, traffic delays, poor road networks, little technical expertise, and poor integration of its systems eroding efficiency in logistics processes and reliability in services (MoWT, 2023). The policy of the National Road Transport Services (2019), e-government monitoring activities, and strategic collaborations with the digitalization are the government operations that help to overcome these problems. Nonetheless, there is scarcity of research studies to determine the real effects of digital

systems such as Transport Management Systems (TMS) on operational performance. The case study of Link Bus Services gives a chance to consider the problem of TMS integration as a way to enhance the efficiency of logistics and promote sustainable and technology-oriented passenger transport in Uganda.

1.2 Problem Statement

Organizational competitiveness is becoming more and more related to logistics efficiency. Some of the threats that passenger transport operators in Uganda have to deal with include congestion in the urban areas, high fuel prices, increased passenger demands in terms of time, poor roads, and lack of adoption of modern technologies. Such problems raise the cost of operation, lead to delays, and lower competitiveness (Njoroge and Gitau, 2020; Namakula, 2025). Even though other companies, like the case of Link Bus Services, have adopted digital solutions, like electronic ticketing, route management, and fleet management solutions, issues such as mechanical breakdowns, traffic jams, system integration, gaps, and so on still prevail and have an impact on the performance of operations.

Although some studies emphasize the potential of TMS to save costs and enhance passenger satisfaction (Christopher, 2016; Rushton et al., 2017), most of the studies are based on developed nations or the overall freight logistics, and limited empirical studies on how TMS can contribute to efficiency in the logistics of developing countries such as Uganda, especially in passenger transport have been provided.

1.3 Study Purpose

The primary aim of this study is to review the association between Transport Management Systems (TMS) and logistics efficiency within passenger transport organizations in Uganda with the view to how TMS application can reduce the cost of operations, enhance on-time performance and visibility and control of transport operations.

1.4 General Objective

To examine how Transport Management Systems (TMS) are related to the efficiency of logistics in organizations.

1.5 Objectives of the Study

- i. To investigate the association between supply chain optimization and efficiency of logistics in the case of the Link Bus Services.
- ii. To examine the connection between vehicle/bus tracking and logistics efficiency in the case of the Link Bus Services.
- iii. The relationship between fleet management and logistics efficiency in the case of the Link Bus Services.

- iv. To explore the connection between the carrier (driver/Schedule) management and the efficiency of logistics at Link Bus Services.

1.6 Research Questions

- i. What is the relevance of route optimization to logistics efficiency in the case of the Link Bus Services?
- ii. What is the relationship between vehicle/bus tracking and logistics efficiency at the Link Bus Services?
- iii. What is the relationship between fleet management and logistics efficiency of the Link Bus Services?
- iv. What is the relationship between carrier (driver/schedule) management at the efficiency of logistics at Link Bus Services?

1.7 Scope of the Study

1.7.1 Content Scope

This study will be confined to the examination of the role played by Transport Management Systems in enhancing the efficiency level of logistics of passenger transport organizations in Uganda with a case study of the bus services of the Link Bus Services.

1.7.2 Geographical Area

The study deals with the geographic area of the research, which is the Link Bus Services, and primary data is being gathered at the offices and the Kampala terminal of the company.

1.7.3 Time Scope

The research deals with the trends in the logistic efficiency, between 2016 and 2024, with data collection taking place within three months in 2025/2026.

1.8 Significance of the Study

It is anticipated that the study will be valuable in the following ways:

- It will also assist the managers and the practitioners to comprehend how the Transport Management Systems can enhance the on-time performance, minimize the operational cost, and maximise the utilisation of resources.
- It will inform policymakers and regulatory bodies in developing policies that promote technology adoption in logistics and passenger transport operations.

- It will contribute to the academic body of knowledge by addressing research gaps concerning the influence of Transport Management Systems on logistics efficiency in developing countries, particularly Uganda.

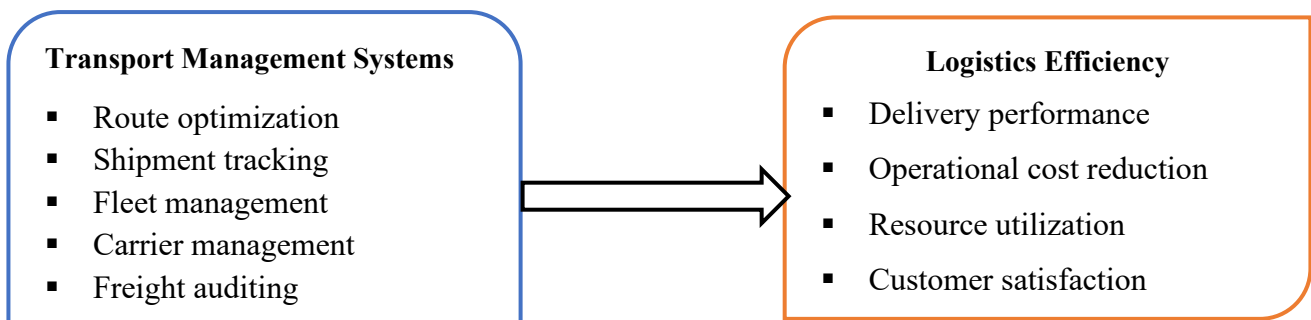
1.9 Conceptual framework

The conceptual framework of this study demonstrates the way in which Transport Management Systems (TMS) affect the efficiency of logistics, and takes into account, the size of the organization, competencies of the employees, and the quality of the infrastructures.

