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Impact of E-Commerce Growth on Urban Logistics in France

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Abstract

Purpose: The article aims to examine how e-commerce growth is affecting urban logistics, including traffic congestion, environmental impact, and warehouse demand. It explores challenges posed by increased last-mile deliveries and suggests ways cities can adapt for efficient, sustainable logistics. This analysis seeks to provide solutions for balancing consumer demand with urban sustainability.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The findings revealed that e-commerce growth intensifies urban congestion, increases emissions from delivery vehicles, and drives up demand for warehouse space near cities. These changes challenge urban infrastructure and logistics efficiency. Sustainable solutions, like green vehicles and optimized delivery networks, are essential to mitigate these impacts.

Unique Contribution to Theory, Practice and Policy: Urban growth theory, resource-based view (RBV) & sustainable urban logistics theory may be used to anchor future studies on the impact of e-commerce growth on urban logistics. Practically, logistics companies and urban planners should implement region-specific solutions to manage the unique challenges of e-commerce growth. From a policy perspective, city governments should establish clear guidelines and incentives to encourage sustainable urban logistics practices.

Keywords: *E-Commerce Growth, Urban Logistics*

INTRODUCTION

Last-mile delivery, the final step in the delivery process where goods reach the customer's door, is crucial for logistics efficiency and customer satisfaction. In the United States, companies like Amazon have invested heavily in technology and infrastructure to optimize last-mile efficiency, reducing delivery times from days to within hours in certain urban areas. Amazon's delivery efficiency improved by 15% after introducing algorithms for route optimization and using local delivery hubs to minimize travel distances (Cohen & Lee, 2020). In Japan, the use of robotics and automated systems for last-mile delivery has been significant, particularly in densely populated cities like Tokyo, which has seen a 20% increase in efficiency due to such innovations (Tanaka, 2019). Despite these advancements, rising e-commerce demands in developed economies challenge logistics providers to continuously innovate in last-mile delivery.

In Germany, the last-mile delivery sector has benefited from the integration of electric vehicles and alternative delivery solutions, such as parcel lockers. Deutsche Post DHL introduced electric vans in urban areas, which have reduced delivery times by 15% and decreased carbon emissions, aligning with Germany's sustainability goals (Schmidt & Müller, 2020). Additionally, parcel lockers in cities like Berlin allow consumers to pick up packages at their convenience, increasing delivery efficiency by reducing failed delivery attempts by 25% (Meier & Klein, 2019). In the United Kingdom, companies like DPD and Hermes have adopted artificial intelligence (AI) and data analytics to optimize routes, leading to a 10% reduction in delivery times and lower operational costs. The use of smart lockers has also gained traction, particularly in London, further enhancing last-mile efficiency by centralizing package pick-ups in dense urban areas.

In France, last-mile delivery has seen substantial efficiency improvements through initiatives that prioritize environmental sustainability and urban convenience. Companies like La Poste have introduced electric cargo bikes and drones for deliveries, which have reduced carbon emissions by 30% and improved delivery times in urban areas by 20% (Dupont & Leroy, 2021). The rise of "click and collect" services, where consumers pick up online orders at local stores, has also decreased failed delivery attempts by 25% in Paris and other major cities. In South Korea, the use of robotics and automated sorting centers by logistics giants like CJ Logistics has significantly increased delivery efficiency. These robotic systems improved sorting accuracy and reduced handling time, resulting in a 15% faster last-mile delivery rate (Kim & Jang, 2020). South Korea's advanced technology integration in logistics demonstrates how automation can drive last-mile efficiency in densely populated areas.

In developing economies, last-mile delivery efficiency is often hindered by infrastructure limitations and resource constraints. In India, e-commerce companies like Flipkart and Amazon have improved delivery times by 25% by leveraging local partnerships and using smaller delivery vehicles that navigate congested urban areas effectively (Singh & Sharma, 2021). Additionally, cash-on-delivery, common in many parts of India, creates unique challenges but has been addressed through improved mobile payment options, which have further streamlined the process. Similarly, in Brazil, local logistics providers have adopted electric bikes and motorcycles for last-mile delivery in cities like São Paulo, achieving a 30% reduction in delivery time and costs (Moura & Ribeiro, 2020). These efforts in developing economies highlight how companies are adapting last-mile delivery strategies to fit regional challenges and improve overall efficiency.

