logistics

MDPI

Review

Toward Greening City Logistics: A Systematic Review on Corporate Governance and Social Responsibility in Managing Urban Distribution Centers

Bahareh Mansouri [1,2], Subhasmita Sahu [1] and M. Ali Ülkü [2,3,*]

[1] Sobey School of Business, Saint Mary's University, Halifax, NS B3H 3C2, Canada
[2] CRSSCA-Centre for Research in Sustainable Supply Chain Analytics, Dalhousie University, Halifax, NS B3H 4R2, Canada
[3] Rowe School of Business, Faculty of Management, Dalhousie University, Halifax, NS B3H 4R2, Canada
* Correspondence: ulku@dal.ca

Abstract: *Background:* The ramifications of climate change are rampant: All stakeholders must act effectively and swiftly. Unsustainable and increased urbanization adds additional strain on combatting environmental degradation. Since the last decade, urban distribution centers (UDCs) have emerged in response to the steep rise in urban freight transportation and its negative impact on city congestion and air quality. *Methods:* In this paper, we conduct a comprehensive review of the performance of UDCs and investigate its alignment with the corporate governance (CG) and corporate social responsibility (CSR) initiatives, including the shareholders' governance strategies and policies, as well as environmental, social, and economic measures. Our systematic literature review consists of multiple phases: In the first one, we utilize bibliometric tools to implement a quantitative analysis of the extant literature. Next, a cluster-based network analysis complements this analysis to describe the evolution of research in this area. *Results*: Our descriptive analysis categorizes existing research on UDCs based on CG- and CSR-compliant themes. We classify pertinent peer-reviewed articles into topical clusters and offer research opportunities related to improving the performance of UDCs. *Conclusions:* This study aims to stimulate further scholarly inquiry into sustainable city logistics and provides a knowledge-based guide for academicians and practitioners, logistics service providers, policymakers, and customers.

Keywords: logistics service; sustainability; freight transportation; urban distribution center; consolidation; last-mile delivery; social responsibility; corporate governance; bibliometric analysis

Citation: Mansouri, B.; Sahu, S.; Ülkü, M.A. Toward Greening City Logistics: A Systematic Review on Corporate Governance and Social Responsibility in Managing Urban Distribution Centers. *Logistics* **2023**, *7*, 19. https://doi.org/10.3390/logistics7010019

Academic Editor: Robert Handfield

Received: 1 December 2022
Revised: 14 March 2023
Accepted: 15 March 2023
Published: 21 March 2023

1. Introduction

By 2050, 68% of the world's population will reside in cities, according to the United Nations [1]. Urban freight transportation plays a crucial role in the development of big cities and impacts how well people's quality of life is supported. Additionally, it promotes logistics competitiveness and supports commercial and industrial activity conservation and maintenance. However, adverse transportation side effects impact social, economic, and environmental measures. This problem worsens when it comes to heavy cargo. Their operational characteristics (such as speed and agility) and physical qualities (such as length and size) hurt their neighboring traffic. They are generally diesel-powered, so they have more detrimental environmental effects, such as increased air and noise pollution [2]. The problem with the big freight vehicles in urban areas is made even worse by traffic congestion. Heavy freight vehicles typically tend to generate more traffic congestion than smaller vehicles. Heavy trucks in the United States consumed nearly 20% of additional fuel in 2020 because of traffic congestion [3].

The growth of retailing, initially in conventional brick-and-mortar stores and, more recently, via the internet, has been driven by the rampant consumption of commodities

and the increased desire for convenience in shopping. E-commerce allows products to be bought anywhere in the digital world and then delivered to the final user, typically in a city, after travelling across the globe. Since 1993, this sector has experienced tremendous growth and is now generally acknowledged as a standard method for conducting business [4]. Approximately 300% more money was spent online between 2014 and 2019. Internet sales increased from 8% in 2012 to 20% of all retail sales in 2021, according to data from the United States [5]. In addition, the COVID-19 pandemic and the sanitary crisis further contributed to the rapid growth of e-commerce. According to a recent McKinsey survey conducted in the US, 30% of respondents said they switched from purchasing in-store to online shopping because of the pandemic [6].

The last mile of the products' shipment is known to be the most challenging of all with respect to several factors, such as cost, efficiency, and emissions [7]. By 2030, the global demand for last-mile delivery is anticipated to increase by 78%, leading to a 36% increase in the number of delivery vehicles in 100 cities [8]. It is predicted that by 2030, last-mile deliveries will increase congestion by 21% and emissions by 36% [9,10]. This phenomenon has led to tremendous negative environmental impacts, specifically in the urban areas where most of the population is concentrated. City logistics has been striving to discover environmentally friendly solutions that would lessen traffic jams and other negative consequences that freight transportation has on the environment. Several strategies exist to tackle this issue, including the use of freight consolidation facilities [11], bento box solutions (i.e., pack stations) [12], last-mile deliveries with electric vehicles [13], and delivery during off-peak hours [6,14,15].

Urban consolidation centers (UCCs), also referred to as urban distribution (or delivery) centers (UDC), are responsible for streamlining the infrastructure, business processes, and services that connect the interurban and urban supply chain sectors. Before being sent for last-mile distribution, intercity freight is consolidated and sorted in UDCs. This process eliminates the need for trucks to transport component loads into metropolitan areas. Instead, smaller and more environmentally friendly vehicles with high load-utilization rates would handle the last-mile deliveries. Therefore, using UDCs can improve the effectiveness of the distribution system and ease social and environmental burdens associated with urban freight [16]. The public and supply chain participants gain from UDCs despite the expenditures connected with their creation and management [17]. In a study by Navarro et al. [18], the authors discuss that the costs associated with the UDC operations (in Sao Paulo, Brazil) are justified by the socio-economic, environmental, and financial advantages, such as improved operations, lower greenhouse gas (GHG) emissions, lower hospitalization and premature mortality costs, related to exposure to local pollutants.

A UDC facility location is a crucial aspect that affects its success. The search for the best place for facility building is the focus of UDC's position, commonly known as the "location dilemma." It is a decision-making issue with substantial interrelationships between the affected region and socio-economic, business, environmental, safety, and transportation ramifications. There are two ways to consider the locations of the UDCs: (1) close to the urban population, which is economically advantageous but will cost a lot in terms of increased traffic and air pollution; or (2) far from the urban population, which is advantageous in terms of reducing traffic and air pollution but becomes costly in terms of distribution and transportation costs and longer distance travelled. Due to the size and complexity of large cities and urban areas, choosing a UDC location necessitates a thorough analysis of all environmental, demographic, social, and economic factors. These factors include accessibility, security, connectivity to multimodal transport, costs, environmental impact, proximity to customers and suppliers, resource availability, compliance with sustainable freight regulations, and the likelihood of natural disasters. The potential places are identified based on the evaluation of the parameters. Next, key decision-makers and stakeholders take part in rating each of these suggested places. The total scores are computed in most cases, and the UDC location with the highest score is chosen. Sensitivity analyses are helpful in establishing how criteria weights affect the decision-making process.

Assessments of a variety of location-allocation strategies permit logistics firms to construct new distribution facilities while considering the sustainable freight specifications supplied by city governments for planning last-mile deliveries [19].

The realized and conceptual benefits of UDCs align well with the corporate governance (CG) and corporate social responsibility (CSR) initiatives. The growing popularity of responsible operations and conscious consumerism, as well as the enforced governments' policies on restricting carbon footprints (such as enforcing a carbon tax and emission trading system), has put significant pressure on companies to be more transparent about how they measure and manage environmental, social, economic, and governance-related risks and opportunities. UDCs' core premise on promoting sustainable urban freight transport well-positions them as a long-term winning solution that contributes to the complex challenge of fighting climate changes in urban areas and decarbonizing the freight transport market. In this paper, we closely review the literature on UDCs that contribute to various aspects of CG and CSR and follow our discussion by identifying gaps and proposing future research agendas.

The layout of this paper is as follows: we describe our research focus and methodology in Section 2; Sections 3 and 4 discuss our findings from our bibliometric and network analysis of the extant literature; then, in Section 5, we survey the pertinent literature under themed rubrics; and finally, in Section 6, we conclude and offer several potential research venues.

2. Research Focus and Methodology

The objective of this study is to evaluate the performance of UDCs through the lenses of corporate governance (CG) and social responsibility (CSR). We perform an extensive descriptive analysis that guides us through identifying the most impactful research studies established on the foundation of corporate governance, as well as environmental, social, and economic benefits. Specifically, we study the literature that underscores fundamental concepts on:

(i) the stakeholders' collaboration, decision-making, policymaking, contribution, and perception;
(ii) socio-environmental impacts of the decisions made, policies created, last-mile logistics plans, location selection, and performance evaluation
(iii) economic benefits of various methodologies used to identify the UDC location;
(iv) a balanced holistic overview of all items discussed above.

The methodology adopted is a systematic literature review (SLR) of relevant peer-reviewed papers to understand trends and detect gaps in scientific literature. Our SLR approach consists of three main components: bibliometric analysis, network analysis, and the classification of literature and content analysis. We include keywords to search for articles around urban freight transport with green solutions and their location determination studies to be relevant to our research. Synonymous terms such as, "consolidation centers", "city distribution center", and "Freight consolidation center" have been included. To ensure the quality of the selected papers and support consistency between themes and sources, we confined our work to peer-reviewed articles. Figure 1 illustrates the flowchart of operations followed in a systematic way for the purpose of conducting research on our topic of interest.

