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Last-mile Delivery of Electronic Retailers: Systematic Literature Review and Research Directions

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Abstract

Volume and share of electronic retail (e-tail) business are growing rapidly and this rapid growth was accelerated further due to COVID-19. More e-tailing businesses have increased last-mile delivery operations. To handle this growth, last-mile operators are facing huge challenges due to the complexity of last-mile operations. The last-mile is not only challenging but also critical to e-tailers, customers, society, and the environment. Hence a study of the current body of knowledge on the last-mile of business-to-customer (B2C) e-tailer has become necessary for e-tailers now. This study attempts to review the research done on this important subject and find possible research opportunities that could benefit e-tailers appreciably. The study deciphers critical factors and solutions related to the last-mile. A research framework is also proposed. Practitioners may pay more attention to the implementation and adoption of alternate last-mile delivery arrangements. The challenges and effects of the last-mile offer some directions to researchers.

Keywords: e-commerce, e-tail, online retail, last-mile, business to customer, B2C

1. Introduction

Over the last few years, the Business to customer (B2C) e-commerce business (e-tailing) has grown rapidly all over the world (Asdecker B., 2021). E-tailing is rapidly gaining importance in both mature and emerging markets (Mangiaracina et al., 2019). The share of e-commerce is expected to be 36% of total world trade in 2030 (Bjerkan, K. Y. et al., 2020). From 2014 to 2019 e-commerce sales increased by 200%. This trend is fueled by a wide range of factors like an increase in internet penetration, enhancement of purchasing power of the middle class, increase in awareness of online shopping, worldwide increase in online customer base, the emergence of online business model, availability of a wide range of products online (report of World Economic Forum January 2020). This growth further accelerated due to restrictions imposed to prevent the spread of the COVID-19 pandemic from early 2020 (Ahsan, K., & Rahman, S. 2021). The pandemic led to a strict lockdown and restricted movement of people (Alshater, M. M. et al., 2022). People responsible for emergency services were only allowed to move out. (Barnes, S. J., 2020). These restrictions triggered changes in the economic and socio-cultural life of people (Buheji and Ahmed, 2020; Sigala, 2020). These changes hugely impacted all industries and, in turn, all businesses. Organizations allowed people to work from home. Business organizations adopted virtual work environments and started conducting meetings using online platforms like Zoom, WebEx, Skype, and Google Meet. Educational institutions started using online platforms like Zoom, and Google Meet to conduct classes. A massive increase in the number of users and profit was reported to digital platforms like Zoom, and Google Meet (Ha, N. T. et al., 2022). An enormous change in consumers' shopping behaviour has occurred (Kang et al., 2020). During and post COVID-19 era people are willing to adopt measures like social distancing, contactless delivery (Halan, D., 2021), contactless payment mode so religiously that many authors officially referred to these practices as the new normal (Jamaludin et al., 2020, Ha, N. T. et al., 2022). Most of the people have shifted their shopping to online mode for different needs like groceries, medicines, and consumer goods for daily needs which most of the people used to shop from brick-and-mortar stores before the COVID-19 outbreak (Kulkarni and Barge 2020). Different researchers have reported a growth in online shopping in post COVID era as compared to pre COVID era (Akar, E., 2021; Sharma and Jhamb 2020). To exemplify, there was approximately 100% growth in the USA and 50% growth in Europe in the number of online orders. In 2020 more than 2 billion people shop online with a business value of USD 4.28 trillion (Dhaigude, S.

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A., & Mohan, B. C. 2021, Ha N. T. et al., 2022). So, it indicates that there is a gigantic increase in the number of online customers as well as the volume of online business which resulted increase in the value of the online business. Along with the increase in business value as well as volume, there is a huge increase in the operations of e-commerce businesses. In the same line, the business-to-customer (B2C) online business has grown in a large scale. Because of this growth in online business, the biggest challenge faced by e-tailers is the effective management of the logistics which is the backbone to order fulfilment (He, Zhang, and He 2019). From the perspective of an e-tailer, last-mile delivery is considered to be one of the critical factors in the order fulfilment process (Titiyal, R., et al., 2022). On the other hand, from the perspective of a consumer, the last-mile plays an important role in satisfaction and repurchasing decisions (Risberg, A., & Jafari, H. 2022, Nguyen, D. H. et al., 2019, Hubner, A. et al., 2016, Xing et al. 2010)

The huge growth in the e-tailing business in recent years has impacted its supply chain a lot (Ha. N. T. et al., 2022). Since the last-mile is considered as most difficult in the e-tailing supply chain, the complexity of last-mile delivery has grown drastically. Nowadays more people are shopping online and ordering more. Most online customers look for faster delivery with higher levels of service and more flexibility in delivery options (Parise, S. et al., 2016). Most of customers also want the delivery of their orders at their home (home delivery) (Morganti E. et al, 2014). These features are now indispensable for customer satisfaction and retention which is very important for a sustainable e-tailing business (Zuopeng Xiao et al., 2017). As a result, e-tailing businesses have started considering the last-mile from a support system to a critical element for sustainable business. E-tailers are expected to deliver a large number of orders in small packages to geographically widely spread recipients which in turn makes the last-mile very inefficient and expensive for poor economies of scale (Mangano and Zenezini, 2019). Moreover, customers expect to receive the order on time. Last-mile cost is as high as 53% of the total cost of the logistics supply network (Zuopeng Xiao et al., 2017). These, costly and inefficient, characteristics of last-mile delivery coupled with the very high demand for home delivery may cause different problems related to traffic congestion and carbon emissions. Considering the growth in the e-tailing business it is expected that the number of delivery vehicles for the last-mile may increase by 36% in 2030 as compared to 2019 and carbon dioxide (CO2) emission, due to the increase in the last-mile, may increase by 31%. Due to the increase in the movement of the number of delivery vehicles for last-mile, it is also expected that the average time to commute in cities may increase by 21% in 2030 as compared to 2019 (Ha. N. T. et al., 2022, report of World Economic Forum January 2020). Figure 1 illustrates the same. So last-mile is not only very costly and difficult to execute efficiently but also critical to the environment and social life of people. The last-mile is the final and only physical touchpoint between the consumer and the e-tailer. The interconnectedness between consumer and e-tailer impacts the consumer decision process (Faulds, D. J. et al., 2018). Considering all emotions in the process of fulfilment, the customers weigh the end emotion more heavily than the previous emotions when making judgments about something (Fang, X. et al. 2018). So, an experience of the last-mile plays a very crucial role in the overall customer experience of e-tailers. Last-mile can be considered as the last and final chance to impress consumers in the process of order fulfilment.

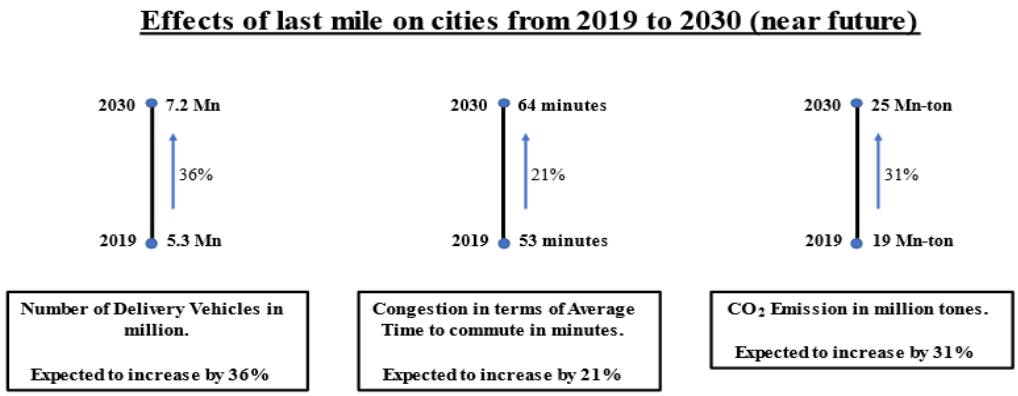

Figure 1. Adapted from Ha. N. T. et al., 2022 and report of World Economic Forum January 2020.

Due to changes in the socio-cultural lifestyle of people post-COVID-19 and the enormous increase of e-tailing businesses worldwide, the last-mile industries are facing lots of challenges to operate. These challenges have imposed difficulties on last-mile delivery (Srivatsa Srinivas and Marathe, 2021) and different innovations are being adopted to

tackle the same. Given the different challenging aspects of last-mile and innovations, researchers have started showing interest in last-mile. Since 2016, the number of publications on the last-mile has increased exponentially (Ha. N. T. et al., 2022, Dhaigude, S. A., & Mohan, B. C. 2021). There is a trend of upward interest in the last-mile of e-tailing among practising business managers as well as researchers (Melacini, M. et al., 2018). Given this, it is very important and highly desirable to have a comprehensive literature review on the last-mile of the B2C e-tailing business (Mangiaracina et al., 2019). To the best of the author's knowledge, there is a lack of such extensive and comprehensive literature review on the last-mile post-2016. Researchers have yet to know about the different literature and future research options related to the last-mile of B2C e-tailers. For this reason, this study is trying to examine the current status and propose the future scope of research.

