Explanatory (Causal) Research. Effects of Last-Mile Delivery Challenges on E-Commerce Growth in Lagos State

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ABSTRACT

Over the last few years, Lagos State has seen a growth of e-commerce, but the last-mile delivery problems of traffic, poor road networks, high delivery costs, and inefficient address systems have resulted in a delivery snarl. These unfulfilled delivery systems negatively impact e-commerce customer retention and the profitability of e-commerce ventures. Even so, these snarl systems impact e-commerce in Lagos State as a result of their inefficiencies on in the logistics systems and customer trust. Using a survey research design, e-commerce customers and logistics providers from all of Lagos State were sampled, resulting in a sample size of 384 customers, traced with structured questionnaires. These were analyzed, with the predictions checked, by simple descriptive and multiple regression analytical systems. The multiple regression shows **B = 0.642, t = 7.735, p = 0.000 (< 0.05)**. Since **p < 0.05**, the Ho was **rejected,** and H1 is **accepted**. The results indicate that last-mile delivery systems do influence the growth of e-commerce systems in Lagos State. The study concludes that although Lagos has systemic infrastructural bottlenecks, firm-level strategies like technology use, flexible delivery systems, and contracts with local courier agents help alleviate some of the challenges. As a result, the study proposes that governmental and private infrastructure deficit stakeholders engage on the integration of novel infrastructural bottlenecks, more e-Commerce and Logistics providers need to be equipped and invested in automated systems like the real-time delivery tracking systems. More firms should integrate active and passive delivery systems within one system, amongst others

Keywords: Customer, Delivery, E-commerce, Growth, Last mile

INTRODUCTION

E-commerce in Nigeria started in Lagos State and has extended to all parts of the country. This is attributed to the increasing number of internet users, affordable smartphones, and the tech-savvy young population. The increasing volume of online shopping does not translate to the efficient delivery of goods ordered online to consumers, a service considered as last-mile delivery. It is a critical component in ensuring customer satisfaction and a repeat purchase (Adeniran, Akinsehinwa, & Olorunfemi, 2022). Last-mile delivery in Lagos State is situated in the center of a complex delivery system, where it is the most time-consuming and expensive, not to mention the poor quality of roads, the population density, and traffic jams. Such conditions make customers form unfavorable perceptions of e-commerce, especially when poor delivery is juxtaposed with the expectations of the digital shopping experience (Adeniran et al., 2022).

The increase in competition from e-commerce platforms such as Jumia and Konga and other new online vendors places the efficiency of logistics systems, and especially last-mile systems, as an essential strategic advantage (Igwe 2025). Customers now regard troublesome deliveries as a sign of a platform's poor reliability, and as a result, chronic unfulfilled logistics systems become an active deterrent to e-commerce growth (Adeniran et al.,

2022). Regulations of the urban landscape also shape the delivery environment in Lagos. Poorly designed addressing systems, traffic control, and informal settlements aggravate reliable delivery planning. These poorly designed systems increase the friction in last-mile deliveries and, as a result, e-commerce more generally (Agbeche et al., 2025).

Consumer behavior in Lagos State is predominantly influenced by the digital world, particularly by the conveniences of e-commerce (Yakeen et al. 2024). For online shoppers, the ability to buy items while skipping the hassle of store hours and traveling distances to physical stores is a great advantage. Urban residents spend a great deal of time buying their needs online. Additionally, the absence of time constraints and geographical barriers adds to the appeal of online shopping. Nevertheless, while the digital shopping experience is seamless, and while the shopping interface satisfies customers' needs, the true challenge in the e-commerce business is meeting customers' expectations in order fulfillment.

While e-commerce is booming in Lagos State, the absence of efficient last-mile delivery systems continues to hinder the industry's growth. Logistics companies struggle to deliver within the specified time limits, which, in turn, decreases customer satisfaction and the trust customers place in the e-commerce platforms (Adeniran et al., 2022). In Lagos, poorly integrated logistics systems, uncoordinated third-party delivery systems, and a lack of efficient route allocation systems create inconsistent delivery services. Customers are far more likely to experience no delivery, a late delivery, or even a lost delivery. This lack of consistent service is a disincentive to service re-purchase (Agbeche et al., 2025).

Moreover, high last-mile delivery service costs in Lagos, primarily due to expensive fuel, time lost in traffic, and multiple delivery attempts, create a strain on logistics companies and e-commerce businesses (Aighobahi, 2024). These uncompetitive operational costs, in conjunction with those of e-commerce businesses, are passed on to customers, contributing to the uncompetitiveness of online shopping. The absence of strategically planned, data-centered logistics within many delivery companies remains another prominent issue. Some companies even fail to procure basic delivery automation, GPS trackers, or demand predictors. This absence of basic automation technologies will certainly advance chronically inefficient delivery systems and overly extend delivery times, slowing growth rates in the e-commerce sector (Adeniran et al., 2022).

