Towards Green Transportation Practices Using a Buyer/Supplier Perspective: A Systematic Literature Review

Gisèle Mendy Bilek, Richard Calvi, Daniel Erhel, Youcef Mechouar

logistics

MDPI

Review

Towards Green Transportation Practices Using a Buyer/Supplier Perspective: A Systematic Literature Review

Gisèle Mendy Bilek [1], Richard Calvi [2], Daniel Erhel [2] and Youcef Mechouar [3,*]

[1] IAE Pau-Bayonne, Laboratoire de Recherche En Management, College of Études Européennes et Internationales, Université de Pau et des Pays de l'Adour, 64100 Bayonne, France; gisele.mendy-bilek@univ-pau.fr
[2] Institute for Research in Management and Economics, Université Savoie Mont Blanc, 74940 Annecy, France; richard.calvi@univ-smb.fr (R.C.); daniel.erhel@univ-savoie.fr (D.E.)
[3] Research Center in Economics & Management, IUT de Sceaux, Université Paris-Saclay, 92330 Sceaux, France
* Correspondence: youcef.mechouar@universite-paris-saclay.fr

Abstract: *Background*: The role of individual supply chain actors in carbon emissions reduction (CER) is well-documented. However, it is critical to identify the conditions required to develop a systemic approach for encouraging these actors to share their visions and align their environmental strategy for CER. This study aims to identify the determinants (motivations, pressures, and incentives) and modalities (practices conducting greening transportation from shippers and logistics service providers (LSP) point of view) necessary for a better environmental alignment between actors for a CER initiative. *Methods*: We base our argument on a systemic literature review that points out 28 articles written in the period between 2010 and 2023 and fully aligned with the scope of our analysis. *Results*: The originality of our approach is that we focus on the interplay between shippers and LSPs to better understand the dynamics of green transportation practices. *Conclusions*: This paper invites researchers to adopt a dyadic approach to the phenomenon in order to better understand how the CER willingness is effectively diffused in the business interactions of shippers and LSP.

Keywords: carbon emissions reduction; green purchasing; green supply chain; systematic literature review

Citation: Bilek, G.M.; Calvi, R.; Erhel, D.; Mechouar, Y. Towards Green Transportation Practices Using a Buyer/Supplier Perspective: A Systematic Literature Review. *Logistics* **2024**, *8*, 68. https://doi.org/10.3390/logistics8030068

Academic Editor: Robert Handfield

Received: 5 April 2024
Revised: 20 June 2024
Accepted: 28 June 2024
Published: 5 July 2024

1. Introduction

Based on government efforts, the total transport activity in the global economy is predicted to more than double by 2050, compared to 2015 (OECD Report, 2021) [1]. Overall, continuing economic development and a growing world population are expected to increase the global demand for transportation. In the context of the freight economy, freight transport is projected to grow 2.6-fold. This increase in freight transportation will translate to an increase in carbon dioxide (CO_2) emissions. As per a report (OECD Report, 2021) [1], CO_2 emissions from transport are projected to increase by 16% by 2050, despite the implementation of the ongoing decarbonization efforts. The existing decarbonization policies are inadequate to ensure the sustainability of freight transportation. Hence, the projected increase in transport demand is expected to more than offset the emission reductions from these policies (OECD Report, 2021) [1].

The report suggests that more elaborate transportation decarbonization policies can reduce these emissions by almost 70% in 2050 compared to 2015 (OECD Report, 2021) [1]. It also suggests implementing targeted actions to reduce unnecessary travel; use sustainable transport modes, electric vehicles, and low-carbon fuels; and improve energy efficiency. In this regard, in its climate and energy policy framework for 2050, the European Union has set a target for decarbonizing freight transportation. These initiatives are expected to bring countries closer to the Paris agreement goal of limiting global warming to 1.5 °C by 2050.

In this context, the green transportation initiatives of logistics service providers (LSPs) and shippers have been playing a critical role in helping manufacturers and customer implement their environmental sustainability strategies. Owing to this role, the green initiatives adopted by logistics service providers have been gaining academic attention. The researchers have conducted several reviews with different perspectives in order to build a comprehensive picture of the literature on green freight transportation. These reviews have focused on the broader fields of green supply chain management (Ghosh et al., 2020; Kolberg and Longoni, 2019) [2,3] and environmental sustainability in logistics and transportation (Ellram and Murfeld, 2017; Marchet et al., 2014) [4,5]. Some reviews have also considered the buyers' perspective and the role of purchasing functions in managing sustainability and environmental issues (Johnsen et al., 2017; Dzhengiz and Niesten, 2020) [6,7], and some others have examined the role and services of the LSPs in the decarbonization process (Centobelli et al., 2017; Evangelista et al., 2018; Meyer, 2020) [8–10], but the study of *how* the CER is diffused in the buyer/LSP's interaction is still in its infancy.

In this regard, Jazairy et al. (2021, p. 424) [11] (p. 424) note that "LSPs" implementation of green logistics practices (GLPs) (e.g., green modal shifts, alternative fuels, and green warehousing) is, to a large extent, dependent on the relationships formed with and the actions made by shippers (i.e., logistics buyers'). In other words, shippers' ability and motivation to change the way they buy transportation services and LSPs' environmental commitment can concretely contribute towards green transportation. Therefore, the interaction between these two actors provides a relevant level of analysis of the GLPs (Bask et al., 2018; Jazairy, 2020; Martinsen and Björklund, 2012; Nilsson et al., 2017; Rahman et al., 2022; Wolf and Seuring, 2010) [12–17].

Despite research calls, there is a lack in the literature on the collaboration between supply chain actors to facilitate green transportation. In order to fill this gap, this study reviews the literature on green transportation adoption by considering the interplay between the shippers and the LSPs. Therefore, the main objectives of this article are (i) carrying out a systematic and comprehensive literature review on green transportation practices emerging in the buyer/LSP's interaction context, (ii) suggesting an analytical framework classifying the existing literature and its contribution to the field of green transportation practices, (iii) identifying a set of propositions and directions for future research.