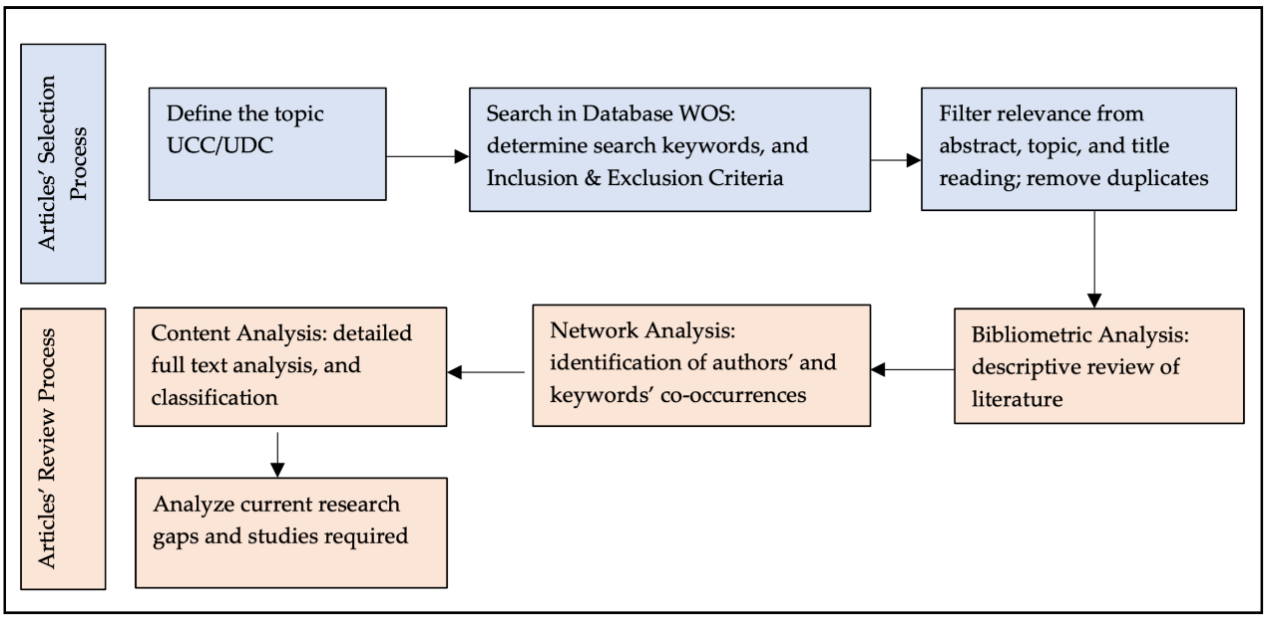

Figure 1. Systematic literature review: general processing steps.

3. Bibliometric Analysis

We initiated our study of the UDCs by conducting a bibliometric literature analysis. Bibliometric analysis is a scientific approach of software-assisted review that can pinpoint critical features of publications (including authors, affiliations, year of publication, publisher, etc.) relevant to a particular topic or field. This employs statistical and mathematical analysis techniques that enable the collection of trustworthy quality indicators. As a result, data on the number of documents published by an organization or a nation, research teams, or people with the highest scientific production may be found. In recent years, bibliometric analysis has become incredibly popular in business research. Bibliometric tools (e.g., Gephi, Leximancer, and VOS viewer), scholarly databases (e.g., Scopus and Web of Science), as well as the cross-disciplinary pollination of the bibliometric methodology (from information science to business research), contribute to the popularity of this approach [7]. We use Web of Science (WOS), a trusted publisher-independent citation database. In Table 1 we show keywords selected as "inclusion criteria" within the abstract, topic, and title of the research papers. This search returns 112 items.

Table 1. Keywords used for bibliometric analysis.

Inclusion Criteria	Description
Keywords	"Urban delivery center", "Urban consolidation center", "Freight consolidation center", "City distribution center"
Web of Science Categories	Urban Studies, Green Sustainable Science Technology, Operations Research Management Science, Transportation Science Technology, Transportation, Management, Economics
Language	English
Document Types	Peer-reviewed Articles
Time Interval	All times (1978–2022)

In our bibliometric analysis, we include various terminologies used to refer to urban distribution centers. In what follows, we discuss reviewed papers with respect to top-publishing authors, years, countries, affiliations, publication titles, and publishers. We set our baseline to identifying the top 10 in each category; however, we exceed this count on a

case-by-case basis, whenever we deem truncation to the top 10 does not fully represent a fair demonstration of the results.

3.1. Publication Years

The study of urban freight consolidation first appeared in the literature in 1978 and 1979. Both studies were pursued in the USA at the University of Texas, Austin, and the University of Tennessee. However, following the initial studies, UDCs did not attract any attention in the literature for two decades. In the noughties, the study of urban consolidation started gaining attention again and four papers were published during this decade. In the early 2010s, this topic started gaining momentum with a hike in the annual publication rate in 2017. Given that 10 out of 11 papers published this year originated in Europe, a possible explanation for this sudden incline could be the European countries' strong support of the suitability initiatives proposed in the Paris Agreement in 2015 that entered into force in November 2016. In 2020, we observe a sudden decline in publication rates which can be explained due to the COVID-19 pandemic disruptions. Nonetheless, this decline is mostly recovered during the subsequent years 2021 and 2022. In Figure 2, we illustrate the publication timeline in the study of UDCs.

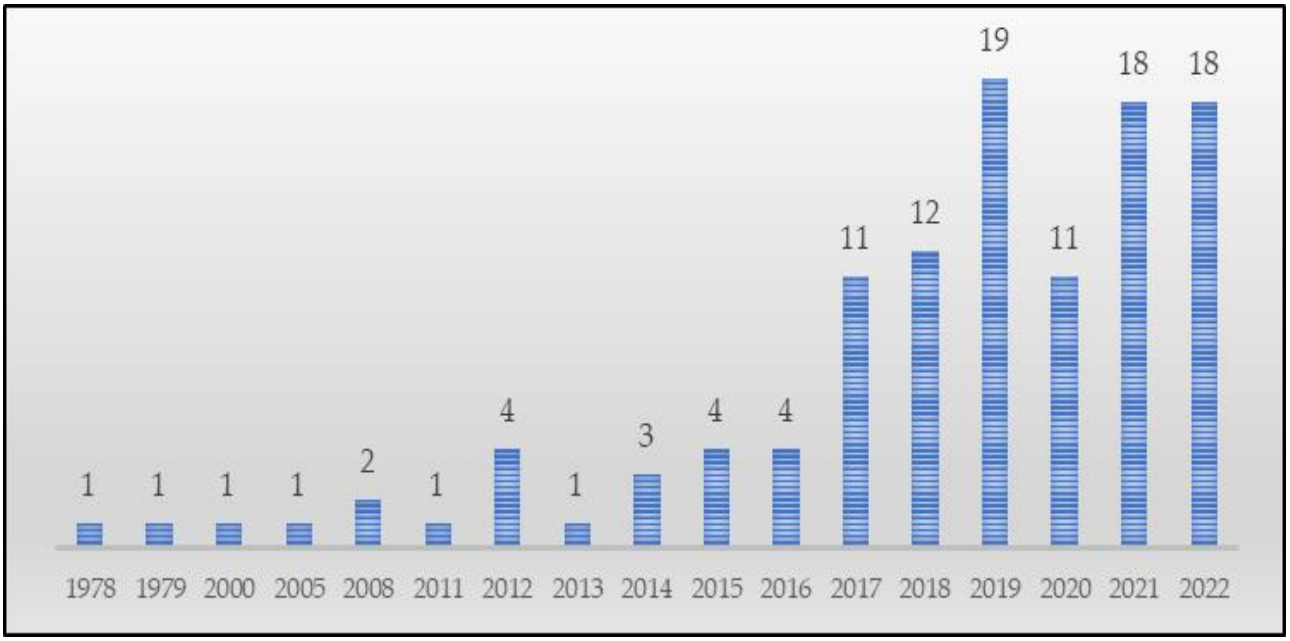

Figure 2. Record count of annual publication rate.

3.2. Top-Publishing Authors

Next, we aim to identify the top 10 publishing authors. We recognize in total 298 authors publishing in this area and list the top ones in Table 2. The number of articles to which the top-publishing authors contribute is within the same range, with the top four authors contributing to four and the remaining seven contributing to three publications. Given that the subsequent seven authors each contribute to the same number of articles, we list the top eleven publishing authors. In Table 3, we also present the institution to which each author is affiliated as well as the country in which the affiliation is located. It is apparent that the authors affiliated with European institutions have made outstanding contributions in this area. Almost half of the top-producing authors (six out of eleven) are affiliated with Europe. This count is, respectively three, one, and one for authors affiliated with Asian, South American, and Australian institutions. Note that we refrain from summing up the record counts associated with countries in one continent to avoid multi-counting some articles that are written by co-authors from different countries.

Table 2. Top-publishing authors out of 298 papers.

	Author	Record Count
1	Björklund M (Linköping University-Sweden)	4
2	Browne M (University of Westminster-England)	4
3	Tavasszy L (Delft University of Technology-Netherlands)	4
4	Vieira JGV (Universidade Federal de São Carlos-Brazil)	4
5	Aljohani K (University of Jeddah-Saudi Arabia)	3
6	Gonzalez-feliu J (Université de Lyon-France)	3
7	Janjevic M (Université Libre de Bruxelles, Belgium)	3
8	Johansson H (Linköping University-Sweden)	3
9	Qureshi AG (Kyoto University-Japan)	3
10	Taniguchi E (Kyoto University-Japan)	3
11	Thompson, RG (The University of Melbourne-Australia)	3

Table 3. Top affiliations out of 168 papers.

	Affiliation	Record Count
1	Centre national de la recherche scientifique (CNRS) (France)	5
2	Delft University of Technology (Netherlands)	5
3	Indian Institutes of Technology (India)	4
4	Udice French Research Universities (France)	4
5	Universidade Federal de São Carlos (Brazil)	4
6	University of Gothenburg (Sweden)	4
7	Kyoto University (Japan)	3
8	Linköping University (Sweden)	3
9	Rensselaer Polytechnic Institute (USA)	3
10	Universitat Politècnica de Catalunya (Spain)	3
11	Universite Libre De Bruxelles (Belgium)	3
12	University of Melbourne (Australia)	3
13	University of Southampton (England)	3
14	University of Twente (Netherlands)	3
15	University of Westminster (England)	3

3.3. Top-Publishing Affiliations

In Table 3, we recognize the top-publishing affiliations, from a total of 168, along with the country they are located in. We keep the top fifteen in this list since the last nine affiliations have the same count of publications. Consistent with our results on the most contributing authors, we discern 10 European affiliations on the top 15 list, reflecting their significant contribution to this field of knowledge. The count of top contributing affiliations is two in Asia and one in each of the continents North America, South America, Asia, and Australia.

