Journal of Customer Value and Operational Excellence
Vol. 1, No. 01, October 2026: pp. 01-13
DOI: https://doi.org/10.71238/jcvoe.v1i01.199

A Bibliometric Analysis of Last-Mile Delivery and Quick Commerce: Research Trends and Themes

Loso Judijanto [1], Nanny Mayasari [2]
[1] IPOSS Jakarta losojudijantobumn@gmail.com
[2] Universitas Nusa Cendana nanny.mayasari@gmail.com
Corresponding Author: losojudijantobumn@gmail.com

Info Artikel
Article history:
Received: October, 2026
Revised: October, 2026
Accepted: October, 2026

Keywords:
Bibliometric Analysis; City Logistics; E-Commerce; Last-Mile Delivery; Quick Commerce

ABSTRACT

The growth of e-commerce and the arrival of quick commerce have placed last-mile delivery at the centre of urban logistics research. This study maps the thematic structure, research trends, and collaboration patterns of the field through a bibliometric analysis. A total of 428 documents indexed in Scopus from 2010 to 2026 were analysed with VOSviewer using keyword co-occurrence, co-authorship (author, institution, and country), and citation analysis. The results show that city logistics is the dominant concept and connects six thematic clusters covering sustainable e-commerce logistics, vehicle routing and optimization, last-mile decision making, freight transportation and cargo bikes, and last-mile strategies within urban freight systems. The overlay map indicates a shift from urban consolidation, trucks, and conventional distribution toward last-mile delivery, fleet operations, customer satisfaction, adaptive large neighborhood search, and machine learning in 2023 and 2024. Italy is the most productive and best-connected country, while Comi and Gatta lead the two largest co-authorship groups. The most cited works deal with operational research concepts, parcel lockers, autonomous robots, and drones. Quick commerce is still represented mainly through related terms such as instant, on-demand, e-grocery, and food delivery, which points to a clear direction for future studies.

This is an open access article under the CC BY-SA license.

Corresponding Author:
Name: Loso Judijanto
Institution: IPOSS Jakarta
Email: losojudijantobumn@gmail.com

INTRODUCTION

E-commerce has changed the way goods move through cities. Orders that used to arrive at shops in consolidated loads are now split into many small parcels sent to homes, offices, and pick-up points, and this final leg has become the most costly and least efficient part of the supply chain (Boysen et al., 2021; Lim et al., 2018). Last-mile delivery adds to congestion, emissions, and conflicts

over kerb space, so city authorities increasingly manage it through access restrictions, consolidation schemes, and freight policies (Cardenas et al., 2017; Kiba-Janiak et al., 2021).

Quick commerce adds new pressure to this system. Services that promise groceries, meals, and daily goods within minutes depend on small urban depots, flexible fleets, and real-time dispatching (Mishra et al., 2025; Perboli et al., 2021). Studies on e-grocery channels in Rome, Milan, and Shanghai show that consumers trade off speed, price, and convenience in different ways (Gatta et al., 2021; Maltese et al., 2021), while research on delivery riders reveals the labour and safety risks that sit behind the speed promise (Nguyen et al., 2023; Tran et al., 2022). Instant delivery has also entered the operations research agenda through drone hub networks and smart logistics concepts for e-grocery (Hu et al., 2024; Leyerer et al., 2020).

Researchers have proposed many solutions to these problems. Parcel lockers and collection points reduce failed deliveries and vehicle kilometres (Deutsch & Golany, 2018; Iwan et al., 2016); crowdshipping uses the spare capacity of travellers and public transport users (Gatta et al., 2019; Sina Mohri et al., 2023); and cargo bikes, electric vehicles, and micro-hubs cut emissions in dense districts (Gonzalez-Calderon et al., 2022; Katsela et al., 2022; Patella et al., 2021). Drones and autonomous robots are being tested as complements to delivery vans (Alverhed et al., 2024; Borghetti et al., 2022; Simoni et al., 2020), while vehicle routing models with delivery options and large neighbourhood search heuristics have become standard tools for planning these systems (Dumez et al., 2021; Tilk et al., 2021).

As a result, the literature has grown quickly and spread across transport engineering, operations research, urban planning, and consumer studies. Several reviews summarise parts of it, from sustainable e-commerce logistics to machine learning and last-mile strategies (Cano et al., 2022; Demir et al., 2022; Giuffrida et al., 2022; Lyons & McDonald, 2023). Most of them focus on one solution or one discipline, so the overall structure of the field and the position of quick commerce within it are still unclear. A bibliometric approach can show which concepts form the core of the field, how themes have changed over time, and which authors, institutions, and countries drive the work.

This study therefore conducts a bibliometric analysis of Scopus-indexed research on last-mile delivery and quick commerce. It aims to identify the main thematic clusters, trace recent shifts in research focus, map collaboration among authors, institutions, and countries, and point out the most influential publications. The results are intended to help researchers entering the topic, as well as practitioners and policymakers who design delivery services for growing cities.

METHODS

This study applies a quantitative bibliometric design that combines performance analysis and science mapping. Performance analysis describes the volume, type, and citation impact of publications, while science mapping reveals the relationships among keywords, authors, institutions, and countries. This combination is suited to a field such as last-mile delivery, where contributions come from several disciplines and are published in journals, conference proceedings, and book series.

Bibliographic data were retrieved from the Scopus database because of its broad coverage of transport, logistics, and operations research outlets and its complete metadata for authors, affiliations, keywords, and citations. The search combined terms related to last-mile delivery and city logistics with terms related to e-commerce, quick commerce, and instant or on-demand delivery in titles, abstracts, and keywords. The final dataset, exported in RIS format in October 2026, contains

428 documents published between 2010 and 2026, consisting of 249 journal articles, 113 conference papers, 46 book chapters, 12 reviews, five conference reviews, two data papers, and one note. Almost all documents (425) are written in English. Publication output rose from fewer than 25 documents per year before 2021 to 58 in 2021 and 61 in 2025, and the dataset has received 12,725 citations in total.

The data were analysed with VOSviewer version 1.6.20. Keyword co-occurrence analysis was used to produce network, overlay, and density visualizations, while co-authorship analysis was carried out at the author, institution, and country levels. In each map, node size reflects the number of occurrences or documents, link thickness shows the strength of co-occurrence or collaboration, and colours represent clusters formed by the VOSviewer clustering algorithm. In the overlay map, colours indicate the average publication year of each keyword. Citation analysis was then performed by ranking documents by their Scopus citation counts to identify the ten most cited publications.