This study aspires to answer the following research questions

RQ 1: What are the themes involving the last-mile of B2C e-tailing popular among researchers?
RQ 2: What is the current research landscape on the last-mile of B2C e-tailing?
RQ 3: What are the research gaps and future research scope on the last-mile of B2C e-tailing?

Answering the research questions will provide valuable insights into the literature. Hence the objectives of this research are enumerated as follows:

1. To provide the current research status on the last-mile of B2C e-tailing.
2. To pick out research gaps and furnish future research scopes.
3. To provide future research framework on the last-mile of B2C e-tailing.

Keeping in mind the Research Questions, this paper is structured into the following sections: The second section provides the methodology adopted and review procedures. The third section discusses the theoretical concepts and background of last-mile delivery. The fourth section presents the results of the study, followed by the fifth section which articulates the conceptual framework. The sixth section presents discussions of the main findings and highlights the key theoretical, practical, and social implications. The seventh section proposes the directions for further research and concludes this structured literature review with the limitations of the study.

2. Methodology

A literature review is considered a systematic method to educate oneself on a particular topic by referring to some specific keywords related to the topic (Jafari, 2015). A literature review also includes an analysis of available information to organize a view that delivers knowledge and ideas for the future which was established by different authors (Schryen et al., 2015). So, reviewing and examining contemporary literature is the first step for any research (Akbari and Do, 2021; Nagariya et al., 2021). Table 2 gives an idea about the literary landscape on the themes of last-mile and e-commerce in terms of bibliometric analysis and literature review published from 2016 to 2022.

2.1 Reviewing the literature systematically: Steps Followed

The study hinges its methodology on scanning relevant articles and research papers on the subject. This study has taken up broadly an approach of four steps based on Ha. N. T. et al., 2022, Akbari et al. (2022), Belinski et al. 2020 and PRISMA statement Liberati A. et al., 2009. These steps are explained in Figure 2. The four steps, about reviewing of literature and inclusion of articles, are described below chronologically as identification, screening, eligibility and inclusion of articles.

Step-1: Identification of articles

Step-1.1 Selection of database

Articles and research papers were searched through the internet. Based on the PRISMA statement (Liberati A. et al., 2009) search was mainly focused on the last-mile in the field of business and economics. The searches were conducted in

Taylor & Francis, Emerald Insight, Science Direct (Elsevier), MDPI, Research Gate, Inderscience, and EBSCOhost. Searches were done through the respective website as well as through Google Scholar to ensure the optimum inclusion of all articles related to keywords.

Step-1.2 Keywords used

The keywords used during the identification of records were “ecommerce”, “e-commerce”, “e-tailer”, “Final delivery”, “Final mile”, “Final mile delivery”, “Last-mile delivery”, “Last-mile logistics”, “Last-mile fulfilment”, “Last-mile operation", "Last-mile distribution”, “Business to customer” and “B2C”. The included keywords are searched in the title and/or abstract of articles while searching from the selected databases.

Step-1.3 Year of publication

Since 2014 e-commerce sales have increased hugely. This upward trend is fueled by a wide range of factors like an increase in internet penetration, enhancement of purchasing power of the middle class, increase in awareness of online shopping, worldwide increase in online customer base, the emergence of online business model, availability of a wide range of products online (report of World Economic Forum January 2020). The number of articles published on last-mile logistics of e-commerce and e-tailing has increased drastically since 2016. Due to the increase in sales in e-tailing, practising managers are also facing lots of difficulties to operate. So, the last-mile of e-tailing as a subject has gained a lot of importance among practising managers and researchers since 2016 (Ha. N. T. et al., 2022, Mucowska, M. 2021, Anthony A. et al., 2021, Patella, S.M. et al., 2021, Kiba-Janiak, M. et al., 2021, Dhaigude, S. A., & Mohan, B. C. 2021). In this vein, the range of time for retrieving, reviewing, and examining literature is taken from 2016 to 2022 as the publishing year. At the end of this stage, in total 723 articles were identified and extracted.

Step-2: Screening of articles

Duplication of records is checked. It was found that 256 records were available in duplicate. After removing these 256 records, 467 records were considered for further screening.

Original research articles were included. Articles from “peer-reviewed journals” and conference publications were considered. Further to this, articles whose full texts are available and which are published in the English language were included. Books and book chapters were excluded assuming the latest updates on last-mile may not be available. Articles published in any language other than English were not considered for selection. Table 1 depicts the same. At the end of the screening process, 147 full-text articles were selected for eligibility check.

Table 1. Screening process – list of inclusion and exclusion criteria

Inclusions	Exclusions
1. Peer-Reviewed Journals	1. Books
2. Conferences articles	2. Book chapters
3. English Language	3. Other than English Languages
4. Full text available	

Step-3: eligibility of articles

The articles, included after the screening, were assessed for eligibility to be included. At first, the titles and abstracts of the screened articles were read carefully, and accordingly, the articles which were not relevant to the focus area of this study were removed. At this stage, 51 articles were excluded. Then the full texts of the rest 96 selected articles were read. Contents of 12 articles were found to not fit our focus area of study. Hence, these 12 articles were excluded.

Step-4: inclusion of articles

This is the final phase of the systematic review. The final sample size of articles included in the study is 84.

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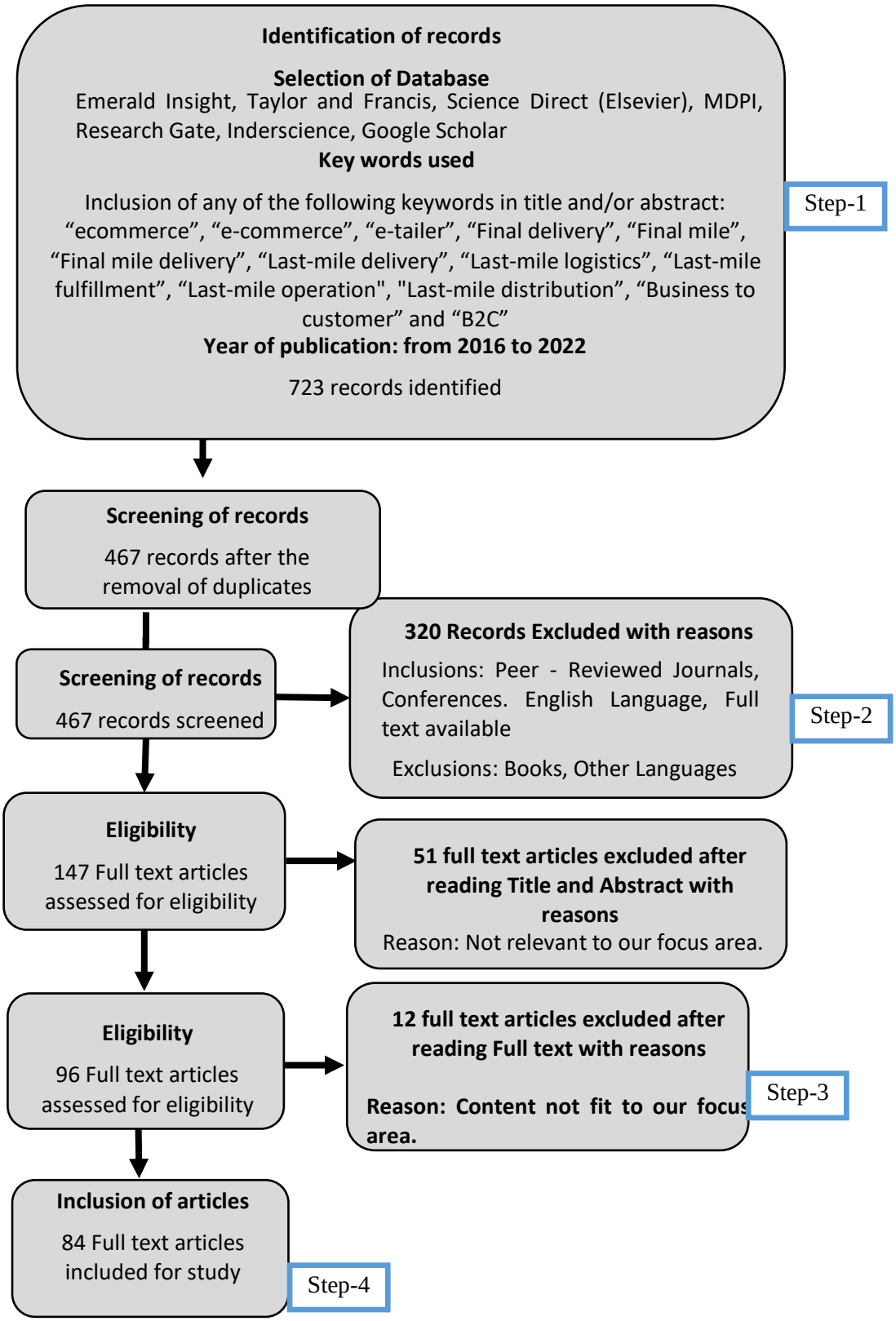

Figure 2. Flow chart of the final selection of articles.

