

Analysis of the Impact of Delivery Efficiency on E-Commerce Adoption by Courier Companies in Lagos Metropolis, Nigeria

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DOI: <https://dx.doi.org/10.47772/IJRISS.2025.910000409>

Received: 12 October 2025; Accepted: 19 October 2025; Published: 13 November 2025

ABSTRACT

The rapid expansion of e-commerce has revolutionized the global retail landscape, offering consumers unprecedented convenience and access to a diverse array of products. This study examines the influence of delivery time accuracy, dispatch and routing efficiency, real-time tracking, cost competitiveness, and last-mile delivery effectiveness on e-commerce adoption among DHL customers in Lagos. The study employed a descriptive survey research design with structured questionnaires administered across major commercial and logistics hubs, including Ikeja, Lagos Island, Lekki, Surulere, and Apapa. According to DHL Nigeria Report (2024), the estimated annual customer base in Lagos was 110,012, from which a sample size of 399 respondents was determined using stratified random sampling and Slovin's formula. Inferential statistics of multiple regression analysis were applied to analyze the data. Result of multiple regression analysis on the impact of delivery efficiency on e-commerce adoption among DHL customers in Lagos State showed that four (4) out of five (5) explanatory variables were positively statistically significant in explaining the variation of delivery flexibility. These variables were delivery time accuracy ($p = 0.000$), dispatch and routing efficiency ($p = 0.010$), real-time tracking capability ($p = 0.001$), and last-mile delivery effectiveness ($p = 0.003$). These results emphasize that customers value speed, accuracy, and visibility in delivery logistics more than cost considerations. The study concludes that delivery efficiency plays a statistically significant role in enhancing e-commerce adoption in metropolitan Lagos. DHL should prioritize targeted investments in AI, data analytics, and technology-driven logistics solutions to strengthen delivery time accuracy, routing efficiency, real-time tracking, and last-mile operations.

Keywords: Delivery Efficiency, E-commerce Adoption, Courier Services, DHL, Lagos State

INTRODUCTION

The rapid expansion of e-commerce has revolutionized the global retail landscape, offering consumers unprecedented convenience and access to a diverse array of products (Alzahrani and Alzahrani, 2024). Central to this transformation is the efficiency of last-mile delivery, the final step in the supply chain where goods are transported from a distribution hub to the end consumer (Viu-Roig and Alvarez-Palau, 2020). This critical phase not only determines operational success but also profoundly influences customer satisfaction and loyalty (Oyama et al., 2022). As the e-commerce sector continues to evolve, understanding the nuances of customer last-mile experience becomes imperative for businesses aiming to enhance adoption rates and maintain a competitive edge (Yindi et al., 2021).

In the rapidly evolving landscape of e-commerce and logistics, the last-mile delivery experience has emerged as a critical component of overall customer satisfaction and business competitiveness (Yindi et al., 2021). The "last mile" refers to the final leg of a product's journey from a distribution center to the customer's doorstep. This phase, although short in distance, is often the most complex, costly, and impactful on customer perception (Lim et al., 2023). Customer last-mile experience encompasses the end-to-end process that consumers undergo from the moment an order is dispatched to its final delivery at their doorstep (Alzahrani and Alzahrani, 2024). This experience is multifaceted, involving elements such as delivery speed, reliability, real-time tracking, and the professionalism of delivery personnel (Oyama et al., 2022). A seamless and positive last-mile experience can

significantly elevate customer satisfaction, fostering trust and encouraging repeat purchases (Viu-Roig and Alvarez-Palau, 2020). Conversely, challenges such as delayed deliveries, lack of transparency, or mishandled packages can lead to dissatisfaction, negative reviews, and ultimately, customer attrition (Zhou et al., 2007). Therefore, optimizing the last-mile delivery process is paramount for e-commerce businesses striving to meet and exceed customer expectations (Yindi et al., 2021).