RESULTS

Keyword Co-Occurrence Network Visualization

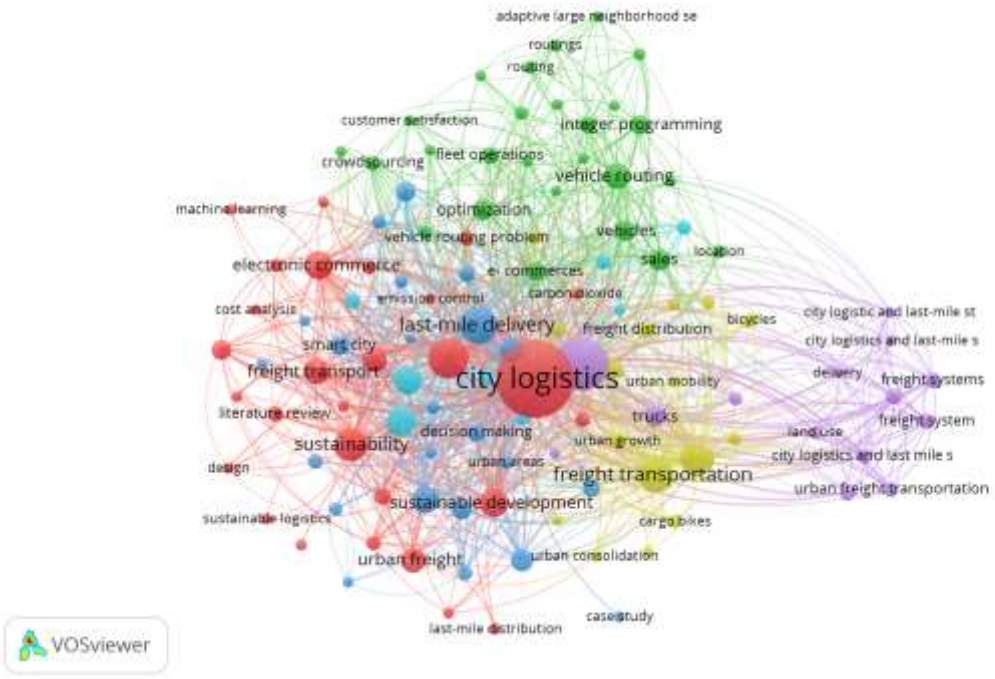


Figure 1. Network Visualization
Source: Data Analysis

Figure 1 shows the keyword co-occurrence network of research on last-mile delivery and quick commerce. City logistics is the largest node and sits at the centre of the map, as it appears in 354 of the 428 documents and co-occurs with almost every other keyword. Last-mile delivery, freight transportation, sustainability, electronic commerce, sustainable development, and urban freight are the next largest nodes around the centre. The dense links among them show that the field treats the last mile as a city-level freight problem driven by online shopping (Cardenas et al., 2017; Lim et al., 2018). The keywords are divided into six colour clusters, each grouping terms that tend to appear together in the same documents.

The red cluster brings together city logistics, electronic commerce, sustainability, sustainable development, freight transport, urban freight, smart city, emission control, carbon dioxide, cost analysis, sustainable logistics, last-mile distribution, and literature review. It covers the effects of e-commerce growth on urban freight and its environmental and economic costs, a theme also found in reviews of sustainable last-mile delivery (Cano et al., 2022; Kiba-Janiak et al., 2021), while machine learning at the left edge shows data-driven tools entering this stream (Giuffrida et al., 2022). The green cluster, at the top of the map, contains vehicle routing, vehicle routing problem, integer programming, optimization, routing, adaptive large neighborhood search, fleet operations, location, sales, and vehicles, and represents operations research models for delivery networks (Dumez et al., 2021; Zhou et al., 2018). Crowdsourcing and customer satisfaction also belong to this cluster, linking routing models to crowd-based capacity and service quality, both of which matter for on-demand and quick commerce services (Perboli et al., 2021; Yu et al., 2022). The blue cluster connects last-mile delivery with decision making, urban areas, urban consolidation, and case study, and reflects city-specific evaluations of consolidation and delivery schemes (Katsela et al., 2022; Van Rooijen & Quak, 2010).

The yellow cluster includes freight transportation, trucks, urban growth, urban mobility, bicycles, cargo bikes, and freight distribution, and deals with vehicle choice and the shift from vans to lighter modes such as cargo bikes (Galkin et al., 2025; Gonzalez-Calderon et al., 2022). The purple cluster on the right side groups city logistics and last-mile strategies, freight system, freight systems, delivery, land use, and urban freight transportation. Its position away from the centre and its several spelling variants suggest a separate body of strategic and planning studies, which links delivery operations to land-use and regulatory decisions (Fontaine et al., 2023). The small light-blue cluster lies close to the core and bridges the other groups. Quick commerce does not appear as a separate node; its content is absorbed by electronic commerce, sales, customer satisfaction, and crowdsourcing, a pattern discussed further in the Discussion section.