Adapted from Ha. N. T. et al., 2022, Dhaigude, S. A., & Mohan, B. C. 2021 and Liberati A. et al., 2009

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2.2 Existing literature on last-mile

At the end of the article selection process, 84 articles were included in the study. After the inclusion of literature is done, the data related to articles were entered in MS Excel. The pertinent data related to articles like title, country of study, year of publication, name of the journal, name of publisher, number of citations (as of 07.01.2023), country of authors, methodology used, themes, sub-themes, and so on were incorporated. In this process, it was revealed that sixteen literature reviews on the last-mile of e-tailers could be included which were published from 2016 to 2022. The details of the same are given in table 2. With a boost in the e-tailing business, which is further accelerated by COVID-19 restrictions, there is an increase in attention to innovation and sustainability in the last-mile. Since the last-mile operation has become more difficult and critical, more attention is given by practising professionals as well as academic research people. At this time, a comprehensive review of the literature on the last-mile of e-tailers is needed. This comprehensive systematic literature review explores research on the last-mile of e-tailers from 2016 to 2022 which is trying to put forward the attention of researchers. This study also proposes future research opportunities which may help academics as well as industry.

Table 2. Summary of previous literature review articles

Author	Journal	Citation number as on 07.01.2023	Number of papers reviewed	Year of focus	Theme
Jain, N. K. et al., 2017	Asia Pacific Journal of Marketing and Logistics.	74	73	till 2016	Dimensions of e-fulfilment - effects on customer
Herold, D. M., & Lee, K. H. (2017)	Carbon Management	78	66	2000 - 2015	Carbon management in logistics
Melacini, M. et al., 2018	International Journal of Physical Distribution & Logistics Management.	223	58	2002 - 2017	E-fulfilment
Mangiaracina, R. et al., 2019	International Journal of Physical Distribution & Logistics Management.	188	75	2001 - 2019	Last-mile efficiency B2C ecommerce
Meyer, T. (2020)	Transportation Research Part D: Transport and Environment	48	715	till 2019	Carbon management in logistics
Tavasszy, L. A. (2020)	Transport Policy	56	NA	2020	Effects of logistic innovation
Mucowska, M. (2021).	Sustainability	19	126	1994 - 2021	Last-mile sustainability
Anthony A. et al., 2021	International Journal of Logistics Research and Applications	12	33	2010 - 2020	Last-mile sustainability

(Continued)

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Table 2. Summary of previous literature review articles

Author	Journal	Citation number as on 07.01.2023	Number of papers reviewed	Year of focus	Theme
Patella, S.M. et al., 2021	Sustainability	59	159	till April 2020	Last-mile sustainability
Kiba-Janiak, M. et al., 2021	Sustainable Cities and Society	41	161	1997 - 2020	Last-mile sustainability
Dhaigude, S. A., & Mohan, B. C. (2021)	Journal of Internet Commerce	1	177	2001 - 2021	Logistic Service Quality
Pan, S. et al., 2021	International Journal of Production Research	32	82	2014 - 2020	Last-mile sustainability
Ahsan, K., & Rahman, S. (2021)	Industrial Management & Data Systems	14	75	till 2020	Last-mile return
Mavi, R. K. et al., 2022	The International Journal of Logistics Management	4	148	2009 - 10th January 2022	Innovation in transport and COVID implication
Ha, N. T. et al., 2022	Benchmarking: An International Journal	2	281	2006 - 2020	Last-mile delivery and Supply Chain Management
Titiyal, R. et al., 2022	Management Research Review.	1	122	2000 - 2020	E-fulfilment

3. Theoretical concept of last-mile delivery

3.1 Definition of last-mile delivery

Due to globalization and the development of business across countries, supply chain operation has become very important and critical (Ha. N. T. et al., 2022). Last-mile can be understood as the final step of logistics and supply chain operation where the goods are delivered to end consumers (Aljohani and Thompson, 2020; Zeng et al., 2019). Last-mile is discussed by different authors depending on different perspectives of business models like Business to Customer (B2C), Business to Business (B2B), and Consumer to Consumer (C2C) (Tipagornwong and Figliozzi, 2014). Moreover, last-mile is used by different authors by different terms like last-mile kilometre, and last-mile supply chain which indicates the usage of last-mile is not standardized by authors. So, by and large, the last-mile can be understood as the last transportation of a consignment in a supply chain from the last dispatch point to the delivery point where the consignee receives the consignment (Motavallian 2019, p. 106). Considering different types of business models, we take the definition of last-mile as delivering the product to the customer's home by the distributors/retailers from the local distribution centre. (Hofmann, E. (2013). Supply Chain Management: Strategy, Planning and Operation, S. Chopra, P. Meindl).

3.2 Importance of last-mile delivery

Last-mile is the last and final step of the order fulfilment process (Nguyen, D. H. et al. 2019). In the e-tailing business, the customer explores and finalizes the product to be bought in online mode. Placement of orders and payment is done also in online mode. So, the last-mile is the only physical touch point between e-tailers and customers. The way the last-mile delivery is performed has some impacts to obtain competitive advantages Many e-retailing giants (e.g., Amazon

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and JD.com) believe that capacities of last-mile delivery are their core assets to obtain competitive advantages. The last-mile fulfilment is what the ongoing e-commerce battles are currently fighting for (Zuopeng Xiao et al., 2017).

Moreover, last-mile delivery is the last touch-point to building brand image by e-tailers as people weigh the end emotion more heavily than the previous emotions when making judgments about something (X. Fang et al., 2018). So, a good last-mile experience may lead to customer satisfaction and loyalty. The generation of loyalty in customers is very important for a sustainable business.

3.3 Last-mile challenge – The cost factor

Delivery of orders by e-tailers is done at a poor scale of economies as it is generally done as a single order per delivery (Mangano and Zenezini, 2019, Boyer et. al. 2004). And most of the time consolidation of orders in the last-mile is not possible. Moreover, the delivery time required per order increases due to unsuccessful delivery attempts and difficulty in finding the exact address of the customer. So, delivery per order becomes costly. Last-mile is the costliest part of the whole logistic supply network. Different authors have expressed the same in different articles. Zuopeng Xiao et al., 2017 indicated that last-mile cost is as high as 53% of the total cost of the logistics supply network. Hence, the last-mile posits a big challenge to e-tailers.

3.4 Last-mile challenge – Efficiency factor

The last-mile delivery person needs to find the address of the customer and delivers the products. The delivery person often faces difficulty in finding the address of the customer (Deutsch, Y. et al., 2018). Another problem faced by last-mile delivery persons is unsuccessful delivery attempts due to the non-availability of customers at home (Deutsch, Y. et al., 2018, Kedia, A. et al., 2017). In this case, delivery persons need to repeat delivery attempts. Not only does the time taken per delivery increase but also failure to deliver on the promised date of delivery occurs which affects the quality of service (Mummalaneni, V. et al., 2016). These factors reduce the efficiency of last-mile delivery.

3.5 Last-mile challenge – Environment factor

In the e-tailing business, customers place orders online and in most cases want the delivery at home (Morganti et al., 2014). Nowadays, customers are very demanding and want product delivery as fast as possible. The chance of consolidation of orders at the last-mile is the least. Moreover, kilometres travelled per delivery at the last-mile is high due to poor economies of scale, failure in delivery attempts, and difficulties in finding addresses. Around 92% of CO2 emissions are due to road transport (Anthony A. et al., 2021, Nicolaides et al., 2018). It increases the emission of greenhouse gases. Considering the immense growth in the e-tailing business, it is expected that the number of delivery vehicles for the last-mile may increase by 36% in 2030 as compared to 2019 and greenhouse gas (carbon dioxide - CO2) emissions. due to an increase in last-mile operation, may increase by 31%. Due to the increase in the movement of the number of delivery vehicles for last-mile, it is also expected that the average time to commute in cities may increase by 21% in 2030 as compared to 2019 (Ha. N. T. et al., 2022, report of World Economic Forum January 2020). These have brought impacts on human habitat due to emissions, lack of public space, pollution, noise and congestion (Patella, S.M. et al., 2021. Mucowska, M. 2021). These posit a real challenge to keep the last-mile environment friendly.