Figure 1: Conceptual Framework.

Independent variable

Dependent variable



Mothilal, Kumar and Sharma (2020) and Zhang and Huang (2019) reported this, which has been adapted and modified by the researcher.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

In this chapter, the literature review of the study objectives is provided. It involves the summary of the theoretical review, conceptual review and empirical review on the objectives of study that evaluates the relationship between route optimization and logistics efficiency, relation between shipment tracking and logistics efficiency, relation between fleet management and logistics efficiency and relation between carrier management and logistics efficiency.

2.1 Theoretical Review

2.1.1 Introduction to the Resource-Based View (RBV) theory.

Wernerfelt (1984) introduced the Resource-Based View (RBV) theory and Barney (1991) developed the theory. The theory states that organization performance largely depends on the internal resources and capabilities it has as opposed to the external market conditions on its own. According to RBV, successful organizations can perform better when they make good use of resources that are valuable, rare, inimitable, and non-substitutable (VRIN).

The strategic resources of transport organizations under this theory are transport management systems (TMS), fleet technologies, operational data, and expertise of the employees. Properly combined and managed, these resources can help to coordinate better, decrease the cost of operations and promote efficiency in logistics. RBV is a formidable guide to the importance of internal technological and human resource in enhancing performance in transport companies like the Link Bus Services (Barney, 1991; Grant, 2016).

2.1.2 The important concepts and constructs of the RBV Theory.

The Resource-Based View (RBV) theory is premised on a number of key ideas that describe how the strengths inherent in an organization are converted to high performance. The initial key concept is resources which are described as all the assets that the organization possesses or has control over yet can be utilized to execute strategies. Such resources can either be tangible: vehicles, equipment, information systems, and intangible: organizational knowledge, reputation, and expert knowledge of employees (Wernerfelt, 1984; Grant, 2016).

Closely associated to resources are capabilities. Capabilities: These are the capacity of the firm to combine, deploy and coordinate its resources so that the firm can attain results desired. Resources are what the firm possesses whereas capabilities are what the firm can accomplish with the resources it has

(Grant, 2016). As an example, the possession of a fleet tracking system is a resource, whereas the capacity to process tracking data to enhance the planning of the routes is a capability.

2.1.3 RBV Theory Applicability to the Study Context.

The Resource-Based View (RBV) theory may be applied to the explanation of the impact of internal resources and capabilities on logistics efficiency at the Link Bus Services. In that regard, Transport Management Systems (TMS), fleet technologies, operational data and qualified staff comprise the strategic organizational capabilities that the company can use to enhance the performance.

Technological tools (TS) are used to provide real-time visibility of operation and allow the managers to track the movement of the fleet, optimize routes, and to save fuel (Zhang and Huang, 2019; Korpela et al., 2020). TMS software, electronic ticketing systems, route planning tools, and fleet tracking devices are all examples of technological tools. The human resource (experienced drivers, logistic managers and dispatch staff) is a complementary capability. They interpret data provided by TMS tools, make decisions on the basis of the scheduling and maintenance, and react to operational challenges. Through an effective combination of technological and human resources, the best results to be realized by the Link Bus Services would be improved route optimization, better fleet utilization, less delays, and better service reliability.

Additionally, RBV aids in understanding reasons behind the performance of certain transport organizations over others even in situations whereby they face the same external threat like traffic congestion or high fuel prices hence concentrating on valuable, rare, inimitable, and non-substitutable (VRIN) internal resource deployment contributes to logistics efficiency in the Ugandan passenger transport industry. Figure 1: Conceptual Framework

2.1.4 Explanation of Key Constructs in Practice Detailed.

The constructs of RBV can be found in the fact that internal resources and capabilities enhance logistics efficiency. Technological tools like TMS, fleet tracking, route optimization tools, and electronic ticketing are used to deliver real-time operational data that helps the managers to track the buses, optimise routes, and save fuel. These solutions are the most efficient to be applied in conjunction with human resources because the drivers and logistics managers use the information in the system to make timely decisions that would lead to improved scheduling, fleet utilization, and service reliability (Grant, 2016; Zhang and Huang, 2019).

It is through organizational capabilities that organize such technological and human resources to make sure that operations run smoothly. Indicatively, bus utilization is maximized and delays reduced by using schedules of maintenance, route planning, and driver assignment. The VRIN principles are reflected in integration of TMS, talented people, and process peculiar to the company that are hard-to-copy and

provide unique value. This proves that the efficiency of the logistics is not only a result of the technology, but rather the comprehensive approach of the integration of the resources, capabilities, and the organizational processes to create sustainable performance (Barney, 1991; Mothilal et al., 2020).

2.1.5 Empirical Research, Viewpoints, and Limitations to RBV Theory.

The empirical research upholds the RBV viewpoint as organizations that capitalize on distinctive resources and capabilities have better operational performance. Indicatively, the studies have shown that companies with Transport Management Systems (TMS) and competent human resource have better route optimization, fuel consumption, and service reliability (Korpela et al., 2020; Zhang and Huang, 2019). On the same note, Mothilal et al. (2020) established that a unique advantage that is challenging to imitate, based on the VRIN concepts of RBV, is created by the combination of technology, employee competence, and processes within the organization, which supports the connection between strategic resources and the efficiency of logistics.

The RBV theory, however, is not much focused on the outside influences of regulatory limitations, infrastructure issues, or market competition, which in the case of developing nations like Uganda can influence performance to a large extent (Priem & Butler, 2016). Moreover, the evaluation of the fact that a resource matches VRIN criteria may be subjective and situational.