From the initial 290 articles selected according to our combination of keywords, we extracted and deeply analyzed 28 papers published in academic journals. Our analysis of this empirical material is structured around the following research questions:

RQ1: What are the motivations and barriers for LSPs and shippers to engage in a commercial collaboration formed to implement a CER strategy?

RQ2: Which contingency factors influence the development of CER practices in the LSP and shipper relationship?

RQ3: How does the literature account for Greening Transportation Purchasing Practices (GTPP) from the different stakeholder perspectives?

In the next section, we describe the methodology used to identify the papers. Thereafter, we first describe the content of the 28 articles selected according to the scope of the journals covered, the geographical target, the unit of analysis (buyer firm, LSP, both, or dyad), and the main theories and methodologies mobilized. Subsequently, a content analysis is presented. We identify the determinants, modalities, and outcomes of a CER initiative. Finally, we propose a descriptive framework for the studies of green transportation driven by the interplay between shippers and LSPs.

2. Literature Review Approach

This section describes the methodology adopted to conduct a systematic literature review (SLR) on the determinants, modalities, and outcomes for a better environmental alignment between buyers and suppliers involved in a CER initiative on road transportation services. The objective of an SLR is to provide a comprehensive picture of the existing research. The interest in such an approach is twofold. First, it allows for consolidating the

results of research in a specific field by mapping, evaluating, and synthesizing disparate elements in the literature. Second, the identification of research gaps guides the future scope of research (Johnsen et al., 2017) [6].

The SLR is considered an efficient and high-quality method insofar as it improves the review process by synthesizing research in a reliable, transparent, and reproducible way (Koberg and Longoni, 2019) [3]. To meet the above criteria, the methodology implemented in this research was largely based on the founding work of Tranfield et al. (2003) [18] and in line with other authors who have used it in similar fields as procurement (Dzhengiz and Niesten, 2020; Pereira et al., 2014) [7,19], sustainable purchasing and supply (Johnsen et al., 2017) [6], or environmental sustainability in the logistics service industry (Evangelista et al., 2018) [9]. This methodology makes it possible, in our case, to identify and classify all the major studies on the particular subject that green transport represents. Accordingly, the review process was organized into the following three stages, which were further structured into several phases (Figure 1).

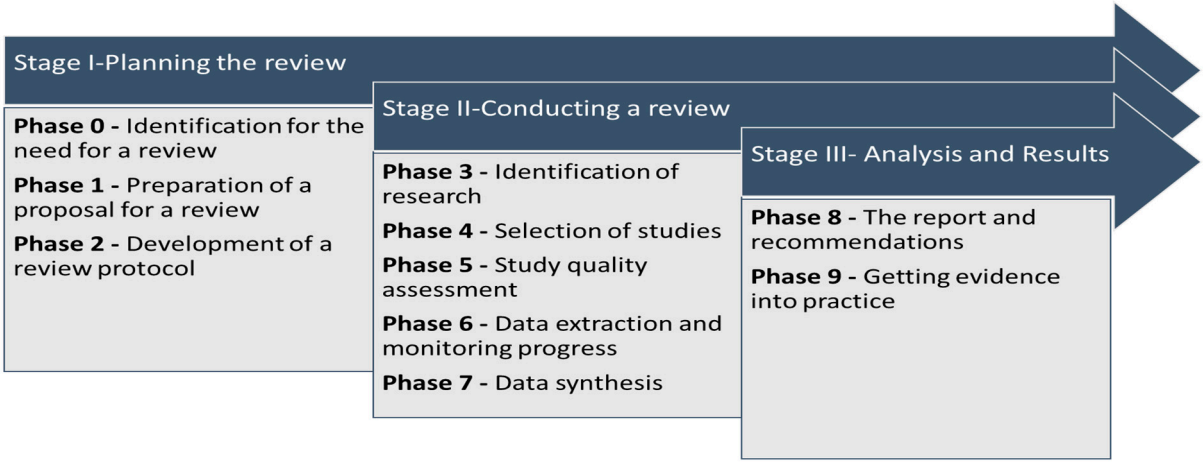

Figure 1. A three-stage method for the SLR (Tranfield et al., 2003) [18].

2.1. Planning the Review

The first phase of this stage aims to delimit the subject area by explaining the need for a review. Therefore, we present the context of our research in order to formulate a proposal for the review and, subsequently, to develop the review protocol.

Since the beginning of the year 2000, several voluntary programs for the measurement and reduction of carbon emissions have been implemented in the US and Europe. In France, a voluntary program has been in place since the year 2009 for carriers through the framework "Objectif CO_2 les transporteurs s'engagent" in order to put forward those who voluntarily agreed to reduce their CO_2 emissions through a set of actions (Fabbe-Coste et al., 2016) [20]. More recently, in 2016, the program FRET 21 included shippers as buyers of logistics services in order to involve the clients who define the offer in the freight transportation sector. Wolmarans et al. (2014) [21] show that shipper initiatives are largely driven by company policy and that shippers tend to push sustainability requirements onto the carriers that work for them. However, the lack of uniform assessment and reporting mechanisms greatly reduced its value for either shippers or carriers to influence decisions (Bynum et al., 2018) [22]. Furthermore, the multiple relationships between public and private actors involved in the program (ranging from the program coordinator to the transport organizations), the complexity of the transport and logistics sector (including the differences among the transport operators' sub-groups and the resistance of transport firms to introduce innovative practices impacting on the environment) may prevent the achievement of the desired project outcomes. The EVE (Voluntary Engagement for Environment) program recently launched in France (middle of 2019) does not constitute an exception. This program aspires to improve transport operators' efficiency and reduce the

impact of transportation flows on the environment. It is coordinated by a public agency, and it targets more than 700 carriers, 200 shippers, and 70 freight forwarders embarked at the end of 2022.