3.4. Top-Publishing Countries

In Table 4, we study research trends based on the countries the co-authors are associated with to gain insight into the demographics of relevant research activities. We identify 36 countries and list the top 15 in Table 4. Only the last five entries in this table represent countries located in Asia and Australia, each with a count of four contributions; therefore, we include them in Table 4 for an inclusive representation of record counts across the globe.

Interestingly, although the USA does not appear in the list of top-contributing authors and we only spot one American institution in the list of top-contributing affiliations, it transcends all the other countries in the total number of articles generated. This implies that relevant research in UDCs conducted in the USA is decentralized, i.e., it is not central to one (or a few) author(s) or affiliation(s). Italy, with the second-highest count of articles, follows a similar analogy. Nevertheless, there are countries where the majority (or even all) of the total count of publications in the area of UDCs is designated to a few author(s) or affiliation(s). For instance, while the total record count in India is four, the record count of the Indian Institutes of Technology is also four, which suggests that research is strongly centralized to one affiliation in the country. Consistent with our results from previous subsections, we observe significant contributions by the European countries; nearly half of the countries recognized on this list are European (seven out of fifteen).

Table 4. Top-publishing countries out of 36.

	Country	Record Count
1	USA	16
2	Italy	13
3	France	11
4	Netherlands	11
5	England	10
6	Sweden	10
7	Spain	8
8	Belgium	5
9	Brazil	5
10	Canada	5
11	Australia	4
12	Colombia	4
13	India	4
14	Indonesia	4
15	Japan	4

Reasons that contribute to extensive research conducted in European countries include having: (1) highly developed urban areas and urban freight transport, (2) increased purchase power, (3) internet access triggering augmented e-commerce, (4) road transport limitations proportional to urban area size (road transportation in Europe accounts for on average of almost 76% of all inland freight transport between the years 2010 and 2018), and last but not least, (5) highly incentivizing sustainability initiatives compliance and commitment following the Paris Agreement as explained in Section 3.1.

3.5. Publication Titles

We recognize 56 publication titles (journals) and illustrate the top 12 in Table 5. We include two additional entries (entry 11 and entry 12) as they have the same record count as the tenth journal on the list. We represent the record count and record percentage to, respectively, capture the number of and the percentage of papers published per publication title. Finally, we report the journals' publishers and their 2021 SCImago Journal Rank (SJR). JSR indicator is a measure of the prestige of scholarly journals that accounts for both the number of citations received by a journal and the reputation of those journals. The average SJR rank of the top 12 publication titles is 1.35.

Table 5. Top-publishing journals out of 56.

	Publication Titles	Record Count	Record %	Publisher	JSR Rank (2021)
1	Sustainability	9	8.036	MDPI	0.664
2	Research in Transportation Economics	8	7.143	Elsevier	0.759
3	Transportation Research Record	7	6.25	SAGE	0.0575
4	Transportation Research-Part E	6	5.357	Elsevier	2.835
5	Transport	5	4.464	Taylor & Francis	0.461
6	Transportation Research-Part A	5	4.464	Elsevier	2.228
7	Case Studies on Transport Policy	4	3.571	Elsevier	0.776
8	Transport Policy	4	3.571	Elsevier	1.732
9	Transportation Science	4	3.571	INFORMS	2.81
10	Journal of Transport Geography	3	2.679	Elsevier	1.854
11	Networks Spatial Economics	3	2.679	Springer	1.077
12	Research in Transportation Business and Management	3	2.679	Elsevier	0.934

3.6. Publishers

We recognize 27 publishers and illustrate the top 12 in Table 6. Similar to publishing titles, we report on two additional entries as they have the same record count as the tenth publisher. We represent the record count and record percentage to, respectively, capture the number of and the share of papers published by each publisher. With a record count of 41 articles, which accounts for more than a third (36.6%) of all published articles, Elsevier surpasses the other publishers. It is noteworthy to mention that Elsevier is ranked four in Table 5 where we identify the publishers associated with the top producing journals, insinuating that this publisher is not reliant on one (or a few) journals, but rather their large count of contributions originates from publication in the multiple numbers of their journals. In Table 5, it is observed that half of the listed journals (six out of twelve) are published by Elsevier. In fact, Elsevier is the third largest publisher (with respect to the number of journals), following Springer and Taylor and Francis Group [20]. All three publishers emerge in Table 6. Other publishers in Table 6 that are included in the world's top 100 largest publishers as outlined in [20] are SAGE (in rank 5), IEEE (in rank 18), and MDPI (in rank 15).

Table 6. Top publishing publishers out of 27.

	Publishers	Record Count	Record %
1	Elsevier	41	36.607
2	MDPI	13	11.607
3	Taylor and Francis	10	8.929
4	Springer Nature	8	7.143
5	Vilnius Gediminas Tech Univ	5	4.464
6	Emerald Group Publishing	4	3.571
7	Informs	4	3.571
8	SAGE	4	3.571
9	IEEE	2	1.786
10	OmniaScience	2	1.786
11	TRB National Research Council	2	1.786
12	ISTIEE	2	1.786

4. Cluster Analysis for Authorships and Keywords

To perform co-authorship and keywords analysis, we use VOS viewer, one of the most effective tools that helps draw useful bibliometric network illustrations. It enables the construction and visualization of co-occurrence networks of significant keywords taken from scientific literature using text mining as an exclusive feature.

We first study co-authorship to show cooperation between academics. This tool helps to construct a network among co-authors by checking the authors' number of publications and where they work together. Association by stronger authors is visualized by the number of co-authored articles. A filter criterion of at least 35 citations has been applied here for the authors. A complete counting method is applied to the network analysis to count the total number of authors' appearances in all papers. As the next step, we implement re-ordering with normalization and strength association, resulting in three clusters of A, B, and C, as illustrated in Figure 3.

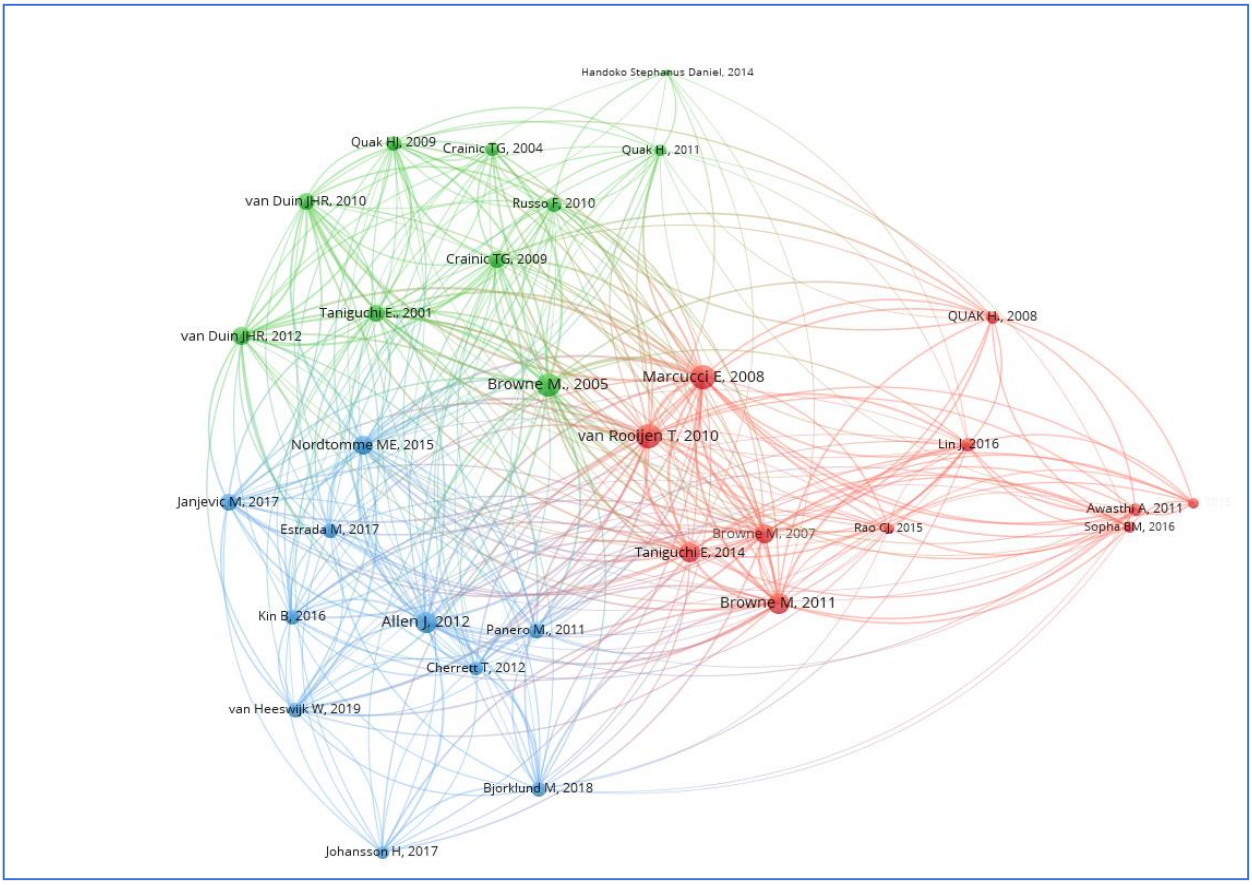

Figure 3. Network analysis of the co-occurrence of highly cited authors.

Cluster A (red-colored network) in Figure 3 mainly focuses on UDCs. It underlines research by renowned authors who have written multiple articles and co-occurred together various times. All the authors' names (such as Awasthi, Browne, and Taniguchi) have numerous studies on UDCs around various topics such as sustainability, developing models to measure the impact of UDC, and economic contributions. Cluster B (green-colored network) detects the co-occurrence of authors who reflect more on urban transport, optimizing city logistics, and freight transport. Authors such as Crainic, Taniguchi, and Browne are clustered together. Here, UDC has been discussed as a feasible solution for solving city transport issues. In Cluster C (blue-colored network), the co-occurrence of authors mainly stems from conducting research around critical factors that impact the

UDC or urban freight transport. "Cost" and "policy barriers" are examples of significant elements that can contribute to the overall success of UDCs.