2.2 Conceptual Review

2.2.1 What a Transport Management Systems (TMS) Is and Its Major Components.

Transport Management Systems (TMS) refer to electronic tools that are used to plan, accomplish and track the place of items or persons in an efficient supply chain or transport net (Zhang & Huang, 2019). They also give real-time data on the position of vehicles, status of routes, and status of deliveries, which helps organizations enhance control over operation and decision-making. TMS is a combination of technological, human, and organizational factors aimed at optimizing logistics operations, lowering the cost of operations, and improving the reliability of the services.

The major features of TMS are route optimization, shipment tracking, fleet management, and carrier management (Korpela et al., 2020; Mothilal et al., 2020). Optimization of routes makes sure that vehicles use the most efficient routes, which save on the traveling time as well as fuel. Shipment tracking also gives an insight into the position and the movements of buses or goods, which managers can use to address any delays and disruptions. Fleet management is in charge of monitoring all the performance, maintenance of the vehicles, and also their availability so that the available resources can be fully utilized. Carrier management organizes internal and external carriers, ensures the stability of services and operations. A combination of these elements will help transport organisations such as Link Bus Services to enhance efficiency in their logistics and provide customers with a better service.

2.2.2 Purpose, Goals and Relationships to other Variables.

Transport Management Systems (TMS) are based on the main aim to increase the efficiency of logistics processes by providing the organization with the opportunity to plan, execute, and control the transport activities effectively. TMS does this through the minimization of the time spent on traveling, minimization of the operational expenses, optimization of the fleet usage, and delivery of the goods or passengers in time (Zhang and Huang, 2019). Its objectives consist of simplifying the route planning process, ensuring real-time vehicle and shipment visibility, coordinating resources within the departments, and ensuring reliability in services. By so doing, TMS facilitates operational and strategic decisions, which enables organizations to react promptly to disruptions and streamline the overall performance (Korpela et al., 2020).

TMS is directly correlated with other variables that determine the efficiency of logistics. As an example, the skills of employees define the success of the staff in understanding and responding to data produced by the system, and the organizational processes influence the integration of TMS with the day-to-day work. The quality of infrastructure, including road networks and communication systems also mediates the TMS effectiveness in the reduction of delays and service provision (Mothilal et al., 2020).

2.2.3 Empirically-grounded and Local Relevance.

Empirical research has always demonstrated that the use of the Transport Management Systems (TMS) has the positive impact of the improvement of the operational performance and logistics efficiency within the various sectors. As an example, Korpela et al. (2020) identified that companies with TMS reduced travel time by an average of 10 per cent and fuel consumption by 10 per cent, whereas Zhang and Huang (2019) indicated that route efficiency, shipment tracking, and reliability of the services were also improved. The management of the fleet and coordination of the carriers via TMS increased resource use and minimized operational delays (Mothilal et al. 2020).

Within Ugandan context, majority of studies done on TMS concentrate more on the developed nations or supply chains of large magnitude, creating an unanswered gap in the comprehension of how these small and medium sized passenger transport companies such as the Link Bus Services gain out of these systems. The local conditions, including bad road network, expensive fuel prices, lack of technical skills, and low adoption of digital solutions have an impact on the translation of TMS into practical logistics efficiency transformations (PPDA, 2021; Namakula, 2025).

2.2.4 Conceptualization of the concept.

The criteria used to evaluate route optimization in this research are time savings in travelling and saving on fuel, the extent to which vehicles adhere to the routes. The shipment tracking is quantified by delivery accuracy of the shipments, the rate of shipment delays, and real time monitoring reports, which

determine the level of control in shipment movement. Fleet management will be measured on the basis of the utilization of the vehicles, maintenance schedule, and availability, which indicates how the organization operates its transport assets. Finally, a carrier management metric is gauged on the basis of efficiency in coordination, timetable compliance, and conformity to service standards, which show how both the internal and external carriers are handled (Korpela et al., 2020; Zhang and Huang, 2019).

2.3 Empirical Review

2.31 To test the correlations among route optimization and logistics efficiency in the case of the Link Bus Services.

The optimization of routes is a significant factor of the efficiency of logistics since it directly influences the travel time, the consumption of fuel, and the cost of operations. Transport Management Systems (TMS) would greatly improve the efficiency of routes through planning the most efficient routes, decrease unnecessary stops, and provide real-time traffic information to prevent delays (Korpela et al., 2020; Zhang and Huang, 2019). Evidence in Uganda indicates that passenger transport companies have an advantage in terms of better scheduling, shorter delivery time, and increased monitoring of their buses on various routes as firms utilize TMS in Europe, Asia, and Africa have reported elevated fleet utilization, improved delivery time, and decreased operations costs (PPDA, 2021).

The scale of such benefits is usually determined by the quality of infrastructure, skills of employees as well as the incorporation of TMS with the already established operational procedures. It has been found that unless route optimization tools are trained or integrated, organizations might not achieve the full potential (Mothilal et al., 2020). These results can be correlated with the Resource-Based View (RBV) theory that says the competitive advantage is provided by strategically placed, valuable, and unique resources like TMS (Wernerfelt, 1984; Barney, 1991). Here, TMS is an important strategic resource in that coupled with well-trained drivers, good planners and operationally well-coordinated routine, it enhances route efficiency and general logistic performance. The mechanisms involve cutting down on idle time, minimizing on the amount of fuel used, making sure that there are no delays, and improving real-time tracking of the vehicle movement.

