THE INFLUENCE OF TRANSPORTATION MANAGEMENT SYSTEMS (TMS) ADOPTION ON FLEET SCHEDULING AND TRACKING EFFICIENCY IN UGANDA'S THIRD-PARTY LOGISTICS FIRMS: A CASE STUDY OF JUMIA UGANDA

MARIA NAMAZZI

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A DISSERTATION SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A DEGREE OF BACHELOR OF PROCUREMENT AND LOGISTICS MANAGEMENT OF UGANDA CHRISTIAN UNIVERSITY

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UGANDA CHRISTIAN UNIVERSITY
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DECLARATION

I, **NAMAZZI MARIA**, declare that this dissertation titled **"The influence of transportation management systems (TMS) adoption on fleet scheduling and tracking efficiency in Uganda's third-party logistics firms: A case study of Jumia Uganda."** is my original work and has not been submitted to any other university or institution of higher learning for the award of any academic qualification.

I also state that all information sources employed in this research have been appropriately recognized and referenced using the guidelines of the accepted scholarly sources.

Name: NAMAZZI MARIA

Registration Number: S23B12/037

Signature: Namazzi

Date: 22/05/2026

APPROVAL

This dissertation, which is entitled *the influence of transportation management systems (TMS) adoption on fleet scheduling and tracking efficiency in Uganda's third-party logistics firms: A case study of Jumia Uganda*, by Namazzi Maria Reg. Number S23B12/037, has been under my supervision and is now ready for submission to the School of Business for examination

Supervisor: MR. DUNCAN TUMUHAMYE

Signature: ______________________

Date: 22/05/2026

DEDICATION

This is dedicated to;

To my family, the motivation and a listening ear, advice and guidance on how to navigate through the whole journey. Not giving up on me even when I felt I was not doing my best, I am really grateful for the love and scarifies made as they have built my foundation.

To my friends, they have been the reason as to why this worked out, the confidence, push and bond that they never wanted to leave me behind, early morning calls to go for classes and late in the night to stay up and study. They made each day memorable and looking up to an achievement at the end, celebrating the small victories.

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I would like to thank the Lord for this great journey he has led and guided me through. As well as the people who have made it interesting and worth it.

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ABSTRACT

As e-commerce in Uganda continues to grow, the need for third party logistics companies to enhance their fleet operations is increasing. Companies like Jumia Uganda have turned to Transportation Management Systems (TMS) digital platforms to resolve these inefficiencies, which have long been an issue. Even with this investment, how much the adoption of TMS contributes to a firm's fleet scheduling and tracking efficiency is still an empirical question.

This study determined the impact of TMS adoption on fleet scheduling efficiency, fleet tracking efficiency, the level of TMS adoption, as well as challenges of TMS implementation in Jumia Uganda. There was a 92% return of questionnaires (46 returned). The items in the instrument showed excellent reliability from Cronbach's Alpha ($\alpha = 0.905 – 0.918$). Descriptive statistics, Pearson correlation and simple linear regression were used to analyse data in SPSS version 26. The study adopted the Diffusion of Innovation (DOI) Theory, Technology–Organisation–Environment (TOE) Framework and Resource-Based View (RBV) Theory as a theoretical framework.

The study revealed a high level of TMS adoption and operationally embedded at Jumia Uganda with a composite mean of 4.14 which included route optimisation, automated dispatching, GPS monitoring, and data sharing in real time. TMS adoption significantly and positively predicted fleet scheduling efficiency ($r = 0.945$, $\beta = 0.945$, $R^2 = 0.893$, $F = 368.650$, $p < 0.001$) and fleet tracking efficiency ($r = 0.972$, $\beta = 0.972$, $R^2 = 0.945$, $F = 757.964$, $p < 0.001$), with both null hypotheses rejected. The performance of tracking was more accurately predicted by TMS than by scheduling performance. Internal factors such as Internet connection, IT skills of staff, road infrastructure and management support were generally seen as facilitating. The network instability, variability of road conditions, gaps in system integration, staff resistance to adoption and third-party coordination failures were key implementation challenges.

At Jumia Uganda, adoption of TMS is a clear enabler for fleet scheduling and tracking efficiency, and their performance in tracking has almost a perfect correlation with their predictive relationship. Managers should invest in redundant internet infrastructure, and institutionalize the training of TMS; and emphasize integration of the entire ERP and WMS. Government agencies need to tackle the issue of road and broadband connectivity in peri-urban delivery zones and TMS vendors should evolve a solution that is affordable and offline, to fit the logistics environment in Uganda.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Transportation Management Systems (TMS) are the software solutions that streamline and optimise vital transportation operations such as route planning, fleet scheduling, monitoring of shipments in real time, effective load management, and coordinating with carriers. These processes are digitised in TMS, which leads to a reduction in manual errors, speed up decision making and enhance service delivery. In logistics markets, it has been found that businesses using TMS platforms have seen substantial cost savings on their logistics services, better use of their fleet, and better customer satisfaction.

Third-party logistics companies play a critical role in intra-Uganda logistics operations and the booming e-commerce industry in Uganda. As one of the most important e-commerce logistics companies in Uganda, Jumia Uganda has a big and complex fleet, which is used to serve last mile delivery to the Greater Kampala Metropolitan Area and beyond. This fleet's scheduling and real-time tracking efficiency play a key role in the company's service quality and competitiveness. Although the use of the digital logistics tools such as TMS is on the rise, there has been little study of how these tools can actually enhance fleet scheduling and tracking efficiency at Jumia Uganda. The study, therefore, examines the effect of TMS adoption on the efficiency of fleet scheduling and tracking, taking a case study approach on Jumia Uganda.

1.1 Background to the Study

Logistics efficiency is essential to businesses for their competitiveness and is a vital part of the global supply chain. TMS solutions have become a revolutionary advancement in the global logistics industry. A TMS is a digital system that automates transportation planning, scheduling of fleets, tracking of freight, selection of carrier, route management, etc. TMS is increasingly becoming a vital tool for third party logistics providers in reducing transportation costs, maximising asset utilisation and improving service level in terms of real-time data analysis and operational visibility at global level (Jović et al., 2020; Tang, 2020). In developed countries like the USA, Germany and Australia, TMS is an integral part of logistics, helping to optimize routes, consolidate loads and manage transportation disruptions proactively. As the complexity of global commerce and the surge in e-commerce continues to grow, TMS adoption has become more than just a useful tool, it's now a strategic necessity.

In Africa, the logistics sector is marked by a growing trend of digitisation initiatives and the ongoing challenges of poor infrastructure and low operational efficiency.The logistics industry in Africa is evolving with more and more initiatives towards digitisation while challenges remain when it comes to infrastructure and operational efficiency. Several countries in East Africa, such as Uganda, Kenya, and Tanzania, are introducing digital logistics solutions like electronic customs clearance, cargo documentation online, and cargo monitoring solutions. Research shows that digital transportation technologies have positive effects on the logistics performance, operational coordination and efficiency of cross-border trade in the region (Lawrence & Mupa, 2024; Njuguna et al., 2025). Sensor-based technologies have been used to enhance route deviation monitoring, lead-time forecasting and shipment visibility in Kenya (Njeri et al., 2023). There are however some obstacles in implementing these solutions such as limited interoperability of the systems, irregular Internet connectivity, and slow adoption by SME logistics operators.

Road transport is a key mode of transport in Uganda, being a landlocked nation, both for domestic distribution and international trade. This sector remains booming, following the increased trade volumes, fast urbanisation in Greater Kampala Metropolitan Area, expansion of manufacturing and retail businesses, and the emergence of e-commerce platforms. Jumia Uganda is one of these and has become a prominent logistics company in e-commerce, with a Kenyan-registered fleet of delivery vehicles providing fast delivery of high-volume last mile deliveries in and around Kampala. The company's fleet operations are tightly synchronized and their vehicles are tracked in real time in order to ensure deliveries of the customers are made within strict deadlines.

Notwithstanding the operational demands, the sector is still facing inefficiencies such as the inadequate fleet scheduling, low visibility of tracking of the vehicles in the field, delivery delays, high fuel consumption and low utilisation rates of vehicles (Uganda Bureau of Statistics, 2023). Many logistics businesses still use manual scheduling, phone calls and disjointed dispatch systems to co-ordinate. Adopting a TMS is seen as a potential answer to these problems. Some of the evidence indicates that companies which adopt TMS in Uganda, are able to reduce freight expenses by about 8-10% based on route optimization and better tracking features (Namakula, 2025). However, the adoption is still uneven, and adoption costs are high, internet connectivity is unreliable and insufficient, and technical capacity is limited.

While the advantages of TMS have been widely discussed in the context of international and regional studies, there is a lack of empirical evidence specifically focused on the impact of TMS on scheduling and tracking efficiency in Uganda's e-commerce logistics sector involving third-party logistics. While there is extensive literature on the benefits of TMS in international and regional contexts, empirical studies on the effects of TMS on the efficiency of scheduling and tracking in e-commerce-based third-party logistics environments in Uganda are rare. Specifically, there is no published study that focuses on the relationships between these within Jumia Uganda's logistics. This leaves a considerable gap in knowledge which is addressed in the present study.

1.2 Statement of the Problem

Third party logistics companies in the booming Ugandan e-commerce market need to have high fleet scheduling accuracy and real-time tracking visibility. With a high volume of goods being sent out daily, Jumia Uganda, as one of the major logistics providers in the e-commerce sector, is under a lot of pressure to ensure the timely delivery of goods, minimise failed deliveries, reduce fuel consumption and keep customers happy. These goals can be achieved by TMS, which offer the technology for route optimization, dynamic load planning, tracking through GPS, and centralized scheduling (Kukreja et al. 2020). With the advent of digital integration, the use of TMS is found to be related to better fleet utilization, shorter delivery lead times, and better logistics performance (Yusof et al., 2024; Kechil et al., 2022).

While these are potential benefits, there are tangible operational issues which are observed. Logistics challenges like delivery delays, underutilisation of vehicles, inadequate load planning, lack of real-time vehicle tracking, and high transportation costs persist in the e-commerce industry in Uganda (Ainomugisha, 2022). Failure to schedule and tracking gaps directly have a negative impact on delivery failures, re-delivery costs and low customer satisfaction issues which are more pronounced in last-mile delivery operations like Jumia Uganda. While TMS and related information technologies have been adopted as a solution to these problems, there is little evidence of benefits in terms of fleet scheduling and tracking efficiencies at the firm level. In many cases manual coordination, paper-based dispatch documentation and verbal communication are used for dispatch operations, partially (Kuteyi et al., 2022).

There is limited research and empirical evidence available to support the operation of a firm specifically in Uganda's e-commerce logistics environment, addressing topics related to operational outcomes like planning time reduction, adherence to the schedule, real-time monitoring coverage, and deviation detection. The study by Ainomugisha (2022) found that IT adoption can positively influence logistics performance in Uganda, however, no study has investigated the impact of TMS adoption on the efficiency of fleet scheduling and tracking in a specific sector like Jumia Uganda.

Although the use of TMS is growing, it's not known if it helps to reduce the efficiency of fleet scheduling and tracking at Jumia Uganda. This study seeks to fill that empirical gap.

1.3 Purpose of the Study

The purpose of this study is to assess the influence of Transportation Management Systems (TMS) adoption on fleet scheduling and tracking efficiency at Jumia Uganda.

1.4 Specific Objectives

1. To assess the extent of TMS adoption at Jumia Uganda.
2. To examine the effect of TMS adoption on fleet scheduling efficiency at Jumia Uganda.
3. To examine the effect of TMS adoption on fleet tracking efficiency at Jumia Uganda.
4. To examine the challenges affecting TMS implementation at Jumia Uganda.

1.5 Research Questions

1. What is the extent of TMS adoption at Jumia Uganda?
2. What is the effect of TMS adoption on fleet scheduling efficiency at Jumia Uganda?
3. What is the effect of TMS adoption on fleet tracking efficiency at Jumia Uganda?
4. What challenges affect the implementation of Transportation Management Systems at Jumia Uganda?

1.6 Research Hypotheses

H_{01}: TMS adoption has no significant influence on fleet scheduling efficiency at Jumia Uganda.

H_{02}: TMS adoption has no significant influence on fleet tracking efficiency at Jumia Uganda.

1.7 Scope of the Study

The study is on the adoption of TMS and how it affects the efficiency of fleet scheduling and tracking efficiency in Jumia Uganda logistics operations. The analysis is restricted to the functionalities of transport which directly affect the route planning, dispatching, scheduling and location monitoring aspects: route optimisation, load planning, GPS-based real-time vehicle tracking. Other TMS capabilities, for example warehouse management, freight audit and payment, invoicing or customer billing are not included unless they are directly connected with the fleet scheduling and tracking processes.