As customer expectations evolve within the consumer market, more and more customers are expecting same-day or next-day deliveries. However, the majority of logistics service providers in Lagos do not have properly designed systems or infrastructure to accommodate the consumer expectation of rapid, facilitated delivery, resulting in a service provision gap in rapid, facilitated delivery (Agbeche et al., 2025). Pervasive high-risk crime within Lagos also aggravates delivery problems due to increased delivery risk (Hassan et al. 2024). Crime problems like theft, package stealing, and other assaults, as well as delivery risk management problems like service avoidance and risk-pricing, make the scalable delivery of e-commerce services far less profitable (Aighobahi, 2024).

The last-mile delivery system’s lack of accountability not only undermines customer trust, and repeat business but also diminishes the overall potential for online retail to flourish in Lagos (Adeniran, Akinsehinwa, & Olorunfemi, 2022). Another problem is the lack of an adequate street and house numbering system in different neighborhoods in Lagos. Streets in some neighborhoods are not named, and addresses are either not numbered, poorly numbered, or inconsistent.

This problem is especially challenging in informal settlements or newly built residential areas, where there is little or no urban planning. Delivery failures, delays, and excessive redelivery charges can result from the lack of geocoded addresses or digital coordinates. If no basic and uniform addressing structure exists, it will make little difference how sophisticated the logistics system is. There will always be issues with accurate and timely last-mile delivery (Agbeche, Ejumudo & Abam, 2025).

Aim of The Study

The aim of this study is to examine the challenges of last-mile delivery and how they affects the growth of e-commerce in Lagos State.

Scope and Limitation of the Study

This study examines the effects of last-mile delivery challenges on the growth of e-commerce within Lagos State, Nigeria. Lagos was chosen for this study as it is Nigeria's economic center, home to a considerable amount of e-commerce activities and logistics companies. This research investigated the implications on e-commerce growth of challenges, including traffic congestion, poor road network, delivery delays, and astronomical logistics costs. The study as carried out in Lagos State of Nigeria, between 2020 and 2025, as this period reflects the most current challenges of e-commerce growth and logistics. The research engaged logistics managers, e-commerce business owners, and consumers based in Lagos as the respondents.

Theoretical Background

Logistics Performance Theory

Logistics Performance Theory explains how the efficiency and effectiveness of logistics activities influence overall organizational and economic performance. It views logistics not merely as a support function but as a strategic capability that enhances competitiveness, profitability, and customer satisfaction. The theory emphasizes that key logistics functions such as transportation, warehousing, inventory management, order processing, and information flow directly affect service quality and operational outcomes. When these functions are well-coordinated and optimized, firms achieve lower costs, faster delivery times, improved reliability, and better responsiveness to customer needs. At the national level, logistics performance also determines trade competitiveness. For example, the World Bank measures countries' logistics efficiency through the Logistics Performance Index (LPI), which evaluates customs efficiency, infrastructure quality, shipment reliability, tracking systems, and timeliness.

The theory is particularly relevant in: E-commerce growth, Port operations and freight forwarding, urban transport systems and developing economies facing infrastructure challenges. For example, in Lagos, improved port efficiency and intelligent routing systems can enhance overall logistics performance and stimulate trade growth. This paper is anchored on this theory.

Supply Chain Resilience Framework

A Supply Chain Resilience Framework explains how supply chains prepare for, respond to, recover from, and adapt to disruptions while maintaining performance and continuity. It provides a structured model for identifying capabilities that reduce vulnerability and enhance long-term sustainability. Resilience has become increasingly important due to disruptions such as pandemics, port congestion, climate events, geopolitical tensions, and infrastructure failures. The Supply Chain Resilience Framework provides a structured approach for managing uncertainty and disruptions. By strengthening flexibility, redundancy, agility, visibility, and collaboration, organizations can build supply systems that not only survive shocks but emerge stronger. In rapidly evolving logistics environments, resilience is no longer optional it is a strategic necessity.

This study adopts the Lagos Supply Chain Resilience Framework (LSCRF) as its conceptual foundation. The framework explains how resilience capabilities within Lagos' logistics ecosystem influence supply chain performance outcomes under conditions of infrastructural, institutional, and operational uncertainty. Lagos, as Nigeria's commercial nerve centre with key trade gateways such as Apapa Port and Tin Can Island Port experiences recurring disruptions including congestion, transport bottlenecks, flooding, and regulatory delays. The framework therefore conceptualizes resilience as a multidimensional construct that enhances operational continuity and competitiveness.

METHODOLOGY

A descriptive survey research design was chosen for this study. The study encompassed all people who are directly or indirectly part of the e-commerce ecosystem within Lagos State, Nigeria. This includes owners of online retail businesses, providers of delivery services, managers of logistics, and customers who shop online

and do so frequently. Since the number of targeted respondents is infinite, the study adopted the Cochran formula to determine the population size that was used for the study.