Due to the level of complexity characterizing such an environmental voluntary commitment program, the "French Environment & Energy Management Agency" ADEME, which supervises the EVE project, financed a research project aimed at designing a collaborative model to effectively implement the environmental voluntary commitment program EVE. As the research project is engaged in an early stage, the systematic review is the first step of this research program. In addition, we identify early in the process a real lake of consideration of the shippers/LSPs interactions in research on CER for transportation. For example, Mc Kinnon, one of the most famous experts on the topic, did not really address the CER in transport through the prism of the commercial relationship between shippers and LSPs (Mc Kinnon, 1998, 2003, 2018) [23–25]. At last, the previous systematic literature review on the topic, such as Evangelista et al. (2018) [9], approached the subject with a unilateral view of LSPs.

For these reasons, our research proposal contributes to identifying the determinants of a CER initiative (motivations/pressures/incentives), the modalities (stakeholders, the modes of communication, information flows between actors, resources, moderating factors), and the outcomes (practices for CER, intra- and inter-organizational collaboration) necessary for a better environmental alignment between actors. Further, by comparing buyers' and sellers' views on environmental sustainability behaviors, contrasting patterns will emerge based on the actor's different roles in the supply chain, providing a further depth of insight by conceptualizing how their different conditions influence green logistics purchasing practices.

After identifying the need for this systematic review and formulating its proposal, the next phase consists of developing the protocol for the systematic review. The protocol of this systematic review is based on the steps defined in [18] completed by the works of Webster et al. (2002) [26] and Seuring and Müller (2008) [27] to explain the methods used in each phase, as shown in Table 1.

Table 1. Protocol for systematic review (adapted from Seuring and Müller (2008) [27]).

Stage	Phase	Method
Conducting	Identification of research	Structured search by keywords Cross-referencing technique
	Selection of studies	Inclusion/Exclusion criteria
	Study quality assessment	International Scientific Indexing (ISI) classification
	Data extraction and monitoring progress	Bibliographic reference management software
	Data synthesis	Concept matrix
Analysis and Results	The report and recommendations	Descriptive analysis
	Getting evidence into practice	Synthesis of main findings and research opportunities

2.2. Conducting the Review

This stage corresponds to the identification of the research, the selection of the articles, the evaluation of their quality, the collection and extraction of the data, as well as the synthesis of the results, which will be presented in the next section. The collection of the material for this study was carried out by mobilizing a structured search by keywords, which consists of defining the relevant keywords and developing the search string. The step of choosing keywords is crucial because they are defined according to the research question. Therefore, the set of relevant keywords has been identified on the basis of previous research, the experience of the four authors on the subject, and different experts and professionals in the field of green logistics of the "French Environment & Energy Management Agency" ADEME, which funds the research. To test the relevance of the keywords identified, a

focus group meeting was set up. Only the keywords recognized as the most inherent by the focus group participants were selected and then organized into three main families of topics: purchasing situations, transport, and low carbon (Table 2). The combination of these three families of keywords (or three topics) makes it possible to find the buyer/supplier commercial relationship in the context of reducing carbon emissions in the papers, which is the core of our study. Using the above sets of keywords, at least 360 combinations have been obtained and applied to the most important search engines, Scopus and Wiley. These databases ensure a good coverage rate of international academic journals on green transport (Evangelista et al., 2018) [9].

Table 2. Distribution of relevant keywords per family topic.

Purchasing (5 Keywords)	**Transport (9 Keywords)**	**Low Carbon (8 Keywords)**
Purchasing	Transport *	Carbon Emission *
Procurement	Carrier *	CER
Loader *	Road transportation	Environnement *
Buying	Transportation service *	Green
Buyer *	LSP	Low carbon
	Freight *	CO_2
	Shipper *	Greenhouse gas emission *
	Third-party logistics *	GGE
	3PL	

Note: The "*" indicates possible derivatives of the keyword.

For the next phase concerning the selection of papers, several inclusion criteria were applied for filtering the materials: (i) the inclusion of business-to-business purchasing activities of freight road transportation—since business-to-consumer purchasing activities are outside the scope of this study, they have been deleted from the body of potential publications; (ii) the exclusion of public procurement, humanitarian, or event logistics problems; and (iii) the exclusion of multi-objective optimization models from the selection.

Since the assessment of the quality of the publications selected is complex but imperative [18], the application of the criterion of inclusion of classified journals for articles seems to constitute a more objective solution because of the prior evaluation processes made by peers and the associated impact factors. Thus, for more reliability, as a unit of analysis, we used a high peer-reviewed English scientific journal (international scientific indexing (ISI) classification) on business and management.

Once the combinations of relevant keywords and associated search criteria were applied, 290 peer-reviewed articles were collected from the two databases. After filtering out duplicate articles (124), the number of articles decreased to 166. We then performed an abstract analysis (by reading the abstract), where we applied our inclusion criteria presented above. Forty-seven articles were retained. The complete list of publications after the application of the inclusion criteria was uploaded to a bibliographic reference management software and shared between the four authors to perform a second sorting: retain articles that contribute to answering our research questions after reading the summary and the introduction/conclusion or even a complete reading in case of ambiguity. The content analysis is an important step in order to understand what research works are currently achieving, what they have in common, and the originality of their approaches. Beyond the usual criteria for the description of an academic publication (author, date, title, name of the journal. . .), reading articles brought key dimensions (Level/unit of analysis, motivation, barrier, moderator factors, green actions, and main contribution) that structure the analysis and then lead to findings. Then, a concept matrix has been built in order to ease the analysis and the synthesis of the author's point of view. This method next facilitates all statistical treatment of the collected data. We divided 47 articles retained in two. Each paper was analyzed by two researchers using the concept matrix. After that, a discussion between them had to lead to a common coding for each article. The results were discussed, and

different judgments were resolved jointly by the four authors during multiple meetings. Ultimately, 20 articles were selected whose content meets at least one of the key dimensions of the concept matrix (Level/unit of analysis, motivation, barrier, moderator factors, green actions, and main contribution). Subsequently, the implementation of the cross-referencing technique makes it possible to complete the search using keywords. Indeed, it allows the reintegration of works that do not mention the chosen keywords. This method leads to the integration of eight articles from classified journals. As a result, the final sample included 28 articles in total that were all relevant to how freight transport can reduce emissions through business collaboration between shippers and LSPs (Figure 2).