The study is limited to the logistics operations of Jumia Uganda within Kampala city, Uganda; comprising the main fulfilment centre, dispatch hubs and logistics fleet operations in the Greater Kampala Metropolitan Area. Kampala is chosen because it is the main logistics hub in Uganda and it experiences the most logistics activity of the daily operations for Jumia Uganda.

The units of analysis include the employees of Jumia Uganda who are directly involved in fleet planning, dispatching, coordination, monitoring and those who have responsibility in implementing and supporting the TMS such as logistics managers, fleet supervisors, dispatch officers, transport coordinators, and IT personnel.

The time period is 2020 - 2025, selected to reflect the increased digitalisation and TMS implementation in Jumia Uganda's logistics operations in recent times.

1.8 Justification of the Study

E-commerce businesses in Uganda, including Jumia Uganda, are facing growing demand for enhanced delivery operations in the last-mile segment due to the surge in e-commerce activities, which has led to increased fleet usage, complexity, and volume. Even with the investment in digital logistics solutions, such as TMS, inefficiencies in delivery timelines, route planning and fleet visibility can be seen in last-mile operations. The existing literature on TMS was largely found in developed economy and multi-firm environments, while the empirical evidence in TMS in single-firm, case study context within the e-commerce logistics industry in Uganda is very limited.

The study is necessary as it will give a firm, context sensitive and evidence-based insights that will help to improve logistics performance at Jumia Uganda and to inform technology investments. If not purposefully studied, generalised assumptions can be made that don't align with the current operational dynamics of the e-commerce delivery landscape in Uganda, leading to ongoing inefficiencies and wasted resources.

Further, empirical evidence from this study can inform institutions like the Ministry of Works and Transport and the Uganda Communications Commission to come up with targeted policies that will support digital transformation in the logistics and e-commerce sector.

1.9 Significance of the Study

This study adds to the scarce empirical evidence in the field of digital logistics systems in e-commerce settings in developing economies. The study validates the use of a context-specific basis for testing and extending theories in last mile logistics, such as the Technology–Organisation–Environment (TOE) framework and the Diffusion of Innovation (DOI) theory, by providing firm-level data from Jumia Uganda's 3PL operations.

The findings should enable logistics managers, fleet supervisors, dispatch officers and transport coordinators at Jumia Uganda determine if and how the adoption of TMS impacts on the level of scheduling discipline, the speed of dispatching, route coordination, visibility of tracking in the logistics chain, and overall fleet control. The results could also be useful to other logistics companies that are delivering ecommerce goods in Uganda, aiming at using technology for operational efficiency.

The study has been anticipated to assist the Ministry of Works and Transport, Ministry of ICT and National Guidance and the Uganda Communications Commission in their work. Results could serve to support evidence for the role of digital logistics systems to enhance the efficiency of urban logistics, increase freight monitoring capabilities, and contribute to the digital transformation of Uganda's booming e-commerce and logistics industry.

The results can guide TMS software vendors, fleet technology providers and system integrators in designing TMS solutions more appropriate for the business context of e-commerce last mile logistics, such as lower-cost TMS solutions, mobile-accessible TMS solutions, and TMS solutions that can be easily implemented.

1.10 Limitations and Delimitations of the Study

1.10.1 Limitations

The study also had some limitations due to the need to obtain accurate information from the employees of Jumia Uganda on the adoption of TMS and operational performance, some of the operational information was regarded as sensitive. Data collection was limited due to financial and time constraints. In addition, the findings were not directly applicable to other third party logistics companies in Uganda as it is a single organisation case study and therefore offers company specific information and insights only.

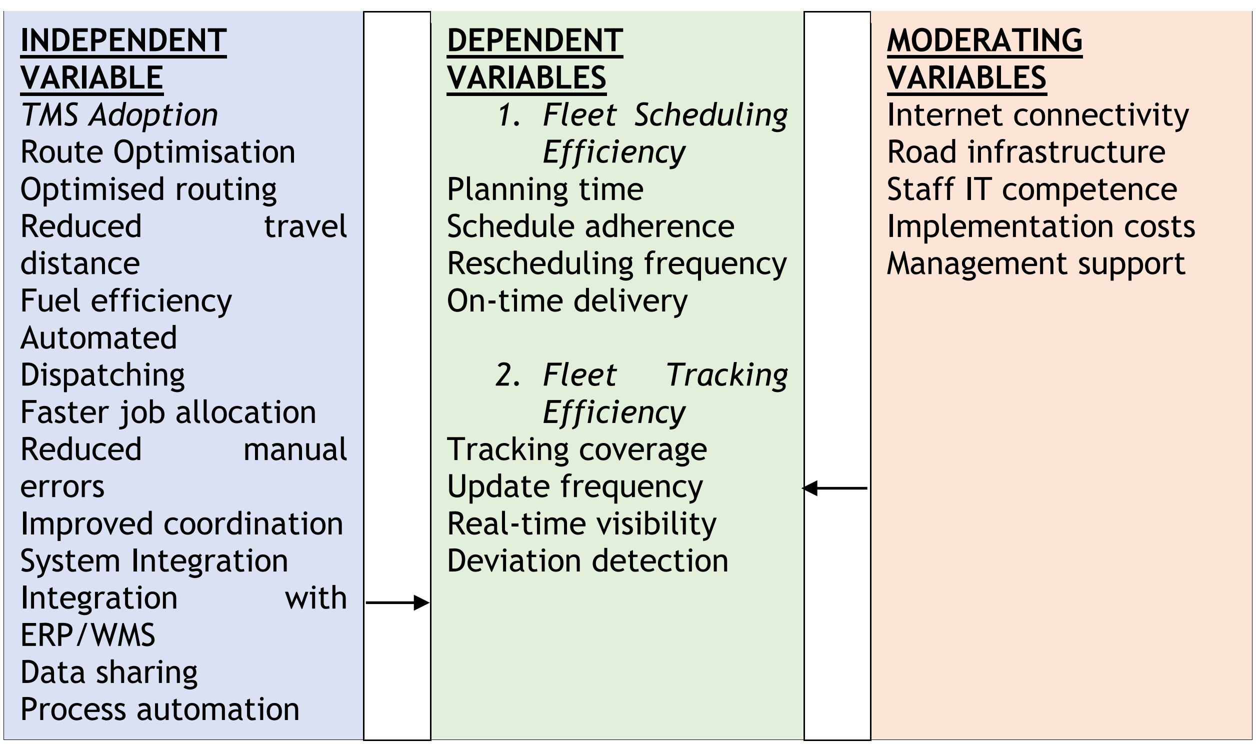
1.10.2 Delimitations

Geographically the study was conducted in the scope of Jumia Uganda's logistics operations in Kampala and Greater Kampala Metropolitan Area (GKMA). It was done specifically for the employees directly involved in the scheduling, dispatching, tracking and TMS management of fleet, and not on those in non-logistics related roles like sales, customer service or finance. The following key operational performance indicators were studied: fleet scheduling efficiency and fleet tracking efficiency.

1.11 Conceptual Framework

This study has a conceptual model which integrates the independent variable with two dependent variables: Transportation Management Systems (TMS) adoption, fleet scheduling efficiency and fleet tracking efficiency. Control variables such as the internet, road infrastructure, staff IT skills, implementation costs and management support are incorporated because they could affect the strength of the relationship between TMS adoption and the efficiency outcomes of the fleets in the operating environment of Jumia Uganda.

Figure 1.1: Conceptual Framework



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter discusses literature on the adoption of Transportation Management Systems (TMS) and operational efficiency of fleets in 3PL providers particularly in the e-commerce logistics context of Jumia Uganda. The chapter discusses theoretical literature, conceptual definitions and empirical literature on the impacts on fleet scheduling efficiency and fleet tracking efficiency of TMS adoption, and how contextual factors, including internet connectivity, staff IT competence, management support and infrastructure quality, moderate the impacts. Finally, one can find the gaps in the literature that warrant the current study that is concluded at the end of the chapter.

2.2 Theoretical Review

Three theories that complement each other are used as a basis for the study, namely; the Diffusion of Innovation (DOI) Theory, the Technology–Organisation–Environment (TOE) Framework and the Resource–Based View (RBV) Theory. The theories cover aspects of technology adoption behaviour, organisational readiness to innovate and the link between technological capability and operational performance and are presented together in order to explain the technology adoption behaviour.

2.2.1 Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation Theory (DIT) (Everett Rogers 1962, revised in later editions) provides an explanation of the diffusion of new technologies within organisations and societies over time. Rogers (2003) states that there are five factors that affect the rate of adoption and level of diffusion: relative advantage, compatibility, complexity, trialability, and observability. For the purposes of TMS, relative advantage refers to when businesses like Jumia Uganda notice advantages like better routing and visibility of the fleet. When it comes to TMS integration, compatibility is defined as the ease with which it can be integrated into the logistics workflows, and complexity is how hard or easy it is to understand the integration. The likelihood of firms implementing a TMS increases when they are able to observe the positive results of similar organisations and when they can test out the TMS in a pilot program before it is implemented.

The theory of DOI is important in the study because it elaborates on the reasons for variations in adoption rates and levels of TMS use among logistics firms and gives the framework of understanding the drivers of TMS acceptance in the operational environment of the study logistics firms, Jumia Uganda.

2.2.2 Technology-Organisation-Environment (TOE) Framework

The TOE Framework (Tornatzky and Fleischer, 1990) suggests that the process of technology adoption has three contexts: technological, organisational and environmental. Technological context is linked to TMS features like route optimisation, real-time tracking and fleet analytics. Organisational context includes the size of the firm, IT infrastructure, managerial support and competence of the employees. Industry conditions, customer expectations and road infrastructure quality, and internet connectivity are all part of the environmental context.

The TOE framework is especially relevant as it represents the interplay between Jumia Uganda's internal capabilities and Uganda's overall operating environment and their respective impact on TMS adoption and the impact on fleet operational performance.

2.2.3 Resource-Based View (RBV) Theory

The Resource Based View theory suggests that competitive advantage will be found when valuable, rare, inimitable and non-substitutable organizational resources are effectively used. Implementing TMS effectively can be a strategic tool that optimises routes, boosts the precision of scheduling, and enhances fleet visibility for companies like Jumia Uganda. The RBV theory applies to this study as it helps explain that the adoption of TMS is an operational efficiency and a source of competitive advantage in the e-commerce logistics market in Uganda.

2.3 Conceptual Review

2.3.1 Transportation Management Systems (TMS) Adoption

Transportation Management Systems are digital platforms and software that help plan, execute, monitor and optimize transportation and logistics processes. Today's TMS solutions include features like route optimization, load scheduling and GPS tracking, dispatch management and fuel monitoring, and automatic reporting.

From the operational perspective, the adoption of TMS in this study is the proportion of how much Transportation Management Systems are implemented and how much they are effectively used on Jumia Uganda's fleet operations. It can be gauged by metrics such as the number of systems used, how long it has been in use, level of integration with logistics processes and the number of TMS capabilities that are being used. The studies show that the use of TMS can help streamline logistics processes, improve decision-making and increase visibility of the fleet, which in turn contributes to logistics efficiency (Kechil et al., 2022; Yusof et al., 2024). For successful implementation, however, it is necessary to have organisational readiness, infrastructure of quality, employee competence, and managerial support.

2.3.2 Fleet Scheduling Efficiency

From an operational perspective, fleet scheduling efficiency here is an ability of Jumia Uganda to schedule, coordinate and operate transport operations in an efficient way to ensure optimal use of resources and timely deliveries to the last-mile by analyzing data on routes, resources, and orders to develop the most effective journey plans. It is gauged with metrics such as on-time dispatch percentages, delivery schedule compliance, vehicle utilisation, vehicle turnaround, idle time minimisation and load planning accuracy.

TMS aids in scheduling efficiency by automating route planning, optimising delivery schedules and enhancing dispatch team and delivery rider/driver coordination. By processing information in real time, TMS can help you respond quickly to traffic disruptions, delivery changes, and any other operational issues.

2.3.3 Fleet Tracking Efficiency

From an operational point of view, this study focused on fleet tracking efficiency as the ability of Jumia Uganda to accurately and promptly track and control fleet movements. It is evaluated using metrics like real-time location accuracy, GPS-enabled vehicle percentage, deviation response time, driver behaviour monitoring and fuel usage monitoring.

GPS integration and real-time fleet monitoring capabilities in TMS enhance fleet tracking efficiency by giving dispatch managers better visibility into fleet operations, helping them detect delays, track route adherence, and boost operational transparency.