In the second phase of our network analysis, we performed a co-occurrence analysis on the keywords of the studied articles. Similar to the authors' analysis above, we conducted a full counting method of the keywords' appearances in the articles and then applied a filter criterion of at least 50 citations. Duplicates and ambiguous keywords have been removed for better visibility as in Figure 4. Strongly associated nodes are positioned closer together, whereas weakly associated nodes are positioned farther apart. We identify four clusters, A, B, C, and D, as illustrated in Figure 4.

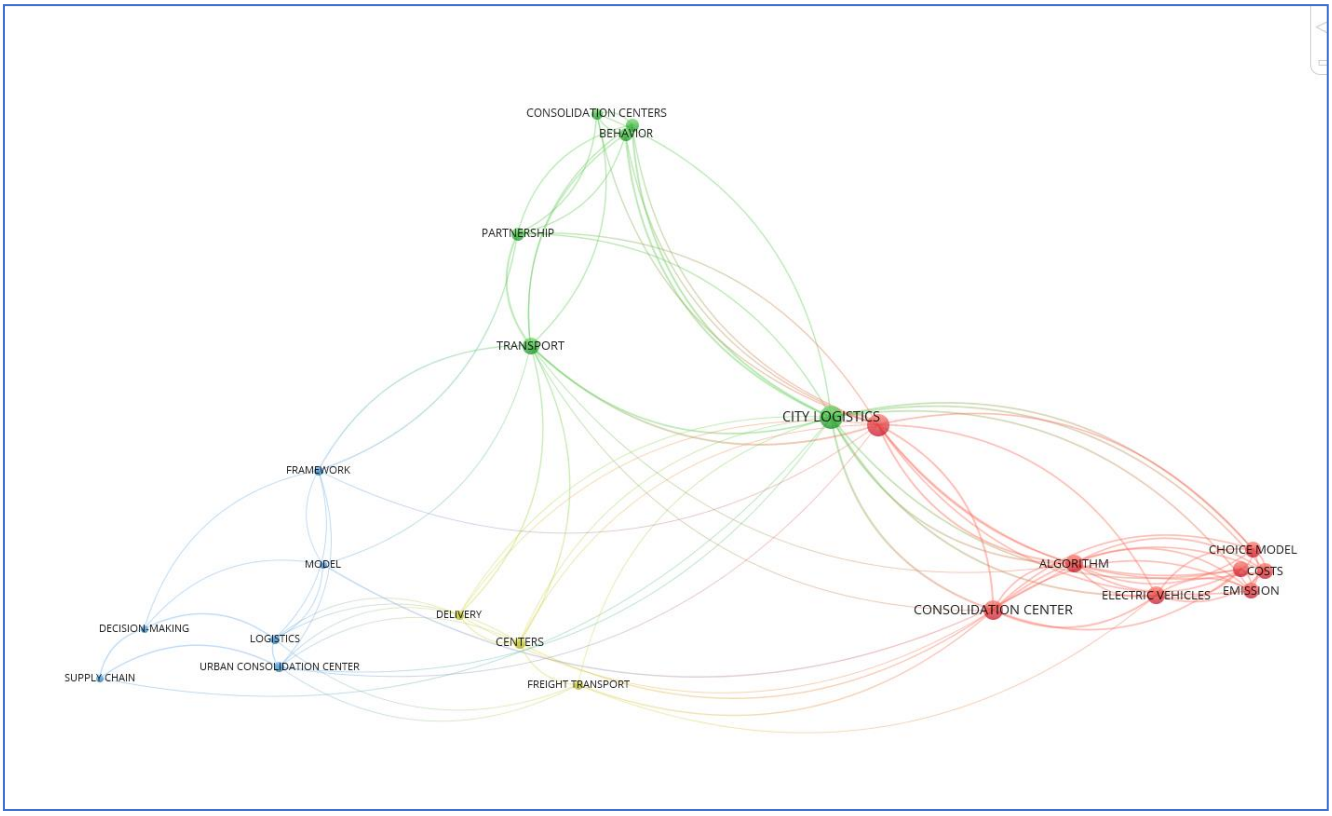

Figure 4. Network analysis of co-occurrence of highly cited keywords.

Cluster A (red-colored network) in Figure 4 is the largest cluster with the close association and co-occurrence of keywords between various models around consolidation centers and various algorithms used to maximize the impact of UDCs in terms of sustainability. Cluster B (green-colored network) is a keyword association around stakeholder analysis and speaks about stakeholders' behavior and response to UDCs within the contexts of city logistics and partnerships, such as receiver-carrier. Cluster C (blue-colored network) is mostly around optimizing freight, strengthening the incorporation of the handling process into the supply chain, and reducing operating costs. Cluster D (yellow-colored network) provides an overview of where UDCs can be sited considering a variety of socio-environmental, economic, and governance initiatives.

The study of keyword co-occurrences in Figure 4 reveals that the clusters created cover prominent topics in governance and corporate social responsibility. More specifically, Cluster A explains issues in socio-environmental and compliance with sustainability initiatives. The wide range of topics concerning stakeholders in Cluster B overlays governance. Cluster C explains economic benefits. Finally, Cluster D includes articles that present a holistic point of view. With that understanding, we further exclude areas that are not central to

this study in the WOS search and focus our attention on the 80 most relevant publications. Section 5 explains our classification of the literature and paper included in each class.

5. Literature Classification Regarding Corporate Social Responsibility and Governance

Based on the knowledge we obtain from our descriptive bibliometric analysis and cluster analysis, we conduct an in-depth literature review of some of the most impactful research articles in the area. We organize this study by classifying the literature into four categories consistent with the four clusters observed in our keywords cluster analysis. The categories encompass key pillars in Corporate Governance (CG) and Corporate Social Responsibilities (CSR), including governance, social, environmental, and economic impacts. In the literature, the social and environmental impacts of UDC facilities and operations are closely interrelated in that mitigating negative environmental impacts and city congestions leads to a higher quality of life and improved health conditions for urban citizens, which is considered the social benefit of incorporating UDCs into urban freight planning. Therefore, we combine the two categories into a single one entitled, Socio-Environmental. Each category includes dominant research themes as subcategories. This group's last category includes articles presenting a holistic overview that meets both CG and CSR initiatives. We structure this section by outlining the categories, subcategories, and papers covered in Table 7. We then explain each category in a subsection constructed with an identical name as the corresponding category.

Table 7. Classification of the reviewed literature.

Categories	Subcategories	Papers
Governance	Stakeholder Collaboration	[15,21,22]
	Stakeholder Decision-making	[19,22–30]
	Stakeholder Contribution and Involvement	[31–33]
	Stakeholder Perception	[17,34–38]
Socio-Environmental	Location Selection Problem	[39–44]
	Decision-making	[45]
	Policy Evaluation	[35–37,45–47]
	Vehicle Routing Problem	[43,48–51]
	Performance Evaluation	[52–55]
	Winner Determination Problem	[15,21]
	Last-mile Logistics	[36,56,57]
	Freight Consolidation Problem	[12,58,59]
	Collaborative Network	[60,61]
	Operations Management	[62–64]
Economic	Location Selection Problem	[19,40,41,65]
	Policy Evaluation	[22,23,32,46,66,67]
	Vehicle Routing Problem	[56,61,68–70]
	Winner Determination Problem	[67]
	Last-mile Logistics	[21,33,71]
	Operations Management	[28,72]
Holistic	Compliance with CG and CSR Initiatives	[11,73]

5.1. Governance

Corporate governance is the structure of rules, practices, and processes used to direct and manage a company which essentially involves balancing the interests of a company's

many public and private stakeholders. Only a few examples of private players are long-distance carriers, regional carriers connected to the UDCs' customers, and producers of commodities. Local authorities (LAs), however, make up the largest group of public stakeholders in these networks [74,75]. The traits and interests of numerous stakeholders lead to the diversity of their behaviors and objectives on how the UDC network functions [11]. As a result, it is typical for different stakeholder groups in UDC networks to have very different objectives. In fact, the overall sustainable development strategies of LAs rarely consider private players' everyday commercial operations or logistical planning procedures. This can lead to limited collaboration and a distinct boundary between various realms of duty.

Based on this explanation, we identify the category of Governance. The subcategory Stakeholder Collaboration contains four papers. Notably, Handoko and Lau [76] assert that when participating carriers collaborate, they have the option to combine their remaining shared orders with those from the fleets of the other carriers while keeping their own private orders. To increase the overall cost savings gained by all participating carriers, it is discussed that consolidation is made possible using a two-fold auction process. The subcategory Winner Determination Problem intends to enable many shippers and carriers to plan delivery months in advance while also allowing them to submit a last-minute bid for UDC's services [15,21]. We identified ten publications in the field of Stakeholder Decision-making. These papers discuss the impact of stakeholders' decisions on the UDC's functionality, setting, and operations. Most of these papers concentrate on models that can be used to produce UCC/UDC models based on choices made by different stakeholders. These models are generally created utilizing agent-based simulations and multicriteria decision-making techniques. Four papers are included in the third subcategory, Stakeholder Contribution and Involvement, which study how, when, and where stakeholders' contributions and involvement are needed for UDCs. For instance, with policy evaluations, the involvement of stakeholders is paramount for locational decisions and other operational strategies. Papers [17,34] in our fourth subcategory, Stakeholder Perception, present details on how each stakeholder is seen to affect UDC and how its monetization is considered. In that same subcategory, Amaya et al. [35] explore how the carriers' and the receivers' perception of sustainable urban freight transport is discussed and how policies framed around this are compliant with sustainability regulations and the stakeholders' notions.

To summarize, stakeholders' perception, involvement, decision making, and collaboration toward designing UDCs and policy framing for sustainable freight transport is an important point discussed extensively in the extant literature.