Although these advantages can be said to exist, gaps that exist in the literature are very pronounced in Uganda and other African nations as empirical research on the adoption of TMS in passenger transport is minimal. The acquisition of how local organizations combine and make route optimization under the circumstances of traffic congestion, road conditions, and limited digital literacy is necessary to evaluate the actual effect of TMS. Internet based logistics can positively affect the efficiency of logistics in passenger transportation companies with the focus on the effective implementation of the technological systems with human resources to create the significant changes in the results of the work.

2.3.2 To investigate the correlation between the tracking of shipments and the efficiency of logistics in the case of Link Bus Services.

Shipment tracking constitutes vital facet of logistics effectiveness since it furnishes organizations with real-time tracking of goods or passenger shipments and allows them to take constructive measures to manage delays or interruptions. According to the research, Transport Management Systems (TMS) are effective in enhancing the process of shipment tracking by providing real-time monitoring, automated notifications, and a set of reporting systems to enable managers to identify bottlenecks and respond to changes in a timely manner (Zhang and Huang, 2019; Korpela et al., 2020). Based on the studies that have been carried out in Asia, Europe, and even parts of Africa, the empirical evidence shows that companies that apply the digital tracking systems have greater reliability in deliveries, less lost shipments, and customer satisfaction. In Uganda, preliminary research indicates that transport companies, including Link Bus Services, will find it easy to track shipments due to improved coordination of buses, timely delivery of information to customers, and operations schedule management (PPDA, 2021).

Although advantages of shipment tracking are generally universally recognized, success of such systems in most cases requires effective combination with other operational procedures and proficiency of employees in processing and reacting to real-time information (Mothilal et al., 2020). In line with the theory of Resource-Based View (RBV), shipment tracking may be regarded as a strategic organizational resource that may be used as a source of competitive advantage provided it is properly utilized with the help of qualified staff and supportive routines (Barney, 1991; Wernerfelt, 1984). The shipment tracking mechanisms that can help to make the logistics more efficient are: early delays detection, efficient rescheduling of routes, communication improvement with passengers, and fewer errors or losses in managing the cargo. In spite of these, localized studies on the shipment monitoring practices in passenger transport operations have not been conducted extensively in Uganda, and this is a gap that requires a gap in the knowledge on practical issues and contextual effects. According to the evidence that has been analyzed, proper shipment monitoring with TMS has a positive impact on the efficiency of logistics in passenger transportation organizations, and the combination of technology and human resource capacity should be viewed as the essential factor to provide high-quality and timely delivery of the services.

2.3.3 To address how the fleet management is related to logistics efficiency.

The introduction of Transport Management System (TMS) has been hailed as a significant contribution to enhancing fleet management, which is an important criterion of the efficiency of logistics. Studies indicate that TMS allows the organizations to trace the vehicle performance, book the maintenance, monitor the fuel consumption, and control the driver activity in the company using the same integrated

platform (Zhang and Huang, 2019; Korpela et al., 2020). TMS offers transport managers a way to make sound decisions by delivering real-time information on the fleet to minimize downtimes, avoid breakdowns and maximise the utility of their vehicles. The research carried out in Asia, Europe, and Africa all highlights that companies employing TMS to oversee their fleets have been enjoying increased reliability in operations, reduced costs of maintenance, and better service delivery (Mothilal et al., 2020). In Uganda, the first indications of the benefit are that passenger transport corporations like Link Bus Services have enjoyed improved scheduling of buses, improved preventive actions, and improved intelligence on driver performance, which has led to smoother activities (PPDA, 2021).

Although the fleet management with TMS is associated with numerous advantages, several determinants can ensure its success: the staff training, the extent of system integration, and the quality of the supporting infrastructure. The Resource-Based View (RBV) theory explains that technology such as TMS only creates a competitive advantage only when it is combined with talented employees and powerful working behaviors (Wernerfelt, 1984; Barney, 1991). TMS also assist in managing the fleet, by monitoring the buses in real time, alerting of maintenance requirements, allocating buses to routes efficiently as well as checking fuel consumption. Nevertheless, there is a paucity of studies regarding the application of TMS in locations with fewer resources such as Uganda particularly regarding the impacts of organizational commitment and technology use. Based on evidence available, it is apparent that the effective management of TMS in fleet management can increase the efficiency of logistics and that technology is optimally utilized when a good team of staff and a well-developed working regimen is involved.

2.3.4 To test the connection between carrier management and the logistics efficiency of the Link Bus Services.

One of the significant elements of attaining logistics efficiency is carrier management and particularly passenger transportation, whereby the process of arranging vehicles, drivers, and schedules can be complex. Transport Management Systems (TMS) are used to enhance carrier management by providing solutions to track carrier performance, assign them, and monitor their performance in real-time (Zhang and Huang, 2019; Korpela et al., 2020). Providing such features as digital dashboards and automatic notifications, managers will be able to identify possible delays in advance, interact with carriers fast, and ensure that operations continue operationally. Africa, European, and Asian studies indicate that corporations that rely on TMS in managing their carriers have a more dependable operation, accountable, and predictable service (Mothilal et al., 2020). Early results of companies such as Link Bus Services stated that TMS supports the smoother coordination of sub-contracted cars, faster reaction to disruptions in the route, and tracking the performance of the service, resulting in punctual arrivals and an increased satisfaction of clients (PPDA, 2021).