3.6 Last-mile sustainability

The concept of sustainability has gained a lot of importance worldwide across many industries. Sustainability can be defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Kiba-Janiak, M. 2021, Aras and Crowther, 2013). In earlier days, sustainability used to be connected with the environment only. However the perspective of sustainability has changed and different authors have come up with different perspectives like environmental sustainability, economic sustainability, and social sustainability.

The concept of sustainability from the perspective of last-mile delivery has gained lots of attention from practising managers and research scholars (Ignat and Chankov, 2020). The economic sustainability of last-mile generally handles three perspectives namely delivery options, cost, and speed (Nguyen et al., 2019). Last-mile delivery’s environmental sustainability mainly handles air pollution, noise pollution, emission of carbon dioxide (greenhouse gases), the printing of invoices on paper, and packaging of the consignment (Patella, S.M. et al., 2021. Mucowska, M. 2021, Freitag and

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Kotzab, 2020, Demir et al., 2015). The social sustainability of last-mile delivery mainly handles two perspectives namely the vehicle drivers' perspective and the general public's perspective. Employment generation, salary, working conditions, and different benefits from the employer are connected with vehicle drivers' perspective of social sustainability. (Ha. N. T. et al., 2022). And from the perspective of the general public, it is often related to a lack of public space, traffic congestion, number of accidents, and an increase in commuting time (Laghaei et al., 2016).

4. Results – current research landscape

This section includes discussions of the results of the review of the literature and the same are explained using graphs and tables also as applicable.

4.1 Distribution by year of publishing

Analysis of the timeline in terms of the year of publishing of 84 articles, which were reviewed in this study, is displayed in Figure 3. In general, there is an increasing trend in the number of articles published on the last-mile of e-tailers. The number of publications in the period 2019 to 2022 is around 78.5% of the total number of publications during the period of study. So, in 57.1% time. 87.5% of the articles were published. It is also observed that there is a huge surge in the number of publications post-pandemic. This indicates a considerable increase in interest among researchers on the last-mile of e-tailers. It is worth considering that this huge growth in interest corresponds to factors like an increase in internet penetration, enhancement of purchasing power of the middle class, increase in awareness of online shopping, worldwide increase in online customer base, the emergence of online business model, availability of a wide range of products online and change in socio-cultural lifestyle of people due to COVID19 pandemic.

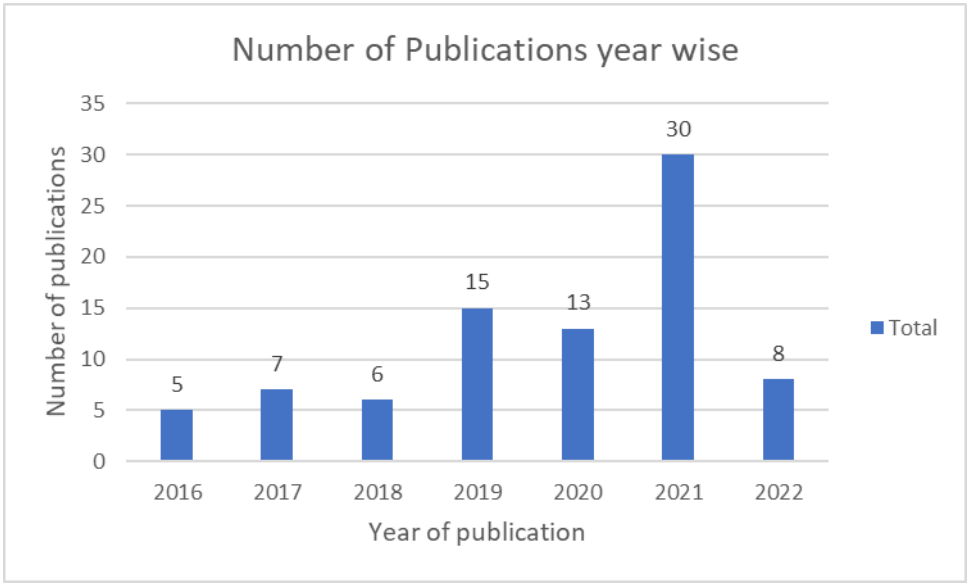

Figure 3. Year-wise distribution of the number of articles on the last-mile of e-tailers.

4.2 Distribution by the source of publishing

The percentage distribution of the number of articles published by eight different publishers is displayed in Figure 4. Out of 84 articles, one article is a conference paper and has not been published in any journal. Science Direct/Elsevier has the maximum share of 47% of the total articles. Science Direct/Elsevier is followed by Taylor and Francis with a 22% share, Emerald Insight with an 18% share and MDPI with a 9% share. This shows the participation of these good quality publishers in the focus area of this study related to the last-mile of e-tailers. The rest of the publishers namely Sage Publication, ResearchGate, Inderscience and Wiley-Blackwell have a 1% share each.

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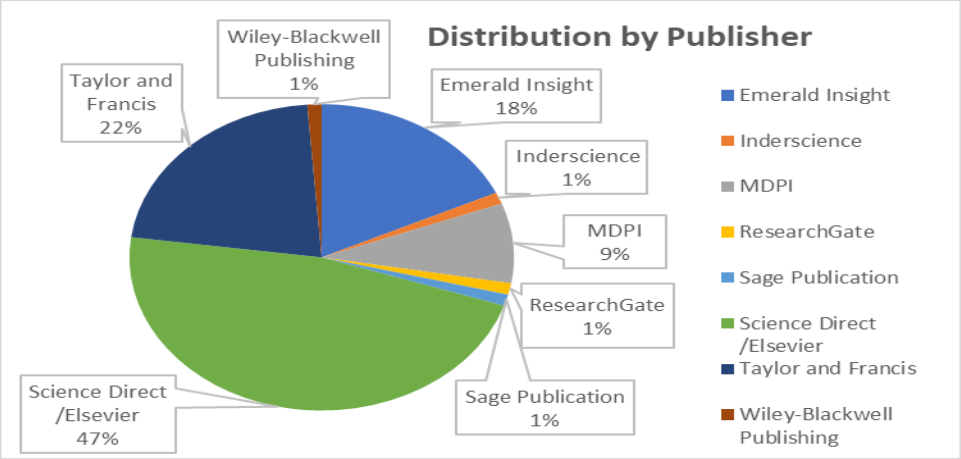

Figure 4. Percentage distribution of the number of articles based on publishers.

4.3 Distribution of focus of study

We need to understand which geographical areas across the world have more focus to study on the last-mile of e-tailers. To understand this focus, 84 articles are categorized in terms of the country in which the studies were performed and the same is displayed in figure 5. Out of 84 articles, 27 articles focused on general rather than focusing on any particular country and this type of article contributes around 32.14% of the total number of studies. The share of articles with no focus on the country of study is maximum. The second highest country of focus is China with a 9.5% share followed by Sweden with a 7.14% share, Germany and the USA with a 6% share each and Norway with a 5% share. Besides the above-mentioned countries, Poland, New Zealand, Italy, Australia, Brazil, Europe, India and Belgium are also the focus of the study of the last-mile of e-tailers. In 2 articles it is mentioned that the study was conducted in Europe and it did not mention any country. In this analysis, Europe is considered as one focus country of study for analysis reporting purposes. The study on last-mile of e-tailers was studied across 23 different countries and all continents. It is observed that larger and more developed economies like the USA, China, Sweden and Germany have more focus. Other countries are also the focus of this study indicating the growing importance of evaluating and understanding the last-mile of e-tailers and the increase of interest in the last-mile.

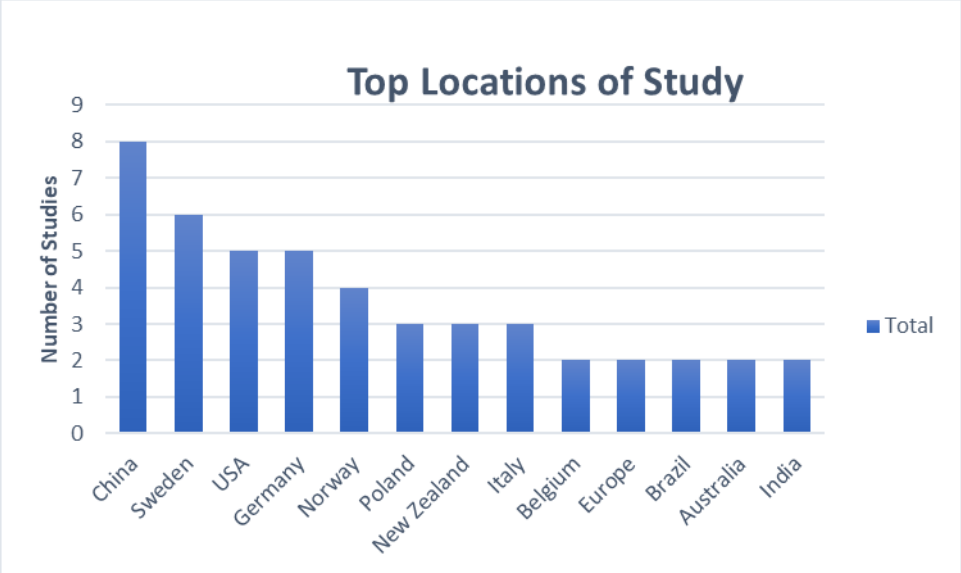

Figure 5. Focus of the study country-wise.