5.2. Socio-Environmental

Urban cargo transportation supports industrial competitiveness, economic efficiency, and commercial activities [77], and so it is an essential element in the growth of large cities. However, it also harms the environment in many other ways, such as through energy use, pollution, noise, and visual interference. In support of environmental initiatives, UDCs serve as a hub for the transshipment of goods to metropolitan areas that aim to streamline the delivery and distribution processes while lessening the density of freight traffic and altering the type of transport vehicle used in the shipping process. The operations performed through the UDCs must also consider the social ramifications of integrating UDCs into the urban freight transport supply chain involving retailers, carriers, suppliers, and the stakeholders in the urban movement, such as governmental agencies, the general public, and all other sectors.

The category Socio-Environmental classifies articles that address both the social and environmental impacts of business decisions associated with UDCs. The first subcategory, Location Selection Problem, lists articles that underscore the problem of selecting a location for UDC using different methods, such as liner programming or spatial methods, to develop models that select the best location that benefits stakeholders (with respect to costs) and the local authorities (concerning environmental benefits). In the second subcategory of Decision-making, Awasthi and Chauhan [45] discuss alternatives for sustainable logistics

in cities including UDCs, vehicle-sizing restrictions, and congestion-charging schemes. Access-timing restrictions are considered as using methods such as AHP, fuzzy logic, and affinity diagram. Stakeholders' decisions are factored in the decision-making process: ultimately, the best alternative is chosen as per the stakeholders' agreed-upon decision. The third subcategory on Policy Evaluation groups articles that have taken active reviews of the current logistics policies such as off-hour deliveries windows, truckload policies, and last-mile deliveries using electric vehicles. Mainly, this group of articles describe stakeholders' perspectives on the policies implemented and further propose the best policy frameworks that obtain maximum benefits. It is crucial to recognize the current barriers that exist in city logistics and when urban freight policies and actions must be implemented to overcome these barriers [46]. As vehicle routing is a common problem in city logistics, we associate a subcategory to papers that discuss how the formulated mathematical models address UDC problems. This subcategory includes articles that discuss policy evaluations and vehicle routing problems with time windows and propose a mathematical model (see for instance, [49]).

The subcategory Performance Evaluation includes articles that compare UDCs to other sustainable methods of city logistics optimization solutions, such as off-hour delivery, as in [52]. Ji et al. [29] focus on evaluating the environmental and economic benefits of UDCs by proposing two models for the same urban delivery and estimating motor vehicle emissions. Lin et al. [53] study the impact and performance of UDCs after implementation. In this paper, two different methods are used to measure emissions and establish cost benefits. The subcategory Last-mile Logistics is another common problem in urban logistics. It is relevant to the issues faced when optimizing the last mile of delivery and how UDC can help gain environmental benefits. Ayu and Nahry [56] discuss UDC's impact on carbon emissions. In a case study in Brazil, de Oliveira et al. [36] optimize the last-mile delivery from UDCs. Olsson et al. [57] provide a literature review on 155 peer-reviewed articles, determine five main components of last-mile deliveries, and discuss how UDCs play a significant role in defining them. The Freight Consolidation subcategory includes papers investigating the underlying optimization problems that achieve maximum environmental sustainability. Freight consolidation is a major area in that if the routes are not optimized or consolidated well, they lead to increased environmental pollution and challenges. Montwi et al. [12] explain using integrated logistics centers as UDCs and concentrate on freight movement between carriers, shopping centers, and UDCs. In [58], the authors highlight the benefits and performance of a parcel distribution network between carriers, UDCs, and shopping malls. Ülkü [59] proposes a comprehensive method of calculating carbon emissions from dispatching any type of vehicle. That approximation provides useful means for UDCs to assess their impact on environmental degradation and freight consolidation strategies relevant to sustainable last-mile deliveries. The subcategory Collaborative Network for freight operations [60] describes the circumstances that prompt local carriers to alter their conduct and subcontract the delivery of their freight to work with or without UDCs. The economic actors (local carriers) must then decide on whether or not they should utilize the suggested collaborative logistics network to deliver to the city center. Rabe et al. [61] discuss a collaborative network using a discrete-event supply chain simulation tool to evaluate the consolidation of distribution flows. Finally, the papers included in the Operations Management subcategory focus on optimizing the operations in urban delivery centers to improve operational efficiency. Intending to control UDC efficiency, the authors in [62] propose an analysis of the functional organization of a UDC using a micro-simulation approach. González et al. [63] gather and analyze information on the different methods used in co-distribution. Pérez-Guzmán et al. [64] propose a methodology to assess the feasibility of implementing an external transfer initiative which consists designated transfer locations where goods are transferred from large vehicles to sustainable city-scaled modes for urban delivery.

5.3. Economic

Although UDCs have demonstrated that they can reduce freight vehicles' travel distances in cities [78], many of the initiatives discussed have a limited lifespan [15,79,80]. There are concerns and questions regarding the economic feasibility of UDC programs following some facilities' historical failure and their reliance on public funding (e.g., [75,81]). Furthermore, since parties involved (such as shippers, retailers, and local governments) have different objectives and frequently incur financial costs while decreasing environmental costs, system-wide optimization often fails to produce solutions that independent parties would be willing to commit to in action. Nonetheless, the pattern of optimizing freight movements has raised the possibility of added benefits of UDCs. The operating costs might also be reduced by introducing niche technology and strengthening the incorporation of the synchronous handling process into the supply chain (e.g., [82]).

Considering various standpoints of research articles on the financial benefits and drawbacks of establishing a UDC, we defined the category Economic to study this aspect more deeply. We scrutinize six different approaches prescribed for UDCs to achieve the greatest possible financial value. The first subcategory focuses on the infamous location selection problem; a popular area of research for UDCs to maximize economic benefits in accordance with the selected strategic location. Bouhana et al. [65] discuss multiple potential chosen locations and use a multicriteria decision method to choose the best. Awasthi et al. [19] explain uncertainties associated with choosing the best location. They suggest an approach for logistics operators to locate new distribution sites while taking municipal administrations and propose sustainable freight standards into account. There are also some models for selecting the best location for UDCs with respect to financial benefits (see, for example, [40,41,83]).

Articles included in the category Policy Evaluation contribute to evaluating policies, barriers, and subsidies for urban freight transport and how it impacts the UDC in reaping the financial benefits from them. For example, the papers [23,66] are agent-based simulations and focus on access regulations for UDCs in relation to various stakeholders, such as carriers and other parties. Nordtømme et al. [46] focus on barriers that impact the UDC implementation or operations and suggest new approaches and policies to get through these barriers so UDCs can acquire their potential financial benefits. The study by van Heeswijk and Larsen [32] evaluate the administrative measures that play a major role in sustainable models for UDCs. The Vehicle Routing subcategory explains how following a non-optimal freight movement in urban areas contributes to environmental pollution and leads to high costs in relation to urban freight transport. Studies conducted in this area identify UDC facilities as a solution to reduce costs and achieve environmental benefits. In doing so, they suggest various approaches such as collaborative freight operations involving UDCs [61], and access to externalities in relation to external costs for shipments [56]. Handoko et al. [68] analyze the profitable route problem which is a subclass of the vehicle routing problem and study how to maximize the difference between profit earned and cost incurred. Lemardelé et al. [69] resolve the vehicle routing problem by analyzing the operational costs and externalities produced in relation to the UDCs. Having analyzed all the factors, this paper proposes the potential of autonomous deliveries with unmanned aerial vehicles, such as drones, to reduce CO_2 emissions and obtain cost benefits. In a recent paper, Marques et al. [70] study the problem of two-echelon capable of vehicle routing with time windows in which freight delivery from depots to clients is accomplished by using intermediary facilities known as satellites. A mixed integer model is formulated to resolve the issue with first-echelon and second-echelon routes being connected by an exponential number of given constraints and an enormous number of route variables. Compared to the alternative scenario with precise freight synchronization at satellites, the overall transportation cost could be reduced.

The Winner Determination Problem category explains the horizontal and vertical decomposition techniques: it proposes using the auction mechanism to identify the winners (third-party carriers) in an auction environment while minimizing overall auction costs.

Last-mile logistics has received many researchers' attention. Wang and Lim [21] define a delivery dispatching problem with time windows and propose an approximate dynamic programming solution methodology, while van Heeswijk et al. [33] propose using the Markov decision model. Deng et al. [71] present a cost–benefit performance evaluation assessment comparing implementing UDCs versus a peer-to-peer platform for last-mile deliveries. Another broad category for UDC analysis is Operations Management, which is essential to gain maximum profit benefits. In [28], the authors discuss combining cooperative efforts between freight carriers. They propose utilizing a consolidation terminal as a strategic approach to cut operational expenses and, consequently, the detrimental effects on the city. In [72], the authors focus on designing an inner layout of UDCs to ensure smooth operations that lead to cost savings. The first phase of the model is based on optimizing the UDC facility layout, and then they integrate the allocation problem.

5.4. Holistic

In [11], Teo et al. develop a multiagent model to evaluate the effectiveness of UDCs with respect to the city logistics tactical planning (e.g., proximity to freight village and utilizing designated parking spots) and demonstrate their model's impact on the environment to relieve traffic congestion and adverse environmental effects. By taking into account various socio-environmental factors, the UDC's self-sustaining economic measures, and the governance policies, the authors provide a holistic view of the viability and effectiveness of UDCs. The authors also discuss factors that contribute to a longer and healthier period of UDCs' economic life. Additionally, they advocate for the participation of the stakeholders and discuss that it promotes the success of UDCs.

In the review paper [73], the authors combine a bibliometric analysis with a systematic literature review to comprehensively study city logistics and highlight its characteristics and issues. Although the study is not centered on the utilization of UDCs in scheduling urban freight, this concept is discussed on several occasions as innovative tools with environmental, economic, and social sustainable potentialities when planning city logistics. The importance of understanding the stakeholders' needs, preferences, and viewpoints is mentioned within the context of UDCs. The broad range of discussions offered helps constitute a comprehensive overview of the area of city freight transportation in general. Occasional extensions made to UDCs assist with creating a holistic perspective on UDCs' properties, functionality, challenges, and contributions.