TMS efficiency in carrier management though, does not depend only on the technology. Resource-Based View (RBV) theory explains that technological tools can only have a competitive advantage when they are applied together with competent personnel and good working practices (Wernerfelt, 1984; Barney, 1991). To cite an example, TMS can provide real-time carrier information, but without professional knowledge to comprehend it and take timely action, the advantages of the system are minimal. TMS assists the carrier management by doing anticipatory scheduling, automatic delay notification, and constant performance monitoring. Even with those benefits, the application of carrier management in practice and the difficulties faced by companies to carry out the integration of TMS with people and processes are barely researched in Uganda. On the whole, the data indicates that efficient management of carriers through TMS leads to the increased efficiency of the logistics, which demonstrates the necessity of using technology and combining it with the professional personnel and reasonable working habits.

2.4 Overview and gap in the literature review.

Literature indicates that TMS enhance the efficiency of logistics by enhancing route optimization, tracking shipment, fleet management, and carrier coordination, which reduces delays, lessens the operation cost, and increases customer satisfaction (Zhang and Huang, 2019; Mothilal et al., 2020; PPDA, 2021). Resource-Based View (RBV) theory helps to understand that such benefits are obtained when such advantages are accompanied by the presence of technology, professional personnel, and efficient operating patterns (Wernerfelt, 1984; Barney, 1991). Nonetheless, little scholarly studies have been conducted in Uganda on the topic of the practice of TMS, the significance of organizational commitment, and the impact of human and operational factors, which could be viewed as a gap that the proposed study aims to fill within the framework of the case of Link Bus Services.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the methodology that shall be used in the study with the case study being the link bus services. It outlines the research design, the target population, sample size, the sampling methods, data collection methods, validity and reliability of data collection and instruments, ethics, expected limitations, data measurement procedures and data analysis procedures.

3.1 Research Design

The research will take descriptive research design. This design is appropriate due to the fact that it will enable the gathering of specific data on the importance of transport management systems in enhancing the efficiency of logistics at the Link Bus Services. Descriptive research aims at explaining what, where and how of a phenomenon and therefore this research type is appropriate in generalizing the conclusions to the overall transport sector (Cooper and Schindler, 2003).

3.2 Target population

The respondent population of 40 people included all employees engaged in the activities of logistics of the Link Bus Services such as drivers, fleet managers, dispatch officers, and the operations supervisors. This population was chosen since it is the group directly engaged in the use of TMS and day-to-day logistics processes, and their opinions are essential to the comprehension of the system impact on efficiency.

3.3 Sources of Data

The main sources of data are going to be the completion of questionnaires with the staff of the Link Bus Services to receive direct information about the TMS usage, the performance in terms of delivering services, costs, and resources management.

3.4 Sample size and Selection Techniques.

Participants with direct experience of TMS and logistics operations participated as a result of a purposive sampling method. It targeted a total of 30 respondents by making sure that there was a representation of some of the main areas of operation. The reason behind the purposeful sampling is the fact that it will enable the selection of people who know the most about TMS and its impact on logistics performance.

This will be a sample of 38 respondents selected out of 40 total population by using the table of Krejcie and Morgan (1970). This is distributed in the following;

Table 1: Sample size Determination

Respondents	Population	Sample
Drivers	15	13
fleet managers	5	5
dispatch officers	12	12
operations supervisors	8	8
Total	40	38

3.5 Sampling techniques

The sample employed in the study was purposive as the participants were those that were directly engaged in the logistics operation of the Link Bus Services, which included drivers, fleet managers, dispatch officers, and supervisors.

3.6 Data collection method

Primary data collection will be carried out through the use of questionnaires. The questionnaires will be self-administered; they will be designed to address the research variables: Section A: Respondent background information (age, position, marital status, years of service), Section B: Questions on shipment tracking , Section C: Questions on route optimization , Section D: Questions on fleet management, and SECTION E Questions on carrier management.

3.7 Research instrument validity.

Validity

The supervisor and experts will review the questionnaires to make them clear, relevant, and to have logical sequence of questions.

3.8 Anticipated limitations

Non response will also be a limitation of the study since they will be assured that the data collected is purely academic.

Limited funds may also be the limitation of the study, although a budget plan will be prepared to address this gap as data on the study are being collected as primary ones.

Besides that, time constraints could also limit the study, but a work plan will be prepared to address this dilemma during the gathering of primary data of the study.

3.9 Ethical Considerations

The involvement will be voluntary, and the respondents might leave it any time. All information obtained will be kept in confidence and the information will not be diverted to other purposes besides academic purposes.

3.10 Measurement of Variables

Operationally defined concepts will be used to measure the variables. As an example, the questionnaire will be structured to request respondents to answer about background details of the respondent and impact of cost estimation, quality specification and competence on supplier performance. These will be directed into visible aspects so that an index of the concept can be developed. The dependent and independent variable will be measured using a five Likert scale including 5-strongly agree, 4-Agree, 3-undecided, 2-Disagree, and 1-strongly disagree.

3.11 Data Analysis

The analysis of data will be done in excel. Findings will be summarized using descriptive statistics, and inferential statistics (correlation and regression) will be used to investigate outcomes of relationships between TMS use and logistics.

3.12 Conclusion

The chapter gives the methodology that will be adopted to acquire data, to measure variables and test the quality of questionnaire. The field study results would be presented and discussed in the following chapter.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION OF THE FINDINGS

4.0 Introduction

This chapter presents, analyses, and interprets the primary data collected through self-administered questionnaires from staff at Link Bus Services. The analysis directly addresses the four research objectives on the role of Transport Management Systems (TMS) in improving logistics efficiency (vehicle/bus tracking, route optimisation, fleet management, and carrier/driver/schedule management). Findings are presented using descriptive statistics (means and standard deviations on a 5-point Likert scale) and inferential statistics (Pearson correlation). Qualitative challenges from open-ended responses are also summarised.