In Mexico, last-mile delivery is increasingly efficient due to the adoption of mobile technology and partnerships with local businesses. Amazon and Mercado Libre have partnered with neighborhood stores to act as drop-off and pick-up points, which has reduced delivery times by 20% in major cities like Mexico City and Monterrey (Gómez & Rivera, 2021). This model helps address the challenges of urban congestion and limited infrastructure, particularly in densely populated areas. In Indonesia, Gojek and Grab have revolutionized last-mile delivery by using motorbikes, which are faster and more adaptable to congested traffic. Their services have decreased delivery times by an average of 30%, making them popular options in cities such as Jakarta (Suryanto & Wijaya, 2020). Both countries demonstrate how localized solutions are essential for overcoming regional challenges in last-mile logistics.

In Thailand, companies like Lazada and Shopee have enhanced last-mile efficiency by using small delivery vehicles and motorbikes capable of navigating traffic in densely populated cities like Bangkok. These services have managed to reduce delivery times by 25% and increased reliability in congested urban settings (Phan & Wong, 2019). In Egypt, last-mile delivery has improved as companies implement cashless payment options and partner with local businesses for delivery points. Aramex, for example, has utilized neighborhood shops as package pickup locations, reducing the time and cost of deliveries by 20% in Cairo and Alexandria (Farag & Ali, 2021). These approaches underscore the importance of adapting delivery models to regional conditions to optimize efficiency in developing economies.

In Sub-Saharan Africa, last-mile delivery faces significant challenges, such as limited road networks and high transportation costs. In Kenya, logistics firms have turned to motorbikes for last-mile delivery in urban areas, leading to a 40% improvement in delivery times compared to traditional vehicles (Mwangi & Ouma, 2020). Nigeria has also seen advancements in last-mile delivery efficiency through e-commerce platforms like Jumia, which relies on local partners and mobile payment systems to streamline delivery. By using local couriers and adapting to mobile technology, Jumia has managed to reduce delivery times by 20% in major cities (Obasi & Ike, 2019). Despite these improvements, last-mile delivery efficiency in Sub-Saharan Africa remains a challenge due to infrastructure limitations and high logistical costs.

In Ghana, last-mile delivery efficiency is improved through digital platforms like Shopnaw, which coordinates local couriers to manage deliveries across urban areas. By leveraging motorbikes and real-time tracking, the platform has reduced delivery times by 25%, making it a popular choice in Accra (Asare & Kwarteng, 2021). In South Africa, last-mile delivery companies such as Picup use smart route optimization to navigate complex urban layouts, achieving a 15% improvement in delivery times in Johannesburg and Cape Town. Additionally, South African retailers have adopted locker systems in shopping malls, allowing customers to collect their orders at convenient locations, which has helped decrease failed delivery attempts (Ndlovu & Moyo, 2020). These innovations are essential in a region where road infrastructure and congestion pose significant last-mile challenges.

In Tanzania, last-mile delivery efficiency has been enhanced by using mobile technology for route optimization and real-time tracking. Companies like Kilimall and Glovo have adopted mobile applications that allow couriers to access optimized routes, reducing delivery times by 30% in cities such as Dar es Salaam (Ngowi & Omary, 2020). In Rwanda, drone technology is being utilized for medical and essential supply deliveries in remote and rural areas. Through partnerships

with companies like Zipline, Rwanda has achieved a 70% reduction in delivery time for medical supplies to remote clinics, demonstrating a groundbreaking approach to last-mile delivery in rural regions (Munyaneza & Bizimana, 2019). These innovations illustrate how technology and regional partnerships can improve last-mile logistics in challenging environments across Sub-Saharan Africa.

Problem Statement

The rapid growth of e-commerce has significantly transformed urban logistics, presenting both opportunities and challenges for cities. As online shopping demand rises, the need for efficient last-mile delivery solutions intensifies, increasing traffic congestion, carbon emissions, and pressure on existing urban infrastructure (Santos & Silva, 2020). Many cities face difficulties adapting to the higher volume of deliveries, particularly in dense urban areas where traditional logistics models struggle to meet the demand sustainably. While innovations like smart lockers, electric vehicles, and route optimization have been introduced, there remains a gap in understanding the most effective approaches for sustainable urban logistics amidst the e-commerce boom. Consequently, examining the impact of e-commerce growth on urban logistics is essential to identify strategies that can mitigate negative effects while supporting economic growth and consumer convenience.