The formula is expressed as:

$$n0 = ((Z^2 * p * q))/e^2$$

Where:

- n0 = required sample size

- Z = Z-score corresponding to the desired confidence level (1.96 for 95% confidence)

- p = estimated proportion of the population with the characteristic of interest (commonly 0.5 when unknown)

- q = 1 – p

- e = margin of error (0.05 for a 95% confidence level)

Substituting the values:

n0 = (1.96^2 * 0.5 * 0.5) / (0.05^2)

n0 = (3.8416 * 0.25) / 0.0025

n0 = 0.9604 / 0.0025

n0 = 384.16

Thus, the required sample size is approximately 384 respondents.

The study employed a structured questionnaire, which was administered among the selected respondents. Each questionnaire contained various components covering all the essentials of last-mile delivery and the growth of e-commerce, including delivery durations, infrastructural challenges, customer satisfaction, and the difficulties concerning the delivery staff.

Collected data were analyzed using descriptive statistical techniques specifically frequencies, percentages, and mean scores. These techniques enabled the summary of responses to identify the key patterns and trends concerning the challenges of delivery and their effects on e-commerce.

Data Presentation and Analysis

Introduction

This part of the chapter comprises the bio-data of the respondents, the descriptive statistics of the research questions.

Table 6.1: Age Distribution of Respondents

Age Group	Frequency	Percentage (%)
18-25	35	29.2
26-35	50	41.7
36-45	20	16.7

46-55	10	8.3
56 and above	5	4.1

Source: Researcher's fieldwork (2025).

Table 6.1 shows that the majority of respondents fall within the 26-35 age bracket, representing 41.7% of the sample, while young adults (18-25 years) also form a significant portion, accounting for 29.2% of the total respondents. There is a decreasing participation rate as age increases beyond 35 years. The least represented group is those aged 56 and above, with only 4.1% participation. These distribution indicates a youthful demographic is more engaged in the study, possibly reflecting the primary e-commerce user base.

Table 6.2: Gender Distribution of Respondents

Gender	**Frequency**	**Percentage (%)**
Male	70	58.3
Female	48	40.0
Prefer not to say	2	1.7

Source: Researcher's fieldwork (2025).

Table 6.2 shows the gender distributions of the respondents. From the table, the vast majority are males, accounting for 58.3%, while females account for 40%. The gender distribution shows a slight male dominance in e-commerce participation from the survey response. Female participation is substantial but lower compared to males. This may be because it is assumed that more males purchase gift items for their female counterparts, either wives or girlfriends. These results may highlight gender-based differences in access or engagement with e-commerce services in Lagos State.

Table 6.3: Occupation Distribution of Respondents

Occupation	**Frequency**	**Percentage (%)**
Student	35	29.2
Employed (Full-time)	50	41.7
Employed (Part-time)	15	12.5
Self-employed	15	12.5
Unemployed	5	4.1

Source: Researcher's fieldwork (2025).

Table 6.3 shows the occupational distribution of the respondents. From the table, the largest occupational group is full-time employed respondents, who account for 41.7% while students form a considerable segment with 29.2%. Part-time employed and self-employed respondents each represent 12.5%, while unemployed respondents are the smallest group of 4.1%. These mix suggests the study captures opinions from a diverse economic activity spectrum relevant to e-commerce usage.

Analysis of Research Questions

Table 6.4: Specific Challenges of Last-Mile Delivery Affecting E-commerce Growth

Statements	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	Standard Deviation
Traffic congestion significantly delays last-mile deliveries in Lagos State.	36	24	33	22	2.36	1.11
Poor road infrastructure hinders timely delivery of e-commerce goods.	29	26	30	30	2.53	1.13
Security concerns during delivery reduce efficiency and increase costs.	22	29	28	36	2.68	1.11
Inadequate addressing and location systems make deliveries challenging.	38	28	26	23	2.30	1.13
High delivery costs discourage frequent purchases from e-commerce platforms.	23	30	35	27	2.57	1.06

Source: Researcher's fieldwork (2025)

The results show that traffic congestion is the most widely recognized challenge affecting last-mile delivery in Lagos State, with a mean of 2.36. Although respondents' views were fairly distributed across the options, the high number of agreements indicates that delays caused by congestion remain a central concern.

Poor road infrastructure also recorded a mean of 2.53, suggesting that respondents perceive road conditions as a significant barrier to efficient e-commerce operations.

Security concerns emerged with the highest mean value of 2.68, indicating that threats during delivery are not only frequent but also impactful in shaping delivery efficiency and costs. Similarly, inadequate addressing systems (mean = 2.30) and high delivery costs (mean = 2.57) are seen as persistent difficulties.