Ngugi and Ochieng (2021) define e-commerce adoption as “the organizational or individual acceptance and effective utilization of digital platforms for commercial activities, influenced by technological readiness, regulatory environments, and socio-cultural factors.” In many Sub-Saharan African countries, for example, mobile penetration and digital payment innovations have spurred a significant rise in online retail activity, although infrastructural and regulatory challenges persist. According to Chatterjee and Kumar (2022), e-commerce adoption refers to “the process by which businesses and consumers begin to use internet-based platforms for commercial activities, including transactions, marketing, and customer engagement.” This adoption has become critical for businesses seeking operational efficiency, expanded market reach, and improved customer service. Several factors influence this adoption, including technological infrastructure, internet accessibility, payment security, and cultural attitudes towards online transactions (Yindi et al., 2021). Notably, the logistical capabilities of an e-commerce platform, particularly in last-mile delivery, play a crucial role in shaping consumer perceptions and acceptance (Viu-Roig and Alvarez-Palau, 2020). Efficient and reliable delivery services can act as a catalyst for e-commerce adoption, as they directly impact the overall shopping experience (Oyama et al., 2022). In contrast, inconsistent or subpar delivery performance can deter potential customers, hindering the growth and penetration of e-commerce markets (Alzahrani and Alzahrani, 2024).

Delivery efficiency is a crucial determinant of e-commerce adoption, as it directly influences customer satisfaction and loyalty (Hübner et al., 2016). Consumers expect timely and reliable deliveries, yet many e-commerce businesses struggle to meet these expectations due to supply chain inefficiencies and infrastructural challenges (Xing et al., 2021). Inconsistent delivery performance, lengthy transit times, and last-mile delays have been cited as major factors that discourage customers from making repeat purchases online (Alzahrani and Alzahrani, 2024). While some research has explored the role of delivery speed, there remains a gap in understanding how overall delivery efficiency including packaging quality, route optimization, and courier reliability impacts the rate of e-commerce adoption in different regions.

LITERATURE REVIEW

Delivery Efficiency

Delivery efficiency refers to the capability of a logistics or transportation system to ensure that goods and services reach their intended destinations in a timely, cost-effective, and reliable manner (Hübner et al., 2021). It involves the optimization of multiple supply chain components, including order processing, packaging, transportation, and final delivery, with the goal of minimizing delays, reducing costs, and enhancing customer satisfaction (Mangiaracina et al., 2019). Efficient delivery is especially crucial in industries such as e-commerce, retail, and manufacturing, where timely and accurate product distribution significantly impacts consumer trust and overall brand reputation (Esper et al., 2022).

The efficiency of delivery services is determined by several key factors, including speed, accuracy, flexibility, and sustainability. Speed refers to how quickly products are transported from warehouses to customers, directly influencing customer satisfaction and purchase decisions (Nguyen et al., 2020). Accuracy ensures that the correct items are delivered in the expected condition, reducing return rates and enhancing customer trust (Ramanathan et al., 2021). Flexibility in delivery services, such as offering multiple shipping options or same-day delivery, allows businesses to cater to diverse consumer needs, thereby increasing competitiveness in the market (Pantano and Timmermans, 2022). Additionally, sustainability is becoming an integral component of delivery efficiency, with businesses adopting eco-friendly logistics solutions such as electric delivery vehicles, optimized route planning, and carbon-neutral shipping methods to reduce their environmental impact (Hassan et al., 2022).

Several external and internal factors influence delivery efficiency. Externally, the availability of transportation infrastructure, urban traffic congestion, and government regulations can affect delivery timelines and costs

(Sharma et al., 2021). Internally, the level of technological integration in logistics operations, such as the use of automated warehouses, GPS tracking systems, and artificial intelligence-driven route optimization, plays a significant role in improving delivery speed and reliability (Tang et al., 2022). Companies that invest in advanced logistics technologies and strategic partnerships with reliable delivery providers can achieve higher levels of efficiency, thus enhancing their competitive edge in the market (Kim et al., 2020).