Theoretical Framework

Urban Growth Theory

Originated by Robert E. Park and Ernest W. Burgess, Urban Growth Theory explains how cities expand and adapt in response to population and economic shifts. This theory is relevant to e-commerce's impact on urban logistics because rapid e-commerce growth changes the spatial and economic landscape of cities, affecting transportation patterns, land use, and infrastructure demands. As cities adapt to the increased movement of goods, Urban Growth Theory helps explain how logistics infrastructure must evolve to handle high delivery volumes and congestion (Smith & Chen, 2021).

Resource-Based View (RBV)

Developed by Jay Barney, the Resource-Based View (RBV) posits that firms achieve competitive advantage by effectively managing their unique resources and capabilities. In the context of urban logistics, companies involved in last-mile delivery are leveraging resources such as technology, real estate, and workforce efficiency to handle the demands of growing e-commerce. Applying RBV to urban logistics provides insights into how logistics firms can optimize their resources to improve delivery efficiency, sustainability, and customer satisfaction in dense urban areas (Jones & Green, 2020).

Sustainable Urban Logistics Theory

Sustainable Urban Logistics Theory, which has evolved in recent years, focuses on creating logistics models that minimize environmental impact while meeting urban demands. This theory is crucial for examining how e-commerce growth pressures urban logistics to adopt sustainable practices like green vehicles, optimized routes, and decentralized delivery points to reduce congestion and emissions. By applying this theory, research can evaluate the effectiveness of these

sustainable approaches in addressing the environmental challenges associated with last-mile deliveries in growing urban areas (Liu & Park, 2019).

Empirical Review

Wang and Chen (2019) focused on the effects of e-commerce growth on urban traffic congestion in several major Chinese cities, including Beijing and Shanghai. Using GIS (Geographic Information System) mapping and an extensive analysis of traffic data from 2015 to 2019, the researchers sought to determine how the rising volume of online shopping deliveries contributed to traffic density in urban areas. Findings indicated a 20% increase in peak-hour traffic congestion in cities with higher e-commerce activity, particularly in dense commercial zones. The researchers noted that delivery vehicles caused delays due to frequent stops and increased road occupancy. These impacts were more pronounced in cities with less developed road infrastructure, where increased delivery demand strained existing traffic systems. The study also highlighted the environmental consequences, such as increased emissions due to delivery vehicle idling. Wang and Chen recommended that urban authorities consider implementing off-peak delivery times to reduce congestion during peak hours. Additionally, they proposed the adoption of green vehicles, such as electric vans, to address the environmental impacts associated with last-mile delivery. The authors emphasized that such initiatives would not only alleviate congestion but also improve air quality in heavily trafficked areas. They also suggested investing in dedicated delivery lanes to streamline logistics operations. Another recommendation was to improve public awareness about the benefits of selecting longer delivery windows, which could enable more efficient scheduling.

Singh and Sharma (2020) investigated how e-commerce growth has altered land use patterns in metropolitan areas in India, focusing on the increased demand for warehouse and distribution centers near cities. Through surveys with logistics firms and interviews with urban planners, they examined how land use has shifted over the past decade to accommodate the needs of e-commerce. Their research showed that warehouses and distribution hubs are increasingly occupying land on the outskirts of cities, limiting space available for residential and recreational areas. This shift has led to increased land prices and altered the urban landscape, creating challenges for balanced development. Singh and Sharma found that a growing demand for logistics facilities has resulted in zoning conflicts, particularly in rapidly urbanizing regions like Mumbai and Delhi. Additionally, the construction of new warehouses has led to deforestation and habitat disruption in some regions. To address these issues, the authors recommended implementing strategic zoning policies to guide the placement of logistics facilities while preserving green spaces and residential areas. They also suggested developing “logistics clusters” outside major cities to consolidate warehousing and minimize environmental impacts. Another proposal was for incentives to encourage vertical warehouse construction, reducing the land footprint. Singh and Sharma concluded that a balanced approach is essential for maintaining sustainable urban growth alongside e-commerce expansion.

Davis (2021) examined how the growth of e-commerce impacts urban CO2 emissions in high-density U.S. cities. Using data from last-mile delivery records and emissions monitoring systems in cities like New York, Chicago, and Los Angeles, they assessed the correlation between e-commerce activity and environmental impact. Their findings indicated a 15% increase in CO2 emissions in areas with high e-commerce demand, driven by an increase in delivery frequency and shorter delivery times. The study revealed that smaller, frequent deliveries to meet rapid delivery demands contributed to a higher carbon footprint compared to traditional retail logistics. Davis et

al. found that e-commerce often requires more delivery vehicles on the road, resulting in more emissions and increased traffic congestion. The authors suggested policy interventions to encourage shared delivery services, which consolidate shipments and reduce the number of vehicles on the road. They also recommended tax incentives for companies investing in electric or hybrid delivery vehicles. Additionally, the study proposed the use of urban consolidation centers to centralize distribution and improve delivery efficiency. The researchers emphasized that implementing these changes could help mitigate the environmental impact of last-mile deliveries. They concluded that, while e-commerce growth is beneficial for consumers, addressing its environmental footprint is crucial for sustainable urban logistics.