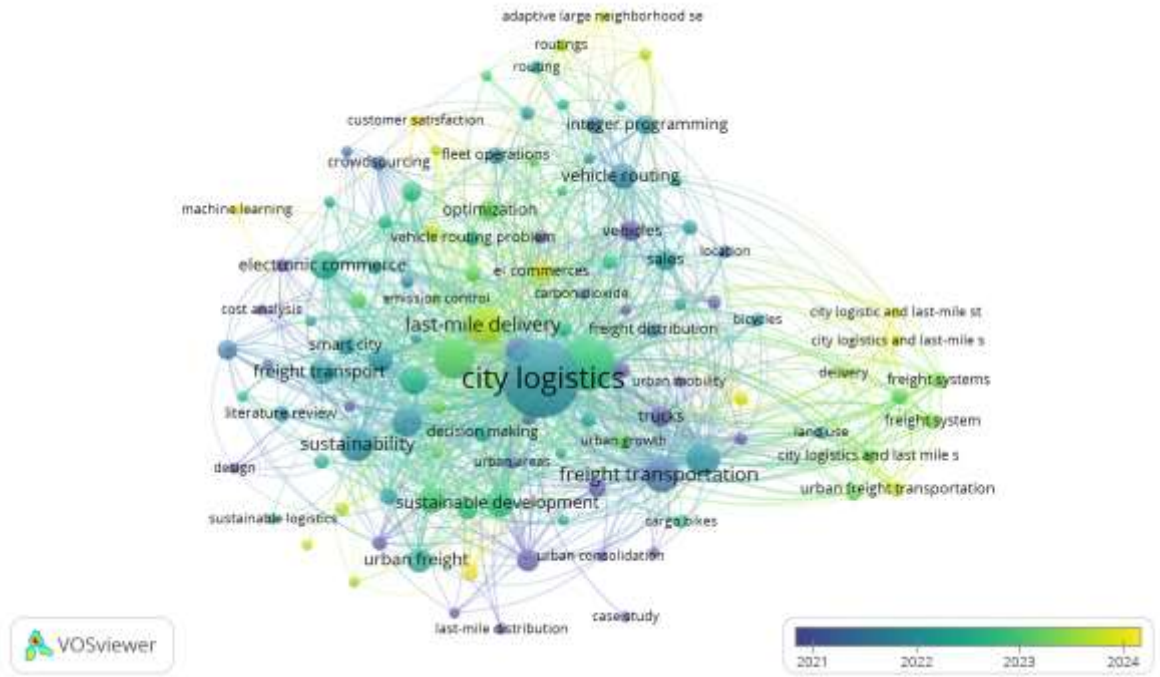


Figure 2. Overlay Visualization
Source: Data Analysis

Figure 2 presents the overlay visualization, where the colour of each node shows the average publication year of documents using that keyword, from 2021 (dark blue) to 2024 (yellow). Most nodes are teal or green, meaning that their average year falls between 2022 and 2023. This matches the publication trend, in which output jumped from 24 documents in 2020 to 58 in 2021 and has stayed high since then. City logistics itself is teal, indicating that it remains the stable reference term across the whole period.

Older themes appear in purple and dark blue. They include urban consolidation, last-mile distribution, case study, cost analysis, design, trucks, urban mobility, vehicles, carbon dioxide, and location. These keywords reflect the first stage of city logistics research, which tested urban consolidation centres, mobile depots, and cleaner trucks in real cities (Paddeu, 2017; Van Rooijen & Quak, 2010; Verlinde et al., 2014). Crowdsourcing is shown in blue-teal, which places it in the first wave of crowdshipping research around 2019 to 2021, when studies examined the use of public transport users and private drivers for parcel delivery (Gatta et al., 2019; Guo et al., 2019).

The most recent keywords appear in yellow and light green: last-mile delivery, e-commerces, customer satisfaction, fleet operations, adaptive large neighborhood search, routings, machine learning, city logistics and last-mile strategies, urban freight transportation, and freight systems. They show that newer studies focus on customer experience, fleet management, and data-driven decision making (Aljohani, 2024; Giuffrida et al., 2022), and on heuristics that can solve large routing problems with several delivery options (Dumez et al., 2021). These topics are closely tied to quick commerce, where short delivery promises require dispatch and routing decisions to be updated quickly while service quality is kept high.

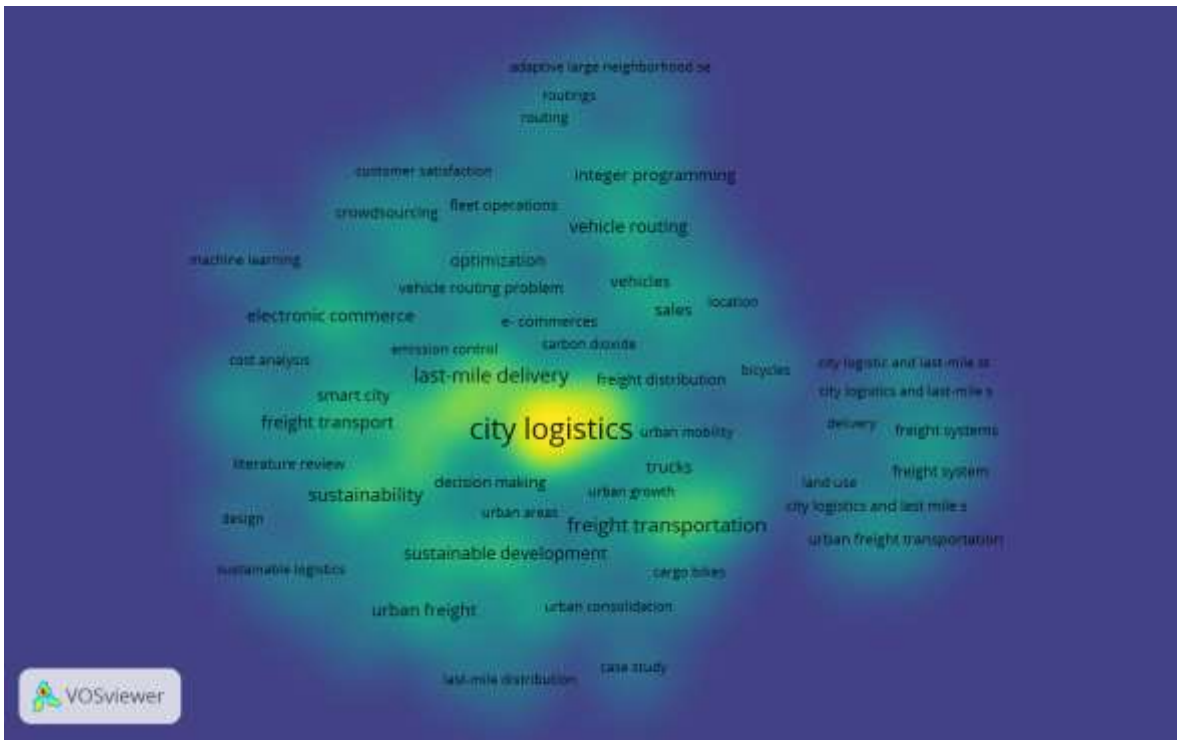


Figure 3. Density Visualization
Source: Data Analysis

Figure 3 shows the density visualization, where the colour of each area reflects how often keywords appear and how closely they are linked. Yellow marks the highest density and dark blue the lowest. City logistics forms the brightest yellow area at the centre of the map, followed by last-mile delivery just above it. These two terms therefore carry most of the research activity and act as the entry points into the literature.