2.3.4 Moderating Variables

Adoption of the TMS can be influenced by a number of moderating factors in the operational efficiency of Jumia Uganda. One of the factors that moderate the extent to which a TMS can be used is internet connectivity; without reliable connectivity, the performance and visibility of the system will be affected. The effectiveness of use of TMS's features by dispatchers and fleet managers is determined by staff IT proficiency. Support from management is essential for allocation of resources, system implementation and employee acceptance. The quality of Kampala's and its environs' road infrastructure is a potential constraint on the success of route optimization, especially when the roads are not in good condition to support the planned routes and it leads to delays in deliveries.

2.4 Empirical Literature Review

2.4.1 TMS Adoption and Fleet Scheduling Efficiency

Studies on the efficiency of fleet scheduling in general confirms that the use of digital transport technologies has a positive impact on scheduling efficiency as it automates planning and increases visibility within the transport networks. But the degree of achievement of these benefits in developing country logistics contexts is not agreed by scholars.

Yusof et al. (2024) observed that Digital Logistics systems could positively influence route coordination, operability, and reliability of deliveries, while Kechil et al. (2022) showed a positive effect of Digital Logistics system on scheduling efficiency by improving the operability and communication between dispatch teams and drivers. Namakula (2025) found that companies that adopted an integrated TMS had better route optimisation, lower transportation costs, and better fleet coordination than those that used manual scheduling systems in Uganda.

These studies have been lauded as supportive of the correlation between the use of TMS and scheduling efficiency, but they have been criticized for being primarily based in technologically advanced logistics settings that tended to have relatively stable infrastructure and high levels of digital readiness. Therefore, results might not be transferrable to the e-commerce logistics context in Uganda where the internet is not as reliable and infrastructure capacity is not as developed. In East Africa, Njuguna et al. (2025) have conducted research on logistics digitalisation, which revealed that although logistic digitalisation tools aided in delivery scheduling, inconsistent internet connectivity and limited technical expertise hindered their impact. Likewise, Mwesiumo and Halpern (2022) found that infrastructural constraints remain to be a challenge in the utilization of logistics technology in developing economies. Empirical studies specific to the outcomes of scheduling efficiency in Jumia Uganda's fleet operations have not been done before, thus this study fills the firm-specific empirical gap.

2.4.2 TMS Adoption and Fleet Tracking Efficiency

The general consensus of the studies is that GPS-based TMS systems increase tracking accuracy and improve speed of response to disruptions to operations. Yusof et al.

(2024) found that integrated TMS played a key role in enhancing real-time fleet visibility and delivery coordination. Namakula (2025) also noted fuel usage reduction, driver accountability, and quicker response to delivery deviations as benefits of digital fleet monitoring systems. Olyanga et al (2022) proved that real-time tracking systems can enhance delivery predictability and customer satisfaction by providing real-time shipment visibility.

There are others, however, who question the literature on the premise that simply having tracking technology does not necessarily result in operational efficiency. The lack of sufficient digital infrastructure and low technical capability are key factors that still constrain the use of digital logistics in developing economies as emphasized by Mwesiumo and Halpern (2022), which directly relates to Uganda's context. Njuguna et al. (2025) found that despite the implementation of GPS systems in fleet management, many companies faced challenges in having a view on the fleet, with the issue being attributed to poor network infrastructure. In Uganda, there is no empirical study that has investigated fleet tracking efficiency indicators which include GPS coverage, real-time response time, deviation detection in an e-commerce logistics company like Jumia Uganda. This study thus aims to fill that gap directly.

2.4.3 Moderating Factors and TMS Effectiveness

The existing literature supports the point that the relationship between the adoption of TMS and its efficiency is highly influenced by the organisational and environmental conditions. Tornatzky and Fleischer (1990) contend that the success of technology implementation outcomes can be attributed to the quality of managerial commitment, technological infrastructure and operating environments. Mwesiumo and Halpern (2022) found that organisational readiness and IT competence are important factors affecting technology assimilation, while Olyanga et al. (2022) noted that IT infrastructure and internet connectivity are critical factors that affect the effectiveness of digital logistics in various African countries.

In spite of this recognition, there have been some studies that have been criticized for assuming that adopting technology is directly related to performance when this does not take into account contextual conditions. Limited empirical work looks into how internet connectivity, staff IT skills, management support, and infrastructure quality specifically moderate the relationship between TMS adoption and efficiency at the firm level in Uganda's e-commerce logistics industry. The moderating dynamics in Jumia Uganda are thus explored in this study.

2.5 Research Gap

Previous studies have shown the benefits TMS brings to logistics efficiency such as route optimisation, scheduling coordination, and real-time fleet visibility. A number of significant gaps exist, however.

Regarding context: most TMS adoption studies have been carried out in developed economies, or multi-firm survey studies in Africa, which would not be suitable for single-firm, e-commerce-driven logistics in Uganda. Second, in terms of scope, the research conducted in Africa is mainly limited to the general adoption of ICT and performance in the ICT value chain, not necessarily to performance of the fleet or their efficiency in scheduling and tracking. Third, in relation to moderating factors, there is limited empirical research that explores the moderating role of internet connectivity, staff IT competence, management support and infrastructure quality on the relationship between TMS and efficiency in the e-commerce logistics sector in Uganda. Fourth, on firm level evidence: None of the studies that have been published has specifically focused on TMS adoption and its operational efficiency outcomes within Jumia Uganda, thus creating a gap in the context and methodology.

This study, therefore, fills these contextual, thematic, moderating and firm specific gaps by examining the effects of TMS adoption on the efficiency of fleet scheduling and fleet tracking efficiency at Jumia Uganda, while incorporating the participation of key moderating factors.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The methodology used to investigate the impact of the adoption of TMS on the efficiency of fleet scheduling and fleet tracking efficiency at Jumia Uganda is presented in this chapter. The chapter presents the research design, study area, target population, sampling technique, and sample size, data collection instruments, data collection procedures, quantitative data analysis technique, validity and reliability of research instruments, measurement scale, and ethics.

3.1 Research Design

The study was conducted with a case study research design and cross-sectional survey approach in quantitative method. The case study design is suitable as it allows a detailed and firm specific analysis of TMS adoption and its effects on the operational efficiency of fleet within the bounded context of Jumia Uganda (Yin, 2018). The cross-sectional survey design allowed for information to be gathered from multiple respondents at one time in order to get a snapshot of the TMS adoption process and outcomes in terms of fleet efficiency of the firm.

In this design, descriptive and explanatory elements were used both. The descriptive component involved describing the current level of TMS implementation and the current state of efficiency of the fleet scheduling and tracking at Jumia Uganda. The explanatory component set up and explained the causal relationship between the two variables of operational efficiency and TMS adoption. This mix is in line with the suggestions provided by Kothari (2004) and Saunders, Lewis, and Thornhill (2019) for research studying technology adoption and operational performance. The design is also consistent with the DOI Theory, TOE Framework, and RBV Theory on which the study is based.

3.2 Study Area

The study was carried out in Jumia Uganda, a leading e-commerce logistics company in Kampala, Uganda. Jumia Uganda operates a fleet of delivery vehicles and motorcycles on last mile delivery routes in the Greater Kampala Metropolitan Area (GKMA) including Kampala Central, Ntinda, Naalya, Mukono and Wakiso. The company has one main fulfilment centre and multiple dispatch centres that daily manage very high volumes of deliveries by applying digital logistics tools. Jumia Uganda was chosen as the study's location due to its size as a fleet operator, the fact that it is currently investing in digital logistics and TMS and its significance as a prominent logistics player in the fast-growing digital retail market in Uganda.

3.3 Target Population

The target population comprised Jumia Uganda staff directly involved in transportation, fleet management and logistics. The respondents of the study were specifically logistics managers, fleet supervisors, dispatch officers, transport coordinators, and IT users who were involved with the TMS implementation and support in the organisation. These categories are deemed suitable as they have direct experience of implementing a TMS, scheduling processes, and fleet tracking results at Jumia Uganda.

The sample population included 57 employees from the various functional areas of Jumia Uganda which are located in their fulfilment centre, dispatch and IT unit in Kampala. This population size is a better size for statistical analysis than the original 35 was, and was identified after initial organisational scoping at the firm.

3.4 Sampling Techniques and Sample Size

3.4.1 Sampling Technique

Purposive sampling and simple random sampling were used in the study. Key informants, including logistics managers, fleet supervisors and IT personnel who have specialized responsibilities within the TMS implementation and operational processes were selected using purposive sampling (Creswell, 2014). The respondents were identified using the organisational structure and department list of Jumia Uganda, which was obtained from the HR department with permission. Within the two groups of dispatch officers and transport coordinators, the lists of available personnel were used to draw samples from the list of staff members, so that all persons in the list the same chance of being selected and no selection bias occurred.

3.4.2 Sample Size

The sample size was determined using Yamane's (1967) formula:

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

Where n = sample size, N = target population, and e = margin of error (0.05).

Given a target population of 57 employees: $n = 57 / [1 + 57(0.05)^2] \approx 50$ respondents.

Table 3.1: Sample Size Distribution

Category	Population	Sample Size
Logistics Managers	8	8
Fleet Supervisors	10	9
Dispatch Officers	20	17
Transport Coordinators	12	11
IT Personnel	7	6
Total	57	50

3.5 Data Collection Method

3.5.1 Questionnaire Survey

Data collected at Jumia Uganda were quantitative and gathered through structured questionnaires to capture quantitative data on TMS adoption, fleet scheduling efficiency, fleet tracking efficiency and moderating variables. The questionnaires were primarily closed-ended with items on a five point Likert scale:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

The interval measurement scale enabled responses to be standardised for Jumia Uganda's logistics and IT team, and was used to enable statistical analysis methods such as correlation and regression analysis. Some of the sample questionnaire statements were:

In our organisation, Transportation Management System helps to plan routes more efficiently.

At Jumia Uganda, 100% of the team has adopted TMS and this has helped improve the on-time dispatch and delivery coordination process.

Real-time fleet tracking has improved operational visibility of our delivery fleet.

Internet infrastructure is adequate for the implementation of the TMS in Jumia Uganda.

Employers have adequate IT skills to leverage the capabilities of the TMS.

3.6 Data Collection Instrument

3.6.1 Structured Questionnaire

The structured questionnaire was designed to collect quantitative data on the study variables and contained sections covering: demographic information; TMS adoption at Jumia Uganda; fleet scheduling efficiency; fleet tracking efficiency; and moderating variables. The questionnaire was administered through Google Forms and in hard copy where necessary, and was written in clear, simple language to enhance understanding and response accuracy among Jumia Uganda's logistics and IT staff.

3.7 Data Collection Procedure

An introductory letter was obtained from the university to allow for the carrying out of the study. Permission for the data collection was then sought formally from the management of Jumia Uganda prior to the start of data collection. Questionnaires were sent out electronically using Google Forms and personally to Jumia Uganda's fulfilment centre and dispatch centres on approval. Researcher clarified with the appropriate term if needed to obtain accurate responses. Data entry and analysis were preceded by the completed questionnaires being checked for completeness, consistency and accuracy.

3.8 Validity and Reliability of Instruments

3.8.1 Validity

Validity refers to the degree of accuracy of research instruments for measuring the variables being tested. Content validity was achieved by having the questionnaire reviewed by the research supervisor and two logistics and information systems professionals to determine how relevant, clear, and adequate the questions were.

Content Validity Index (CVI) was calculated based on expert ratings to determine the acceptability for the study, and CVI score 0.70 or higher was considered acceptable. Pre-data collection necessary corrections were made as per expert recommendations.

3.8.2 Reliability

The reliability of the research instrument is indicated by the consistency and dependability of the instrument. A pilot study was carried out on a small sample of logistics workers outside the selected sample, which served as a test of reliability, achieved by Cronbach's alpha coefficient. The internal consistency was assessed by calculating Cronbach's Alpha coefficient and the value of 0.70 and above was regarded as acceptable (Tavakol & Dennick, 2011).

3.9 Measurement Scale

The study employed an interval measurement scale using a 5-point Likert scale to assess the respondents' perceptions about the TMS adoption, the fleet scheduling efficiency, the fleet tracking efficiency and moderating factors. The interval scale allows for the quantification of abstract concepts and the measure of numerical values, standardisation of responses by Jumia Uganda staff, and the use of statistical methods such as Pearson correlation coefficient and regression analysis.

3.10 Quantitative Data Analysis

The quantitative data were coded, entered into and analysed using the Statistical Package for Social Sciences (SPSS Version 26). Respondent characteristics and study variables were summarised using descriptive statistics such as frequencies, percentages, means and standard deviations. Pearson correlation analysis and simple linear regression analysis were used for inferential statistics to analyze relationship between the TMS adoption and each fleet operational efficiency variables. All statistical inferences were made at a level of 0.05.