Figure 2. Review process.

2.3. Analysis and Results

In the third stage, the sample of selected journal articles was analyzed using a two-step approach. First, a descriptive analysis was conducted to identify some key characteristics of the final sample set (See Section 3). Secondly, the content of the articles included in the final sample was analyzed (See Section 4). In this analysis, we focused on an in-depth exploration of the core literature. Hence, the category and structure of the publications can be presented according to several dimensions. This approach helps in understanding how researchers address our research questions. We also adopted a critical approach when analyzing the publications and discussing the overall situation. The sequence of the explanation of the publications is based on the year of publication—starting with the oldest publication. Based on this review, we will synthesize major trends in the analysis of drivers, barriers (RQ1), contingency factors (RQ2), and Green Transportation Purchasing Practices (GTPP) for reducing CO_2 emissions.

3. Descriptive Analysis

In the material collection step, we identified 290 publications on green purchasing for road transportation. By applying the first filter by title and abstract, we thoroughly read 166 publications. The first and second filters yielded 28 publications relevant to the research topic.

We overview these 28 articles and perform an in deep analysis to identify the journals publishing the articles' topics, the geographical target of the studies, the categories of stakeholders, the research methods, and the theories.

3.1. Main Journals Covered

The 28 articles have been published in 16 very diverse journals. However, none of these articles have a clear focus on the green practices for road transportation service in a collaborative approach. The only exception is the "International Journal of Physical Distribution & Logistics Management", which has six articles on this subject (See Table 3).

Table 3. Distribution of articles by journals.

Journal	Number Articles
Interactional Journal of Physical Distibuton & Logistics Management	6
Journal of Purchasing & Supply Management	3
International Journal of Logistics Research and Applications	3
Journal of Cleaner Production	2
Transportation Research Part D: Transport and Environment	2
Research in Transportation Business & Management	2
Management of Environmental Quality: An International Journal	1
International Food and Agribusiness Management Review	1
Logistics Research	1
International Journal of Logistics Management	1
International Journal of Logistics Systems end Management	1
Strategic Outsourcing: An International Journal	1
The International Journal of Logistics Management	1
International Journal of Production Economics	1
Industrial Marketing Management	1
International Journal of Productivity and Performance Management	1
Total	**28**

3.2. Targeted Geography

Another way to look at the publications is to review the countries where the studies have been conducted. In particular, this approach is relevant when reviewing empirical studies. The proportion of the sample representing Europe accounts for 86%, with a majority of the publications conducted in the Nordic countries (46%) and, particularly, Sweden (34%). This confirms the leadership of the European countries in the research on carbon emissions reduction. The finding also shows the contribution of researchers from certain regional clusters. Table 4 indicates an under-representation of this topic in countries producing the most freight transport emissions. For example, according to EUROSTAT 2017, the freight transportation industry accounted for 38% of employment in Germany, Poland, and France. However, this subject was represented in less than 10% of the studies conducted in these countries.

Table 4. Empirical studies by countries.

Countries Studied	Number of Papers *	%
Sweden	12	34%
CEE	4	11%
Italy	4	11%
USA	4	11%
Scandinavia	2	6%
Germany	2	6%
Denmark	1	3%
Finland	1	3%
France	1	3%
Holland	1	3%

Table 4. *Cont.*

Countries Studied	Number of Papers *	%
Ireland	1	3%
Switzerland	1	3%
Asia	1	3%
Total	**35**	**100%**

* If there is more than one country in a paper we count 1 for each country investigated.

3.3. Stakeholders and Research Type

The authors distinguished three types of stakeholders—shippers, LSPs, and carriers (see Table 5). It is important to specify that the term LSP does not only cover road transport but also covers a set of logistics services. We can see that in our panel of articles, we have quite an equivalent proportion of articles focused on LSPs or shippers, while 10 articles investigated green transportation practices from the commercial point of view of the interaction between LSPs and shippers. Table 5 also gives an overview of the type of method used in these studies. We can see, for example, a lack of case-study approaches regarding the phenomenon while researchers are taking the shipper point of view. We can also note that only four studies considered a real dyadic approach (i.e., field studies including shippers and LSPs having business relationships). We suggest that this is a real methodological gap while we consider, like (Evangelista et al., 2018) [9], that the more efficient practices in green transportation could mainly emerge from LSP-and-shipper collaboration.

Table 5. Stakeholders and research methods.

Stakeholders	Number of Papers	Research Methods				
		Case Studies	Surveys	Mix	Experiment	Dyadic Approach
LSP	**9**					
Abbasi and Nilsson, 2016 [28]		x				
Bask et al., 2018 [12]				x		
Evangelista, 2014 [29]		x				
Kudla and Klass-Wissing, 2012 [30]		x				
Lieb and Lieb, 2010 [31]			x			
Nilsson et al., 2017 [15]				x		
Perotti et al., 2012 [32]		x				
Perotti et al., 2015 [33]		x				
Pieters et al., 2012 [34]			x			
Shippers	**8**					
Bjorklund, 2011 [35]			x			
Jazairy and Haartman, 2020 [36]			x			
Lammgård and Andersson, 2014 [37]			x			
Large et al., 2013 [38]			x			
Palsson and Kovacs, 2014 [39]			x			
Pazirandeh and Jafari, 2013 [40]			x			
Philipp and Militaru, 2011 [41]			x			
Davis-Sramek et al., 2020 [42]			x		x	