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4.4 Most cited record

The most cited records, among the 84 records, are displayed in Table 3. Records about the number of citations of more than 100 are shown in Table 3. The citation cutoff date was taken as 07.01.2023. The number of citations 452 is at the top of the list. This empirical study focused on last-mile efficiency, was done by authors from Germany and the data for the study was collected through interviews with grocery retail and logistics experts in Europe. Out of these most cited articles, the popular themes are "Alternate place or mode of delivery", "Intention to adopt Alternate place or mode of delivery" and "Last-mile Efficiency". The next popular themes are "Last-mile Sustainability" and "Last-mile Effects". This data indicates the themes of the last-mile of e-tailers in which researchers are showing maximum interest.

Table 3. Most cited records

Title of the study	Authors	Journal	Number of times cited
Last-mile fulfilment and distribution in omni-channel grocery retailing.	Hübner, A. H., Kuhn, H., & Wollenburg, J. (2016)	International Journal of Retail & Distribution Management	452
E-fulfilment and distribution in omni-channel retailing.	Melacini, M., Perotti, S., Rasini, M., & Tappia, E. (2018)	International Journal of Physical Distribution & Logistics Management.	223
Crowdsourcing the last-mile delivery of online orders by exploiting the social networks.	Devari, A., Nikolaev, A. G., & He, Q. (2017)	Transportation Research Part E: Logistics and Transportation Review	211
Scheduling last-mile deliveries with truck-based autonomous robots.	Boysen, N., Schwerdfeger, S., & Weidinger, F. (2018)	European Journal of Operational Research	193
Post-purchase shipping and customer experiences in online shopping and their impact on customer satisfaction.	Cao, Y., Ajjan, H., & Hong, P. (2018)	Asia Pacific Journal of Marketing and Logistics.	190
A parcel locker network as a solution to the logistics last-mile problem.	Deutsch, Y., & Golany, B. (2018)	International Journal of Production Research	188
Innovative solutions to increase last-mile delivery efficiency in B2C e-commerce.	Mangiaracina, R., Perego, A., Seghezzi, A., & Tumino, A. (2019)	International Journal of Physical Distribution & Logistics Management.	188
Online retail experience and customer satisfaction: mediating role of last-mile.	Vakulenko, Y., Shams, P., Hellström, D., & Hjort, K. (2019)	International Review of Retail, Distribution and consumer research	122
Choosing parcel machines in the context of the ecological attitudes of the Y generation consumers purchasing online.	Moroz, M., & Polkowski, Z. (2016)	Transportation Research Procedia	117
The "next day, free delivery": Possibilities for sustainable last-mile transport in an omnichannel	Rai, H. B., Verlinde, S., & Macharis, C. (2018)	International Journal of Retail & Distribution Management	117
What is the right delivery option for you? Consumer preferences for delivery attributes in online retailing.	Nguyen, D. H., De Leeuw, S., Dullaert, W., & Foubert, B. P. (2019)	Journal of Business Logistics	110
The determinants of customers' intention to use smart lockers for last-mile deliveries.	Yuen, K. F., Wang, X., Ma, F., & Wong, Y. D. (2019)	Journal of Retailing and Consumer Services	107

Parcel locker systems in a car dominant city: Location, characterisation and potential impacts on city planning and consumer travel access.	Lachapelle, U., Burke, M., Brotherton, A., & Leung, A. (2018)	Journal of Transport Geography	103

4.5 Distribution of journals by the number of articles published

Table 4 portrays the distribution of leading journals which published research on the last-mile of e-tailing. A total of 84 articles were published across 52 journals. "Transportation research procedia" is leading with 8 publications. "Sustainability" is in second position with 4 publications which are followed by "International Journal of Physical Distribution & Logistics Management", "Sustainable Cities and Society", "International Journal of Logistics Research and Applications" and "Journal of Retailing and Consumer Services" with 3 publications each. Many of these leading journals are under A* / A ratings in the ABDC list. More and more presence of articles on the last-mile of B2C e-tailing in these journals is encouraging. This also indicates that the discipline under this study is given importance by highly qualified business and management journals.

Table 4. Most relevant journals by the number of publications

Name of Journal	Publisher	Number of Publications
Transportation research procedia	Science Direct /Elsevier	8
Sustainability	MDPI	4
International Journal of Physical Distribution & Logistics Management.	Emerald Insight	3
Sustainable Cities and Society	Science Direct /Elsevier	3
International Journal of Logistics Research and Applications	Taylor and Francis	3
Journal of Retailing and Consumer Services	Science Direct /Elsevier	3
International Journal of Production Research	Taylor and Francis	2
Research in transportation economics	Science Direct /Elsevier	2
International Journal of Retail & Distribution Management	Emerald Insight	2
Transport Policy	Science Direct /Elsevier	2
Asia Pacific Journal of Marketing and Logistics.	Emerald Insight	2
Transportation Research Interdisciplinary Perspectives	Science Direct /Elsevier	2
The International Journal of Logistics Management	Emerald Insight	2
Transportation Research Part D: Transport and Environment	Science Direct /Elsevier	2
Research in Transportation Business & Management	Science Direct /Elsevier	2
Transportation Research Part A: Policy and Practice	Science Direct /Elsevier	2
Journal of Transport Geography	Science Direct /Elsevier	2
Logistics	MDPI	2
Transportation Research Part E: Logistics and Transportation Review	Science Direct /Elsevier	2

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4.6 Usage of theory in published articles

The study reveals that in most of the articles, no theoretical lens is used. Figure 6 depicts the usage of theory in articles. No theory is used in 77 articles out of a total of 84 articles which constitutes 92% of all articles on the subject. Only 7 articles applied theory in the research which is a mere share of 8% of 84 reviewed articles. The number of different theories applied is 7. Out of these 7 theories, the only theory which is applied in two articles is the "Unified Acceptance and Use of Technology (UTAUT)" theory. In one article two theories are used namely "Attitude theories and Diffusion of Innovation (DOI) theory". The other theories applied are "Theory of Planned Behaviour (TPB)", "Grounded theory", "Hybrid Biogeography-Based Optimization (HBBO) theory" and "Travel Salesman Problem".

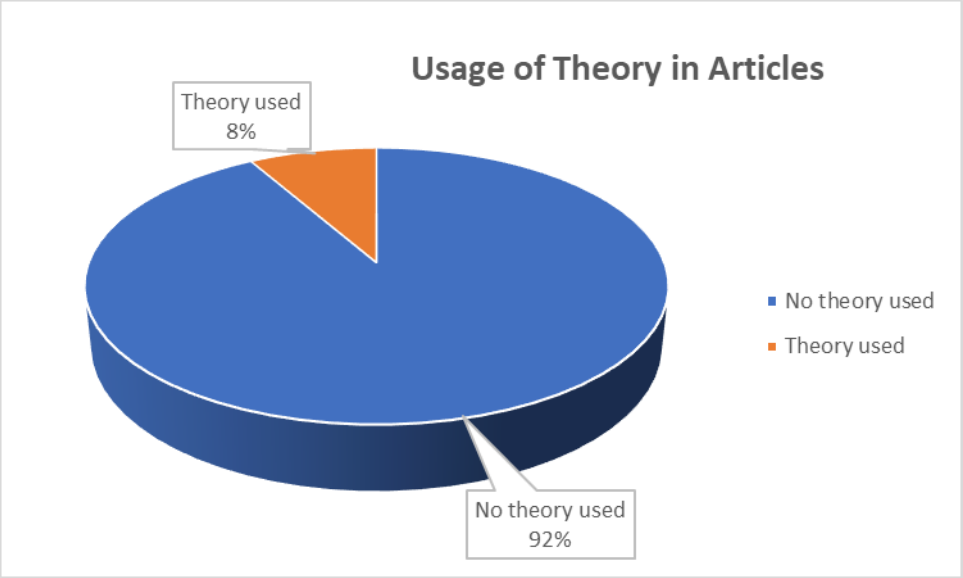

Figure 6. Share of usage of theory in published articles

4.7 Research method

Table 5 demonstrates different research methods adopted in the discipline and the number of articles in which the method is applied. Table 5 shows that the most popular method among researchers is "survey" and as high as 33 articles have adopted only the "survey" method out of a total 84 articles on the last-mile of the B2C e-tailer. Approximately 40% of the total articles adopted only the "survey" method. There is one article in which "interview" is used along with "survey" and in another article "secondary data" is used along with "survey". The other methods used are "Quantitative", "Interview", "Secondary data", "Interview and secondary data", "Interview and Quantitative", "Quantitative and qualitative", "Case Study", "Qualitative" and review of the literature.