Furthermore, effective delivery management can lead to substantial cost savings, improved inventory control, and a seamless customer experience. Businesses that optimize their delivery networks not only minimize operational costs but also prevent revenue losses due to mismanaged shipments, lost goods, and failed deliveries (Zhang et al., 2021). In the modern digital economy, where consumer expectations for rapid and reliable deliveries are increasing, organizations must continuously innovate their logistics strategies to maintain market relevance and ensure long-term customer retention (Gong et al., 2020).

Delivery efficiency is a fundamental aspect of modern supply chain management, influencing customer satisfaction, business profitability, and overall market competitiveness. With the rise of e-commerce and evolving consumer expectations, companies must leverage technology, enhance logistical processes, and adopt sustainable delivery practices to ensure optimal efficiency in their supply chain operations (Janjevic and Ndiaye, 2022).

E-Commerce Adoption

E-commerce adoption refers to the process by which consumers embrace online shopping platforms as an alternative to traditional retail shopping. It involves the willingness and readiness of individuals to purchase goods and services through digital platforms, facilitated by internet connectivity, online payment systems, and logistics networks. The adoption of e-commerce has transformed the global retail landscape, offering consumers a convenient, diverse, and accessible shopping experience (Bashir et al., 2021).

The growth of e-commerce is driven by multiple factors, including advancements in technology, changes in consumer preferences, and improvements in logistical efficiency (Nguyen et al., 2019; Oyama et al., 2022). Digital transformation has made it easier for businesses to establish online storefronts, provide personalized recommendations, and ensure seamless transactions (Alzahrani & Alzahrani, 2024). The widespread availability of smartphones and mobile applications has further accelerated the adoption of e-commerce, enabling consumers to shop from anywhere at any time (Yindi et al., 2021).

Despite its numerous benefits, e-commerce adoption varies across different regions and consumer demographics. While developed economies have high e-commerce penetration rates due to established technological infrastructure and digital literacy, developing economies face challenges such as poor internet access, lack of trust in online transactions, and inefficiencies in last-mile delivery (Viu-Roig & Alvarez-Palau, 2020; Zhou et al., 2007). Understanding consumer behavior and the key determinants of e-commerce adoption is crucial for businesses looking to expand their online presence and improve customer satisfaction (Hübner et al., 2016; Xing et al., 2021).

Empirical Review

Huang et al. (2020), in their study titled "The Role of Logistics Performance in E-commerce Adoption," employed a quantitative approach by analyzing survey data from 300 e-commerce customers in China. Using regression models, the study examined the relationship between delivery efficiency and consumer satisfaction. The findings showed that fast and reliable delivery services significantly influenced e-commerce adoption, whereas poor delivery services led to negative customer perceptions and reduced trust in online shopping. However, the study focused solely on customer perceptions and did not analyze how logistics firms themselves perceived and tackled delivery efficiency challenges.

Nguyen and Huynh (2021) carried out a study titled "The Effect of Delivery Speed and Reliability on Online Shopping Growth," using a case study approach to analyze the logistics strategies of top e-commerce platforms in Vietnam. Through primary interviews and secondary data analysis, the study revealed that shorter delivery

times and improved real-time tracking services positively impacted consumer retention. However, it also identified poor last-mile delivery networks as a major limitation. Despite these insights, the study did not explore how government infrastructure investments could enhance delivery networks for improved e-commerce adoption.

Akinyemi and Adebayo (2022) investigated the relationship between e-commerce logistics and customer satisfaction in Nigeria in their study titled "E-commerce Logistics and Customer Satisfaction in Nigeria." The researchers conducted a survey with 200 Nigerian e-commerce customers and used statistical analysis to assess key logistics challenges. The findings indicated that delays in order fulfillment, poor handling of goods, and high logistics costs negatively affected consumer trust and, consequently, e-commerce adoption in Nigeria. However, the study did not consider how emerging technologies such as AI and blockchain could be integrated to improve delivery efficiency in Nigeria's e-commerce sector.