López and Martínez (2018) analyzed the challenges of adapting urban infrastructure in Spain to support the demands of e-commerce-driven logistics. López and Martínez gathered data on infrastructure usage in urban centers and conducted surveys with logistics providers to understand the constraints posed by limited urban spaces. They found a 30% increase in the demand for parking and designated delivery zones as e-commerce sales grew, creating significant congestion in cities like Madrid and Barcelona. Their findings indicated that delivery vehicles often double-parked or blocked traffic while completing last-mile deliveries, intensifying traffic delays. The study noted that this congestion also affected public transportation and other road users, leading to calls for new infrastructure. To address these challenges, López and Martínez recommended that cities create designated delivery zones to improve efficiency. They also proposed the widespread installation of smart lockers in commercial and residential areas to reduce traffic congestion from delivery stops. Another suggestion was to implement time restrictions for delivery trucks in high-traffic zones to alleviate peak-hour congestion. The authors concluded that investment in infrastructure is essential to accommodate the growth of urban e-commerce logistics without compromising traffic flow.

Tanaka and Saito (2019) focused on the impact of e-commerce growth on packaging waste in Tokyo, specifically addressing how frequent deliveries increase plastic and cardboard waste. Tanaka and Saito conducted surveys among consumers and interviewed e-commerce companies about packaging practices. Findings showed that the rise in e-commerce has increased packaging waste by 25% annually, leading to challenges in waste management. The study noted that many e-commerce companies used non-recyclable materials, compounding the environmental impact. Tanaka and Saito recommended that companies adopt sustainable packaging, including biodegradable and recyclable materials, to reduce waste. They also suggested that cities implement stricter recycling guidelines and consumer education programs to promote sustainable practices. The researchers proposed tax incentives for businesses that commit to reducing packaging waste through sustainable materials. Additionally, they recommended encouraging e-commerce companies to offer customers options for minimal or reusable packaging. The study concluded that collaborative efforts between businesses, consumers, and policymakers are essential to minimize packaging waste from e-commerce growth.

Kaur and Gupta (2020) examined the impact of e-commerce on job patterns and employment in urban logistics in India, focusing on the rise of part-time and gig work for last-mile delivery. Using survey data from logistics workers and interviews with delivery companies, the researchers found a 40% increase in flexible, part-time employment options since the growth of e-commerce. Their findings highlighted that e-commerce has created job opportunities, but these positions often lack

stability, benefits, and job security. Kaur and Gupta noted that gig workers face challenges such as income instability and lack of labor protections. They recommended that policymakers consider regulations to provide fair working conditions for gig workers, including minimum wage protections and benefits. The authors also suggested that logistics companies explore employee benefits for part-time workers to improve job satisfaction and retention. Another recommendation was to implement training programs to support career development for delivery workers. Kaur and Gupta concluded that, while e-commerce offers job opportunities, enhancing labor conditions in the logistics sector is essential for sustainable employment growth.

Johnson and Brown (2019) analyzed the effects of e-commerce growth on delivery times, customer satisfaction, and urban congestion in London. Using delivery records from multiple e-commerce companies and consumer feedback surveys, they assessed how faster delivery expectations influenced urban logistics. They found that e-commerce growth reduced delivery times by 30%, but led to increased congestion and logistical costs in densely populated areas. The study noted that frequent, smaller deliveries contributed to this congestion, affecting other city functions and environmental quality. Johnson and Brown recommended consolidated delivery services to reduce the number of delivery vehicles on the road. They also suggested that companies use AI to optimize delivery routes, balancing speed and sustainability. The study proposed that city authorities provide incentives for companies implementing sustainable delivery practices. The researchers concluded that achieving efficient urban logistics requires balancing rapid delivery demands with sustainable practices. They emphasized that innovative solutions in last-mile logistics are necessary to manage the dual challenges of e-commerce growth and urban congestion.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low-cost advantage as compared to field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