The effect of TMS adoption on each of the dependent variables was analyzed by the use of two separate regression models:

Model 1: $Y_1 = \beta_0 + \beta_1 X + \varepsilon$

Model 2: $Y_2 = \beta_0 + \beta_1 X + \varepsilon$

Where:

X = TMS adoption (independent variable)

Y_1 = Fleet scheduling efficiency (dependent variable, Model 1)

Y_2 = Fleet tracking efficiency (dependent variable, Model 2)

β_0 = Constant (intercept)

β_1 = Regression coefficient

ε = Error term

This specification is appropriate in positioning TMS adoption as an independent variable and fleet scheduling and tracking efficiency as separate dependent variables, which align with the study objectives, hypotheses, and the context for the case study that is Jumia Uganda.

3.11 Ethical Considerations

Ethical research principles were followed in the study. All Jumia Uganda participants gave informed consent prior to data collection. Participants were briefed on the study's purpose and assured that participation will be voluntary and they may end at any time without penalty. Confidentiality and anonymity were ensured; individual responses were not attributed to named employees or revealed in the research report. All data gathered for this study was utilized for the purpose of research only and kept in a secure manner following research ethics guidelines of the university.

3.12 Chapter Summary

The methodology used to explore the effect of the adoption of TMS on fleet scheduling efficiency and fleet tracking efficiency at Jumia Uganda has been presented in this chapter. The chapter explained the research design of case study which was conducted on a cross-sectional survey approach, study location where this study took place which was Kampala in Jumia Uganda operations, study population which was 57 employees, sampling technique and procedure, data collection instruments and procedure, Data analysis using SPSS version 26 with corrected two model regression specification, and ethical consideration. Selected Methodology allowed the study objectives to be achieved systematically and reliably.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 Introduction

The data gathered from Jumia Uganda personnel in direct transportation, fleet and logistics operations is presented, analysed and interpreted in this chapter. This chapter includes the results of the response rate, background information of respondents, reliability of the research instrument, descriptive statistics for all variables studied, Pearson correlation analysis for the two hypotheses that were studied, and the result of simple linear regression for the two hypotheses studied.

4.1 Response Rate

A total of 50 questionnaires were given to the sampled employees at Jumia Uganda in each of the five functional categories. Of these 46 were returned, giving an overall response rate of 92%, as shown in Table 4.1 below.

Table 4.1: Response Rate

Category	Questionnaires Issued	Questionnaires Returned	Response Rate (%)	Notes
Logistics Managers	8	8	100%	-
Fleet Supervisors	9	9	100%	-
Dispatch Officers	17	13	76.5%	4 non-returns
Transport Coordinators	11	11	100%	-
IT Personnel	6	5	83.3%	1 non-return
Overall Response Rate	50	46	92%	-

Source: Primary Data, 2026

According to the Table 4.1, the overall response rate of 92% is high and may be representative of a quantitative survey. The response rate of 70% and more is deemed to be satisfactory and reliable for generalisation of findings (Mugenda and Mugenda, 2003). The return rate for all logistics managers and transport coordinators was 100%, with a few questionnaires not being returned by dispatch officers and IT personnel. The high response rates are due to personal follow up, Google Forms and coordination with Jumia Uganda Departmental heads.

4.2 Background of Respondents

This section describes the background details of the 46 respondents, which consists of gender, age group, level of education, designation, years of experience in logistics or transport operations and duration of using TMS at Jumia Uganda. These are summarised in Table 4.2 below.

Table 4.2: Background Information on the Respondents

Item	Details	Frequency	Percentage (%)
Gender	Male	31	67.4
	Female	15	32.6
	Total	46	100.0
Age Group	18–25	6	13.0
	26–35	36	78.3
	36–45	4	8.7
	Total	46	100.0
Level of Education	Diploma	8	17.4
	Bachelor's Degree	34	73.9
	Master's Degree	4	8.7
	Total	46	100.0
Position / Designation	Logistics Manager	8	17.4

	Fleet Supervisor	10	21.7
	Dispatch Officer	13	28.3
	Transport Coordinator	11	23.9
	IT Personnel	4	8.7
	Total	46	100.0
Years of Experience	1–3 years	9	19.6
	4–6 years	33	71.7
	7 years and above	4	8.7
	Total	46	100.0
TMS Usage Duration	1–3 years	11	23.9
	4–6 years	35	76.1
	Total	46	100.0

Source: Primary Data, 2026

The majority of participants were male (67.4%, n = 31) and female (32.6%, n = 15) as presented in Table 4.2. The gender balance is in line with the male predominant profile in the logistics and fleet operations departments of Jumia Uganda and similar patterns found in East African logistics sector studies (Lawrence & Mupa, 2024).

With respect to age, the dominant category was the 26–35 years bracket, which constituted 78.3% (n = 36) of the respondents, followed by the 18–25 age group at 13.0% (n = 6), and the 36–45 age group at 8.7% (n = 4). There were no respondents that were 46 years and older. The distribution indicates that Jumia Uganda's logistics workforce is mostly made up of relatively young and mid-career professionals, who are more likely to be receptive towards technology adoption such as TMS.

In terms of educational attainment, most respondents had Bachelor's Degree (73.9%, n = 34), followed by Diploma (17.4%, n = 8) and Master's Degree (8.7%, n = 4). The relative higher proportion of degree-level qualifications suggests that the workforce is quite knowledgeable and can participate in the functional aspects of TMS and respond to the study instrument with a knowledgeable response.

In terms of the respondents by job title, Dispatch Officers made up the largest group at 28.3% (n = 13), followed by Transport Coordinators at 23.9% (n = 11), Fleet Supervisors at 21.7% (n = 10), Logistics Managers at 17.4% (n = 8), and IT Personnel at 8.7% (n = 4). This distribution is indicative of the proportion of each functional category of the Jumia Uganda workforce in the fleet and logistics segment.

As far as experience in logistics or transport operations, 71.7% of respondents had 4-6 years' experience, 19.6% had 1-3 years, and 8.7% have 7 years and more. The results show that the bulk of the respondents have a fair amount of experience in logistics and fleet management, thus their perception of TMS adoption and fleet efficiency is more likely to be valid and reliable.

On the other hand, 76.1% (n = 35) of respondents stated they had used TMS for between 4-6 years, with 23.9% (n = 11) using it for 1-3 years. The large share of respondents reporting that they have been using TMS for a year or more indicates that the TMS community is familiar with the system, thereby boosting the validity of the self-reported benefits of TMS for fleet scheduling and tracking efficiency.

4.3 Reliability of the Research Instrument

The test of the reliability of the research instrument was conducted by the Cronbach Alpha coefficient in advance of the main analysis. In social science research, a value of 0.70 or greater is deemed acceptable (Tavakol & Dennick, 2011). The results are presented in Table 4.3 below.

Table 4.3: Reliability Statistics

Variable	Section	No. of Items	Cronbach's Alpha
TMS Adoption	Section B	8	0.905
Fleet Scheduling Efficiency	Section C	8	0.916
Fleet Tracking Efficiency	Section D	8	0.918

Source: Primary Data, 2026

The Cronbach's Alpha values for all three constructs were well above the 0.70 level (see Table 4.3). TMS Adoption had an α of 0.905, Fleet Scheduling Efficiency an α of

0.916, and Fleet Tracking Efficiency an α of 0.918. All items of the instrument reflect good internal consistency across each of the study scales, giving support to the reliability of the instrument in measuring the targeted constructs (Nunnally, 1978). A high alpha value underlines the credibility of the following inferential analyses.

4.4 Extent of TMS Adoption at Jumia Uganda.

The aim of the first specific objective was to evaluate the level of TMS implementation in Jumia Uganda. The eight items to measure the operationalization of TMS adoption were based on a five-point Likert scale, with 5 indicating Strongly Agree and 1 indicating Strongly Disagree. The descriptive results are shown in Table 4.4.

Table 4.4: Descriptive Statistics for TMS Adoption (Section B)

Item	Response Distribution										Mean	SD
	SA	%	A	%	N	%	D	%	SD	%		
B1. Jumia Uganda uses TMS to optimise delivery routes on a daily basis.	8	17.4	37	80.4	1	2.2	0	0.0	0	0.0	4.15	0.420
B2. TMS enables automated dispatching of delivery assignments at Jumia Uganda.	9	19.6	36	78.3	1	2.2	0	0.0	0	0.0	4.17	0.437
B3. TMS is integrated with other systems such as WMS/ERP at Jumia Uganda.	3	6.5	41	89.1	2	4.3	0	0.0	0	0.0	4.02	0.333
B4. GPS tracking through TMS is actively used to monitor fleet movements.	9	19.6	36	78.3	1	2.2	0	0.0	0	0.0	4.17	0.437
B5. Digital scheduling through TMS has replaced manual dispatch methods.	8	17.4	38	82.6	0	0.0	0	0.0	0	0.0	4.17	0.383

B6. TMS facilitates real-time data sharing among dispatch teams, drivers, and management.	7	15.2	38	82.6	1	2.2	0	0.0	0	0.0	4.13	0.400
B7. The extent of TMS utilisation across fleet operations has increased over the past three years.	10	21.7	35	76.1	1	2.2	0	0.0	0	0.0	4.20	0.453
B8. TMS at Jumia Uganda supports load consolidation and load planning for daily deliveries.	5	10.9	41	89.1	0	0.0	0	0.0	0	0.0	4.11	0.315

Source: Primary Data, 2026. Key: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

The level of agreement on all the items listed in the TMS adoption was consistently high across all items and item means ranged from 4.02 to 4.20, with none of the respondents indicating Disagree, nor Strongly Disagree on any of the items. The presence of this pattern implies that Jumia Uganda has a high level of adoption and consistency of TMS adoption.

The highest-rated item was B7 'The extent of TMS utilisation across fleet operations has increased over the past three years' (Mean = 4.20; SD = 0.453), with 21.7% of respondents strongly agreeing and 76.1% agreeing. This finding aligns with the background information showing that 76.1% of respondents reported using TMS for 4–6 years, confirming a trajectory of growing TMS utilisation at the firm. This result is consistent with Namakula (2025), who found that Ugandan logistics firms using integrated TMS demonstrated increasing levels of system utilisation over time.

There is a strong level of agreement that TMS allows for automated dispatching (B2), GPS tracking using TMS is being used to monitor the movements of the fleet (B4), and digital scheduling through TMS has replaced manual dispatching methods (B5). The results here point to the active use and operation of key system features such as route optimisation, automated dispatch, GPS tracking, load planning, etc. beyond the mere installation of TMS, which is also supported by the findings of Yusof et al. (2024) in their logistic and IT review.

B3 'TMS is integrated with other systems such as WMS/ERP at Jumia Uganda' was the lowest rated item (Mean = 4.02; SD = 0.333) which was still rated as high, with 89.1% agreeing and 6.5% strongly agreeing. The slightly lower score could be due to the fact that full system integration is still in a stage of development as Mwesiumo and Halpern (2022) observed with logistic systems in developing economies. The overall composite mean score for TMS Adoption was 4.14 (SD = 0.310), showing a high level of TMS adoption in all the measured dimensions at Jumia Uganda.

4.5 Effect of TMS Adoption on Fleet Scheduling Efficiency at Jumia Uganda

The second specific objective of this study was to investigate the impact of TMS on the efficiency of scheduling of the fleets at Jumia Uganda. Eight Likert scale items were used to measure the efficiency of fleet scheduling. Descriptive results presented in Table 4.5.

Table 4.5: Descriptive Statistics for Fleet Scheduling Efficiency (Section C)

Item	Response Distribution										Mean	SD
	SA	%	A	%	N	%	D	%	SD	%		
C1. TMS has reduced the time required to plan and schedule daily delivery routes.	6	13.0	40	87.0	0	0.0	0	0.0	0	0.0	4.13	0.341
C2. TMS adoption has improved schedule adherence among delivery teams.	9	19.6	37	80.4	0	0.0	0	0.0	0	0.0	4.20	0.401
C3. TMS has improved on-time dispatch of delivery vehicles and riders.	6	13.0	39	84.8	1	2.2	0	0.0	0	0.0	4.11	0.379
C4. Fleet utilisation has improved since TMS adoption at Jumia Uganda.	7	15.2	39	84.8	0	0.0	0	0.0	0	0.0	4.15	0.363
C5. TMS has reduced the frequency of delivery rescheduling	10	21.7	36	78.3	0	0.0	0	0.0	0	0.0	4.22	0.417

at Jumia Uganda.												
C6. TMS enables more accurate load planning and vehicle assignment.	7	15.2	38	82.6	1	2.2	0	0.0	0	0.0	4.13	0.400
C7. TMS has reduced idle time of delivery vehicles at Jumia Uganda.	9	19.6	37	80.4	0	0.0	0	0.0	0	0.0	4.20	0.401
C8. Overall, TMS has significantly improved fleet scheduling efficiency.	7	15.2	39	84.8	0	0.0	0	0.0	0	0.0	4.15	0.363

Source: Primary Data, 2026. Key: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

Table 4.5 indicates that all the items related to fleet scheduling efficiency were rated as highly, the item mean ranged from 4.11 to 4.22 and no respondents responded Disagree or Strongly Disagree on any items. The overall pattern of response here is positive indicating that the respondents in general believe that the implementation of TMS has meaningfully impacted the efficiency of fleet scheduling in all the measured dimensions.