METHODOLOGY

The study area focused on Lagos State, Nigeria, a major economic and commercial hub in West Africa with a dense population, vibrant markets, and diverse industries, including finance, manufacturing, shipping, and a rapidly growing digital economy. Major commercial and logistics locations included Ikeja, Lagos Island, Lekki, Surulere, and Apapa, where DHL operates service centers to support e-commerce activities. These locations were selected for their socio-economic and infrastructural significance, capturing diverse consumer, business, and corporate logistics patterns across Lagos. The study employed a descriptive survey research design with the use of structured questionnaires administered to DHL customers across Lagos during 2024. According to the DHL Nigeria Report (2024), the total estimated customer base in Lagos was 110,012 annually, with significant participation from individual consumers, small business owners, and corporate clients. Using stratified random sampling and Slovin's formula, a sample size of 399 respondents was determined and proportionally distributed across the three customer groups. Inferential statistics of multiple regression analysis were applied to analyze the data.

RESULT AND DISCUSSION

Socio-economic Characteristics of DHL Customers

An analysis of the socio-economic background of respondents, as presented in Table 1, revealed significant demographic diversity among DHL customers. The gender distribution indicates a slight predominance of male respondents, who accounted for 54.2% of the sample population, compared to 45.8% female respondents. This marginal disparity (Mean = 1.46, SD = 0.499) suggests a relatively balanced gender representation among DHL service users, thereby mitigating the risk of gender bias in customer perceptions.

Marital status analysis illustrates that the majority of respondents were married, representing 85.2% of the total sample, whereas single individuals constituted 14.5%, and only 0.3% were divorced. The mean score of 1.86 (SD = 0.357) implies a high concentration of married individuals, reflecting the possible association between marital stability and frequent logistics engagements, such as household or family-related deliveries.

Age distribution indicates that the largest proportion of respondents were between the ages of 30–39 years (37.9%), followed by the 40–49 year bracket (28.0%) and 18–29 years (18.8%). The mean age score (Mean = 3.33, SD = 0.988) falls within the 30–39 range, suggesting that DHL's clientele base predominantly consists of active, economically productive individuals. This demographic trend aligns with the general pattern of middle-aged adults being primary consumers of logistics and delivery services due to career, business, and household responsibilities.

In terms of academic qualification, a significant proportion of respondents held NCE/OND certificates (49.6%), followed by those with WAEC qualifications (38.4%). Only 7.4% of the customers had attained HND/BSc degrees, while 4.6% fell under the 'Others' category. The average educational qualification (Mean = 1.78, SD = 0.771) suggests a moderately educated customer base, likely reflecting the accessibility and appeal of DHL services across various educational strata.

The occupational profile of respondents reveals that students form the largest occupational group, accounting for 37.2% of the sample, closely followed by self-employed individuals (31.0%). Civil servants represented 18.6%, while 13.2% of respondents identified with other occupations. The occupational mean (Mean = 2.39, SD = 0.936) indicates a strong presence of economically independent users particularly self-employed individuals and students who may rely on courier services for business operations or academic-related logistics.

Table 1: Socio-economic Characteristics of DHL Customers

Variable	Category	Frequency	Percent (%)	Mean	Standard Deviation
Gender	Male	213	54.2	1.46	0.499
	Female	180	45.8		
Marital Status	Single	57	14.5	1.86	0.357
	Married	335	85.2		
	Divorced	1	0.3		
Age	Below 18 years	7	1.8	3.33	0.988
	18–29 years	74	18.8		
	30–39 years	149	37.9		
	40–49 years	110	28.0		
	50 years and above	53	13.5		
Academic Qualification	WAEC	151	38.4	1.78	0.771
	NCE/OND	195	49.6		
	HND/BSc	29	7.4		
	Others	18	4.6		
Occupation	Civil Servant	73	18.6	2.39	0.936
	Student	146	37.2		
	Self-employed	122	31.0		
	Others	52	13.2		
Total		393	100.0		

Source: Researcher’s Computation (2025)

Analysis of Delivery Efficiency Impact on e-Commerce Adoption

Findings from the result of multiple regression analysis provided critical insights into the analysis of delivery efficiency impact on e-commerce adoption of courier company in Metropolitan Lagos, Nigeria is presented in Table 2 and Table 3, which provide the Model Summary, ANOVA, and Coefficients for the regression model assessing the impact of delivery efficiency on e-commerce adoption.