Green areas of medium density appear in four zones that mirror the main clusters in Figure 1. The left zone covers freight transport, smart city, and electronic commerce; the lower zone covers sustainability, sustainable development, and urban freight; the lower-right zone covers freight transportation, trucks, and urban growth; and the upper zone covers vehicle routing, integer programming, and optimization. These are well-developed sub-areas with a large body of work, such as studies on green and sustainable delivery vehicles (de Oliveira et al., 2017; Patella et al., 2021) and routing models for last-mile distribution (Tilk et al., 2021).

The dark blue areas at the edges contain machine learning, customer satisfaction, adaptive large neighborhood search, routings, case study, last-mile distribution, land use, delivery, bicycles, and location. These keywords appear less often and are only weakly linked to the core, and the purple strategic cluster on the right forms a separate, faint zone. Several of these low-density terms are also among the most recent in Figure 2, so they can be read as developing topics. They offer room for studies that connect quick commerce with customer experience and data-driven delivery planning.

Co-Authorship Network

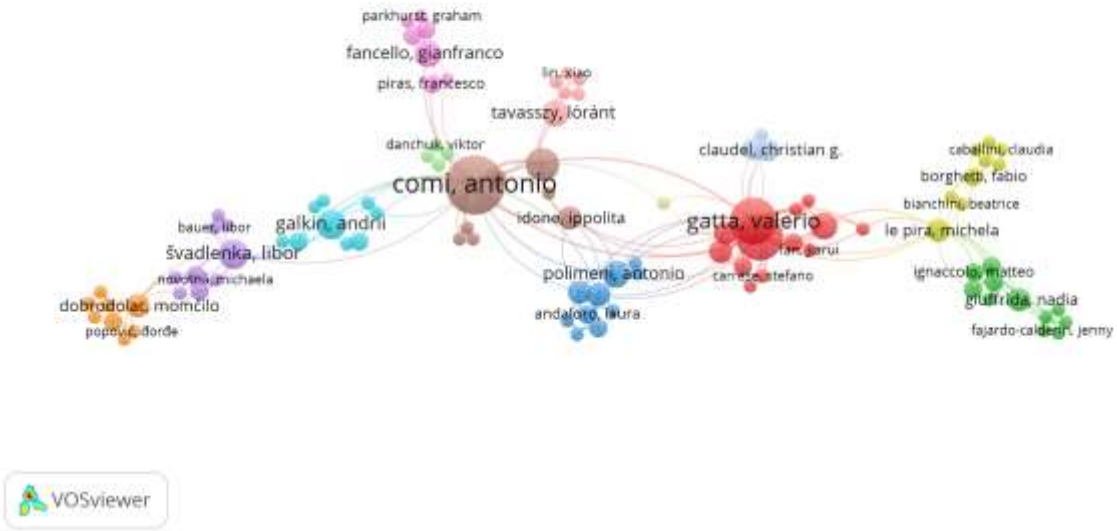


Figure 4. Author Visualization
Source: Data Analysis

Figure 4 displays the co-authorship network among authors. Each node represents an author, node size shows the number of documents, and colours mark groups of authors who publish

together. The map contains about a dozen small clusters joined through two large hubs. The first and largest hub is Comi, Antonio (brown cluster), the most productive author with 19 documents, who works closely with Idone, Ippolita. This group studies eco-friendly delivery vehicles, information and communication technologies for the last mile, and consumer choices of delivery location for online purchases (Comi & Hriekova, 2024; Comi & Savchenko, 2021; Hriekova et al., 2025).

Comi's hub connects to several clusters on the left side of the map: Galkin, Andrii (cyan), Švadlenka, Libor and Novotná, Michaela (purple), Dobrodolac, Momčilo and Popović, Đorđe (orange), Fancello, Gianfranco, Piras, Francesco, and Parkhurst, Graham (pink), Tavasszy, Lóránt and Lin, Xiao (light red), and Danchuk, Viktor (light green). This chain links Italian researchers with partners in the Czech Republic, Ukraine, Serbia, the Netherlands, and the United Kingdom, and produces work on cargo bike programmes, micro-hub location, and shopper behaviour in last-mile planning (Galkin et al., 2025; Kunytska et al., 2021; Novotná et al., 2022).

The second hub is Gatta, Valerio (red cluster) with 12 documents, who works with Fan, Jiarui and Carrese, Stefano and is connected to Claudel, Christian G. (light blue), Polimeni, Antonio and Andaloro, Laura (blue), Le Pira, Michela, Borghetti, Fabio, Caballini, Claudia, and Bianchini, Beatrice (yellow), and Ignaccolo, Matteo, Giuffrida, Nadia, and Fajardo-Calderin, Jenny (green). This group covers crowdshipping, e-grocery channel choice, parcel lockers, drone delivery, and agent-based simulation of e-commerce logistics (Borghetti et al., 2022; Calabrò et al., 2023; Gatta et al., 2019; Iannaccone et al., 2021; Maltese et al., 2021). The two hubs are joined by only a few links, through Idone and Polimeni, so the network depends heavily on two Italian research centres.



Figure 5. Institution Visualization
Source: Data Analysis

Figure 5 shows the co-authorship network among institutions. Only a small group of institutions passes the threshold and forms a connected network. CIRRELT in Montreal, Canada, is the largest node at the centre (green cluster), surrounded by DAUIN at Politecnico di Torino and two other small nodes from the same cluster.

CIRRELT is linked to the Center for Automotive Research (red) on the left, the Department of Control and Computer Engineering (blue) on the right, and the Department of Management and Production Engineering (yellow) at the top, all three being units of Politecnico di Torino. These links come mainly from the work of Perboli and colleagues on parcel delivery business models, satellite depots for the on-demand economy, simulation-optimisation of multimodal delivery, and ICT models for e-grocery (Perboli et al., 2018, 2021; Perboli & Rosano, 2019; Tadei et al., 2016).

The small size of this network shows that institutional collaboration is weak compared with collaboration among individual authors. Many institutions publish without repeated partners, so their links do not appear on the map. Stronger cross-institution consortia, including universities in developing countries where quick commerce is growing, would help transfer models and data between research groups.