6. Discussion and Direction for Further Research

The rapid growth of urbanization on the one hand, and the increased popularity and accessibility of e-commerce on the other hand (especially during the pandemic), have caused large cities to face complex challenges, such as pollution, congestion, noise, and climate change. This problem has invoked vigorous research around analyzing, describing, and seeking solutions to the issue of green last-mile deliveries within urban cities. UDCs have been proposed in response to this issue with the warrant to restrain large delivery trucks from entering large cities and, instead, allow urban freight to be received and sorted in the proximity of large cities. Last-mile logistics is then outsourced and scheduled to distribute freight to the final urban destinations utilizing sustainable transport vehicles, such as fully loaded small vehicles that are electric or low emission. The UDCs' added leverage to plan sustainable urban freight transport aligns them with increasingly enforced governments' and municipalities' policies to reduce carbon emissions.

Our review of relevant literature initiates by performing a comprehensive bibliometric analysis to gain insight into several descriptive aspects of the existing literature, such as the distribution of most frequently published journals, publishers, authors, affiliations, and countries, as well as the timeline of the conducted research. Our cluster-based network analysis represents the co-occurrence of highly cited keywords and co-authors. Our network analysis results guide us to identify two main streams of studies: (1) papers that discuss ideas around the stakeholders' governance regarding the system of rules, practices, and

processes by which UDCs are directed and controlled, and (2) papers that discuss the socio-environmental and economic impacts that UDCs establish. With that, we use our descriptive analysis results to identify some of the most impactful papers, categorize them through the lenses of corporate governance (CG) and corporate social responsibility (CSR), and conduct an in-depth review to discuss their most significant findings. We also recognize gaps and shortcomings in the literature review, which we explain below.

Governance. Utilizing UDCs should encourage both monetary and non-monetary benefits for all participants when incorporated into a sustainable urban logistics system that reduces the overall costs of distributing goods through cities. When financial benefits cannot be realized in the short term, mechanisms are needed to offer equitable and effective cost-sharing for stakeholders participating in UDC networks. Especially with limited funding, local authorities could find it very challenging to coordinate a range of objectives (across the social, environmental, and economic dimensions) connected to numerous categories of private stakeholders, while considering the everyday commercial operations or logistical planning procedures of private players. For UDCs to become financially viable, it is important to advance responsibility-sharing initiatives that aim to end the initial situation in which such facilities are exclusively dependent on subsidies from local and federal governments.

Sustainability. Aligning resources toward greening city logistics under the United Nations Sustainable Development Goals (UNSDGs) is imperative. Unsustainable urban development poses extensive problems that need to be tackled in synchrony and determination by all the stakeholders: citizens, government, regulators, businesses, policymakers, civil society organizations, city animals and the environment, among others. To that end, interdisciplinary research that develops a framework and actionable research paths are required: particularly, UNSDG #11 (Sustainable Cities and Communities), #9 (Industry, Innovation, and Infrastructure) and #12 (Responsible Consumption and Production) could be simultaneously used as guideposts for developing sustainable solutions to target the alarmingly increasing global city logistics and urbanization problems. A quadruple bottom line approach (see, [84,85]), whereby the four pillars of sustainability (economic, social, environmental, and cultural well-being) are considered for city logistics, is becoming imperative.

Innovation. Another area of investigation that warrants the successful implementation of UDCs is deploying advanced technologies, such as the internet of things and blockchain (e.g., [86–88]) along with increased delivery capacities of crowdsourcing (e.g., [89,90]) to plan and schedule UDC deliveries. Such methods offer innovative ways to incorporate the measurement and control of sustainability performances in greening city logistics. However, it is imperative to explore whether the additional energy consumption and shared-capacities these emerging intelligent technologies bring justify sustainable last-mile deliveries.

Corporate social responsibility. Based on the literature review, one area that is not fully explored is a full-fledged study of the social impact of using UDCs concerning corporates' ethical and philanthropic responsibilities. Such studies can be crucial in assessing how UDCs act and how much they contribute to the community. Below, we explain two areas we deem worthwhile social contributions while greening city logistics.

(1) Integrating spatial proximity to low-income communities into the objective of the location-allocation problems. The soaring cost of living and real estate prices within cities usually pulls more low-wage workers (including vulnerable, marginalized, and food-insecure families) out of downtown areas and into suburban areas. With the UDCs located on the outskirts of large cities and close to such communities, these centers can engage in more social activities that help such communities thrive. The impacts can include providing employment opportunities, complementary health insurance and benefits, local charities and food banks support. Such a strategic location-allocation approach provides an equitable opportunity to include individuals from diverse backgrounds as the workforce which ensures that businesses and individuals are conscientious of the influence they have on the world around them

and actively engage in protecting the environment, helping those in need, supporting local communities, and cultivating positive influences on society and education.

(2) Securing last-mile delivery opportunities for sustainable and innovative technology trends. Logistical options for shipping and fulfillment have expanded with the rapid growth of e-commerce, cloud, and mobile computing solutions. While this growth has created many opportunities for businesses, it has also raised the standard of consumer expectations. Exploiting new technology in planning last-mile deliveries from the UDCs could stifle future growth. Alternatively, UDCs can plan in advance to strategically construct their facilities in a location that facilitates using such advanced technologies (e.g., green vehicles, drones, autonomous trucks, and e-bikes).

Author Contributions: Conceptualization, B.M. and M.A.Ü.; methodology, B.M. and S.S.; validation, B.M. and M.A.Ü.; investigation, B.M., S.S. and M.A.Ü.; writing—original draft preparation, B.M. and S.S.; writing—review and editing, B.M. and M.A.Ü.; visualization, B.M. and S.S.; supervision, B.M. and M.A.Ü.; funding acquisition, B.M. and M.A.Ü. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by SMUWorks 2022 Grants at Saint Mary's University, and the Center for Research in Sustainable Supply Chain Analytics, Dalhousie University (CRSSCA #68066-220003-SCR).

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Simoni, M.D.; Bujanovic, P.; Boyles, S.D.; Kutanoglu, E. Urban Consolidation Solutions for Parcel Delivery Considering Location, Fleet and Route Choice. *Case Stud. Transp. Policy* **2018**, *6*, 112–124. [CrossRef]
2. Linnenluecke, M.K.; Marrone, M.; Singh, A.K. Conducting Systematic Literature Reviews and Bibliometric Analyses. *Aust. J. Manag.* **2020**, *45*, 175–194. [CrossRef]
3. Chen, C.T. A Fuzzy Approach to Select the Location of the Distribution Center. *Fuzzy Sets Syst.* **2001**, *118*, 65–73. [CrossRef]
4. Gimenez, C.; Tachizawa, E.M. Extending Sustainability to Suppliers: A Systematic Literature Review. *Supply Chain. Manag. Int. J.* **2012**, *15*, 531–543. [CrossRef]
5. Young, J. Ecommerce vs Retail Sales from 2012–2021. 2022. Available online: https://www.digitalcommerce360.com/article/e-commerce-sales-retail-sales-ten-year-review/ (accessed on 1 March 2023).
6. McKinsey & Company Report. US Consumer Sentiment and Behaviors during the Coronavirus Crisis. 2021. Available online: https://www.mckinsey.com/business-functions/growth-marketing-and-sales/our-insights/survey-us-consumer-sentiment-during-the-coronavirus-crisis (accessed on 5 December 2022).
7. Donthu, N.; Kumar, S.; Mukherjee, D.; Pandey, N.; Lim, W.M. How to Conduct a Bibliometric Analysis: An Overview and Guidelines. *J. Bus. Res.* **2021**, *133*, 285–296. [CrossRef]
8. Statista. Annual Excess Fuel Consumed due to Congestions in the United States between 2019 and 2020, by Road Vehicle Type. 2021. Available online: https://www.statista.com/statistics/1274900/excess-fuel-consumed-in-the-us-due-to-congestions-by-vehicle-type/ (accessed on 20 May 2022).
9. Hillyer, M. Urban Deliveries Expected to Add 11 Minutes to Daily Commute and Increase Carbon Emissions by 30% until 2030 without Effective Intervention. 2020. Available online: https://www.weforum.org/press/2020/01/urban-deliveries-expected-to-add-11-minutes-to-daily-commute-and-increase-carbon-emissions-by-30-until-2030-without-effective-intervention-e3141b32fa/ (accessed on 1 December 2022).
10. Statista. eCommerce Report. 2022. Available online: https://www.statista.com/study/42335/ecommerce-report/ (accessed on 1 March 2023).
11. Teo, J.S.E.; Taniguchi, E.; Qureshi, A.G. Evaluation of Urban Distribution Centers Using Multiagent Modeling with Geographic Information Systems. *Transp. Res. Rec.* **2015**, *2478*, 35–47. [CrossRef]
12. Montwiłł, A.; Pietrzak, O.; Pietrzak, K. The Role of Integrated Logistics Centers (ILCs) in Modelling the Flows of Goods in Urban Areas Based on the Example of Italy. *Sustain. Cities Soc.* **2021**, *69*, 102851. [CrossRef]
13. Janjevic, M.; Ndiaye, A. Investigating the Financial Viability of Urban Consolidation Centre Projects. *Res. Transp. Bus. Manag.* **2017**, *24*, 101–113. [CrossRef]
14. Gonzalez-Feliu, J.; Morana, J.J. Assessing urban logistics pooling sustainability via a hierarchic dashboard from a group decision perspective. In *Sustainable Logistics (Transport and Sustainability, Vol. 6)*; Macharis, C., Melo, S., Woxenius, J., Van Lier, T., Eds.; Emerald Group Publishing Limited: Bingley, UK, 2014; pp. 113–135. [CrossRef]