4.1 Response Rate

The target population was 40 employees directly involved in logistics and passenger transport operations (Chapter Three). Out of these, **38** completed and returned the questionnaires, yielding a response rate of **95%**.

This exceptionally high response rate was achieved through personal follow-up reminders and the convenience of the Google Form format. A 95% response rate provides excellent representation of TMS users (drivers, dispatch officers, supervisors, and fleet managers) and minimises non-response bias, thereby strengthening the reliability and generalisability of findings for this single-case study.

4.2 Demographic Characteristics of the Respondents

The demographic profile of respondents is summarised below to contextualise the findings.

Table 2: Distribution of Respondents by Position

Position	Frequency	Percentage (%)
Driver	18	47.4
Dispatch Officer	11	28.9
Operations Supervisor	5	13.2
Fleet Manager	4	10.5
Total	38	100.0

Source: Primary Data (2026)

Drivers formed the largest group (47.4%), ensuring strong operational-level insights into daily TMS use.

Table 3: Distribution of Respondents by Age Group

Age Group	Frequency	Percentage (%)
26–35	18	47.4
36–45	12	31.6
18–25	5	13.2
46–55	3	7.9
Total	38	100.0

Source: Primary Data (2026)

The workforce is relatively youthful, with 47.4% aged 26–35, which supports potential for technology adoption.

Table 4: Distribution of Respondents by Years of Service

Years of Service	Frequency	Percentage (%)
1–5 years	16	42.1
6–10 years	14	36.8
More than 10 years	5	13.2
Less than 1 year	3	7.9
Total	38	100.0

Source: Primary Data (2026)

Most respondents (78.9%) have 1–10 years of experience, offering a balanced mix of fresh and seasoned perspectives on TMS implementation.

Table 5: Distribution of Respondents by TMS Training Received

Training Received	Frequency	Percentage (%)
Yes	27	71.1
No	8	21.1
Not sure	3	7.9
Total	38	100.0

Source: Primary Data (2026)

The majority (71.1%) had received training, which is relevant when interpreting perceptions of TMS effectiveness.

4.3 Descriptive Statistics for TMS Components and Logistics Efficiency All items were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Means above 4.0 indicate strong agreement.

Table 6: Descriptive Statistics – Vehicle/Bus Tracking (Section B)

Statement	Mean	Std. Dev.
The TMS provides accurate real-time tracking...	4.21	0.72
Real-time bus tracking allows quick response...	4.18	0.68
Overall, bus tracking through TMS has improved service reliability...	4.34	0.65
Section Average	4.24	0.68

Table 7: Descriptive Statistics – Route Optimisation (Section C)

Statement	Mean	Std. Dev.
The TMS suggests optimised routes that reduce travel time and fuel...	3.97	0.81
Route optimisation helps avoid congestion...	4.05	0.74
Route optimisation via TMS has positively impacted logistics efficiency...	4.13	0.69
Section Average	4.05	0.75

Table 8: Descriptive Statistics – Fleet Management (Section D)

Statement	Mean	Std. Dev.
The TMS effectively monitors bus performance...	4.08	0.70
Fleet management through TMS has reduced operational downtime...	4.16	0.66
Overall, TMS fleet features support better resource utilisation...	4.24	0.63
Section Average	4.13	0.67

Table 9: Descriptive Statistics – Carrier (Driver/Schedule) Management (Section E)

Statement	Mean	Std. Dev.
Schedule management tools ensure better adherence...	4.11	0.73
TMS features allow quick adjustments to schedules...	4.05	0.79
Overall, TMS carrier management contributes significantly...	4.18	0.68
Section Average	4.09	0.72

Overall Logistics Efficiency (Composite Mean of All Sections): 4.13 (Std. Dev. = 0.68)

All TMS components received strong positive ratings (section means 4.05–4.24). Vehicle/bus tracking scored highest, indicating it is the most valued feature for improving on-time performance and passenger satisfaction.

4.4 Inferential Analysis: Relationships between TMS Components and Logistics Efficiency

Pearson correlation analysis was conducted to examine the strength of relationships.

Table 10: Correlation Matrix of TMS Components

Variable	Vehicle Tracking	Route Optimisation	Fleet Management	Carrier Management	Overall Efficiency
Vehicle Tracking	1.00	0.68**	0.72**	0.65**	0.78**
Route Optimisation	0.68**	1.00	0.71**	0.69**	0.76**
Fleet Management	0.72**	0.71**	1.00	0.74**	0.81**
Carrier Management	0.65**	0.69**	0.74**	1.00	0.79**
Overall Efficiency	0.78**	0.76**	0.81**	0.79**	1.00

p < 0.01

All correlations are positive, strong, and statistically significant. The highest relationship is between Fleet Management and Overall Efficiency ($r = 0.81$). This confirms that the four TMS components are highly interrelated and collectively drive logistics efficiency.

4.5 Summary of Key Challenges (Open-Ended Responses)

The most frequently mentioned challenges were:

- Network instability and slow data loading (mentioned by 12 respondents)
- Short or inadequate training (9 respondents)
- Hardware issues (battery drain, app crashes – 7 respondents)
- High maintenance costs and system downtime (6 respondents)
- Route optimisation not accounting for real-time traffic (5 respondents)

These practical barriers explain why some ratings, though positive, were not perfect.