C5 'TMS has reduced the frequency of delivery rescheduling at Jumia Uganda' was the top-rated item (Mean = 4.22; SD = 0.417) with 78.3% strongly agreeing and 21.7% agreeing. This discovery highlights the function of TMS in smoothing out delivery schedules and minimizing reactive adjustments, thereby helping to boost fleet efficiency and ensure on-time deliveries. This aligns with the research of Kechil et al. (2022) that has shown that digital logistics systems caused a considerable decrease of logistics firms' scheduling disruptions.

The second highest rated were C2 and C7, with Mean = 4.20, which shows a high level of agreement that adoption of TMS has helped to improve schedule adherence among delivery teams, and reduced idle time of delivery vehicles. These results combined, indicate that, overall, the implementation of TMS has contributed to enhanced operational discipline and vehicle utilisation, two factors identified in the conceptual framework to be contributing to efficient scheduling.

The lowest mean rating was for C3, 'TMS has improved on-time dispatch of delivery vehicles and riders' (Mean = 4.11; SD = 0.379) with one respondent rating it as

Neutral. This is still a high rating, but the slight deviation may indicate that the operation is sometimes disrupted by traffic or delays by riders that can affect the ability to dispatch on time, as detailed in the qualitative challenge responses. The overall mean for all the items of Fleet Scheduling Efficiency was 4.16 (SD = 0.305) and this indicates that there was high and consistent level of perceived improvement on scheduling efficiency at Jumia Uganda associated with TMS.

4.5.1 Correlation Analysis: TMS Adoption and Fleet Scheduling Efficiency

To measure the strength and direction of the relationship between TMS adoption and fleet scheduling efficiency, a Pearson's correlation coefficient was computed. The results are given in tabular form in Table 4.5.1.

Table 4.5.1: Pearson Correlation — TMS Adoption and Fleet Scheduling Efficiency

		TMS Adoption	Fleet Scheduling Efficiency
TMS Adoption	Pearson Correlation	1	.945**
	Sig. (2-tailed)	—	.000
	N	46	46
Fleet Scheduling Efficiency	Pearson Correlation	.945**	1
	Sig. (2-tailed)	.000	—
	N	46	46

*** Correlation is significant at the 0.01 level (2-tailed). Source: Primary Data, 2026*

As shown in Table 4.5.1, TMS adoption has a very strong positive correlation with fleet scheduling efficiency ($r = 0.945$, $p < 0.001$, $N = 46$) with the correlation being positive and statistically significant. The finding shows that there is a strong correlation of higher level of TMS adoption with higher level of fleet scheduling efficiency at Jumia Uganda. The correlation coefficient of 0.945 is very strong (Cohen, 1988) and the p-value of < 0.001 indicates that this relationship is not due to chance. It corroborates empirical findings by Yusof et al., (2024); Kechil et al., (2022); and Namakula, (2025) which all conclude that TMS can lead to a significant improvement in logistics companies on scheduling coordination and operational planning.

4.5.2 Simple Linear Regression: TMS Adoption and Fleet Scheduling Efficiency

Simple linear regression analysis was used to determine the causal relationship between TMS adoption and the efficiency of the fleet scheduling. The regression model is given as:

$Y_1 = \beta_0 + \beta_1 X + \varepsilon$

Where Y_1 = Fleet Scheduling Efficiency, X = TMS Adoption, β_0 = constant, β_1 = regression coefficient, and ε = error term. The regression results are presented in Tables 4.5.2(a), 4.5.2(b), and 4.5.2(c).

Table 4.5.2(a): Model 1 Summary — TMS Adoption and Fleet Scheduling Efficiency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.945[a]	.893	.891	.1006

Source: Primary Data, 2026 [a] Predictors: (Constant), TMS Adoption

Table 4.5.2(b): ANOVA — Model 1

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.732	1	3.732	368.650	.000[b]
Residual	0.445	44	0.010		
Total	4.177	45			

Source: Primary Data, 2026 [a] Dependent Variable: Fleet Scheduling Efficiency. [b] Predictors: (Constant), TMS Adoption

Table 4.5.2(c): Coefficients — Model 1

Model	B	Std. Error	Beta (Standardised)	t	Sig.
(Constant)	0.316				
TMS Adoption	0.928	0.048	0.945	19.200	.000

Source: Primary Data, 2026 Dependent Variable: Fleet Scheduling Efficiency

The coefficient of determination ($R^2 = 0.893$) in the Model 1 Summary in Table 4.5.2(a) means that 89.3% of the variance in the efficiency of fleet scheduling is explained by the adoption of TMS. This explanatory power is robust in its adjusted R^2 of 0.891, which is after the sample size and number of predictors has been taken into account. Using the standard error of the estimate, the model's predictions are very precise, at 0.1006.

The ANOVA results in Table 4.5.2(b) indicate that the regression model is statistically significant ($F = 368.650$, $p < 0.001$) thus confirming that the TMS adoption is significant in predicting the efficiency of fleet scheduling at Jumia Uganda. The value of the F statistic is very high, meaning that a regression model can account for a lot of variance.

From the coefficient results of Table 4.5.2(c), it can be observed that the coefficient of the fleet scheduling efficiency variable is positive with B = 0.928, Beta = 0.945, t = 19.200, and $p < 0.001$, indicating that the use of TMS has a positive effect on fleet scheduling efficiency. The unstandardised coefficient of 0.928 indicates that a one unit increase in TMS adoption results in a 0.928 unit increase in their efficiency in fleet scheduling. The magnitude of this effect is very strong as evidenced by the standardised Beta of 0.945. The constant (B = 0.316) is the minimum value of fleet scheduling efficiency at 0% TMS adoption.

4.6 Effect of TMS Adoption on Fleet Tracking Efficiency at Jumia Uganda

The third specific objective of this study was to investigate the impact of the TMS adoption on the fleet tracking efficiency in Jumia Uganda. Eight items on a Likert scale were used to measure the fleet tracking efficiency. The descriptive results are shown in Table 4.6.

Table 4.6: Descriptive Statistics for Fleet Tracking Efficiency (Section D)

Item	Response Distribution										Mean	SD
	SA	%	A	%	N	%	D	%	SD	%		
D1. TMS provides real-time GPS tracking of delivery vehicles and riders.	9	19.6	37	80.4	0	0.0	0	0.0	0	0.0	4.20	0.401
D2. TMS tracking coverage includes all active fleet units at Jumia Uganda.	11	23.9	35	76.1	0	0.0	0	0.0	0	0.0	4.24	0.431
D3. TMS provides timely updates on fleet location and status.	5	10.9	41	89.1	0	0.0	0	0.0	0	0.0	4.11	0.315
D4. TMS enables quick detection of route deviations by dispatch officers.	8	17.4	38	82.6	0	0.0	0	0.0	0	0.0	4.17	0.383
D5. TMS tracking supports effective driver behaviour monitoring.	9	19.6	35	76.1	2	4.3	0	0.0	0	0.0	4.15	0.470
D6. TMS improves the accuracy of ETA notifications to clients.	6	13.0	40	87.0	0	0.0	0	0.0	0	0.0	4.13	0.341
D7. TMS tracking has reduced fuel consumption through better route adherence.	4	8.7	42	91.3	0	0.0	0	0.0	0	0.0	4.09	0.285
D8. Overall, TMS has significantly improved fleet tracking efficiency.	8	17.4	38	82.6	0	0.0	0	0.0	0	0.0	4.17	0.383

Source: Primary Data, 2026. Key: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

All of the fleet tracking efficiency elements were very highly rated, with an element mean between 4.09 and 4.24, as shown in table 4.6. None of the respondents said they disagreed or strongly disagreed about any item, while two respondents (4.3%)

said they were neutral about item D5. The overall positive rating scores reflect the general perception of the significant improvement in the efficiency of tracking fleets using TMS at Jumia Uganda.

The highest rated was D2, TMS tracking coverage includes all the units in the fleet at Jumia Uganda with the mean score of 4.24 and SD 0.431, with 23.9% strongly agreeing, while 76.1% agreed. This outcome is a product of a high level of confidence in comprehensiveness of TMS enabled tracking coverage, which is a key measure of tracking effectiveness (Namakula, 2025). It is crucial to have complete fleet coverage so that everyone can see what is going on and be held accountable.

No one responded Neutral or Disagree on item D1 'TMS provides real-time GPS tracking of delivery vehicles and riders. The second highest mean (SD = 0.401) was the item 'TMS provides real-time GPS tracking of delivery vehicles and riders. This is an indication that real-time tracking is not just a toy, but is being implemented and utilized effectively as reported by Olyanga et al. (2022) who proved real-time tracking systems can enhance the predictability of deliveries and operational visibility. There were also good perceptions of TMS helping to detect deviations from the routes (D4) and overall, significantly improving fleet tracking efficiency (D8) with Mean = 4.17.

The lowest rated item was D7 'TMS tracking have reduced fuel consumption because of the better adherence to routes' (Mean = 4.09; SD = 0.285). There was a consensus of 91.3% in agreement, with no respondents disagreeing, although it was the lowest mean. This slightly lower rating could be due to the fact that fuel-saving is a secondary or indirect benefit that is less tangible than real-time location tracking and deviation detection are for the respondents. The composite mean for Fleet Tracking Efficiency was 4.16 (SD = 0.303), which indicates improved levels of perceived improvement in fleet tracking that came from using TMS at Jumia Uganda.

4.6.1 Correlation Analysis: TMS Adoption and Fleet Tracking Efficiency

A Pearson's correlation coefficient was used to analyze the relationship between TMS adoption and tracking efficiency of fleets. The results are shown in Table 4.6.1.

Table 4.6.1: Pearson Correlation — TMS Adoption and Fleet Tracking Efficiency

		TMS Adoption	Fleet Tracking Efficiency
TMS Adoption	Pearson Correlation	1	.972**
	Sig. (2-tailed)	—	.000
	N	46	46
Fleet Tracking Efficiency	Pearson Correlation	.972**	1
	Sig. (2-tailed)	.000	—
	N	46	46

*** Correlation is significant at the 0.01 level (2-tailed). Source: Primary Data, 2026*

Table 4.6.1 shows a very high value of $r = 0.972$ and $p < 0.001$ ($N = 46$) which corresponds to very high positive and statistically significant correlation between TMS adoption and fleet tracking efficiency. This is the highest bivariate correlation in the study and suggests that the use of TMS is even more closely related to fleet tracking efficiency than it is to scheduling efficiency. With a value of 0.972, there is a strong indication of a positive correlation, as TMS appears to be very crucial as an enabler to track performance at Jumia Uganda. This aligns with the findings of Yusof et al. (2024) which suggested that integrated TMS is the most important factor that determines real-time fleet visibility in logistics operations.

4.6.2 Simple Linear Regression: TMS Adoption and Fleet Tracking Efficiency

Simple linear regression analysis was used to investigate the causal relationship of TMS adoption with fleet tracking efficiency. A regression model that is specified is:

$Y_2 = \beta_0 + \beta_1 X + \varepsilon$

Where Y_2 = Fleet Tracking Efficiency, X = TMS Adoption, β_0 = constant, β_1 = regression coefficient, and ε = error term. The results are presented in Tables 4.6.2(a), 4.6.2(b), and 4.6.2(c).