15. Handoko, S.D.; Lau, H.C.; Cheng, S.F. Achieving Economic and Environmental Sustainabilities in Urban Consolidation Center with Bicriteria Auction. *IEEE Trans. Autom. Sci. Eng.* **2016**, *13*, 1471–1479. [CrossRef]
16. Allen, J.; Browne, M.; Woodburn, A.; Leonardi, J. The Role of Urban Consolidation Centres in Sustainable Freight Transport. *Transp. Rev.* **2012**, *32*, 473–490. [CrossRef]
17. Crotti, D.; Maggi, E. Social Responsibility and Urban Consolidation Centres in Sustainable Freight Transport Markets. *Ital. Econ. J.* **2022**. [CrossRef]
18. Navarro, H.Á.R.; Vieira, J.G.V.; Fransoo, J.C. Understanding Urban Logistics and Consumer Behavior in São Paulo City. *Case Stud. Transp. Policy* **2021**, *9*, 1630–1640. [CrossRef]
19. Awasthi, A.; Chauhan, S.S.; Goyal, S.K. A Multicriteria Decision Making Approach for Location Planning for Urban Distribution Centers Under Uncertainty. *Math. Comput. Model.* **2011**, *53*, 98–109. [CrossRef]
20. Nishikawa-Pacher, A. Who Are the 100 Largest Scientific Publishers by Journal Count? A Webscraping Approach. *J. Doc.* **2022**, *78*, 450–463. [CrossRef]
21. Wang, C.; Lau, H.C.; Lim, Y.F. A rolling horizon auction mechanism and virtual pricing of shipping capacity for urban consolidation centers. In *Computational Logistics. ICCL 2015. Lecture Notes in Computer Science (vol 9335)*; Corman, F., Voß, S., Negenborn, R., Eds.; Springer: Cham, Switzerland, 2015; pp. 422–436.
22. Roca-Riu, M.; Estrada, M.; Fernández, E. An Evaluation of Urban Consolidation Centers through Continuous Analysis with Non-equal Market Share Companies. *Transp. Res. Procedia* **2016**, *12*, 370–382. [CrossRef]
23. van Heeswijk, W.J.; Mes, M.R.; Schutten, J.M.J.; Zijm, W.H.M. Evaluating Urban Logistics Schemes Using Agent-based Simulation. *Transp. Sci.* **2020**, *54*, 651–675. [CrossRef]
24. Nourinejad, M.; Rooda, M.J. Locating Urban Consolidation Centers under Shipper Rationality. *J. Adv. Transp.* **2022**, *2022*, 5078042. [CrossRef]
25. Firdausiyah, N.; Taniguchi, E.; Qureshi, A.G. Modeling City Logistics Using Adaptive Dynamic Programming Based Multiagent Simulation. *Transp. Res. Part E Logist. Transp. Rev.* **2019**, *125*, 74–96. [CrossRef]
26. Lindawati; De Souza, R. Determining urban freight facility locations using post-evaluation deliberation. In Proceedings of the 2016 IEEE 18th International Conference on High Performance Computing and Communications; IEEE 14th International Conference on Smart City; IEEE 2nd International Conference on Data Science and Systems (HPCC/SmartCity/DSS), Sydney, NSW, Australia, 12–14 December 2016; pp. 1297–1303. [CrossRef]
27. Estrada, M.; Roca-Riu, M. Stakeholder's Profitability of Carrier-led Consolidation Strategies in Urban Goods Distribution. *Transp. Res. Part E Logist. Transp. Rev.* **2017**, *104*, 165–188. [CrossRef]
28. Roca-Riu, M.; Estrada, M. An Evaluation of Urban Consolidation Centers through Logistics Systems Analysis in Circumstances Where Companies Have Equal Market Shares. *Procedia-Soc. Behav. Sci.* **2012**, *39*, 796–806. [CrossRef]
29. Ji, Y.; Qu, S.; Yu, Z. Bi-level Multi-objective Optimization Model for Last Mile Delivery Using a Discrete Approach. *J. Differ. Equ. Appl.* **2017**, *23*, 179–190. [CrossRef]
30. Aljohani, K.; Thompson, R.G. A Multicriteria Spatial Evaluation Framework to Optimise the Siting of Freight Consolidation Facilities in Inner-city Areas. *Transp. Res. Part A Policy Pract.* **2020**, *138*, 51–69. [CrossRef]
31. Ndhaief, N.; Bistorin, O.; Rezg, N. An Improved Distribution Policy with a Maintenance Aspect for an Urban Logistic Problem. *Appl. Sci.* **2017**, *7*, 703. [CrossRef]
32. Van Heeswijk, W.; Larsen, R.; Larsen, A. An Urban Consolidation Center in the City of Copenhagen: A Simulation Study. *Int. J. Sustain. Transp.* **2019**, *13*, 675–691. [CrossRef]
33. Van Heeswijk, W.J.; Mes, M.R.; Schutten, J.M. The Delivery Dispatching Problem with Time Windows for Urban Consolidation Centers. *Transp. Sci.* **2019**, *53*, 203–221. [CrossRef]
34. Isa, S.S.; Lima, O.F., Jr.; Vieira, J.G.V. Urban Consolidation Centers: Impact Analysis by Stakeholder. *Res. Transp. Econ.* **2021**, *90*, 101045. [CrossRef]
35. Amaya, J.; Arellana, J.; Delgado-Lindeman, M. Stakeholders Perceptions to Sustainable Urban Freight Policies in Emerging Markets. *Transp. Res. Part A Policy Pract.* **2020**, *132*, 329–348. [CrossRef]
36. de Oliveira, L.K.; da Silva Dutra, N.G.; de Assis Correia, V.; Neto, W.D.A.P.; Guerra, A.L. Adoption Assessment by Carriers and Retailers to Use an Urban Consolidation Center-A Case Study in Brazil. *Procedia-Soc. Behav. Sci.* **2012**, *39*, 783–795. [CrossRef]
37. Björklund, M.; Simm, N. Roles and Perspectives When Estimating Energy and Environmental Potentials of Urban Consolidation. *Energies* **2019**, *12*, 4811. [CrossRef]
38. Mangano, G.; Zenezini, G.; Cagliano, A.C. Value Proposition for Sustainable Last-mile Delivery. A Retailer Perspective. *Sustainability* **2021**, *13*, 3774. [CrossRef]
39. Gong, W.; Bao, J.; Wang, H.; Yang, Y. Sustainable ECID urban logistics network design by rail in Beijing, China. In Proceedings of the 9th International Conference on Traffic and Logistic Engineering (ICTLE), Macau, China, 9–11 August 2021; pp. 22–26.
40. Li, S.; Wei, Z.; Huang, A. Location Selection of Urban Distribution Center with a Mathematical Modeling Approach Based on the Total Cost. *IEEE Access* **2018**, *6*, 61833–61842. [CrossRef]
41. Sopha, B.M.; Asih, A.M.S.; Nursitasari, P.D. Location Planning of Urban Distribution Center Under Uncertainty: A Case Study of Yogyakarta Special Region Province, Indonesia. *J. Ind. Eng. Manag.* **2018**, *11*, 542–568. [CrossRef]
42. Agrebi, M.; Abed, M.; Omri, M.N. Urban distribution centers' location selection's problem: A survey. In Proceedings of the 4th International Conference on Advanced Logistics and Transport (ICALT), Valenciennes, France, 20–22 May 2015; pp. 246–251.