Table 5. *Cont.*

Stakeholders	Number of Papers	Research Methods				
		Case Studies	Surveys	Mix	Experiment	Dyadic Approach
Shippers/LSP	**10**					
Bjorklund and Forslund, 2013 [43]			x			
Huge-Brodin et al., 2020 [44]		x				
Jazairy, 2020 [13]		x				
Jazairy and Haartman, 2021 [45]		x				
Jorsfeldt et al., 2016 [46]		x				
Martinsen and Björklund, 2012 [14]						x
Martinsen and Huge Brodin, 2014 [47]		x				x
Rogerson, 2017 [48]		x				
Sallnäs and Huge-Brodin, 2018 [49]		x				x
Wolf and Seuring, 2010 [17]		x				x
Shippers/Carriers/Voluntary Environmental Program (VEP)	**1**					
Ellram and Golicic, 2016 [50]		x				
Total	**28**	**14**	**11**	**2**	**1**	**4**

3.4. Few Theories Mobilized

Concerning the methodological aspect of publications (Table 6), very few articles mobilized a theory. Out of the 28 articles, only 8 articles explicitly referred to a theory in order to structure their empirical investigation. Not surprisingly, stakeholder theory is the most used theoretical framework, mainly when the authors investigated the shipper's point of view. This result contrasts with that of the SLR of Evangelista et al., 2018 [9], who found that the Resource-Based View was the dominant theory for articles focusing on environmental sustainability in third-party logistics. We can advocate that this difference is mainly due to the focus on the LSP point of view (Evangelista et al., 2018) [9]. Indeed, for an LSP, green transportation has more strategic stakes. So, academics naturally mobilize a theory in the field of strategic management in order to enlighten the decisions of actors.

Table 6. Theories used in some articles.

Theory	Reference	Number of Papers
Stakeholder theory	Huge-Brodin et al., 2020 [44]	3
	Martinsen and Huge Brodin, 2014 [47]	
	Palsson and Kovacs, 2014 [39]	
Agency theory	Kudla and Klass-Wissing, 2012 [30]	1
Institutional theory	Jazairy and Haartman, 2020 [36]	1
Legitimacy theory	Ellram and Golicic, 2016 [50]	1
Paradoxes theory	Sallnäs and Huge-Brodin, 2018 [49]	1
Social exchange theory	Davis-Sramek et al., 2020 [42]	1
	Total	**8**

4. Content Analysis and Main Results

This section provides details about the content analysis of the selected papers grouped around our three Research Questions: (RQ1) What are the main internal and external motivations and barriers associated with the implementation of an approach to reduce CO_2 emissions? (RQ2) Which contingency factors may influence environmental consideration for both actors (LSPs and shippers)? (RQ3) How does the literature account for Greening Transportation Purchasing Practices (GTPP) from the different stakeholder perspectives?

4.1. Motivations and Barriers for Achieving Environmental Sustainability in Transport Operations in a Shipper–LSP Relationship

This section presents the results of the literature review in order to respond to RQ1 concerning the motivations and barriers usually pointed out for achieving CER in shipper/LSP relationships. Based on the literature, the motivations for LSPs to apply green supply chain management (GSCM) practices to transportation can be categorized into internal motives or strategy and external pressures.

4.1.1. Internal Motivations for GSCM Practices

Internal motivations originate from a business strategy operationalized through a logistics strategy. The key internal motivations for adopting GSCM practices are employee commitment, clear environmental vision, and management support (Huang et al., 2017) [51]. From an LSP perspective, environmental vision seems to be embedded in most firms' values (Bask et al., 2017) [52] and actively oriented toward internal GSC. Typically, LSPs have their own environmental strategies and policies. They aim to decrease their CO_2 emissions, given that carbon emission reduction is integral to saving costs. In other words, saving fuel saves costs and simultaneously lowers emissions. Given this, environmental sustainability should be integrated with operational performance and cost indicators to boost connected competitive advantage. In this regard, the survey by (Bask et al., 2017) [52] shows that LSPs do not proactively offer environmental services to their shippers. They may offer these services if the latter are solicited by the shippers. In this case, the reviewed studies lack a methodology that can model the collaboration required between actors to facilitate CER.

4.1.2. External Pressures for the Adoption of GSCM Practices

Government support and the establishment of regulations constitute an important motivating factor for the adoption of carbon emission reduction (CER) practices. The mandatory carbon reporting in England has led some British companies to improve the sustainability and environmental performance of their supply chains (Dadhich et al., 2015) [53]. While regulation remains a strong motivator, it is not necessarily a trigger (Walker et al., 2008) [54].

The role of suppliers seems more mixed; it is sometimes considered to be of little importance (Walker et al., 2008) [54]. Environmental practices implemented by competitors may also encourage companies to adopt new environmental approaches, thereby improving their competitive advantage (Evangelista, 2014) [29].

The increasing awareness of environmental issues among societal actors, particularly consumers and NGOs (Hall, 2000; Beamon, 2005) [55,56]. Concerning consumers, customer demand is the primary reason LSPs are developing environmentally sustainable services (Seuring and Muller, 2008; Lieb and Lieb, 2010) [27,31]. LSPs that can offer environmentally friendly services receive more requests for quotations (RFQs) and, consequently, obtain more business (Bask et al., 2017) [52]. Shippers also expect LSPs to follow certain environmental regulations and standards. The literature shows that other external pressures for sustainability can come from other supply chain members, competitors (Evangelista, 2014) [29], government (regulations), shareholders, and NGOs (Seuring and Muller, 2008; Jazairy and Haartman, 2020; Ellram and Golicic, 2016; Huang et al., 2017) [27,36,50,51]. If companies do not feel these pressures from their contractors, they may be reluctant to implement environmental initiatives (Colicchia et al., 2013) [57]. The implementation of en-

vironmental strategies by contractors can also promote the adoption of new environmental practices within the supply chain (Evangelista, 2014) [29].

Jazairy and Haartman (2020) [36] also show that institutional pressures (regulatory, market, competitive) on shippers and LSPs drive them to adopt GSCM practices. These researchers examine the impact of external pressures and moderators on green logistics purchasing/providing decisions. They obtain empirical data from eight individual cases—three shippers and five LSPs. The authors use institutional theory to analyze the institutional pressures (i.e., external drivers) on firms to engage in environmental actions. In a GSCM context, these pressures emerge from regulations, markets, and competitors (Zhu and Sarkis, 2007) [58]. Institutional theorists stress that firm and market characteristics moderate the level of pressure experienced by a firm by either magnifying or diminishing the pressure (Delmas and Toffel, 2008) [59].