The Multiple R value of 0.865 indicates a strong positive correlation between the predictor variables (Delivery Time Accuracy, Dispatch and Routing Efficiency, Real-Time Tracking Capability, Cost Competitiveness, and Last-Mile Delivery Effectiveness) and the dependent variable, which is Delivery Efficiency. The R Square (R^2) value of 0.748 suggests that 74.8% of the variability in delivery efficiency can be explained by the predictors in the model. This is a high level of explanatory power, indicating the model is robust. The Adjusted R Square of 0.744 accounts for the number of predictors in the model, confirming that the model fits well even after adjusting for the degrees of freedom. The Standard Error of 1.418 is the average distance that the observed values fall from the regression line, which is relatively low, suggesting that the model fits the data with minimal error.

The ANOVA table 2 is used to assess the overall significance of the regression model. The F-statistic value of 226.892 with a p-value of 0.000 ($p < 0.05$) indicates that the regression model is statistically significant. This means that at least one of the predictors in the model significantly contributes to explaining variations in delivery efficiency. Thus, the null hypothesis (H_{01} : Delivery efficiency has no significant impact on e-commerce adoption) is rejected, and the model as a whole is significant.

The Coefficients Table 3 provides the regression coefficients for each predictor, showing how much each variable influences the dependent variable (delivery efficiency). For the Delivery Time Accuracy predictor, the Unstandardized Coefficient (B) is 0.912, with a p-value of 0.000, indicating a significant positive relationship with delivery efficiency. Dispatch and Routing Efficiency has a coefficient of 1.007 ($p = 0.010$), Real-Time Tracking Capability has a coefficient of 0.928 ($p = 0.001$), and Last-Mile Delivery Effectiveness has a coefficient of 0.677 ($p = 0.003$). All these variables are significant in explaining delivery efficiency, as their p-values are less than 0.05. However, Cost Competitiveness of Delivery has a very small coefficient of 0.004, and its p-value of 0.764 is greater than the threshold of 0.05, indicating that this variable does not significantly contribute to the model.

Table 2: Model Summary and ANOVA^a for Delivery Efficiency

Multiple R		.865 ^a				
R Square (R ²)		.748				
Adjusted R Square (R ²)		.744				
Standard Error		1.418				
Analysis of Variance Table						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2279.855	5	455.971	226.892	.000 ^b
	Residual	769.693	383	2.010		
	Total	3049.548	388			

Source: Researcher's Computation (2025)

Table 3: Coefficients^a for Delivery Efficiency

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.463	.376		1.233	.218

Delivery Time Accuracy	.912	.060	.395	15.308	.000
Dispatch and Routing Efficiency	1.007	.066	.394	15.279	.010
Real-Time Tracking Capability	.928	.066	.370	14.156	.001
Cost Competitiveness of Delivery	.004	.012	.007	21.300	.764
Last-Mile Delivery Effectiveness	.677	.084	.207	8.017	.003

a. Dependent Variable: Delivery Efficiency

Source: Researcher's Computation (2025)

The results from the multiple regression analysis as presented above revealed a strong relationship between delivery efficiency and e-commerce adoption among DHL customers in Lagos State. With a multiple correlation coefficient (R) of 0.865 and a coefficient of determination (R^2) of 0.748, it can be inferred that approximately 74.8% of the variance in e-commerce adoption is explained by delivery efficiency components. The adjusted R^2 value of 0.744 further confirms the model's robustness and generalizability. The high F-statistic value ($F = 226.892$, $p = .000$) signifies that the model is statistically significant. The regression coefficients in Table 4.5 indicate that all major components of delivery efficiency delivery time accuracy ($\beta = .912$, $p < .001$), dispatch and routing efficiency ($\beta = 1.007$, $p = .010$), real-time tracking capability ($\beta = .928$, $p = .001$), and last-mile delivery effectiveness ($\beta = .677$, $p = .003$) have significant positive impacts on e-commerce adoption. However, cost competitiveness of delivery was not significant ($p = .764$), suggesting that while cost remains a consideration, customers prioritize speed, accuracy, and visibility in delivery logistics.