43. Nataraj, S.; Ferone, D.; Quintero-Araujo, C.; Juan, A.; Festa, P. Consolidation Centers in City Logistics: A Cooperative Approach Based on the Location Routing Problem. *Int. J. Ind. Eng. Comput.* **2019**, *10*, 393–404. [CrossRef]
44. Kijewska, K.; Iwan, S.; Kaczmarczyk, T. Technical and Organizational Assumptions of Applying UCCs to Optimize Freight Deliveries in the Seaside Tourist Resorts of West Pomeranian Region of Poland. *Procedia-Soc. Behav. Sci.* **2012**, *39*, 592–606. [CrossRef]
45. Awasthi, A.; Chauhan, S.S. A Hybrid Approach Integrating Affinity Diagram, AHP and Fuzzy TOPSIS for Sustainable City Logistics Planning. *Appl. Math. Model.* **2012**, *36*, 573–584. [CrossRef]
46. Nordtømme, M.E.; Bjerkan, K.Y.; Sund, A.B. Barriers to Urban Freight Policy Implementation: The Case of Urban Consolidation Center in Oslo. *Transp. Policy* **2015**, *44*, 179–186. [CrossRef]
47. Papoutsis, K.; Dewulf, W.; Vanelslander, T.; Nathanail, E. Sustainability Assessment of Retail Logistics Solutions Using External Costs Analysis: A Case-study for the City of Antwerp. *Eur. Transp. Res. Rev.* **2018**, *10*, 34. [CrossRef]
48. Musolino, G.; Rindone, C.; Polimeni, A.; Vitetta, A. Planning Urban Distribution Center Location with Variable Restocking Demand Scenarios: General Methodology and Testing in a Medium-size Town. *Transp. Policy* **2019**, *80*, 157–166. [CrossRef]
49. Escuín, D.; Millán, C.; Larrodé, E. Modelization of Time-dependent Urban Freight Problems by Using a Multiple Number of Distribution Centers. *Netw. Spat. Econ.* **2012**, *12*, 321–336. [CrossRef]
50. Cattaruzza, D.; Absi, N.; Feillet, D.; González-Feliu, J. Vehicle Routing Problems for City Logistics. *EURO J. Transp. Logist.* **2017**, *6*, 51–79. [CrossRef]
51. Kancharla, S.R.; Ramadurai, G. Multi-depot Two-echelon Fuel Minimizing Routing Problem with Heterogeneous Fleets: Model and Heuristic. *Netw. Spat. Econ.* **2019**, *19*, 969–1005. [CrossRef]
52. Mepparambath, R.M.; Cheah, L.; Zegras, P.C.; Alho, A.R.; Sakai, T. Evaluating the Impact of Urban Consolidation Center and Off-Hour Deliveries on Freight Flows to a Retail District Using Agent-Based Simulation. *Transp. Res. Rec.* **2023**, *2677*, 264–281. [CrossRef]
53. Lin, J.; Chen, Q.; Kawamura, K. Sustainability SI: Logistics Cost and Environmental Impact Analyses of Urban Delivery Consolidation Strategies. *Netw. Spat. Econ.* **2016**, *16*, 227–253. [CrossRef]
54. Sopha, B.M.; Sakti, S.; Prasetia, A.C.G.; Dwiansarinopa, M.W.; Cullinane, K.B.M. Simulating Long-term Performance of Regional Distribution Centers in Archipelagic Logistics Systems. *Marit. Econ. Logist.* **2021**, *23*, 697–725. [CrossRef]
55. Zhou, W.; Lin, J. An On-demand Same-day Delivery Service Using Direct Peer-to-Peer Transshipment Strategies. *Netw. Spat. Econ.* **2019**, *19*, 409–443. [CrossRef]
56. Ayu, N.; Nahry, N. Externalities aspects of freight distribution through the urban consolidation center. *IOP Conf. Ser. Earth Environ. Sci.* **2021**, *622*, 012024. [CrossRef]
57. Olsson, J.; Hellström, D.; Pålsson, H. Framework of Last Mile Logistics Research: A Systematic Review of the Literature. *Sustainability* **2019**, *11*, 7131. [CrossRef]
58. Dupas, R.; Taniguchi, E.; Deschamps, J.C.; Qureshi, A.G. A Multi-commodity Network Flow Model for Sustainable Performance Evaluation in City Logistics: Application to the Distribution of Multi-tenant Buildings in Tokyo. *Sustainability* **2020**, *12*, 2180. [CrossRef]
59. Ülkü, M.A. Dare to Care: Shipment Consolidation Reduces not only Costs, but also Environmental Damage. *Int. J. Prod. Econ.* **2012**, *139*, 438–446. [CrossRef]
60. Faure, L.; Battaia, G.; Marquès, G.; Guillaume, R.; Vega-Mejía, C.A.; Montova-Torres, J.R.; Muñoz-Villamizar, A.; Quintero-Araújo, C.L. How to anticipate the level of activity of a sustainable collaborative network: The case of urban freight delivery through logistics platforms. In Proceedings of the 7th IEEE International Conference on Digital Ecosystems and Technologies (DEST), Menlo Park, CA, USA, 24–26 July 2013; pp. 126–131.
61. Rabe, M.; Klueter, A.; Wuttke, A. Evaluating the consolidation of distribution flows using a discrete event supply chain simulation tool: Application to a case study in Greece. In Proceedings of the Winter Simulation Conference (WSC), Gothenburg, Sweden, 9–12 December 2018; pp. 2815–2826.
62. Gattuso, D.; Cassone, G.C. A Statistical Analysis for Micro-simulation of UDC Operativity. *Procedia Eng.* **2011**, *21*, 114–124. [CrossRef]
63. González, G.; Escuder, M.; Tanco, M. Co-distribution for Urban Logistics (Co-distribución para logística urbana). *Mem. Investig. En Ing.* **2017**, *15*, 97–108.
64. Pérez-Guzmán, S.; Wang, C.; Conway, A.; Arrieta-Prieto, M.E.; Ding, Y.; Zuman, G.S.; Escand, P.; Chen, Q. Methodology for the Feasibility Assessment of an Eco-transfer System. *Transp. Res. Part A Policy Pract.* **2022**, *160*, 280–297. [CrossRef]
65. Bouhana, A.; Chabchoub, H.; Abed, M.; Fekih, A. A multicriteria decision making approach based on fuzzy theory and fuzzy preference relations for urban distribution centers' location selection under uncertain environments. In Proceedings of the International Conference on Advanced Logistics and Transport-IEEE, Sousse, Tunisia, 29–31 May 2013; pp. 556–561.
66. Elbert, R.; Friedrich, C. Simulation-based evaluation of urban consolidation centers considering urban access regulations. In Proceedings of the Winter Simulation Conference (WSC)-IEEE, Gothenburg, Sweden, 9–12 December 2018; pp. 2827–2838.
67. Nguyen, D.T.; Lau, H.C.; Kumar, A. Decomposition techniques for urban consolidation problems. In Proceedings of the International Conference on Automation Science and Engineering (CASE)-IEEE, Gothenburg, Sweden, 24–28 August 2015; pp. 57–62.

68. Handoko, S.D.; Chuin, L.H.; Gupta, A.; Soon, O.Y.; Kim, H.C.; Siew, T.P. Solving multi-vehicle profitable tour problem via knowledge adoption in evolutionary bi-level programming. In Proceedings of the IEEE Congress on Evolutionary Computation (CEC), Sendai, Japan, 25–28 May 2015; pp. 2713–2720.
69. Lemardelé, C.; Estrada, M.; Pagès, L.; Bachofner, M. Potentialities of Drones and Ground Autonomous Delivery Devices for Last-mile Logistics. *Transp. Res. Part E Logist. Transp. Rev.* **2021**, *149*, 102325. [CrossRef]
70. Marques, G.; Sadykov, R.; Dupas, R.; Deschamps, J.C. A Branch-cut-and-price Approach for the Single-trip and Multi-trip Two-echelon Vehicle Routing Problem with Time Windows. *Transp. Sci.* **2022**, *56*, 1598–1617. [CrossRef]
71. Deng, Q.; Fang, X.; Lim, Y.F. Urban Consolidation Center or Peer-to-Peer Platform? The Solution to Urban Last-Mile Delivery. *Prod. Oper. Manag.* **2021**, *30*, 997–1013. [CrossRef]
72. Demirtas, N.; Tuzkaya, U.R.; Tanyaş, M. Layout of Urban Distribution Center Using Possibilistic Programming. *Int. J. Comput. Intell. Syst.* **2016**, *9*, 1068–1081. [CrossRef]
73. Dolati Neghabadi, P.; Evrard Samuel, K.; Espinouse, M.L. Systematic Literature Review on City Logistics: Overview, Classification and Analysis. *Int. J. Prod. Res.* **2019**, *57*, 865–887. [CrossRef]
74. Browne, M.; Allen, J.; Nemoto, T.; Visser, J. Light Goods Vehicles in Urban Areas. *Procedia-Soc. Behav. Sci.* **2010**, *2*, 5911–5919. [CrossRef]
75. Lindkvist, H.; Melander, L. How Sustainable are Urban Transport Services? A Comparison of MaaS and UCC. *Res. Transp. Bus. Manag.* **2022**, *43*, 100829. [CrossRef]
76. Handoko, S.D.; Lau, H.C. Enabling Carrier Collaboration via Order Sharing Double Auction: A Singapore Urban Logistics Perspective. *Transp. Res. Procedia* **2016**, *12*, 777–786. [CrossRef]
77. Bektaş, T.; Crainic, T.G.; Van Woensel, T. *From Managing Urban Freight to Smart City Logistics Networks*; Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation (CIRRELT) Report: Montreal, QC, Canada, 2015.
78. Kin, B.; Verlinde, S.; Van Lier, T.; Macharis, C. Is There Life After Subsidy for an Urban Consolidation Centre? An Investigation of the Total Costs and Benefits of a Privately-initiated Concept. *Transp. Res. Procedia* **2016**, *12*, 357–369. [CrossRef]
79. Mucowska, M. Trends of Environmentally Sustainable Solutions of Urban Last-mile Deliveries on the e-commerce Market—A Literature Review. *Sustainability* **2021**, *13*, 5894. [CrossRef]
80. Siragusa, C.; Tumino, A.; Mangiaracina, R.; Perego, A. Electric Vehicles Performing Last-mile Delivery in B2C e-commerce: An Economic and Environmental Assessment. *Int. J. Sustain. Transp.* **2022**, *16*, 22–33. [CrossRef]
81. Al Eisaeia, M.; Moridpourb, S.; Tay, R. Heavy Vehicle Management: Restriction Strategies. *Transp. Res. Procedia* **2017**, *21*, 8–28. [CrossRef]
82. Acero, B.; Saenz, M.J.; Luzzini, D. Introducing Synchromodality: One Missing Link Between Transportation and Supply Chain Management. *J. Supply Chain. Manag.* **2022**, *58*, 51–64. [CrossRef]
83. Björklund, M.; Johansson, H. Urban Consolidation Centre—A Literature Review, Categorisation, and a Future Research Agenda. *Int. J. Phys. Distrib. Logist. Manag.* **2018**, *48*, 745–764. [CrossRef]
84. Ülkü, M.A.; Engau, A. Sustainable supply chain analytics. In *Industry, Innovation and Infrastructure. Encyclopedia of the UN Sustainable Development Goals*; Leal Filho, W., Azul, A.M., Brandli, L., Lange Salvia, A., Wall, T., Eds.; Springer: Berlin/Heidelberg, Germany, 2021; pp. 1123–1134. [CrossRef]
85. Tiller, S.J.; Rhindress, A.P.; Oguntola, I.O.; Ülkü, M.A.; Williams, K.A.; Sundararajan, B. Exploring the Impact of Climate Change on Arctic Shipping through the Lenses of Quadruple Bottom Line and Sustainable Development Goals. *Sustainability* **2022**, *14*, 2193. [CrossRef]
86. Chadha, S.S.; Ülkü, M.A.; Venkatadri, U. Freight Delivery in a Physical Internet Supply Chain: An Applied Optimisation Model with Peddling and Shipment Consolidation. *Int. J. Prod. Res.* **2022**, *60*, 4995–5011. [CrossRef]
87. Pan, S.; Zhou, W.; Piramuthu, S.; Giannikas, V.; Chen, C. Smart City for Sustainable Urban Freight Logistics. *Int. J. Prod. Res.* **2021**, *59*, 2079–2089. [CrossRef]
88. Nabipour, M.; Ülkü, M.A. On Deploying Blockchain Technologies in Supply Chain Strategies and the COVID-19 Pandemic: A Systematic Literature Review and Research Outlook. *Sustainability* **2021**, *13*, 10566. [CrossRef]
89. Carbone, V.; Rouquet, A.; Roussat, C. The Rise of Crowd Logistics: A New Way to Co-create Logistics Value. *J. Bus. Logist.* **2017**, *38*, 238–252. [CrossRef]
90. Alnaggar, A.; Gzara, F.; Bookbinder, J.H. Crowdsourced Delivery: A review of Platforms and Academic Literature. *Omega* **2021**, *98*, 102139. [CrossRef]