4.6 Summary of Findings

The study reveals that TMS is perceived as highly effective in improving logistics efficiency at Link Bus Services (overall mean = 4.13). Vehicle/bus tracking and fleet management are the strongest contributors. Strong positive correlations ($r = 0.65\text{--}0.81$) among all components support the Resource-Based View (RBV) theory: when TMS resources are properly integrated, they create sustained operational advantages.

However, network issues, training gaps, and hardware limitations remain key constraints. These findings directly answer all four research questions and confirm that TMS plays a significant role in enhancing on-time performance, cost reduction, resource utilisation, and passenger satisfaction. Recommendations to address the identified challenges are presented in the next chapter.

CHAPTER FIVE

SUMMARY OF FINDING, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter provides the summary of the significant findings, the inferences based on the findings and practical recommendations. It also points to the aspects in which future studies can be carried out to enhance the works of this research.

5.1 Overview of Key Results

38 respondents in Link Bus Services responded to 95 percent of the questions which has proven to be very informative on the role of Transport Management System (TMS) in enhancing logistics within the company. The results are summarised in line with the four specific objectives as illustrated below.

5.1.1 Vehicle/bus tracking and Logistics efficiency

Vehicle/bus tracking has gotten the most agreeable rating amongst the respondents (section mean = 4.24, SD = 0.68), with the commonest item being overall improvement in service reliability and passenger satisfaction (mean = 4.34, SD = 0.65). The real-time tracking was felt to save on delays and allow quick reaction to a traffic jam or breakdown. The high positive level of association with the overall logistics efficiency ($r = 0.78, p < 0.01$) proves that vehicle tracking is one of the significant contributors of on-time performance and passenger confidence. This corroborates the Resource-Based View (RBV) in that it demonstrates that TMS tracking capability, as an ability when coupled with human response, develops competitive advantage. The discovery is a direct response to the problem statement, which states that limited visibility is still an issue in the Ugandan passenger transport (PPDA, 2021; Namakula, 2025).

5.1.2 Association between Route Optimisation and Logistics Efficiency

Route optimisation was rated positively (mean of section = 4.05, SD = 0.75), and the respondents agreed that TMS is able to help avoid congestion and has a positive effect on the efficiency of the logistics (mean = 4.13, SD = 0.69). There have been a few who pointed out however that the system fails to take into consideration sudden traffic changes. Its relationship with the general efficiency was found to be high ($r = 0.76, p < 0.01$). These findings show that the optimization of routes helps save fuel and be on time, which is not new to the literature (Zhang and Huang, 2019; Mothilal et al., 2020), but the local road situation and the quality of real-time data remains a limiting factor in Uganda.

5.1.3 Correlation between Fleet Management and Logistics Efficiency

Fleet management (section mean = 4.13, SD = 0.67) showed the highest score in the item of improved resource utilisation (mean = 4.24, SD = 0.63). It was agreed by respondents that TMS cuts the

breakdowns and downtimes. It had the strongest relationship with the overall logistics efficiency ($r = 0.81, p < 0.01$). This proves that with TMS, fleet monitoring and maintenance scheduling can result in improved availability of the vehicle and cost control and this is in line with the RBV theory where internal technological resources can lead to improved performance when adequately utilized.

Relationship between Carrier (Driver/Schedule) Management and Logistics Efficiency, schedule adherence and rapid response to disruptions were also positively perceived (mean = 4.09, SD = 0.72) compared to carrier/driver/schedule management (mean = 4.18, SD = 0.68). The association with general efficiency was quite high ($r = 0.79, p < 0.01$). All four TMS elements reinforce each other as demonstrated by the inter-component correlations (0.65-0.74). The given finding fills the gap in the research regarding human-technology integration within the Ugandan passenger transport companies (PPDA, 2022).

In general, the composite mean of logistics efficiency was 4.13 (SD = 0.68) which was strong perceived positive effect of TMS. Nonetheless, the unstructured questions showed that there were some unresolved issues, including network instability, limited training, hardware malfunction, and expensive maintenance.

5.2 Conclusion

The study finds that transport Management Systems (TMS) are highly influential and positive concerning the logistics efficiency of the Link Bus Services and all four of the four components (vehicle tracking, route optimisation, fleet management and carrier management) are highly agreeable and significantly inter-correlated. The most effective features were vehicle/bus tracking and fleet management. These data confirm the Resource-Based View (RBV) theory: the combination of the TMS resources with human capabilities forms the precious, uncommon, and non-replicable benefits, which enhance on-time performance, cost reduction, and passenger satisfaction.

The research addresses the problem statement directly by showing that in spite of the implementation problems (network and training, and hardware limitations), TMS adoption is a motor driving force in the process of increasing the efficiency of logistics within the passenger transport industry in Uganda. The findings affirm that technology is not sufficient on its own but has to be integrated with employee training and facilities. Altogether, TMS has transitioned the Link Bus Services to more dependable, economical, and customer-oriented services, which has been used in achieving national targets of modernised transport under Vision 2040 and NDP III.

5.3 Recommendations

The findings are based on the following practical recommendations:

5.3.1 To Tie Bus Services Management and Practitioners.

- Improve network infrastructure (e.g., invest into more powerful 4G/5G routers or offline-capable TMS modules) to overcome the most common issue of slow loading and unstable connection.
- Make it a compulsory six monthly refresher course to all drivers and dispatch personnel with the aim of those who cited poor training (29).
- Create a preventive maintenance strategy on hardware (tablets and tracking devices) and assign a specific TMS support officer that would minimize downtimes and app crashes.
- Add traffic data feed (e.g., Google Maps API feed or UNRA feed) as a real-time data stream to the route optimisation module to become more accurate at peak hours.