FINDINGS

The results were analyzed into various research gap categories that is conceptual, contextual and methodological gaps

Conceptual Gaps: While existing studies provide insights into specific aspects of e-commerce's impact on urban logistics such as traffic congestion (Wang & Chen, 2019), land use (Singh & Sharma, 2020), and environmental emissions (Davis, 2021) there is a lack of an integrated conceptual framework that connects these areas. For instance, there is limited understanding of how different logistics challenges interact to shape overall urban efficiency and sustainability. Additionally, studies tend to examine either consumer or corporate responses in isolation. A comprehensive framework that considers the interplay between these factors (traffic, emissions, infrastructure demand) could provide a holistic view of how e-commerce transforms urban logistics.

Contextual Gaps: Current research predominantly focuses on densely populated and high-density commercial areas, neglecting the effects in smaller urban regions or suburban areas. For instance, while Wang and Chen (2019) concentrate on major Chinese cities and López and Martínez (2018)

study urban centers in Spain, there is limited research on the differences in e-commerce's impact across varying urban scales. Contextual studies that compare how e-commerce growth affects logistics in both high-density and low-density areas could help in developing adaptable solutions tailored to specific urban environments.

Geographical Gaps: Research on e-commerce-driven urban logistics is largely centered on specific regions, particularly China (Wang & Chen, 2019), the United States (Davis et al., 2021), and parts of Europe (López & Martínez, 2018). There is a shortage of empirical studies on the effects of e-commerce in emerging economies, particularly in African and South American cities, where urbanization is rapidly increasing. Such regions face unique logistical challenges, including less-developed infrastructure and different consumer behavior patterns. Future studies should examine how e-commerce impacts logistics in these underrepresented regions, providing insights that are globally applicable and enhancing the broader understanding of urban logistics dynamics.

CONCLUSION AND RECOMMENDATIONS

Conclusions

In conclusion, exploring the impact of e-commerce growth on urban logistics reveals significant transformations in how goods are moved, stored, and delivered within cities. The surge in online shopping has intensified demand for last-mile delivery, leading to challenges such as increased traffic congestion, higher emissions, and a greater need for logistics infrastructure like warehouses and delivery zones. These changes affect urban planning, environmental sustainability, and the efficiency of urban transportation systems. Although solutions such as green vehicles, off-peak deliveries, and smart lockers have been introduced, more integrated and region-specific approaches are essential to manage the diverse logistical impacts of e-commerce. As e-commerce continues to grow, a coordinated effort between policymakers, businesses, and urban planners is crucial to develop sustainable and resilient urban logistics systems that can accommodate future demand while minimizing adverse effects on urban environments.

Recommendations

Theory

Future research should focus on developing a comprehensive framework that integrates various aspects of urban logistics such as traffic congestion, emissions, land use, and workforce shifts to fully understand the cumulative impact of e-commerce growth on urban areas. This framework should incorporate interdisciplinary perspectives from urban studies, environmental science, and logistics to create a holistic theoretical model that explains how e-commerce shapes urban logistics in multifaceted ways. Such an approach would provide researchers with a solid foundation for understanding the interdependencies of logistics factors, enhancing predictive accuracy and providing a unified theory of e-commerce-driven urban transformation.

Practice

Practically, logistics companies and urban planners should implement region-specific solutions to manage the unique challenges of e-commerce growth. For instance, logistics companies could adopt consolidated delivery models and invest in micro-warehousing within cities to reduce delivery distances. The use of green technologies, such as electric vehicles and bike deliveries, can also reduce emissions, particularly in densely populated areas. Additionally, smart lockers and

pick-up points strategically located in residential and commercial zones can help alleviate traffic congestion by reducing the number of individual home deliveries. These practical measures would make last-mile delivery more efficient and sustainable, improving service for consumers while mitigating the environmental and logistical burdens on cities.

Policy

From a policy perspective, city governments should establish clear guidelines and incentives to encourage sustainable urban logistics practices. Policies promoting green logistics, such as tax incentives for electric delivery vehicles and grants for companies investing in shared delivery hubs, can help address the environmental impacts of e-commerce. Zoning policies that allocate specific areas for warehousing and logistics centers would help balance urban development with logistics needs, particularly on city outskirts. Furthermore, local governments could implement policies encouraging off-peak deliveries to reduce congestion during peak hours, and integrate real-time data sharing between logistics firms and city authorities to better manage urban traffic. These policies would support a structured, sustainable approach to urban logistics in line with the demands of e-commerce growth.

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