These findings are consistent with recent studies. For instance, Adeniran and Olajide (2020) assert that timely and accurate delivery significantly boosts customer confidence and drives repeat usage of e-commerce platforms. Similarly, Oyelami et al. (2021) found that real-time tracking technologies improve customer experience and foster trust in delivery systems. The importance of dispatch efficiency and last-mile logistics is echoed by Ekeh and Adebayo (2022), who argued that the effectiveness of these logistics elements is essential for overcoming infrastructural constraints in Nigerian cities. The insignificant result of cost competitiveness echoes Chidubem and Aluko (2023), who emphasized that urban e-commerce consumers are increasingly more concerned with service reliability than cost, especially when dealing with premium logistics services like DHL. Therefore, while cost may influence adoption at lower income levels, service quality and efficiency remain the dominant predictors of customer satisfaction and e-commerce growth in Lagos.

CONCLUSION AND RECOMMENDATION

The study therefore concludes that, analysis of delivery efficiency has a statistically significant impact on e-commerce adoption of courier company in Metropolis Lagos, Nigeria. However, it was recommendations that; DHL should prioritize improving delivery time accuracy, dispatch and routing efficiency, real-time tracking, and last-mile delivery effectiveness. Investments in these operational areas would enhance customer satisfaction and contribute to a higher adoption rate of DHL's e-commerce logistics services. This could involve leveraging AI and data analytics to optimize delivery routes and improve dispatch systems.

REFERENCES

1. Adeniran, T., & Olajide, K. (2020). The role of logistics service quality in enhancing e-commerce adoption in Nigeria. *Journal of African Business and Logistics*, 12(3), 45–59.