Table 4.6.2(a): Model 2 Summary — TMS Adoption and Fleet Tracking Efficiency

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.972[a]	.945	.944	.0718

Source: Primary Data, 2026 [a] Predictors: (Constant), TMS Adoption

Table 4.6.2(b): ANOVA — Model 2

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.912	1	3.912	757.964	.000[b]
Residual	0.227	44	0.005		
Total	4.139	45			

Source: Primary Data, 2026 [a] Dependent Variable: Fleet Tracking Efficiency. [b] Predictors: (Constant), TMS Adoption

Table 4.6.2(c): Coefficients — Model 2

Model	B	Std. Error	Beta (Standardised)	t	Sig.
(Constant)	0.222				
TMS Adoption	0.950	0.035	0.972	27.531	.000

Dependent Variable: Fleet Tracking Efficiency. Source: Primary Data, 2026

The Model 2 Summary in Table 4.6.2(a) shows that 94.5% of the variance in fleet tracking efficiency (R^2 = 0.945) is explained by the model, and on an adjusted basis, the model explains 94.4% of the variance (R^2 = 0.945; Adjusted R^2 = 0.944). This is a significantly greater explanatory power than that of Model 1 (R^2 = 0.893) and indicates that TMS adoption is an even more powerful predictor of fleet tracking efficiency than of fleet scheduling efficiency. The standard error of the estimate is small, 0.0718, showing very good predictive precision.

The ANOVA results in Table 4.6.2(b) shows that model 2 is highly statistically significant (F = 757.964, $p < 0.001$). The F-statistic for Model 2 is 757.964, which is approximately twice the F-value of Model 1 (368.650) showing the much stronger predictive relationship between the adoption of TMS and the efficiency of fleet tracking.

As indicated in Table 4.6.2(c), t = 27.531, $p < 0.001$, the coefficient value for fleet tracking efficiency is 0.950 and the Beta value is 0.972, indicating that the adoption of TMS has a significant positive effect on fleet tracking efficiency. The coefficient of 0.950 is not standardised, meaning it reflects a change in efficiency of fleet tracking when TMS adoption increases by 1 unit. The standardised Beta of 0,972 indicates that the direction of the relationship between the TMS adoption and tracking efficiency is very close to being perfect. The baseline value of the tracking efficiency, without TMS adoption is 0.222, which is the constant value. The findings align with Njuguna et al. (2025), who showed the strong association between GPS based fleet management system and tracking visibility outcome in East African logistics environment.

4.7 Moderating Variables Affecting TMS Effectiveness at Jumia Uganda

Apart from the primary goals, the study also explored the factors such as internet connectivity, road infrastructure, staff competence in IT, implementation costs of TMS and management support as moderating variables that affect the effectiveness of the TMS in Jumia Uganda. In Section E, these were assessed using six items on a Likert scale and the results are available in Table 4.7.

Table 4.7: Descriptive Statistics for Moderating Variables (Section E)

Item	Response Distribution										Mean	SD
	SA	%	A	%	N	%	D	%	SD	%		
E1. Internet connectivity at Jumia Uganda adequately supports TMS operations.	3	6.5	42	91.3	1	2.2	0	0.0	0	0.0	4.04	0.295
E2. Road infrastructure in Kampala generally supports TMS route	6	13.0	38	82.6	2	4.3	0	0.0	0	0.0	4.09	0.412

optimisation.												
E3. Staff at Jumia Uganda have sufficient IT competence to use TMS effectively.	5	10.9	40	87.0	1	2.2	0	0.0	0	0.0	4.09	0.354
E4. Implementation costs of TMS have been manageable for Jumia Uganda.	6	13.0	38	82.6	2	4.3	0	0.0	0	0.0	4.09	0.412
E5. Management at Jumia Uganda provides adequate support for TMS adoption.	4	8.7	41	89.1	1	2.2	0	0.0	0	0.0	4.07	0.327
E6. Overall, moderating factors enhance the effectiveness of TMS at Jumia Uganda.	6	13.0	39	84.8	1	2.2	0	0.0	0	0.0	4.11	0.379

Source: Primary Data, 2026. Key: SA = Strongly Agree; A = Agree; N = Neutral; D = Disagree; SD = Strongly Disagree

The data in Table 4.7 shows that all items of the moderating variables were rated positively and the item means were between 4.04 and 4.11. The highest rated item was E6 'Moderating factors overall enhance the effectiveness of TMS at Jumia Uganda', Mean = 4.11; SD = 0.379 with 13.0% strongly agreeing and 84.8% agreeing thus the respondents collectively agree that contextual factors were supportive to TMS effectiveness.

For Internet connectivity (E1), the mean score was 4.04 (SD = 0.295); 91.3% agreed and 1 respondent marked Neutral. This implies that internet connectivity in Jumia Uganda is generally satisfactory for the TMS operations, but there might be some periods of time when internet connectivity is limited to reduce the effectiveness of TMS, as noted by Mwesiumo and Halpern (2022) who reported that even if internet connectivity is generally satisfactory, there may be a period of time when internet connectivity is limited to reduce the effectiveness of the TMS. Staff IT competence (E3) and road infrastructure (E2) had scores of Mean= 4.09 (SD = 0.508) and 89.1% answering that staff have sufficient IT competence, respectively 88.2% and 90.4% agreed to have road infrastructure adequate for the implementation of the TMS. The findings indicate that the general conditions in the context of the organisation and environment for the adoption and effectiveness of TMS at Jumia Uganda are favourable and consistent with the model proposed by Tornatzky and Fleischer (1990), which is part of the Technology-Organisation-Environment framework.

4.8 Challenges Affecting TMS Implementation at Jumia Uganda

This study aimed at looking into all the challenges that are facing the implementation of TMS in Jumia Uganda as the fourth specific objective. The responses that were open-ended to Section F of the questionnaire were gathered and thematically analysed. The challenges identified are organised under five thematic domains as explained below.

4.8.1 Network Connectivity and System Performance Challenges

Inconsistent network connectivity and system performance were the most common issues that were mentioned. The respondents talked about system lag during peak hours, network coverage was not good outside central Kampala, network instability, server down during the rainy seasons, system lag when multiple logins are made, delayed tracking signals, and database lag when there is a lot of traffic. These results corroborate the results from Njuguna et al. (2025) which found that in spite of the use of GPS based fleet management systems, the logistics environment in East Africa still has the problem of having inconsistent tracking visibility due to weak network infrastructure. The application of network-dependent TMS features means that these features are prone to performance degradation when there is a high volume of traffic or when there is bad weather.

4.8.2 Infrastructure and Environmental Challenges

The second major group of problems had to do with physical infrastructure and environmental factors. Participants mentioned the following issues that impact delivery vehicles: bad roads, poor road infrastructure that affects adherence to the route, poor GPS signal during rain, delays due to rain, inaccurate map information for upcountry delivery areas, traffic congestion leading to inaccurate ETA predictions. The results align with the findings of Mwesiumo and Halpern (2022) that infrastructural gaps persist in affecting the digital logistics sector in developing countries, and with the Uganda Bureau of Statistics (2023) report on the condition of roads in the logistics sector in Uganda.

4.8.3 System Integration and Technical Challenges

Respondents also pointed out various technical and integration issues, such as issues that API integration didn't work with the local warehouse maps, problems with legacy

APIs, high set-up fees and licensing costs, high software renewal fees, inaccurate vehicle assignment matches, inaccurate coordinate pinning on delivery locations, manual adjustments conflicting with the software-generated plan, and fuel tracking discrepancies. The technical issues align with the results of Kechil et al. (2022) that identified gaps in system interoperability and complex integration as recurring TMS adoption obstacles for logistics companies.

4.8.4 Human Factor and Change Management Challenges

Some of the respondents noted challenges related to change management in organisations and human behaviour. The challenges were such that they encompassed resistance from older dispatch team members to use tracking systems, driver non-compliance with tracking system data entry requirements, driver location spoofing, delayed notifications to clients due to manual overrides, communication breakdowns between riders and drivers, and steep learning curve for older employees. The results are consistent with Rogers's (2003) Diffusion of Innovation (DOI) theory which identifies complexity and compatibility of the systems to existing work practices as barriers to adoption, and Mwesiumo and Halpern (2022) who concluded that the lack of technical expertise among logistics staff limits the use of digital systems in developing economies.

4.8.5 Operational and Communication Challenges

The fifth class of challenges was operational – from field rider delays, phone battery failure causing rider tracking to drop, not being able to communicate with third-party fleet providers, wrongly assigning weights at the warehouse stage, to not having any automated optimisation algorithms in the current TMS configuration and communication problems with remote drivers. The challenges suggest that although TMS is being embraced at a very high level, its full potential is somewhat hampered by workflow gaps, third-party coordination challenges, and a lack of advanced TMS capabilities like automated load optimisation.

4.9 Testing of Hypotheses

Two null hypotheses were tested based on the regression analyses of the study. The interpretations of the results are provided below.

4.9.1 Hypothesis One

H_{01}: TMS adoption has no significant influence on fleet scheduling efficiency at Jumia Uganda.

The regression analysis results obtained in Table 4.5.2(c) gave a standardised Beta of 0.945, t = 19.200 and a significance level of $p < 0.001$ ($p = 0.000$). The p value is less than the significance level ($p < 0.05$), which means there is enough evidence to reject the null hypothesis (H_{01}). The study hence concludes that TMS use has a positive and significant effect on the efficiency of fleet scheduling at Jumia Uganda. The model accounts for 89.3% of the variance in fleet scheduling efficiency ($R^2 = 0.893$; Adjusted $R^2 = 0.891$) and the overall regression model is significant ($F = 368.650$, $p < 0.001$). The results are consistent with the empirical evidence of Yusof et al. (2024) and Kechil et al. (2022) which found that TMS adoption is one of the key factors that determines the efficiency in scheduling outcomes in Jumia Uganda.

4.9.2 Hypothesis Two

H_{02}: TMS adoption has no significant influence on fleet tracking efficiency at Jumia Uganda.

The regression analysis results presented in Table 4.6.2(c) show a standardised Beta coefficient of 0.972 and a t-value of 27.531, and the significance value of $p < 0.001$ ($p = 0.000$) when TMS adoption was used as the independent variable. The null hypothesis H_{02} is rejected because $p < 0.05$. The study, therefore, has drawn a conclusion that the use of TMS has a significant and positive impact on the efficiency of tracking fleets at Jumia Uganda. The model accounts for 94.5% of the variance in the fleet tracking efficiency ($R^2 = 0.945$; Adjusted $R^2 = 0.944$), and the overall regression model is highly significant ($F = 757.964$, $p < 0.001$). The effect of TMS adoption on fleet tracking efficiency is even greater than that of the fleet scheduling efficiency as indicated by the higher Beta coefficient, F-statistic and R^2 value. The findings align with the work carried out by Namakula (2025) and Olyanga et al. (2022) that showed that the use of GPS-based TMS has the potential of positively impacting real-time fleet visibility and tracking accuracy in logistics.

4.10 Chapter Summary

This chapter has highlighted, analysed and interpreted the findings of the study on the effect of TMS adoption on the fleet tracking efficiency and fleet scheduling efficiency at Jumia Uganda. A total of 46 (92%) questionnaires were returned. The study instrument showed good reliability (Cronbach's alpha value for TMS adoption, fleet scheduling efficiency and fleet tracking efficiency are 0.905, 0.916 and 0.918, respectively).

The descriptive results showed that the extent of TMS adoption was high at Jumia Uganda (4.14) especially for GPS tracking, automated dispatching and route optimisation. Respondents were satisfied with the efficiency of their fleet and all items received scores above 4.0 for the fleet scheduling efficiency (composite mean = 4.16) and fleet tracking efficiency (composite mean = 4.16).

The Pearson correlation analysis confirmed an extremely high positive and statistically significant correlation between the TMS adoption and the fleet tracking efficiency ($r = 0.972$ and $p < 0.001$), as well as with the fleet scheduling efficiency ($r = 0.945$ and $p < 0.001$). The results of simple linear regression revealed that both the fleet scheduling efficiency ($\beta = 0.945$, $R^2 = 0.893$, $F = 368.650$, $p < 0.001$) and fleet tracking efficiency ($\beta = 0.972$, $R^2 = 0.945$, $F = 757.964$, $p < 0.001$) were significantly and positively predicted by the adoption of TMS, leading to the rejection of both null hypotheses.

The means for all the moderating variables such as Internet connectivity, road infrastructure, staff IT skills, implementation costs and management support were above the neutral rating and ranged between 4.04 and 4.11, indicating that contextual conditions at Jumia Uganda in general are favourable for TMS effectiveness. The issues found are network instability, infrastructure constraints, system integration problems, human reluctance towards adoption, and operational communication problems. The findings of these are used to draw the conclusions and recommendations which are presented in Chapter Five.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The chapter summarizes the most important findings from Chapter Four and discusses how they relate to the aims of the study and the existing literature, and offers conclusions and recommendations for policy, practice and research. The discussion critically evaluates the findings of the previous studies and draws some conclusions at how many points they agree or disagree with the present study.