Regulatory pressure can be defined as "the coercive pressures driving the implementation of GSCM by managers in hopes of improving their performance" (Zhu and Sarkis, 2013) [60]. An example of this type of pressure is when governmental agencies enforce certain policies or taxation on firms to limit the environmental impact associated with their business (Seuring and Müller, 2008) [27]. As per Zhu and Sarkis (2007) [58], market pressure is exerted by customers on suppliers to act sustainably. In this case, the firms induce their suppliers to comply with environmental and social norms (Seuring and Müller 2008) [27], such as acquiring environmental management system certifications (e.g., ISO 14001). Finally, competitive pressure is witnessed when firms mimic green strategies adopted by successful firms in their field in order to increase their legitimacy, enhance performance, and gain competitive advantages (Colicchia et al., 2013) [57]. When two firms are subjected to the same level of pressure, they tend to respond differently. This can be attributed to the moderating effect of managerial commitment on environmental responsiveness. In this case, managers play a role when the pressures cross a firm's boundary. Managerial commitment is influenced by the interpretation of pressures, top management support, economic conditions, organizational structure, and collaboration opportunities.

Using a systemic approach, Ellram and Golicic (2016) [50] explore legitimacy-related motivations to utilize a voluntary environmental program (VEP) in order to improve environmentally responsible freight transportation practices (ERTPs). Using the case studies of US shippers and carriers, they developed propositions to better understand the motivations for and perceived benefits of pursuing these practices by joining or not joining the SmartWay transportation VEP. The findings indicate that pragmatic and moral legitimacy are the primary legitimacy drivers of joining a VEP and implementing these practices. In this regard, the findings suggest that membership in a transportation VEP can help the reduction of greenhouse gas emissions and costs, which could encourage and expand these practices.

4.1.3. Barriers to CER Initiatives

LSPs tend to adopt green supply chain practices because of immediate environmental and cost-efficiency issues and not because of an interest in sustainability (Centobelli et al., 2017) [8]. From the perspective of the relationship with their customers, the shippers' unwillingness to pay has been suggested as the main constraint to the adoption of environmental sustainability by LSPs (Evangelista, 2014) [29]. Owing to the lack of accepted methods for measuring and reporting the environmental impact of transportation, the LSPs and shippers can neither share the costs and benefits of environmental initiatives nor use such initiatives for marketing objectives (Bask et al., 2017) [52]. The absence of standard methodologies can also impede collaborative actions to improve the environmental sustainability of the supply chain. However, standard methodologies can help companies measure the environmental impacts and share the costs and benefits of environmental initiatives (Colicchia et al., 2013) [57].

It must also be noted that, as buyers of transport services, shippers rarely possess expertise on transportation issues; they might not be able to guide and advise LSPs in CER

initiatives (Ellram and Golicic, 2016) [50]. Bask et al. (2017) [52] indicate that when shippers purchase transport services, even though they sometimes follow the environmental criteria for RFQs, these criteria do not play a critical role in decision-making during negotiations. This may be attributed to the fact that there are no functional tools for monitoring environmental progress, and thus, it is not possible to impose penalties for failing to reach the targets.

In the context of the responses to pressures, Palsson and Kovacs (2014) [39] show that both actors are influenced by various factors that moderate the level of pressure on them and the responses they undertake.

4.2. Influence of Contingency Factors on Environmental Consideration in GSCM Practices

This topic area contains papers discussing buyer/LSP perspectives and determiners of environmental considerations in GSCM practices for transport services. Bjorklund (2011) [35] uses factor analysis to identify contingency factors that may influence environmental purchasing performance. Of the 16 categories of factors identified in this study, the results indicate that the most important factors are internal management, image, resources of the firm, means of control, product characteristics, and the education of employees. For example, it has been shown that top and middle managers' awareness, priorities, and support are critical to successful environmental practice and green SCM (Zhu et al., 2008) [61]. Pazirandeh and Jafari (2013) [40] indicate that companies with a green sustainability strategy improve their transportation and environmental performance by focusing on both purchasing and operations perspectives. The characteristics of environmental management can influence environmental purchasing (Zsidisin and Siferd, 2001) [62]. Awareness of employees, staff confidence, interest, and knowledge can also influence GSCM practices. Several researchers indicate that product characteristics can also influence the buying process, environmental practices, and transportation (Mc Kinnon, 1998; Carter et al., 2000) [23,63]. These characteristics include financial value, product availability, design, and complexity.

Evangelista (2014) [29] also highlights the criticality of the involvement and support of entrepreneurs or business leaders. In this context, it must be noted that the intrinsic motivation for a commitment to sustainable development seems to depend on the ethical and personal orientation of individuals (especially leaders and managers) who transmit their values to their entire organization and transform them into environmental initiatives on a daily basis. Pagell and Wu (2009) [64] also established that managerial knowledge makes companies more sustainable. Personal ethical values and managerial knowledge are intangible and difficult to quantify; they vary across individuals, depending on age groups, work experience, and education.

Using gap analysis, Martinsen and Björklund (2012) [14] assess the degree of alignment between the supply of green services by logistics companies and shippers' demand. In line with these studies, Huge-Brodin et al. (2020) [44] suggest that a possible inhibitor of the development of greener logistics services is the low degree of alignment between LSPs and their customers. This can be attributed to their different roles, strategic priorities, business models, corporate cultures, and operational processes (Isaksson and Huge-Brodin, 2013) [65]. Using case studies, this research concludes a poor alignment in relation to the environmental dimension of logistics, ambition levels, and actual offerings and requirements. While LSPs demonstrate higher ambition levels for greening logistics, shippers demonstrate lower ambition levels. To improve the understanding of the situation, we applied principles derived from the stakeholder theory. These guidelines support the finding that the shipper's customers are important stakeholders (Huge-Brodin et al., 2020) [44], and these secondary stakeholders may exert greater pressure to change. Given this, alignment required the need for more collaborative approaches for CER initiatives.