The research methods can be described broadly in three modalities of research methodologies namely empirical, review and conceptual (Brozovic 2018). Empirical studies use surveys, experiments, interviews, simulations, case studies and mathematical modelling to assess and evaluate factors and quantify the impact of various aspects on the subject. In review studies, we look back on earlier research, find research gaps and propose prospective future research. In conceptual studies, a framework that is grounded in a concept is created (Dhaigude, S. A., & Mohan, B. C. 2021). 58 articles, which is 69% of all 84 articles, have adopted empirical research methodology. Out of the rest articles, 19% are reviews and 12% are conceptual.

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Table 5. Research methods

Research method adopted	Count of articles
Survey	33
Literature Review	16
Quantitative	10
Interview	10
Secondary data	6
Interview + secondary data	3
Survey + Interview	1
Interview + Quantitative	1
Quantitative and qualitative	1
Survey + secondary data	1
Case Study	1
Qualitative	1

4.8 Country of the corresponding author

Figure 7 demonstrates the country affiliation of the corresponding authors and the number of articles by them. The data shows the maximum number of articles on the subject are published by authors from China and Italy. The authors from China and Italy have published 9 articles each on the discipline. Authors from China and Italy are closely followed by authors from Germany with 8 articles which is further followed by authors from Poland, Sweden, the USA and Australia with 6 articles each. Authors from 25 different countries have published articles on the discipline. Interests are visible on the last-mile of online retailers by authors not only from countries with large economies and large physical sizes but also authors from countries with small economies and small physical sizes like Israel, Estonia, Slovakia and Taiwan.

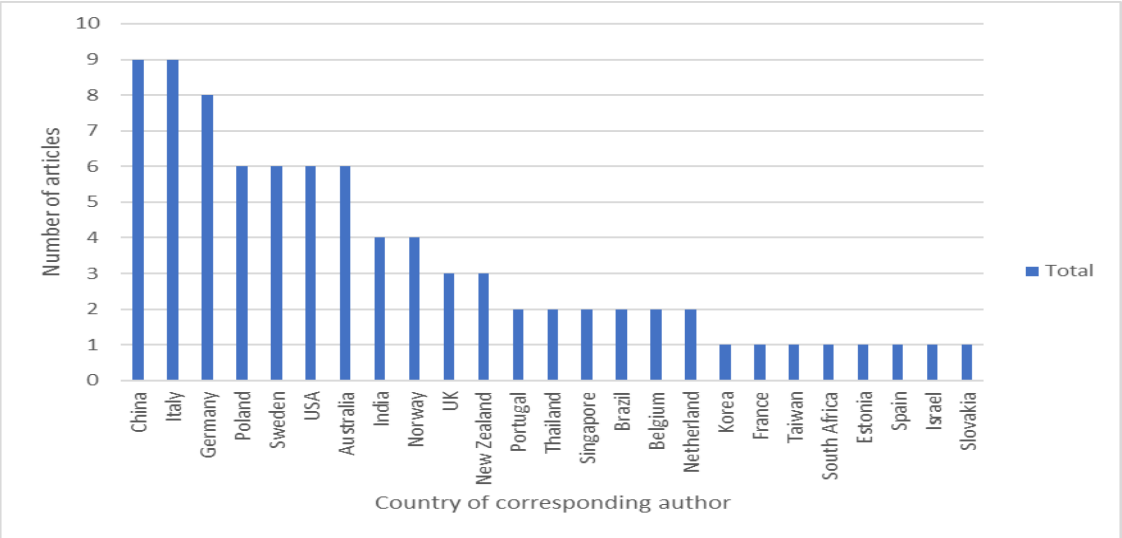

Figure 7. Country of corresponding author and number of articles

4.9 Focus of theme of research

Figure 8 illustrates the main focus of themes of all articles on the last-mile of e-tailer. The analysis shows most popular theme among researchers is “Alternate place or mode of delivery” with 19 articles. Closely followed by “LM (last-mile)

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sustainability" with 18 articles, "LM efficiency" with 16 articles and "Intention to adopt Alternate place or mode of delivery" with 10 articles. These four themes, covering 75% of all articles, give an indication of the popular theme of study by researchers from 2016 to 2022 on the last-mile of the online retailer.

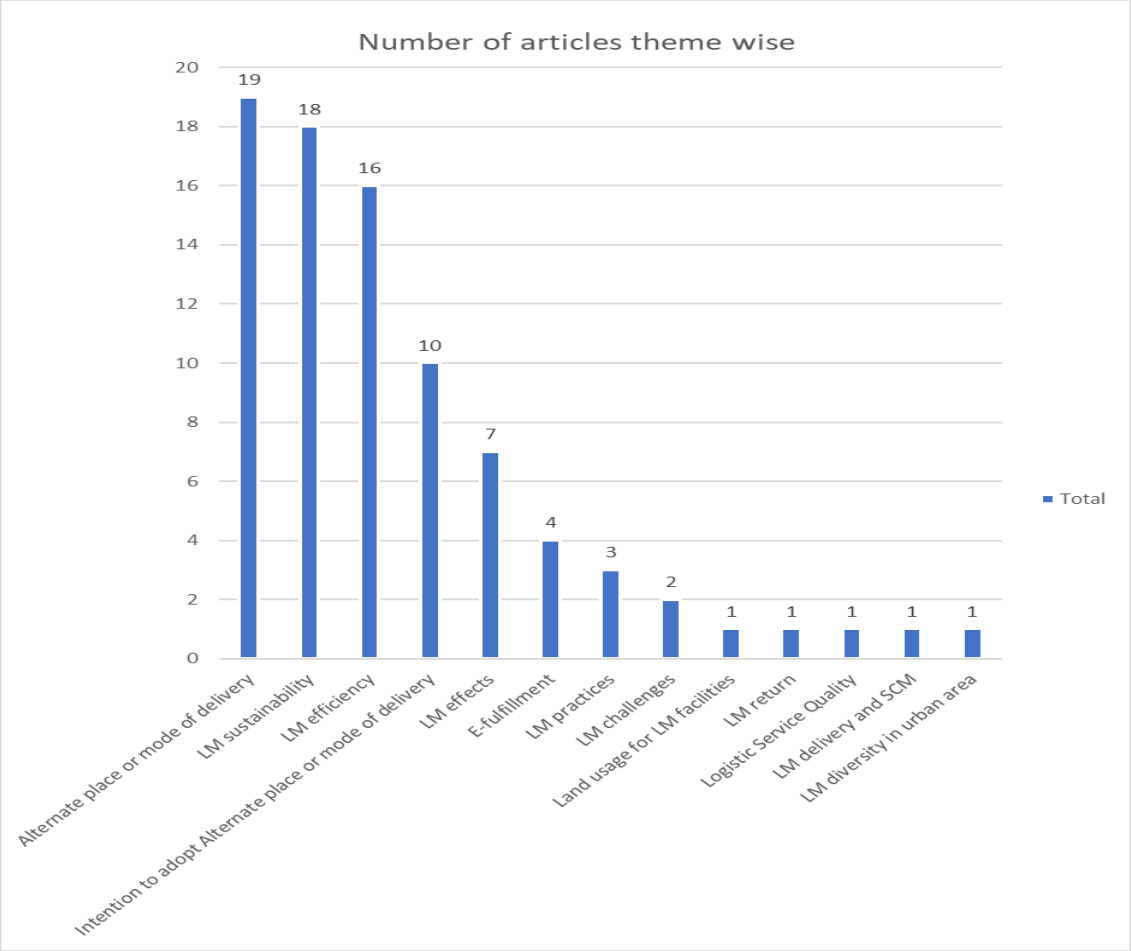

Figure 8. Number of articles under main themes

5. Conceptual framework

As an effect of the gigantic increase in online retailing business in the last few years and the change in the socio-cultural lifestyle post COVID-19 the operation of last-mile delivery has become very complex (Viu-Roig, M. and Alvarez-Palau, E.J. 2020). Nowadays, customers are ordering more and more from online retailers as well as they expect faster doorstep delivery with flexible delivery options. The last-mile delivery service providers are facing lots of challenges which has imposed difficulties to operate (Srivatsa Srinivas and Marathe, 2021). Authors have identified dimensions of last-mile delivery which has an impact on customers, the environment and e-tailer. The dimensions of last-mile identified are: last-mile is the most expensive part of the order fulfilment process, inefficient, responsible for more emission of greenhouse gases, sound pollution, air pollution, availability of less public space (Bjørgen, A. et al., 2021), traffic congestions and customer satisfaction. Given these issues, researchers have tried to offer some solutions. Broadly, researchers have suggested adopting alternate places of delivery like Collection and Delivery Points (CDP), automated parcel lockers, delivery boxes in front of homes, reception boxes, trunk delivery and home access systems (Asdecker, B. 2021) other than conventional home delivery. Along with that, researchers have also suggested adopting alternate modes of delivery like battery-operated last-mile delivery vans, delivery drones, crowd shipping and automated delivery robots. So, the implementation and adoption of alternate arrangements are crucial to mitigate the negative effects of last-mile

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delivery. It is justified by the fact that our literature review reveals that the maximum number of articles are published on the theme "alternate place or mode of delivery". Hence, we propose a framework to address the aspect of "alternate place or mode of delivery" in the literature related to the last-mile delivery of B2C e-tailers.