5.1 Discussions

5.1.1 Extent of TMS Adoption at Jumia Uganda

The study aimed at finding out the level of TMS implementation at Jumia Uganda. The study results showed that the adoption of TMS was high with a mean value of 4.14 (SD = 0.310) across all the measured dimensions, and was operationally embedded. The usage of TMS for route optimisation, automated dispatching, GPS-enabled fleet tracking, load planning and real-time data sharing was high, and most respondents said these functions are used every day. The top-rated item, which was on growth over the last three years (Mean = 4.20), indicates that TMS at Jumia Uganda is not just borrowed, but has increased over time.

The results support the argument proposed by Yusof et al. (2024) that the journey of information technology adoption in logistics companies is not just about the start of the deployment, but also about the embedding of information technology into the normal working processes of the logistics companies in years to come. Likewise, Namakula (2025) noted that logistics companies in Uganda that have embraced the use of TMS software are active users of the system's functions such as route planning, dispatch automation, and tracking shipments, just like it is the case with Jumia Uganda. This is supported by the Diffusion of Innovation theory (Rogers, 2003) that over time the more TMS becomes integrated with existing processes in Jumia Uganda and the more its relative advantages are apparent, the more people will adopt it and the less resistance there will be.

The slightly lower rating on system integration with ERP and warehouse management systems (WM) (Mean = 4.02) is due to a known issue in the development of economy logistics environments. Interoperability issues among TMS and other enterprise systems are still a major challenge in digitally transforming logistics companies per Mwesiumo and Halpern (2022), and Kütahya et al. (2025) highlighted integration with multiple systems as one of the most complex aspects of implementing TMS. The overall finding, however, establishes that the level of TMS adoption is high for Jumia Uganda, which gives a clear technological base for better performance of its fleets.

5.1.2 TMS Adoption and Fleet Scheduling Efficiency at Jumia Uganda

The second research aim was to investigate the impact of using TMS on the efficiency of fleet scheduling in Jumia Uganda. The study findings revealed that TMS adoption has a significant, strong, and positive effect on fleet scheduling efficiency ($r = 0.945$; $\beta = 0.945$; $R^2 = 0.893$; $F = 368.650$; $p < 0.001$). Thus, the null hypothesis H_{01} was rejected: TMS adoption does not seem to have a significant influence on fleet scheduling efficiency. The result showed that TMS adoption accounted for 89.3% of the variance in the efficiency of fleet scheduling, showing that in Jumia Uganda adoption of the TMS is a key factor in determining scheduling performance at the firm.

This result agrees with the results of several previous studies. According to Yusof et al. (2024), a systematic review of information technology and logistics performance revealed that digital transportation systems have a significant positive impact on the three logistics firms's performance.Yusof et al. (2024) performed a systematic review of information technology and logistics performance, which showed that digital transportation systems have significant positive effect on route coordination, adherence to schedule and delivery reliability. In similar fashion, Kechil et al. (2022) showed that the implementation of IT in logistics operations positively affected the scheduling discipline and reduced operational disruptions by providing greater coordination between logistics dispatch and field teams. Namakula (2025) further found that integrated TMS enabled firms to have improved fleet coordination and lower transportation costs than the firms using manual scheduling systems, aligning with the high scores of scheduling efficiency recorded at Jumia Uganda in the Ugandan context.

The least time required to reschedule deliveries (Mean = 4.22) was the top rated scheduling efficiency outcome, indicating that the TMS system planning algorithms and real time operational data at Jumia Uganda have significantly reduced the need for last minute, or reactive, scheduling changes that are common in manual dispatch environments. This is consistent with the finding of Kukreja et al. (2020), who suggested that TMS route optimisation makes the job of delivery schedule more predictable as it offers pre-validated delivery schedules which consider load, distance, time windows and vehicle capacity.

The results, on the other hand, partially reject research that doubted the ability to achieve full benefits from the use of TMS in logistics environments in developing economies. Njuguna et al. (2025) identified unstable connectivity and low technical skills as key challenges in implementing and leveraging digital fleet management in East African logistics contexts, and Mwesiumo and Halpern (2022) noted ongoing challenges of infrastructure limitations in digital logistics performance in developing economies. Based on the findings of the present study, Jumia Uganda could have met these contextual constraints to a reasonable level at least with respect to the relationship between the TMS-scheduling efficiency. This may be explained by the firm's continued investment in TMS since its implementation, the relatively well-trained staffs and a good internet infrastructure, as observed in moderating variable findings (Mean = 4.04).

This result can be explained using the theoretical model of the Technology-Organisation-Environment (TOE) framework (Tornatzky & Fleischer, 1990). The organisational context in Jumia Uganda as captured by the majority degree qualified staff with 4-6 years logistics experience, good management support (Mean = 4.07) and moderate IT competence (Mean = 4.09) has created enabling environment which facilitates the translation of TMS functionalities to scheduling efficiency gains. This finding thus confirms the theoretical prediction that the outcomes of the technology's adoption are influenced by the organisational readiness, as stated in the theoretical framework of the study, which is built upon the Resource Based View theory (Barney, 1991 as cited in the study) that states that technology will be strategic resources if it can be used successfully in an organization environment that is capable and supportive.

5.1.3 TMS Adoption and Fleet Tracking Efficiency at Jumia Uganda

The study further aimed to explore the impact of TMS on fleet tracking efficiency at Jumia Uganda, the third objective. The results of the study showed that there was a very high level of positive correlation, coefficient of determination, and statistically significant effect of TMS adoption on fleet tracking efficiency with $r = 0.972$, $\beta = 0.972$, $R^2 = 0.945$, $F = 757.964$ and $p < 0.001$. H_{02}: "The adoption of TMS does not significantly affect the efficiency of fleet tracking" was thus rejected. Notably, the predictive power of TMS in relation to fleet tracking efficiency ($R^2 = 0.945$) was higher than the fleet scheduling efficiency ($R^2 = 0.893$), thus showing that TMS is more of a determinant of tracking efficiency than scheduling efficiency at Jumia Uganda.

The results are in line with the empirical evidence that makes TMS central to the real-time fleet visibility. In East Africa, Olyanga et al. (2022) found real-time tracking systems enhance delivery predictability and customer satisfaction by providing real-time visibility of shipments. Namakula (2025) also recorded that digital fleet monitoring systems in Uganda helped to enhance driver accountability, cut fuel usage and faster action on route deviations. Yusof et al. (2024) also found that integrated TMS is among the biggest factors affecting real-time fleet visibility in logistics performance review and the correlation of integrated TMS in the current study showed near-perfect (r = 0.972) correlation.

The most successful tracking efficiency result achieved from tracking coverage is all active fleet units at Jumia Uganda (Mean = 4.24), which means that the fleet is fully visible through GPS, thereby ensuring that all operations are held accountable and decisions are taken in real time. This finding is supported by Njeri et al. (2023) whose work showed that sensor devices in logistics operations in Kenya helped to enhance route deviation monitoring, real-time visibility and lead-time forecasting. The positive responses on the item 'TMS allows quick detection of route deviations (Mean = 4.17)', and 'TMS allows timely updates on the status of the fleet (Mean = 4.11)', further show that tracking at Jumia Uganda with the help of TMS serves the primary function of tracking the fleet.

The lowest-rated item (Mean = 4.09) and still reflecting strong agreement, was that TMS tracking has helped reduce fuel consumption by improving the adherence to the planned routes. The indirect and less tangible nature of fuel savings compared to more immediate tracking achievements e.g. real time location updates, may be a factor. Practicing in logistics tracking, Tang (2020) pointed out that fuel efficiency improvements from IoT will only be noticeable over time as their logistics system continues to be used and the routes followed. Jović et al. (2020) also confirmed that the economic advantages of TMS automation such as fuel cost savings are cumulative and increase in tandem with the utilization of a TMS system.

This discovery runs contrary to the findings of Mwesiumo and Halpern (2022) and Njuguna et al. (2025) that in small businesses with GPS fleet management, an inconsistent network infrastructure can limit visibility of real-time tracking in developing economies. However, this may be Jumia Uganda's specific context as they are a major e-commerce logistics company with a decent investment in TMS and a not-so-slow urban delivery process network in Kampala which allows them to be technologically and organisationally ready to reduce the constraints that are normally associated with smaller or less resourced logistics operators. Another potential reason for the extremely high tracking efficiency scores found in Jumia Uganda is the implementation of a more consistent tracking approach, as argued by Dorofeev et al. (2024) who report that companies that have embraced digital twin and integrated monitoring systems for TMS achieve higher tracking consistency.

5.1.4 Challenges Affecting TMS Implementation at Jumia Uganda

The fourth aim of the study was to investigate the problems encountered in implementing TMS at Jumia Uganda. The qualitative results from the open-ended responses yielded five main thematic areas of challenges: the connectivity of the network and the performance limitations of the system; infrastructure and environmental constraints; system integration and technical challenges; human factor and change management challenges; and operational and communication challenges.

The problems of network related issues such as lag during peak hours, server downtime, weak network coverage outside Kampala central and low GPS signal especially during bad weather conditions were the most common category. The results align with Njuguna et al. (2025), which revealed that in East African logistics companies, the network infrastructure is still very weak and unreliable, even when they utilize the GPS-based TMS system. Similarly, Mwesiumo and Halpern (2022) found that inconsistent Internet connectivity is one of the biggest issues to hinder the successful use of digital logistics in developing economy settings; they claim that cloud-based TMS becomes very vulnerable in such situations.

The reality of logistics in urban and peri-urban areas of Uganda is highlighted by infrastructure and environmental issues, such as variations in road conditions, traffic congestion errors in TMS route predictions and poor GPS signal coverage in upcountry delivery areas. The Uganda Bureau of Statistics (2023) indicated that there are ongoing challenges with the road infrastructure in the Greater Kampala Metropolitan Area affecting the efficiency of last-mile deliveries. Kuteyi et al (2022) also noted that low quality road infrastructure in developing economies also hinders the effectiveness of TMS route optimisation, since planned routes often deviate from the actual paths available in the event of damage, flooding or disruption of roads.

The technical difficulties involved in integrating the TMS into Jumia Uganda's overall digital infrastructure are evident in system integration challenges, such as API glitches with local warehouse maps, legacy mapping failures, and the expensive software licensing and renewals. Kütahya et al. (2025) highlighted that assessing the interoperability among the systems is one of the most important and technically challenging aspects of implementing a TMS system, especially when TMS systems need to be integrated with existing ERP, WMS, and third-party carrier systems. High implementation and renewal costs are also cited as major challenges for SMEs in the resource-constrained logistics sector to fully exploit TMS by Kechil et al. (2022).

In terms of human factors, older dispatchers had an aversion to the system, drivers were not always compliant with data entry in the system, drivers could spoof their location and the learning curve was quite steep, all of which are consistent with

Rogers' (2003) DOI theory, which identifies complexity as a major challenge for new technologies. Wazir et al. (2023) have confirmed that driver monitoring IT tools can only be effective if they are supported by well-trained and motivated personnel that adhere to the system's requirements. Moreover, Ainomugisha (2022) discovered that the relationship between information technology adoption and logistics performance in Uganda is significantly moderated by the employees' IT competences, emphasizing the need for continuous training and change management interventions in addition to IT technical deployment.

While TMS implementation at Jumia Uganda appears to be limited by workflow gaps and coordination limitations that lie outside the TMS implementation, challenges such as delayed field rider updates, rider tracking loss when batteries go down, poor coordination with third party fleet providers, incorrect load weight assignment have been observed. This is in line with Kuteyi et al. (2022) who found that the maximisation of the potential of technology in logistics operations must be accompanied by the simultaneous improvement of logistics operational processes and inter-organisational communication.

5.2 Conclusions

The study results have led to the following conclusions:

First, the use of TMS in Jumia Uganda has reached a high degree of embedding and use. Participants verified that they are using TMS on a daily basis for route optimisation, GPS-driven fleet tracking, automated dispatching, load planning and real-time data sharing. Over the last three years, the rate of adoption has increased substantially, reflecting a continued trend of progressive adoption of TMS use across a company's fleet operations. The finding highlights the fact that Jumia Uganda has gone beyond the point of mere deployment of TMS to a digitally integrated logistics operation.

Second, the impact of the use of TMS on the efficiency of scheduling at Jumia Uganda is significant, strong and positive. The regression analysis results were significant with $R^2 = 0.893$, $\beta = 0.945$, $p < 0.001$, which means 89.3% of the variance in fleet scheduling efficiency is explained by TMS adoption, and the null hypothesis H_{01} was rejected. These results are consistent with the fact that TMS is an essential factor in improving scheduling discipline, adherence to schedules, vehicle utilisation, and readiness of drivers to dispatch at Jumia Uganda. Implication: The use of TMS on-going and augmenting will be a key element in continuing and enhancing fleet scheduling performance within the firm.