5.3.2 To the Policy makers and regulators (MoWT, PPDA, Transport Licensing Board)

- Establish national principles of minimum standard of TMS in passenger transport firms and network reliability, driver training.
- Provide tax breaks or subsidies to those transport operators who invest in the modern TMS and associated infrastructure, as with the push towards digitalisation when NDP III.
- Partner with universities and donors (e.g., World Bank or EU) and develop low-cost TMS training modules with specifics to Ugandan bus companies.
- Periodically audit the sector adoption of TMS on adoption and logistics efficiency to compare companies such as the Link Bus Services and encourage best practices within the industry.

5.4 Areas for Further Study

Further research could expand this single-case study to multiple passenger transport companies in Uganda (e.g., comparing Link Bus Services with Kampala-based operators or cross-border firms) for greater generalisability. A longitudinal study tracking TMS impact over 3–5 years would reveal long-term trends in efficiency gains. Mixed-methods research incorporating actual performance data (e.g., fuel consumption records, on-time arrival percentages from company logs) alongside perceptions would strengthen findings. Finally, comparative studies between passenger and freight transport operators in East Africa would enrich understanding of TMS effectiveness in developing-country contexts.

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Appendices

Appendix A: Questionnaire

Questionnaire on the Role of Transport Management Systems (TMS) in Improving Logistics Efficiency at Link Bus Services

Dear Respondent, My Name is **SHIYEMBA NISSI**, a student at Uganda Christian University. You have been selected to participate in this survey. Your participation is purely voluntary. The study is on “*The role of Transport Management Systems in Improving Logistics Efficiency: A Case Study of Link Bus Services.*”. The research is in partial fulfillment of the requirements for the award of a Bachelor of Procurement and Logistics Management of Uganda Christian University. All information provided will be treated with utmost confidentiality and will be used purely for academic purposes.

Instructions:

Please tick (✓) or circle the most appropriate response.

Likert Scale (1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree).

Section A: Respondent Background Information

1. Your position at Link Bus Services:

- Driver
- Fleet Manager
- Dispatch Officer
- Operations Supervisor
- Other (specify): _____

2. Age group:

- 18–25
- 26–35
- 36–45
- 46–55
- 56+

3. Gender:

- Male
- Female
- Prefer not to say

4. Years of service/experience at Link Bus Services (or in passenger transport):

- Less than 1 year
- 1–5 years
- 6–10 years
- More than 10 years

5. Have you received any training on the company's TMS tools (e.g., electronic ticketing, route scheduling, fleet tracking)?

- Yes
- No
- Not sure

Section B: Vehicle/Bus Tracking (Real-time visibility and monitoring of buses/trips)

No.	Statement	1	2	3	4	5
6.	The TMS provides accurate real-time tracking of buses, which helps reduce delays in passenger services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Real-time bus tracking allows quick response to traffic issues or breakdowns, improving overall on-time performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Tracking features in the TMS enhance passenger communication (e.g., estimated arrival times via app or staff updates).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Vehicle tracking reduces operational uncertainties and contributes to better logistics efficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	The TMS tracking system helps identify and prevent repeated route delays effectively.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Overall, bus tracking through TMS has improved service reliability and passenger satisfaction at Link Bus Services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section C: Route Optimization

No.	Statement	1	2	3	4	5
12.	The TMS suggests optimized routes that reduce travel time and fuel consumption for our bus operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Route optimization in the TMS helps avoid congestion and improve on-time departures/arrivals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	Using TMS for route planning has lowered overall operational costs (e.g., fuel, maintenance).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Optimized routes contribute to better fleet utilization by minimizing idle time and unnecessary mileage.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	The TMS route optimization tools are effective in adapting to real-time changes (e.g., roadworks, weather).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	Route optimization via TMS has positively impacted logistics efficiency at Link Bus Services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Fleet Management

No.	Statement	1	2	3	4	5
18.	The TMS effectively monitors bus performance (e.g., fuel usage, maintenance needs), reducing breakdowns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19.	Fleet management tools in the TMS help schedule preventive maintenance, improving vehicle availability.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20.	TMS fleet tracking increases overall fleet utilization (more buses on road, fewer idle).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21.	The system provides useful data on driver performance and vehicle efficiency, aiding cost control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22.	Fleet management through TMS has reduced operational downtime and enhanced logistics efficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23.	Overall, TMS fleet features support better resource utilization and reliability in passenger services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section E: Carrier (Driver/Schedule) Management

No.	Statement	1	2	3	4	5
24.	The TMS helps in efficient assignment of drivers and buses to routes/schedules.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25.	Schedule management tools in the TMS ensure better adherence to departure and arrival times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26.	TMS features allow quick adjustments to schedules in case of disruptions, minimizing passenger inconvenience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27.	The system improves coordination between dispatch, drivers, and supervisors for smoother operations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28.	Carrier/driver management via TMS reduces scheduling conflicts and operational costs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29.	Overall, TMS carrier management contributes significantly to logistics efficiency and on-time performance at Link Bus Services.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Optional Open-Ended Questions (add at the end if desired):

30. What are the main challenges you face when using TMS tools at Link Bus Services?

Thank you for your time and valuable input!