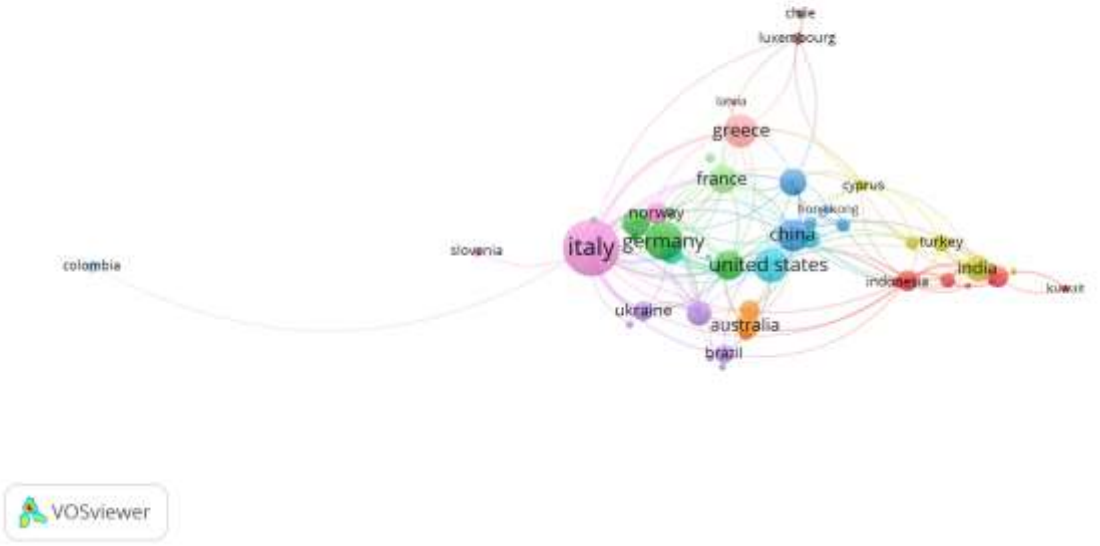


Figure 6. Country Visualization
Source: Data Analysis

Figure 6 presents the co-authorship network among countries. Italy is by far the largest node, with 91 documents, and sits on the left-centre of the map in the pink cluster together with Slovenia and Colombia, which are connected by long, thin links. Germany (43 documents), the United States (35), Greece (32), and China (29) follow. Italy's links reach almost every country in the network, which confirms its role as the main bridge of international collaboration.

Several country groups can be seen. Germany and Norway form a green cluster close to Italy, reflecting joint work between Italian and Norwegian transport researchers. France forms its own light-green cluster, while Greece and Latvia (salmon) are active in case studies on pick-up points and crowdshipping in Greek cities (Karakikes & Nathanail, 2022; Russo et al., 2024). The United States, China, and Hong Kong form the cyan and blue clusters on the right, Ukraine and Brazil appear in the purple cluster below Italy, Australia leads the orange cluster, and Chile and Luxembourg form a small brown cluster at the top.

Asian and Middle Eastern countries are placed on the right edge. India, Turkey, and Cyprus form the yellow cluster through joint studies with Serbian and Czech partners, and India also

contributes studies on routing for fresh food e-commerce (Prajapati et al., 2023). Indonesia and Kuwait appear as small red nodes; Indonesian authors are linked to Taiwan and the Netherlands through work on crowd-shipping and two-echelon routing (Yu et al., 2022; Zamal et al., 2025). Their small size shows that research on last-mile delivery remains concentrated in Europe, even though fast delivery services are growing rapidly in Asian and Latin American cities.

Citation Analysis

Table 1. Most Cited Article

Citations	Author and Year	Title
570	(Boysen et al., 2021)	Last-mile delivery concepts: a survey from an operational research perspective
355	(Lim et al., 2018)	Consumer-driven e-commerce: A literature review, design framework, and research agenda on last-mile logistics models
319	(Iwan et al., 2016)	Analysis of Parcel Lockers' Efficiency as the Last Mile Delivery Solution - The Results of the Research in Poland
291	(Zhou et al., 2018)	A Multi-Depot Two-Echelon Vehicle Routing Problem with Delivery Options Arising in the Last Mile Distribution
281	(Boysen, Schwerdfeger, et al., 2018)	Scheduling last-mile deliveries with truck-based autonomous robots
281	(Deutsch & Golany, 2018)	A parcel locker network as a solution to the logistics last mile problem
232	(Chen et al., 2021)	The adoption of self-driving delivery robots in last mile logistics
218	(Boysen, Briskorn, et al., 2018)	Drone delivery from trucks: Drone scheduling for given truck routes
195	(Simoni et al., 2020)	Optimization and analysis of a robot-assisted last mile delivery system
191	(Perboli & Rosano, 2019)	Parcel delivery in urban areas: Opportunities and threats for the mix of traditional and green business models

DISCUSSION

The results show that last-mile delivery research is built around city logistics as its main frame, with e-commerce as the main driver of change. Three directions stand out from the clusters: studies on the environmental and economic effects of urban freight, operations research on routing and network design, and applied work on vehicles, consolidation, and modal shift. The citation analysis supports this picture, as the most influential works deal with delivery concepts, parcel lockers, robots, and drones (Boysen et al., 2021; Boysen, Schwerdfeger, et al., 2018; Deutsch & Golany, 2018). Quick commerce has not yet formed its own cluster. It enters the literature through studies on on-demand economies, e-grocery, and food delivery (Leyerer et al., 2020; Mishra et al., 2025; Perboli et al., 2021), which means that its specific features, such as delivery promises of minutes rather than days, are still treated as a special case of e-commerce logistics.

The overlay map points to a clear change in research focus. Earlier work examined consolidation centres, trucks, and city distribution policies (Van Rooijen & Quak, 2010; Verlinde et al., 2014), while recent studies pay more attention to customer satisfaction, fleet operations, adaptive large neighborhood search, and machine learning (Aljohani, 2024; Dumez et al., 2021; Giuffrida et al., 2022). This change fits the operational demands of quick commerce, which requires routing and dispatching decisions to be updated in real time and service quality to be kept high. Newer

contributions on digital twins and City Logistics 4.0 show that data-driven tools are becoming part of last-mile planning (Corvello et al., 2026; Fatorachian et al., 2025), although these topics still have low density and need more empirical testing.

The collaboration maps show a field led by a few productive groups. Italy holds the central position, supported by groups around Comi and Gatta that have produced many studies on environment-friendly delivery and crowdshipping (Comi & Savchenko, 2021; Gatta et al., 2019), and by the Montreal–Turin partnership that links CIRRELT and Politecnico di Torino (Perboli & Rosano, 2019). The institution network is small and fragmented, and countries in Asia, Latin America, and the Middle East remain at the edges. This is an important imbalance, because quick commerce and motorcycle-based food delivery are expanding fastest in cities such as Jakarta, Hanoi, and Delhi, where road conditions, rider work patterns, and consumer habits differ from those in Europe (Du et al., 2025; Nguyen et al., 2023).