The two components at the centre of the framework are "alternate place of delivery" and "alternate mode of delivery", as mentioned in Figure 9, which are considered 'alternatives to conventional modes of last-mile delivery'. Within "alternate place of delivery" the components available are Collection and Delivery Point (CDP), automated parcel lockers, delivery boxes in front of the home, reception boxes, trunk delivery and home access systems. And within "alternate mode of delivery" the components available are battery-operated last-mile delivery vans, delivery drones, crowd shipping and automated delivery robots.

Components of "alternate place or mode of delivery" which are suggested to be included in the framework are inefficiency, expensive, customer satisfaction, an increase in greenhouse gas emission and an increase in traffic congestion. Arianna Seghezzi & Riccardo Mangiaracina 2022 have studied the effects of the adoption of crowdsourcing in the last-mile and showed that the last-mile became more efficient and effective. Lai, P. L., (2022) investigated the factors responsible for customer satisfaction and found that the timeliness to receive the parcel at the parcel locker plays the most crucial role in customer satisfaction. Nogueira, G. P. M. et al., 2021 and Prakash Rao et al., 2021 found that most of the customers are very little aware of how delivery options like the speed of delivery can affect the emission of greenhouse gases and the environment. Hagen, T., & Scheel-Kopeinig, S. 2021 studied the cost component of alternate delivery through a central last-mile micro-depot. Swanson, D. 2019 studied the effects of drones in the last-mile on efficiency components. To the best of the knowledge of authors, there are scarce articles dealing with all components related to "alternate place or mode of delivery" in the framework like inefficiency, expenses, customer satisfaction, an increase of greenhouse gas emissions and an increase of traffic congestion.

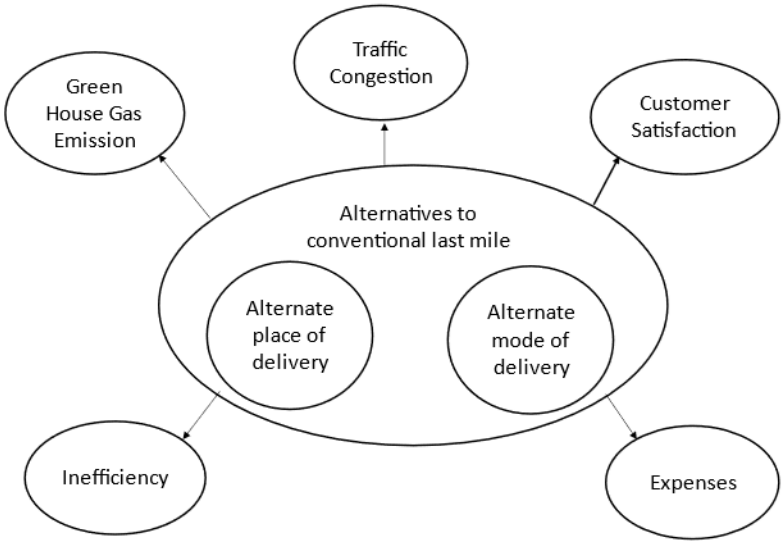

Figure 9. Conceptual framework

6. Discussions and implications

The theme on which the maximum number of articles were published is related to the alternate place of delivery and alternate mode of delivery. Apart from this theme, 3 other themes are very popular among researchers. The other 3 popular themes are "Last-mile sustainability", "Last-mile efficiency" and "Intention to adopt an alternate place or mode of delivery". Our discussions are mainly hinged on these 4 themes. Different authors have indicated that last-mile

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delivery is very costly (Zuopeng Xiao et al., 2017, Amling and Daugherty, 2018, Weiss, C., & Onnen-Weber, U. 2019. Jucha, P., & Corejova, T. 2021), inefficient (Kedia, A. et al., 2020), causes the emission of more greenhouse gases (Moroz, M., & Polkowski, Z. 2016, Caspersen, E. et al., 2021) and causes traffic congestions (Rai, H. B. et al., 2019, Weiss, C., & Onnen-Weber, U. 2019, Bjorgen, A. et al., 2021). Attention and actions on these issues are on priority as the e-tailing business is growing rapidly. The above 4 themes are dealing with all these issues and it is justified that more attention is given to these issues by researchers.

6.1 Alternate place or mode of delivery

This review shows that alternate place of delivery and alternate mode of delivery in the last-mile is recognized by researchers and industry practitioner as one of the most popular themes. Most of the customers of e-tailers want delivery at home. Last-mile delivery by online retailers is not only very costly but also very inefficient. To find the solution to these issues different authors, over the years, suggested adopting an alternate place of delivery. There are suggestions to use Collection and Delivery Points (CDP), automated parcel lockers, delivery boxes in front of homes, reception boxes, trunk delivery and home access systems (Asdecker, B. 2021). Lachapelle, U. et al., (2018) investigated the location of parcel lockers in Australia and suggested developing more parcel lockers in public places like parks, museums and libraries. While in a similar study by Kedia, A. et al., (2020) suggested that the location of parcel lockers should be close to the residential locality which is reachable by customers using an active mode of transport like walking and cycling. Implementation of parcel locker in the last-mile may impact positively online retailers, customers and the environment. Since last-mile experience plays a crucial role in customer satisfaction, it is essential to know the dimensions of parcel locker service that are most crucial for customer satisfaction. Lai, P. L., (2022) investigated the same and found that the timeliness of receiving the parcel at the parcel locker plays the most crucial role in customer satisfaction. Another important dimension of the use of parcel lockers arises in terms of pricing, rather than who is going to pay for the parcel locker. Yu, Y., Lian, F., & Yang, Z. (2021) empirically analyzed and suggested two cases. If the delivery service provider uses a parcel locker for delivery even though the customer is available at home to receive the parcel, the delivery service provider pays for the parcel locker. And if the delivery service provider uses a parcel locker for delivery when the customer is not available at home to receive the parcel, the delivery service provider and customer pay for the parcel locker jointly. The articles discuss aspects like location, effect and pricing for the alternate place of delivery.

Since most of the orders to e-tailers are single order per last-mile delivery, the amount of travel by delivery persons have increased considerably. This increase negatively causes air pollution with more greenhouse gases, traffic congestion, sound pollution and lack of public space. As solutions to these issues with last-mile delivery, authors have come up with innovative solutions and models of last-mile delivery like battery-operated last-mile delivery vans (Ehrler, V. C. et al., 2021), delivery drones, crowd shipping and automated delivery robots. Boysen, N. et al., (2018) studied the scheduling of delivery trucks and launching of delivery robots and argued that the number of delivery trucks can be reduced considerably if automated delivery robots are used in place of conventional delivery mode. Since automated delivery robots are miniature versions of vehicles which is designed to travel through pedestrian pathways and on roads without a driver, regulatory issues may arise. Hoffmann, T., & Prause, G. (2018) argued that usage of these automated delivery robots in last-mile delivery may be uncomfortable for the local municipality using the pedestrian pathways. Further to this, the road transport department needs to formulate regulations in case of any mishap on the road by these delivery robots. It is argued that crowd shipping is a perfect solution to tackle last-mile challenges related to efficiency, cost and effectiveness (Gdowska, K. et al., 2018, Seghezzi, A. et al., 2021, Seghezzi, A., & Mangiaracina, R. 2022). Swanson, D. 2019 studied the effects of drones in the last-mile in the USA and revealed that usage of drones takes less time as compared to traditional delivery by road.

6.2 Last-mile sustainability

Sustainability and its challenges in the perspective of last-mile delivery of online retailers is another popular area of interest for academic researchers and industry practitioners. Sustainability is understood from different perspectives environmental, economic and social. The authors found that there is a lack of awareness and knowledge about sustainability. Nogueira, G. P. M. et al., 2021 and Prakash Rao et al., 2021 found that customers are very little aware of how delivery options like the speed of delivery can affect sustainability. Nogueira, G. P. M. et al., 2021 found that most female customers in Brazil choose more environmentally sustainable delivery options during online shopping. On the

contrary Caspersen, E., & Navrud, S. 2021 found that most of the female customers in Norway have a negative utility of delivery time, greenhouse gas (GHG) emission and pollution. Hence, the authors suggested spreading awareness and knowledge about sustainability and offering environmentally sustainable delivery options to online customers. In this context, Ignat, B., & Chankov, S. 2020 found that customers are more likely to choose environmentally sustainable delivery of social and environmental impacts displayed to customers while choosing delivery options. The effects of the third perspective of sustainability, that is an economic perspective, on customers is also important to check. Rai, H. B. et al., 2018 found that by offering an economic incentive, delivery free of cost, to customers it is more likely that customers are willing to collect parcels on their own or wait longer for the parcel to be delivered which can be considered as a more environmentally sustainable mode of last-mile delivery.