The relatively close standard deviation values (around 1.1) suggest that while some respondents differ in opinion, most acknowledge these challenges as central to the success or failure of e-commerce growth in Lagos State.

Testing of Hypotheses

Table 6.5: Model Summary of Multiple Regression Analysis

Model	R	R^2	Adjusted R^2	Std. Error of Estimate	F-value	Sig. (p-value)	Durbin-Watson
1	0.811	0.658	0.649	3.214	73.452	0.000	1.987

Dependent Variable: Growth of E-commerce

Predictors: Last-mile delivery challenges, Delivery inefficiencies

Table 6.6: Coefficients of Predictors

Predictor Variables	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t-value	Sig. (p-value)	Collinearity Tolerance	VIF
Constant	2.184	0.562	–	3.887	0.000	–	–
Last-mile Delivery Challenges	0.642	0.083	0.571	7.735	0.000	0.912	1.096
Delivery Inefficiencies	0.498	0.095	0.482	6.379	0.000	0.907	1.103

Source**:** Researcher's fieldwork (2025).

Dependent Variable: Growth of E-commerce in Lagos State

Hypotheses Testing Decision

H_0 vs. H_1

From Table 2, the multiple regression analysis shows **B = 0.642, t = 7.735, p = 0.000 (< 0.05)**. Since **p < 0.05**, Ho is **rejected** and H1 is **accepted**.

Interpretation: Last-mile delivery challenges significantly affect the growth of e-commerce in Lagos State.

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

In this study, last-mile delivery challenges were problems predicted to impact e-commerce growth in Lagos State. Findings indicated that challenges, like traffic, the state of the road, expensive delivery costs, and the lack of proper addresses in the system, affect the ease of handling logistics. It slows down the problems. It also creates uncertainty for the e-commerce businesses in the state and, subsequently, impacts the overall performance. The regression results indicate that last-mile delivery problems have challenges that impact e-commerce growth. Inefficient delivery services focus more on delays and mistakes, which also relates to weak customer satisfaction. It also explains the lower retention of an online business and associates it with the lack of delivery service logistics. Unreliable delivery services lead to the customer losing trust in the system and decreasing their usage of e-commerce services.

The research displayed how logistics providers minimized inefficiencies with innovations like GPS systems, flexible delivery, and delivery personnel training. Such innovations help with addressing infrastructure issues while improving customer satisfaction. There are, however, structural issues such as broken infrastructure, and innovation helps solve problems faster when there is no government support. All things considered, inefficient last-mile delivery continues to operationally bleed the business dry, and with such high pressure on costs, sustainable growth of electronic business in Lagos is stifled. This aligns with previous research that states electronic commerce in developing economies is held back by unresolved problems with last-mile delivery.

Conclusion

With the evidence presented, there is a clear statement that logistical inefficiencies in last-mile delivery are the unsustainable growth of Lagos State e-commerce. This is because of broken infrastructure, traffic, poor location systems, and security issues. E-commerce platforms will not solve their growth problems, and until there is a

change in all the issues, it will remain the same. The research shows that the way a business delivers its products can positively or negatively affect the customer's experience. Because customers look to delivery as the most reliable part of service in e-commerce, ongoing delivery issues will make customers lose trust in the business and lose repeat customers. This shows that the logistics of a business will determine customer loyalty and, in turn, the survival of the business.

Also, the research explains how new technologies and clever business strategies help to solve delivery problems. Businesses that improve delivery service invest in new technologies and infrastructure, as well as trained personnel. Therefore, the need for improved services can be addressed at a business level, and it will help save some of the infrastructural challenges in Lagos. To sum the research up in one sentence, fixing issues that come up during last mile delivery will help build trust with customers and, in turn, make the business more profitable. This will help sustain the growth of e-commerce in Lagos and states that e-commerce will not reach its full potential in Nigeria's commercial hub without efforts from the government and the private sector. The policy implications for this study are both strategic and operational. These implications guide government agencies, regulators, urban planners, and private sector stakeholders in designing interventions that improve logistics efficiency and digital commerce expansion.

Recommendations

- From the findings, Lagos State Road Management and Traffic Infrastructure is to be streamlined and optimized to reduce the bottlenecks.

- More e-commerce and Logistics providers need to be equipped and should invest in automated systems like real-time delivery tracking systems. Such systems should be integrated to reduce mistakes and improve the accuracy of delivery, thus increasing the level of confidence customers have in online shopping.

- More firms need to integrate active and passive delivery systems within one system. Neighborhood delivery points, scheduled and timed deliveries, and passive delivery in collaboration with local courier systems.

- More value should be added to delivery systems through customer service training and active communication to the level of customers of each delivery. Such systems of trust and affirmation provide customers with confidence to improve the reliability of the system of delivery and high customer return. This is important for the Long Term Sustainability of the e-commerce platform.

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