4.3. Greening Transport Purchasing Practices (GTPPs)

The previous literature reviews have investigated the Environmental Sustainability Practices in Transportation (Evangelista, 2014, 2018; Ellram and Golicic, 2016) [29,50] or Environmental Sustainability in Freight Transportation (ESFT) (Ellram and Murfield, 2017) [4]. Both dimensions embrace the same reality. In other words, "shippers and LSPs' efforts in transportation matter that involve effective and efficient utilization of resources, including fuel, vehicles, and technologies, to reduce fossil fuel usage and environmental impact" (Ellram and Murfield, 2017) [4] (p. 264).

In this regard, we identified at least three kinds of academic investigations of practices developed by actors in the supply chain, as follows.

4.3.1. The LSP's Perspective

Green logistics practices (GLPs) are the most documented practices in the literature (Bask et al., 2018; Martinsen and Borjkund, 2012; Nilsson et al., 2017; Abbasi and Nilsson, 2016; Evangelista, 2014; Kudla and Klass-Wissing, 2012; Lieb and Lieb, 2010; Perotti et al., 2012, 2015; Pieters et al., 2012; Sureeyatanapas et al., 2018) [12,14,15,28–34,66]. One of the most common outputs of this literature is to define a set of GLPs that can be adopted by the LSP to provide a *greener* offer. The main GLPs quoted in the literature are presented in Table 7.

Table 7. Green logistics practices (GLPs) of LSPs. (Adapted from Ellram and Murfield, 2017; Perotti et al., 2012; Jazairi and Haartman, 2020; Martinsen and Huge Brodin, 2014; Sureeyatanapas et al., 2018; Mashud et al., 2024 [4,32,36,47,66,67]).

Green Logistics Practices of LSP	Description of the Practices
(1) Green modal shifts	Shifting to a more environmentally friendly transport mode (e.g., from road to rail, intermodal platforms)
(2) Green transport management	Increasing fill rates, consolidating shipments, optimizing routes
(3) Green logistics systems	Improving distribution networks, reducing haul length
(4) Green vehicle technologies	Operating more efficient engines, engine stopping when stationary
(5) Eco-driving	Driving techniques to decrease fuel consumption
(6) Alternative fuels	Operating alternative fuel-powered vehicles (e.g., electric trucks, trucks powered by biofuel such as hydrotreated vegetable oil)
(7) Environmental management systems (EMS)	Acquiring certificates such as ISO 14001, EMAS and ISO 5001
(8) Reverse logistics	Taking back used products or packing materials from customers for reuse or recycling, collaborating with customers on recycling programs
(9) Green administration	Selecting, auditing, or assessing partners based on their environmental performance, promoting employee awareness of environmental performance, developing environmental policies
(10) Green packaging	Packing design, reduction, reused and recycling for the environment
(11) Green warehousing	Increasing energy efficiency of warehousing operations, supplying warehouse facilities with renewable energy
(12) Emission data	Calculating, reporting and analyzing CO_2 emissions
(13) Cooperation with shippers	On solution, on flows and supply chain design
(14) Choice of partners	Choose environmentally conscious transport and logistics providers

4.3.2. The Shipper's Perspective

Another stream of research on ESFT focuses on how shippers establish a more environmentally friendly logistics system by making logistics decisions, thus minimizing transport emissions. Following Pazirandeh and Jafari (2013) [40], we refer to shippers' practices induced by this objective as greening transport operations (GTOs). The GTO comprises a

large set of practices that influence the transportation demand of a specific shipper. Table 8 summarizes the GTO practices based on various references.

Table 8. Green transport operations (GTO) of shippers (adapted from Ellram and Ueltschy Murfield, 2017; McKinnon, 2003; Pazirandeh and Jafari, 2013; Abrahamsson et al., 2003; Buysse and Verbeke, 2003; Hart and Ahuja, 1996; Kohn and Brodin, 2008; Prendergast and Pitt, 1996; Yang et al., 2005; Wu and Dunn, 1995 [4,24,40,68–74]).

Green Transport Operations	Description of the Practices
(1) Favorise green modal shift	Rethinking the business and supply chain model of the company in order to accept more "green" transportation modes
(2) Measure and report transport emission to stakeholders	This internal decisions on transparency induce a higher pressure to adopt a "greener" point of view
(3) Optimising vehicle load	By a better planning and/or some supply chain decisions (such as relocation of supply), optimizing the load of truck
(4) Made green investment	. . . to reduce wastes, consumption, green packaging, change energy modes. . .
(5) Use IT tool to improve transport efficiency	Using APS to improve forecast, TMS,
(6) Develop Reverse logistics	Reuse product and packaging, better pallets utilization. . .
(7) Reduce emerging shipment	Better segmentation of customer needs, better forecasts. . .
(8) Give more value to green services of LSPs	Aligning our freight purchasing practices to our environmental strategy

For example, McKinnon (2003) [24] and Wu and Dunn (1995) [74] point out that pursuing a larger share of sea and railway transport is one of the most efficient GTO practices. Studies also show that increasing vehicle utilization by, for example, reducing the volume of goods (Prendergast and Pitt, 1996; Wu and Dunn, 1995) [72,74] is also a powerful tool for improving CO_2 emissions (Kohn and Brodin, 2008; Yang et al., 2005; Wu and Dunn, 1995) [66,71,73]. Buysse and Verbeke (2003) [69] highlight that reporting transport emissions to stakeholders can effectively change the decision-making criteria and enhance the importance of environmental matters. It is also important to increase green investments to improve the environmental performance of transportation (Hart and Ahuja, 1996; Wu and Dunn, 1995) [70,74]. This will include using IT support for analyzing transport efficiency (McKinnon, 2003; Wu and Dunn, 1995) [24,74] and reducing the number of emergency deliveries (Abrahamsson et al., 2003) [68].