These findings have several implications. For practitioners, the literature offers tested options, including parcel lockers, crowdshipping, cargo bikes, micro-hubs, and electric vehicles, that can be combined to meet short delivery windows with lower emissions (Gonzalez-Calderon et al., 2022; Katsela et al., 2022; Sina Mohri et al., 2023). For policymakers, the strategic and land-use cluster indicates that delivery services need to be considered in urban planning and kerb management (Fontaine et al., 2023; Kiba-Janiak et al., 2021). For researchers, there is room to treat quick commerce as a research object in its own right, covering dark store location, rider labour conditions, consumer expectations of speed, and the environmental cost of very fast delivery. Combining machine learning with routing optimization, and applying these models to cities in developing countries, are promising directions for future work.

CONCLUSION

This study mapped research on last-mile delivery and quick commerce using 428 Scopus-indexed documents published between 2010 and 2026. The keyword analysis shows that city logistics and last-mile delivery form the core of the field and are linked to six clusters covering sustainable e-commerce logistics, vehicle routing and optimization, last-mile decision making, freight transportation and cargo bikes, and last-mile strategies within urban freight systems. Over time, research has moved from urban consolidation, trucks, and distribution policies toward last-mile delivery, customer satisfaction, fleet operations, adaptive large neighborhood search, and machine learning.

The co-authorship analysis shows that the field is driven mainly by European, and particularly Italian, research groups, with Comi and Gatta as the most connected authors and CIRRELT and Politecnico di Torino as the most visible institutional partnership. Collaboration among institutions is still limited, and countries in Asia, Latin America, and the Middle East contribute only a small share of the output. The citation analysis confirms that the most influential works address delivery concepts, parcel lockers, autonomous robots, drones, and two-echelon routing.

Quick commerce is not yet a distinct theme in the literature and is mostly discussed through e-commerce, e-grocery, food delivery, and on-demand services. Future studies should examine quick commerce directly, with attention to dark store networks, rider welfare, consumer expectations, and the environmental impact of very short delivery times, and should involve more cases from developing countries. This study has limitations. It relies only on Scopus data, depends on the chosen search terms, and includes a partial year for 2026. Future bibliometric work could

combine Scopus with Web of Science and Dimensions and add co-citation or bibliographic coupling analysis to strengthen the findings.

REFERENCES

Aljohani, K. (2024). The Role of Last-Mile Delivery Quality and Satisfaction in Online Retail Experience: An Empirical Analysis. *Sustainability (Switzerland)*, *16*(11), 4743. https://doi.org/10.3390/su16114743

Alverhed, E., Hellgren, S., Isaksson, H., Olsson, L., Palmqvist, H., & Flodén, J. (2024). Autonomous last-mile delivery robots: a literature review. *European Transport Research Review*, *16*(1), 4. https://doi.org/10.1186/s12544-023-00629-7

Borghetti, F., Caballini, C., Carboni, A., Grossato, G., Maja, R., & Barabino, B. (2022). The Use of Drones for Last-Mile Delivery: A Numerical Case Study in Milan, Italy. *Sustainability (Switzerland)*, *14*(3), 1766. https://doi.org/10.3390/su14031766

Boysen, N., Briskorn, D., Fedtke, S., & Schwerdfeger, S. (2018). Drone delivery from trucks: Drone scheduling for given truck routes. *Networks*, *72*(4), 506–527. https://doi.org/10.1002/net.21847

Boysen, N., Fedtke, S., & Schwerdfeger, S. (2021). Last-mile delivery concepts: a survey from an operational research perspective. *OR Spectrum*, *43*(1). https://doi.org/10.1007/s00291-020-00607-8

Boysen, N., Schwerdfeger, S., & Weidinger, F. (2018). Scheduling last-mile deliveries with truck-based autonomous robots. *European Journal of Operational Research*, *271*(3), 1085–1099. https://doi.org/10.1016/j.ejor.2018.05.058

Calabrò, G., Le Pira, M., Giuffrida, N., Fazio, M., Inturri, G., & Ignaccolo, M. (2023). A spatial agent-based model of e-commerce last-mile logistics towards a delivery-oriented development. *Transportation Research Interdisciplinary Perspectives*, *21*, 100895. https://doi.org/10.1016/j.trip.2023.100895

Cano, J. A., Londoño-Pineda, A., & Rodas, C. (2022). Sustainable Logistics for E-Commerce: A Literature Review and Bibliometric Analysis. *Sustainability (Switzerland)*, *14*(19), 12247. https://doi.org/10.3390/su141912247

Cardenas, I., Borbon-Galvez, Y., Verlinden, T., Van de Voorde, E., Vanelslander, T., & Dewulf, W. (2017). City logistics, urban goods distribution and last mile delivery and collection. *Competition and Regulation in Network Industries*, *18*(1–2), 22–43. https://doi.org/10.1177/1783591717736505

Chen, C., Demir, E., Huang, Y., & Qiu, R. (2021). The adoption of self-driving delivery robots in last mile logistics. *Transportation Research Part E: Logistics and Transportation Review*, *146*, 102214. https://doi.org/10.1016/j.tre.2020.102214

Comi, A., & Hriekova, O. (2024). Managing last-mile urban freight transport through emerging information and communication technologies: A systemic literature review. *Transportation Research Procedia*, *79*, 162–169. https://doi.org/10.1016/j.trpro.2024.03.023

Comi, A., & Savchenko, L. (2021). Last-mile delivering: Analysis of environment-friendly transport. *Sustainable Cities and Society*, *74*, 103213. https://doi.org/10.1016/j.scs.2021.103213

Corvello, V., De Maio, A., Giglio, C., & Musmanno, R. (2026). City Logistics 4.0: a reconceptualization of the domain through a systematic literature review and an agenda for future research. *Annals of Operations Research*, *364*(1), 661–709. https://doi.org/10.1007/s10479-025-06835-x

de Oliveira, C. M., De Mello Bandeira, R. A., Goes, G. V., Gonçalves, D. N. S., & De Almeida D'Agosto, M. (2017). Sustainable vehicles-based alternatives in last mile distribution of urban freight transport: A Systematic literature review. *Sustainability (Switzerland)*, *9*(8), 1324. https://doi.org/10.3390/su9081324