6.3 Last-mile efficiency

Last-mile operation is considered the least efficient part of the whole supply chain of e-tailers. As a consequence of the exponential growth of B2C online retailing, the last-mile operation has also grown drastically. Researchers have come up with different initiatives and innovations to improve efficiency in the last-mile of B2C e-tailers. Our literature review also reveals increasing interest in the efficiency of last-mile among researchers and practitioners. Arianna Seghezzi & Riccardo Mangiaracina 2022 have shown that the adoption of crowdsourcing in the last-mile can make the last-mile more efficient and effective. Crowdsourcing is a last-mile delivery process where a customer carries and delivers parcels of his/her friend or neighbour on the way. Devari, A. et al., 2017 found that 72% of American respondents showed interest in delivering a parcel to their friends. They described the crowdsourcing process as cost-effective, fast, reliable and environment-friendly (less emission of greenhouse gases). Unlike responses from the USA, in a survey among Belgian respondents, only 19.2% showed interest in crowdsourcing (Rai, H. B. et al., 2021). These respondents are frequent online shoppers who prefer door delivery of parcels and rely on neighbours in case of failed door delivery. Probably, cultural differences play an important role in the adoption of crowdsourcing. Since the demand is relatively irregular and demand density is lesser in rural areas, Sousa, R. et al., (2020) suggested some measures to online retailers for efficient last-mile delivery to rural customers. Mainly they suggested adopting a sharing economy mode and collaborating with local entrepreneurs for delivery. The other suggestions to e-tailers are the use of freelance drivers to deliver goods with their cars and the consolidation of orders of rural customers to deliver. Consolidation of orders is not only effective in the rural market but also increases efficiency in the urban market (Zhang, Y. et al., 2019). Boysen, N. et al., (2018) argued that the use of delivery trucks with automated delivery robots can increase the efficiency of last-mile.

6.4 Intention to adopt alternate place or mode of delivery

Increasing interest in alternate places or modes of delivery among researchers is visible. And the researchers have come up with different solutions. The next pertinent and important aspect is related to the adoption of these solutions by e-tailers as well as customers. So, it is obvious that researchers have an increasing interest in the intention to adopt alternate places or modes of delivery. Some researchers have investigated the factors which may influence the decision to use an alternate mode of last-mile delivery like self-service automated parcel lockers. Zhou, M. et al., 2020 reveal that the perceived risk of using self-service automated parcel lockers is one of the factors for indifference to use. The risk is defined in different perspectives like privacy risk, financial risk, time risk and security risk. They found that customers' perceived satisfaction plays the role of mediator and moderator which is a crucial factor for the adoption of self-service parcel lockers. Tsai, Y. T., & Tiwasing, P. 2021 and Yuen, K. F. et al., 2019 have argued factors like convenience, compatibility, privacy, reliability, relative advantage, security and complexity are responsible for the adoption of automated parcel lockers. Merkert, R. et al., 2022 have investigated empirically the adoption criteria for drone delivery. They found that door delivery by postal service is preferred by Australian customers in general. But, depending on the value and size of the parcel, Australian customers are willing to use drone delivery or automated parcel locker also.

6.5 Theoretical implications

The massive growth in e-tailing in recent years has put huge pressure on the last-mile. Due to COVID-19 restrictions, the demand has increased and the pattern of demand is also changed. As a result, the pressure on the last-mile is enhanced further. In line with the current situation, as shown in this review, more researchers have shown interest in the last-mile of B2C e-tailers.

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This literature review presents the latest research on the last-mile of B2C e-tailers. It also contributes valuable insight into existing knowledge on last-mile. The main contribution of the review is directed towards the alternate place and alternate mode of delivery of last-mile of online retailers. Researchers have shown interest in revealing and suggesting alternate places and alternate modes of delivery in place of traditional door delivery in the last-mile given different complications and difficulties due to the increase in last-mile operations. Subsequently, researchers have come up with articles related to a different perspective for the adoption of these alternate arrangements in the last-mile.

Our review has revealed two more important dimensions of last-mile: last-mile efficiency and last-mile sustainability. Sustainability is understood from different perspectives like environmental, economic and social rather than from an environmental perspective only. Thus, it is recommended that we study the area of the alternate place and alternate mode of delivery including its implementation and different aspects of sustainability with a special focus on the social and economic perspective.

6.6 Practical implications

This literature review helps to enrich knowledge and trends about the last-mile of B2C online retailers among practising managers. Discussions of this study are beneficial for practitioners to understand the importance and interconnections of components of last-mile. Since the e-tailing business is growing and so for last-mile operations, different critical aspects of operations are discussed. And to handle different issues related to last-mile operations, innovations in last-mile are also displayed. Implementation of the alternate place of delivery and alternate mode of delivery is inevitable which our review indicates. Focus is required from the practitioner to implement these alternate arrangements. Therefore, this review provides a fresh aspect to the attention of practitioners. The decision-making process of practitioners may have more attention on the implementation and adoption of these alternate last-mile delivery arrangements.

6.7 Social implications

Restrictions imposed due to COVID-19 has changed socio-cultural lifestyle throughout the world. For example, people are more comfortable with contactless transactions and this has become the new normal. As a result, customers' perspectives and expectations related to the last-mile become an important subject to study. Further to this, more delivery trips in the last-mile may affect public space and safety.

7. Conclusions, Limitations and Future Research Directions

7.1 Conclusions

This study presents a systematic review of the literature on last-mile delivery of business-to-customer (B2C) online retailers. Due to the recent increase in online retailing business the subject of "last-mile" has gained more importance for study among researchers and practitioners since 2016. The literature considered in this study was published from 2016 to 2022. The number of articles reviewed in this study is 84 which were published across 52 different journals. The themes which are popular among researchers are identified and are related to "alternate place or mode of delivery", "last-mile sustainability", "last-mile efficiency" and "intention to adopt alternate place or mode of delivery".

Researchers have suggested that the problems and difficulties of last-mile delivery of B2C e-tailers can be solved and mitigated mainly by adopting alternate places of delivery and alternate modes of delivery. As per this review, the maximum number of articles found on these themes indicates increasing interest among researchers. This study examines and reviews the literature and seeks to develop a discussion on the concept of alternate places or modes of delivery in the last-mile. A research framework is proposed on "alternate place of delivery" and "alternate mode of delivery". This literature review suggests studying more articles and performing a continuous evaluation of the proposed framework.

7.2 Limitations

It is acknowledged that this study has some limitations despite diligent efforts put in by the authors. First, this systematic review is on the last-mile of B2C e-tailing and the authors have put their best effort into searching articles accordingly using related keywords. There is a chance that some studies may have been missed out due to the exclusion of similar keywords. Second, this study limits the search of articles through the internet from the following online databases: Emerald Insight, Taylor and Francis, Science Direct/Elsevier, MDPI, Research Gate, Inderscience and Google Scholar. Third, the focus of this study is limited to articles published from 2016 to 2022. Fourth, this study excludes academic

sources like books and book chapters and possibly may have excluded some relevant academic materials. Fifth, this study includes articles published in the English language only.

7.3 Future Research Directions

Last-mile of B2C e-tailer is a new field of study. The majority of the articles studied were published in developed countries. The challenges pertinent to the subject apply to developing countries also. It is suggested to perform studies on the last-mile in both developing as well as developed economies anticipating the growth of e-tailing business across all countries. After a comprehensive study of the literature, some future scopes of research are proposed as below:

(1) Future work should cover the adoption of an alternate mode of delivery, like drone and automated delivery robot, in the last-mile and related effects. Similarly, the adoption of alternate places of delivery can be taken up for study.

(2) Future work should cover the effects of an alternate mode of delivery on the satisfaction of online customers which can be an interesting study. A similar study can also be done for the alternate place of delivery.

(3) Future emphasis on factors responsible for the adoption of an alternate mode of delivery is recommended. More attention to study in developing economies is suggested.

(4) Future studies should cover the social and economic perspective of sustainability related to the last-mile of B2C online retailing.

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Declaration of Competing Interest
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT author statement
Pradipta Ray: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing.
Arun Kumar Paul: Methodology, Formal analysis, Supervision, Writing – review & editing.

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