Thirdly, there is a stronger and significant positive relationship between the TMS adoption and the efficiency of the fleet tracking system at Jumia Uganda. The regression model accounted for 94.5% of the variance in fleet tracking efficiency (R^2 = 0.945; β = 0.972; $p < 0.001$) and the null hypothesis H_{02} was rejected. TMS GPS tracking has given Jumia Uganda full visibility of their fleet, real-time tracking, and ability to monitor driver behaviour with speed, along with good ETA accuracy. The answer is: TMS is the biggest technology driver of the firm's fleet tracking performance, and its ongoing process of using it and upgrading it will be critical to the accountability of the processes and the quality of customer service.

Fourth, while TMS adoption had significant positive impacts, some challenges remain to limit the effectiveness of TMS implementation in Jumia Uganda. They involve poor network connectivity at times of peak traffic, weather conditions that cause problems in certain instances and restrictions on roads and infrastructure that make it difficult to stick to the exact route; integration issues with existing warehouse and ERP systems; lack of IT competence amongst some categories of operations and staff resistance; and coordination issues with third-party fleet providers. These challenges must be overcome to achieve the maximum value from TMS at Jumia Uganda. The impact of a TMS is therefore dependent not just on the deployment of the system but on the organisational and infrastructural environment the system will function in.

5.3 Recommendations for Policy and Practice

The following recommendations are made to Jumia Uganda's management, logistics industry practitioners, TMS vendors and government agencies based on the results of the study:

The management of Jumia Uganda should invest in the technology infrastructure of the TMS, specifically the internet bandwidth, load balancing of the servers and back up connectivity. As network instability was the most often reported implementation issue, the firm should work with more stable internet service providers, and have redundant cloud-based backup systems in place to ensure the continuity of TMS operations during peak delivery times and adverse weather conditions. The recommendation aligns with the study by Mwesiumo and Halpern (2022), which found that connectivity is crucial for the effectiveness of digital logistics, and the study by Njuguna et al. (2025), which revealed the importance of connectivity in digital logistics.

The firm should establish a structured training programme of the TMS system on an on-going basis for all the employees involved in the system and especially dispatch officers, transport coordinators, and older employees who had shown more reluctance in adopting the system. The training must be work-specific and practical in nature, and include GPS tracking compliance, accurate data entry, reporting of route deviations, and load weight verification. Wazir et al. (2023) and Ainomugisha (2022) both agree that employee Information Technology (IT) skills are an important moderating factor on the outcomes of technology use in logistics operations and that employee training in the specific areas of technology use can significantly enhance the compliance and performance of the technology.

For Jumia Uganda, it is recommended to have a complete integration between TMS and warehouse management and ERP systems. Higher scores were observed for the other dimensions of the TMS adoption, with the relatively low score for system integration (Mean = 4.02) indicating that this dimension is still not fully implemented. Full integration would mean the end of duplicated data, manual coordination between departments and the end-to-end visibility of operations from dispatching at the warehouse to the confirmation at the last mile. Kütahya et al. (2025) and Kechil et al. (2022) point out that the performance measures of scheduling and tracking are always better in the case of integrated TMS platforms compared to partially integrated TMS platforms.

Jumia Uganda must implement anti-spoofing measures and compliance incentives in the configuration of its TMS to tackle the challenges of driver location spoofing and failing to comply with TMS data entry requirements. If such human factors issues are not addressed, they will compromise GPS tracking data integrity and operational reporting. As suggested by respondents in the qualitative feedback (Section F2), performance-based reward mechanisms that are based on TMS compliance are effective motivators for driver and rider adoption of the TMS features.

The Ministry of Works and Transport and Uganda Communications Commission should collaborate to tackle the lack of infrastructure and connectivity in the TMS system that limits its effectiveness in peri-urban and upcountry logistics settings. A combination of policies with the following impact would help to boost Uganda's digital logistics ecosystem: Investment policy in last-mile road rehabilitation; expand mobile broadband coverage in delivery areas; and incentives for e-commerce logistics companies to use advanced TMS platforms. The recommendations of the Uganda Bureau of Statistics (2023) on the gaps in the infrastructure in Greater Kampala Metropolitan Area support these policy priorities, while those of Lawrence and Mupa (2024) on infrastructure-led solutions to boosting logistics performance in East Africa also support them.

To build more affordable and mobile TMS solutions which are able to provide basic features like route caching, GPS logging, delivery confirmation and other important features even in the absence of internet connectivity, for TMS providers and fleet technology vendors in Uganda and East Africa. The offline map functionality and the improvements in tracking that can withstand weather conditions as suggested by the respondents in qualitative feedback, are practical needs for TMS designs that are context adaptive for Uganda's conditions of infrastructure. This is in line with Dorofeev et al. (2024) which suggest that TMS platforms be built with the operational context in which they will be deployed.

5.4 Recommendations for Further Research

The study was designed as a case study at a single organization (Jumia Uganda) with focus on the impact of TMS adoption on the efficiency of fleet scheduling and fleet tracking efficiency in Jumia Uganda's logistics operations in Kampala city. This case study approach allowed for detailed and specific learnings, but the results cannot be easily transferred to other third parties' logistics companies or e-commerce logistics environment in Uganda. There are some alternatives for future research suggested.

Comparative multi-firm study of TMS adoption and fleet efficiency outcomes in a sample of selected TPs in the Uganda e-commerce industry – varying their size, ownership structure and TMS maturity status – should be performed in future. This would make it possible to draw general conclusions on the possible relationship between TMS-efficiency and logistics in Uganda and enable cross-firm comparisons.

This study only analyzed the dependent variables fleet scheduling efficiency and fleet tracking efficiency. Other future studies could be conducted on the broader effect of TMS on other logistics performance metrics like freight cost savings, customer satisfaction, last mile delivery failures and overall supply chain responsiveness in Jumia Uganda or similar companies. Some of these dimensions have been started by Namakula (2025) and Jović et al. (2020), however, there is still limited empirical evidence for firms in the Ugandan e-commerce logistics sector.

As the results showed that both Internet connectivity, road infrastructure, IT staff competency and management support are strong moderators in this study, future research is recommended to test these moderators in an empirical way with a larger and more diverse sample. Structural Equation Modelling (SEM) or moderated regression analysis might be used to formally quantify the effect that each moderating variable has on strengthening the link between TMS-efficiency, giving more sophisticated evidence to inform infrastructure investment and capacity building policy decisions.

Going beyond the Greater Kampala Metropolitan area, further studies on the implementation of TMS and the efficient management of Uganda's intercity and cross-border logistics should be undertaken. The problem of poor GPS coverage, the existence of upcountry map inaccuracies and the problem of coordination between the border crossings identified in this study indicate that TMS performance can be significantly different in logistics environments with a long distance or across the border. While Njuguna et al. (2025) and Olyanga et al. (2022) have explored the cross-border logistics at regional level, there is no literature relating to Uganda in the intercity context and focused on TMS.

Last but not least, a longitudinal study to follow up on the adoption of TMS and fleet efficiency outcomes across a three-to-five-year period at Jumia Uganda would lend valuable evidence on how the relationship between TMS and fleet efficiency changes as the organisation continues to deepen the integration of the TMS, upgrade the technical infrastructure and expand the coverage of the TMS to new areas for sales and deliveries. Case studies are especially useful in the context of evolving technology use and its operational implications over time, as pointed out by Yin (2018).

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APPENDIX

RESEARCH QUESTIONNAIRE

Uganda Christian University – School of Business

Bachelor of Procurement and Logistics Management

THE INFLUENCE OF TRANSPORTATION MANAGEMENT SYSTEMS (TMS) ADOPTION ON FLEET SCHEDULING AND TRACKING EFFICIENCY IN UGANDA'S THIRD-PARTY LOGISTICS FIRMS: A CASE STUDY OF JUMIA UGANDA

Dear Respondent,

My name is NAMAZZI MARIA, a student at Uganda Christian University, Mukono, pursuing a Bachelor's Degree in Procurement and Logistics Management (Reg. No: S23B12/037). I am conducting an academic research study titled: "The Influence of Transportation Management Systems (TMS) Adoption on Fleet Scheduling and Tracking Efficiency in Uganda's Third-Party Logistics Firms: A Case Study of Jumia Uganda."

Your participation is entirely voluntary. All information provided will be treated with strict confidentiality and used solely for academic purposes. Individual responses will not be disclosed in any manner that could identify you or your department. The estimated completion time is approximately 15 minutes. Please respond honestly and completely.

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (✓) the appropriate answer.

A1. Gender

[ ] Male [ ] Female [ ] Prefer not to say

A2. Age Group

[ ] 18–25 [ ] 26–35 [ ] 36–45 [ ] 46 years and above

A3. Highest Level of Education

[ ] Certificate [ ] Diploma [ ] Bachelor's Degree [ ] Master's Degree [ ] Other (specify): ________

A4. Position / Designation in the Organisation

[ ] Logistics Manager [ ] Fleet Supervisor [ ] Dispatch Officer [ ] Transport Coordinator [ ] IT Personnel [ ] Other (specify): ________

A5. Years of Experience in Logistics / Transport Operations

[ ] Less than 1 year [ ] 1–3 years [ ] 4–6 years [ ] 7 years and above

A6. How long has your organisation been using a Transportation Management System (TMS)?

[ ] Less than 1 year [ ] 1–3 years [ ] 4–6 years [ ] 7 years and above [ ] Not yet using TMS

SECTION B: TMS ADOPTION AT JUMIA UGANDA

Please rate your level of agreement with the following statements using the scale below:

1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

B1. Jumia Uganda uses TMS to optimise delivery routes on a daily basis.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B2. TMS enables automated dispatching of delivery assignments at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B3. TMS is integrated with other systems such as the warehouse management or ERP system at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B4. GPS tracking through TMS is actively used to monitor fleet movements at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B5. Digital scheduling through TMS has replaced manual dispatch methods at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B6. TMS facilitates real-time data sharing among dispatch teams, drivers, and management at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B7. The extent of TMS utilisation across fleet operations at Jumia Uganda has increased over the past three years.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

B8. TMS at Jumia Uganda supports load consolidation and load planning for daily deliveries.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

SECTION C: FLEET SCHEDULING EFFICIENCY

Please rate your level of agreement with the following statements.

1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

C1. TMS has reduced the time required to plan and schedule daily delivery routes at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C2. TMS adoption has improved schedule adherence among delivery teams at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C3. TMS has improved on-time dispatch of delivery vehicles and riders at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C4. Fleet utilisation has improved since TMS adoption at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C5. TMS has reduced idle time and waiting time for delivery vehicles at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C6. Manual scheduling errors have reduced since TMS adoption at Jumia Uganda. [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C7. TMS improves coordination between dispatch officers and delivery personnel at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

C8. TMS enables faster rescheduling of delivery routes in response to traffic disruptions or operational changes.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

SECTION D: FLEET TRACKING EFFICIENCY

Please rate your level of agreement with the following statements.

1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

D1. TMS enables real-time monitoring of all delivery vehicle movements at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D2. GPS-enabled TMS tracking at Jumia Uganda provides accurate location information for delivery vehicles.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D3. TMS at Jumia Uganda covers the majority of the active delivery fleet in its tracking system.   [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D4. TMS improves detection of route deviations by delivery vehicles at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D5. Fleet tracking through TMS has improved driver accountability at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D6. TMS tracking systems enable prompt response to operational delays and delivery disruptions at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D7. TMS at Jumia Uganda supports fuel consumption monitoring for the delivery fleet.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

D8. Real-time fleet visibility through TMS has improved delivery coordination and operational performance at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

SECTION E: MODERATING FACTORS

Please rate your level of agreement with the following statements.

1 = Strongly Disagree | 2 = Disagree | 3 = Neutral | 4 = Agree | 5 = Strongly Agree

E1. Employees at Jumia Uganda possess adequate IT skills to effectively use TMS functionalities.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

E2. Internet connectivity at Jumia Uganda is reliable enough to support effective TMS operations.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

E3. Management at Jumia Uganda provides adequate support for TMS implementation and staff training.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

E4. Road infrastructure conditions in Kampala affect the effectiveness of TMS route planning at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

E5. The cost of implementing and maintaining TMS is a significant barrier to its full adoption at Jumia Uganda. [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

E6. Poor internet

connectivity reduces the operational effectiveness of TMS at Jumia Uganda.

[ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5

SECTION F: CHALLENGES AND OPEN COMMENTS

F1. What challenges does your organisation face in implementing and using TMS effectively? Please describe briefly.

___

___

___

F2. In your opinion, what improvements could be made to enhance TMS effectiveness at Jumia Uganda?

Thank you sincerely for your time and participation.

For any inquiries, please contact: NAMAZZI MARIA | Uganda Christian University | Reg. No: S23B12/037