Demir, E., Syntetos, A., & Van Woensel, T. (2022). Last mile logistics: Research trends and needs. *IMA Journal of Management Mathematics*, *33*(4), 549–561. https://doi.org/10.1093/imaman/dpac006

Deutsch, Y., & Golany, B. (2018). A parcel locker network as a solution to the logistics last mile problem. *International Journal of Production Research*, *56*(1–2), 251–261. https://doi.org/10.1080/00207543.2017.1395490

Du, K. T., Bui, T. T., Nguyen, T. C., Ha, T. T., Tu, S. S., Hang Pham, T. T., Linh Du, V. K., Nguyen, T. V., & Nguyen, M. H. (2025). Towards sustainable city logistics in developing countries: What drives and prevents food delivery riders from adopting electric motorcycles in Vietnam. *Transportation Research Procedia*, *85*, 158–163. https://doi.org/10.1016/j.trpro.2025.03.146

Dumez, D., Lehuédé, F., & Péton, O. (2021). A large neighborhood search approach to the vehicle routing problem with delivery options. *Transportation Research Part B: Methodological*, *144*, 103–132. https://doi.org/10.1016/j.trb.2020.11.012

Fatorachian, H., Kazemi, H., & Pawar, K. (2025). Enhancing Smart City Logistics Through IoT-Enabled Predictive Analytics: A Digital Twin and Cybernetic Feedback Approach. *Smart Cities*, *8*(2), 56. https://doi.org/10.3390/smartcities8020056

Fontaine, P., Minner, S., & Schiffer, M. (2023). Smart and sustainable city logistics: Design, consolidation, and

regulation. *European Journal of Operational Research*, *307*(3), 1071–1084. https://doi.org/10.1016/j.ejor.2022.09.022

Galkin, A., Švadlenka, L., Vrba, R., & Oliveira, L. K. D. (2025). Evaluation of cargo bike program for parcel deliveries in a medium-sized city. *Transportation Research Part D: Transport and Environment*, *140*, 104609. https://doi.org/10.1016/j.trd.2025.104609

Gatta, V., Marcucci, E., Maltese, I., Iannaccone, G., & Fan, J. (2021). E-groceries: A channel choice analysis in shanghai. *Sustainability (Switzerland)*, *13*(7), 3625. https://doi.org/10.3390/su13073625

Gatta, V., Marcucci, E., Nigro, M., Patella, S. M., & Serafini, S. (2019). Public transport-based crowdshipping for sustainable city logistics: Assessing economic and environmental impacts. *Sustainability (Switzerland)*, *11*(1), 145. https://doi.org/10.3390/su11010145

Giuffrida, N., Fajardo-Calderin, J., Masegosa, A. D., Werner, F., Steudter, M., & Pilla, F. (2022). Optimization and Machine Learning Applied to Last-Mile Logistics: A Review. *Sustainability (Switzerland)*, *14*(9), 5329. https://doi.org/10.3390/su14095329

Gonzalez-Calderon, C. A., Posada-Henao, J. J., Granada-Muñoz, C. A., Moreno-Palacio, D. P., & Arcila-Mena, G. (2022). Cargo bicycles as an alternative to make sustainable last-mile deliveries in Medellin, Colombia. *Case Studies on Transport Policy*, *10*(2), 1172–1187. https://doi.org/10.1016/j.cstp.2022.04.006

Guo, X., Lujan Jaramillo, Y. J., Bloemhof-Ruwaard, J., & Claassen, G. D. H. (2019). On integrating crowdsourced delivery in last-mile logistics: A simulation study to quantify its feasibility. *Journal of Cleaner Production*, *241*, 118365. https://doi.org/10.1016/j.jclepro.2019.118365

Hriekova, O., Comi, A., & Tavasszy, L. (2025). End-consumer preferences for e-purchase delivery location. *Transportation Research Procedia*, *86*, 191–198. https://doi.org/10.1016/j.trpro.2025.04.025

Hu, Z.-H., Huang, Y.-L., Li, Y.-N., & Bao, X.-Q. (2024). Drone-Based Instant Delivery Hub-and-Spoke Network Optimization. *Drones*, *8*(6), 247. https://doi.org/10.3390/drones8060247

Iannaccone, G., Marcucci, E., & Gatta, V. (2021). What Young E-Consumers Want? Forecasting Parcel Lockers Choice in Rome. *Logistics*, *5*(3), 57. https://doi.org/10.3390/logistics5030057

Iwan, S., Kijewska, K., & Lemke, J. (2016). Analysis of Parcel Lockers' Efficiency as the Last Mile Delivery Solution - The Results of the Research in Poland. *Transportation Research Procedia*, *12*, 644–655. https://doi.org/10.1016/j.trpro.2016.02.018

Karakikes, I., & Nathanail, E. (2022). Assessing the Impacts of Crowdshipping Using Public Transport: A Case Study in a Middle-Sized Greek City. *Future Transportation*, *2*(1), 55–83. https://doi.org/10.3390/futuretransp2010004

Katsela, K., Güneş, Ş., Fried, T., Goodchild, A., & Browne, M. (2022). Defining Urban Freight Microhubs: A Case Study Analysis. *Sustainability (Switzerland)*, *14*(1), 532. https://doi.org/10.3390/su14010532

Kiba-Janiak, M., Marcinkowski, J., Jagoda, A., & Skowrońska, A. (2021). Sustainable last mile delivery on e-commerce market in cities from the perspective of various stakeholders. Literature review. *Sustainable Cities and Society*, *71*, 102984. https://doi.org/10.1016/j.scs.2021.102984

Kunytska, O., Comi, A., Danchuk, V., Vakulenko, K., & Yanishevskyi, S. (2021). Optimizing Last Mile Delivering Through the Analysis of Shoppers' Behaviour. *Lecture Notes in Networks and Systems*, *208*, 129–147. https://doi.org/10.1007/978-3-030-71771-1_9

Leyerer, M., Sonneberg, M.-O., Heumann, M., & Breitner, M. H. (2020). Shortening the last mile in urban areas: Optimizing a smart logistics concept for e-grocery operations. *Smart Cities*, *3*(3), 585–603. https://doi.org/10.3390/smartcities3030031

Lim, S. F. W. T., Jin, X., & Srai, J. S. (2018). Consumer-driven e-commerce: A literature review, design framework, and research agenda on last-mile logistics models. *International Journal of Physical Distribution and Logistics Management*, *48*(3), 308–332. https://doi.org/10.1108/IJPDLM-02-2017-0081