2. Akinyemi, B., & Adebayo, R. (2022). E-commerce logistics and customer satisfaction in Nigeria. *Nigerian Journal of Management Studies*, 18(2), 112–128.
3. Alzahrani, S., & Alzahrani, H. (2024). Customer last-mile delivery experience and e-commerce adoption. *International Journal of E-commerce and Digital Logistics*, 9(1), 14–28.
4. Bashir, M., Hassan, T., & Iqbal, S. (2021). Consumer behavior towards e-commerce adoption: A global perspective. *Journal of Retail and Consumer Studies*, 7(2), 89–104.
5. Chatterjee, S., & Kumar, V. (2022). E-commerce adoption and digital transformation: Drivers and barriers. *International Journal of Business Innovation*, 15(4), 201–215.
6. Chidubem, F., & Aluko, J. (2023). Cost competitiveness versus delivery efficiency in urban logistics. *Journal of Transport and Supply Chain Research*, 11(1), 55–70.
7. Ekeh, C., & Adebayo, M. (2022). Last-mile delivery and infrastructural challenges in Nigerian cities. *Journal of Urban Logistics*, 6(2), 74–92.
8. Esper, T., Jensen, T., & Turnipseed, F. (2022). Linking delivery efficiency to customer trust in supply chain management. *International Journal of Logistics Management*, 33(1), 99–115.
9. Gong, Y., Li, Y., & Zhang, H. (2020). Digital economy, logistics innovation, and delivery efficiency. *Global Journal of Supply Chain Management*, 5(3), 150–168.
10. Hassan, M., Bello, A., & Yousaf, K. (2022). Sustainable logistics practices in e-commerce delivery. *Journal of Green Logistics*, 4(2), 33–47.
11. Huang, Z., Li, Q., & Chen, J. (2020). The role of logistics performance in e-commerce adoption. *Asian Journal of E-commerce and Supply Chain*, 8(1), 65–79.
12. Hübner, A., Kuhn, H., & Wollenburg, J. (2016). Last-mile logistics in omnichannel retailing: A review and research agenda. *International Journal of Retail & Distribution Management*, 44(3), 228–247.
13. Hübner, A., Kuhn, H., & Wollenburg, J. (2021). Delivery efficiency in the digital economy. *Journal of Supply Chain Operations*, 10(2), 49–63.
14. Janjevic, M., & Ndiaye, A. (2022). Delivery management systems and cost optimization in urban e-commerce. *Journal of Transport Economics*, 46(3), 205–223.
15. Kim, S., Park, J., & Lee, H. (2020). Technology integration in e-commerce logistics: Opportunities and challenges. *International Journal of Information Systems and Logistics*, 13(4), 233–248.
16. Lim, Y., Tan, C., & Lee, M. (2023). Complexity of last-mile logistics and its impact on customer satisfaction. *Journal of Retail Logistics*, 14(2), 77–93.
17. Mangiaracina, R., Perego, A., Seghezzi, A., & Tumino, A. (2019). Innovative solutions for last-mile delivery: Trends and research directions. *European Journal of Logistics Research*, 27(2), 181–206.
18. Ngugi, P., & Ochieng, D. (2021). E-commerce adoption in Sub-Saharan Africa: Drivers and inhibitors. *African Journal of Digital Business*, 3(1), 41–56.
19. Nguyen, T., & Huynh, H. (2021). The effect of delivery speed and reliability on online shopping growth. *Vietnamese Journal of Business and Logistics*, 9(3), 89–106.
20. Nguyen, T., Pham, L., & Le, D. (2019). Determinants of consumer adoption of e-commerce in emerging economies. *Journal of Asian Business Studies*, 13(4), 427–445.
21. Nguyen, T., Tran, H., & Pham, L. (2020). Delivery speed and its role in online consumer behavior. *Journal of Global Marketing and Logistics*, 12(1), 100–118.
22. Oyama, S., Matsumoto, Y., & Tanaka, H. (2022). Customer satisfaction in last-mile delivery: The role of reliability and professionalism. *International Journal of Logistics Research and Applications*, 25(6), 745–763.
23. Oyelami, B., Ojo, A., & Adebayo, T. (2021). Real-time tracking technologies and customer trust in e-commerce. *Nigerian Journal of Transport and Logistics*, 9(2), 133–148.
24. Pantano, E., & Timmermans, H. (2022). Flexibility and customer satisfaction in last-mile delivery. *Journal of Retail and Consumer Services*, 65, 102–115.
25. Ramanathan, R., Subramanian, N., & Parrott, G. (2021). The impact of accurate delivery services on consumer trust. *Journal of Business Logistics*, 42(2), 189–202.
26. Sharma, P., Verma, R., & Singh, S. (2021). Transportation infrastructure and delivery efficiency in emerging markets. *Journal of Transport Policy Studies*, 28(2), 55–70.
27. Tang, J., Liu, Z., & Chen, F. (2022). Artificial intelligence applications in logistics operations. *Journal of Digital Supply Chain*, 6(1), 66–82.

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28. Viu-Roig, M., & Alvarez-Palau, E. (2020). The impact of e-commerce-related last-mile logistics on cities: A systematic literature review. *Sustainability*, 12(16), 6492.
 29. Xing, Y., Grant, D., McKinnon, A., & Fernie, J. (2021). The role of delivery reliability in e-commerce adoption. *International Journal of Physical Distribution & Logistics Management*, 51(3), 207–225.
 30. Yindi, J., Zhao, L., & Chen, S. (2021). Customer experience in last-mile delivery: A driver for e-commerce adoption. *Journal of E-commerce Studies*, 15(2), 56–70.
 31. Zhang, X., Li, M., & Zhou, P. (2021). Cost savings through optimized delivery management. *International Journal of Supply Chain Efficiency*, 8(3), 140–152.
 32. Zhou, L., Dai, L., & Zhang, D. (2007). Online shopping acceptance model: A critical survey of consumer factors in e-commerce adoption. *Journal of Electronic Commerce Research*, 8(1), 41–62.