Lyons, T., & McDonald, N. C. (2023). Last-Mile Strategies for Urban Freight Delivery: A Systematic Review. *Transportation Research Record*, *2677*(1), 1141–1156. https://doi.org/10.1177/03611981221103596

Maltese, I., Le Pira, M., Marcucci, E., Gatta, V., & Evangelinos, C. (2021). Grocery or @grocery: A stated preference investigation in Rome and Milan. *Research in Transportation Economics*, *87*, 101096. https://doi.org/10.1016/j.retrec.2021.101096

Mishra, S., Pani, A., Sanchez-Diaz, I., & Rai, H. B. (2025). Urban freight activity implications from emerging food industry establishments in an on-demand economy: Evidence from India. *Research in Transportation Economics*, *110*, 101540. https://doi.org/10.1016/j.retrec.2025.101540

Nguyen, M. H., Pojani, D., Nguyen-Phuoc, D. Q., & Nguyen Thi, B. (2023). What if delivery riders quit? Challenges to last-mile logistics during the Covid-19 pandemic. *Research in Transportation Business and Management*, *47*, 100941. https://doi.org/10.1016/j.rtbm.2022.100941

Novotná, M., Švadlenka, L., Jovčić, S., & Simić, V. (2022). Micro-hub location selection for sustainable last-mile

delivery. *PLoS ONE*, *17*(7 July), e0270926. https://doi.org/10.1371/journal.pone.0270926

Paddeu, D. (2017). The Bristol-Bath Urban freight Consolidation Centre from the perspective of its users. *Case Studies on Transport Policy*, *5*(3), 483–491. https://doi.org/10.1016/j.cstp.2017.06.001

Patella, S. M., Grazieschi, G., Gatta, V., Marcucci, E., & Carrese, S. (2021). The adoption of green vehicles in last mile logistics: A systematic review. *Sustainability (Switzerland)*, *13*(1), 1–29. https://doi.org/10.3390/su13010006

Perboli, G., Brotcorne, L., Bruni, M. E., & Rosano, M. (2021). A new model for Last-Mile Delivery and Satellite Depots management: The impact of the on-demand economy. *Transportation Research Part E: Logistics and Transportation Review*, *145*, 102184. https://doi.org/10.1016/j.tre.2020.102184

Perboli, G., & Rosano, M. (2019). Parcel delivery in urban areas: Opportunities and threats for the mix of traditional and green business models. *Transportation Research Part C: Emerging Technologies*, *99*, 19–36. https://doi.org/10.1016/j.trc.2019.01.006

Perboli, G., Rosano, M., Saint-Guillain, M., & Rizzo, P. (2018). Simulation-optimisation framework for City Logistics: An application on multimodal last-mile delivery. *IET Intelligent Transport Systems*, *12*(4), 262–269. https://doi.org/10.1049/iet-its.2017.0357

Prajapati, D., Harish, A. R., Daultani, Y., Singh, H., & Pratap, S. (2023). A Clustering Based Routing Heuristic for Last-Mile Logistics in Fresh Food E-Commerce. *Global Business Review*, *24*(1), 7–20. https://doi.org/10.1177/0972150919889797

Russo, A., Basbas, S., Bouhouras, E., Tesoriere, G., & Campisi, T. (2024). The Study of the 5-min Walking Accessibility for Pickup Points in Thessaloniki: Enhancing Logistics' Last Mile Sustainability. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *14821 LNCS*, 41–53. https://doi.org/10.1007/978-3-031-65308-7_4

Simoni, M. D., Kutanoglu, E., & Claudel, C. G. (2020). Optimization and analysis of a robot-assisted last mile delivery system. *Transportation Research Part E: Logistics and Transportation Review*, *142*, 102049. https://doi.org/10.1016/j.tre.2020.102049

Sina Mohri, S., Ghaderi, H., Nassir, N., & Thompson, R. G. (2023). Crowdshipping for sustainable urban logistics: A systematic review of the literature. *Transportation Research Part E: Logistics and Transportation Review*, *178*, 103289. https://doi.org/10.1016/j.tre.2023.103289

Tadei, R., Fadda, E., Gobbato, L., Perboli, G., & Rosano, M. (2016). An ICT-based reference model for e-grocery in smart cities. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, *9704*, 22–31. https://doi.org/10.1007/978-3-319-39595-1_3

Tilk, C., Olkis, K., & Irnich, S. (2021). The last-mile vehicle routing problem with delivery options. *OR Spectrum*, *43*(4), 877–904. https://doi.org/10.1007/s00291-021-00633-0

Tran, N. A. T., Nguyen, H. L. A., Nguyen, T. B. H., Nguyen, Q. H., Huynh, T. N. L., Pojani, D., Nguyen Thi, B., & Nguyen, M. H. (2022). Health and safety risks faced by delivery riders during the Covid-19 pandemic. *Journal of Transport and Health*, *25*, 101343. https://doi.org/10.1016/j.jth.2022.101343

Van Rooijen, T., & Quak, H. (2010). Local impacts of a new urban consolidation centre - The case of Binnenstadservice.nl. *Procedia - Social and Behavioral Sciences*, *2*(3), 5967–5979. https://doi.org/10.1016/j.sbspro.2010.04.011

Verlinde, S., Macharis, C., Milan, L., & Kin, B. (2014). Does a Mobile Depot Make Urban Deliveries Faster, More Sustainable and More Economically Viable: Results of a Pilot Test in Brussels. *Transportation Research Procedia*, *4*, 361–373. https://doi.org/10.1016/j.trpro.2014.11.027

Yu, V. F., Jodiawan, P., & Redi, A. A. N. P. (2022). Crowd-shipping problem with time windows, transshipment nodes, and delivery options. *Transportation Research Part E: Logistics and Transportation Review*, *157*, 102545. https://doi.org/10.1016/j.tre.2021.102545

Zamal, M. A., Schrotenboer, A. H., & Van Woensel, T. (2025). The two-echelon vehicle routing problem with pickups, deliveries, and deadlines. *Computers and Operations Research*, *179*, 107016. https://doi.org/10.1016/j.cor.2025.107016

Zhou, L., Baldacci, R., Vigo, D., & Wang, X. (2018). A Multi-Depot Two-Echelon Vehicle Routing Problem with Delivery Options Arising in the Last Mile Distribution. *European Journal of Operational Research*, *265*(2), 765–778. https://doi.org/10.1016/j.ejor.2017.08.011