Finally, one important GTO for shippers is to align their freight purchasing practices with their environmental strategies. Shippers have outsourced various types of transport and logistics services to LSPs to reduce costs and benefit from the latter's logistical expertise (Halldórsson et al., 2010) [67]. Thus, from one perspective, shippers depend on LSPs to achieve their green supply chain objectives (Bask et al., 2018; Jazairi, 2020) [12,13]. Conversely, LSPs are constrained by shippers' demands, given that shippers define the logistical services of LSPs (Wolf and Seuring, 2010) [17]. In this regard, the ESFT literature observes that LSPs engage more actively in selling GLPs than shippers do in purchasing them (Martinsen and Björklund, 2012; Wolf and Seuring, 2010; Kudla and Klaas-Wissing, 2012; Large et al., 2013; Jazairy and Haartman, 2021) [14,17,30,38,45]. For example, in their study on 115 European logistics service buyers, Large et al. (2013, p. 130) [38] found that "purchasing companies influence logistics service providers to a minor extent regarding ecologically and socially sustainable actions (. . .). Furthermore, purchasing companies" direct influence on logistics service providers' sustainable actions is put into effect, especially in the case of achieving economic goals at the same time'. Nonetheless, the development of environmental purchasing (Zsidisin and Siferd, 2001; Carter and Dresner, 2001) [62,75] and the governmental initiatives (e.g., Smartway in the US (Ellram and Golicic, 2016) [50] or FRET 21 in France (Touratier-Muller and Ortas-Fredes, 2021) [76]) have been gradually changing the purchasing policies and inducing shippers to consider the environmental impact of their choices on LSPs' practices (Wolf and Seuring, 2010;

Pålsson and Kovacs, 2014; Eng-Larsson and Kohn, 2012) [17,42,77]. Therefore, we can identify a third research stream at the core of our interest—logistics buyer perspective.

4.3.3. A Logistics Buyer Perspective

Some studies conducted a micro-level analysis focusing on how buyers' actors purchase transport services. To qualify this kind of research, we adopt the terminology used in Pazirandeh and Jafari (2013) [40]—greening transport purchasing practices (GTPPs). This term was developed to influence LSPs' services for freight transportation.

This literature can present the first taxonomy for analyzing (1) the buyer's viewpoint, (2) the viewpoints of the buyer and the LSP, and (3) the "*dyadic*" viewpoint (looking at the core of the collaboration between a buyer and its suppliers).

The Buyer's Viewpoint

The SLR identified two articles on GTPP from the standpoint of the sole shipper. For example, Lammgård and Andersson (2014) [37] focus on how companies consider the environmental performance of carriers in their selection decisions and on the evolution of these environmental criteria. They compare the results from two surveys conducted in 2003 and 2012, which involve large Swedish shippers (>100 people) in various sectors. They reveal a low level of environmental efficiency relative to the basic demand in terms of price, timeliness, and relational and IT factors. Another interesting result is that even if environmental considerations appear, logistics managers select transport providers on the basis of service aspects related to reliability and transport quality. Thus, they conclude that the importance of environmental efficiency has not increased over the years, as one might expect, even for shippers. Pazirandeh and Jafari (2013) [40] have a more contrasting observation in their study of 97 logistics managers and transport purchasers comprising large Swedish shippers (>100 people). For example, they validate the hypotheses of a significant relationship between a firm's sustainability strategy and efforts to green transportation. They also highlight the following practices statistically connected with the GTPP:

- Inducing transport providers to procure an environmental certification;
- Including environmental criteria when assessing transport providers;
- Using e-procurement tools to induce LSPs to conform to environmental standards;
- Demanding eco-driving-trained drivers;
- Demanding the use of greener vehicles.

However, beyond the weaknesses of these contradictory results, it is important to consider how to align the services of LSPs with the demand of shippers in order to enhance the environmental sustainability of freight transportation. To this end, the research must focus on the interaction between the client (shippers) and the suppliers (LSPs). Hence, certain studies consider both the actors as the units of analysis.

The Viewpoints of the Buyer and the LSP

Scholars have described a complex process for buying logistics services. For example, Andersson and Norrman (2002) [78] define eight phases in this process: define the service, understand the volume, simplify and standardize, study the market, request information, solicit a request for proposal, negotiate and contract, and follow up. This approach is often used by scholars to study GTPPs. In this context, Rogerson (2017) [48] shows that shippers' freight transport purchasing processes directly influence the GLP of LSPs that can be observable on the market. The author proposes a simplified purchasing process for transport services (define specification, make supplier selection, and sign the contract agreement) and uses three in-depth case studies in the Swedish market to show how shippers' purchasing processes influence CO_2 emissions in terms of logistical variables. The study shows that the most determining phase of this process is the initial phase. Jazairy (2020) [13] also studies the development of LSPs' GLPs based on the logistics purchasing process. However, this research intends to show that shippers cannot achieve

green outcomes by making more green demands. Jazairy (2020) [13] emphasizes that an alignment between demand and the LSP proposal at each stage of the purchasing process is critical to achieving green outcome. Based on in-depth case studies in Sweden and Germany (three shippers and four LSPs), he advocates, for example, that shippers' infeasible green demands may disrupt LSPs' offerings and hinder the CER efforts. In the same way, the research points out possible "deadlock situations in the negotiation phase, where shippers reactively await on LSPs to offer green innovations, surpassing the demands set in the RFPs, while LSPs reactively await for a green signal from shippers while channeling their efforts to secure the business deal under shippers' tight price-pressure competition" (Jazairy, 2020, p. 20) [13]. Jazairi and Haartmann (2020) [36] conduct an in-depth analysis of the concept of alignment in a quantitative study. Indeed, they study the *gap* perception created during the different phases of the purchasing process between 169 shippers and 162 LSPs in the Swedish market. The study shows that, throughout the purchasing process, LSPs' perceptions of their engagement in selling GLPs exceeded those of the shippers buying them. This factor created a gap between their engagements. They also measure the intensity of the gap (from wide to emergent) for each GLP. Similarly, Martinsen and Huge-Brodin (2014) [47] examine the same kind of gap by studying the web page of four dyads of shippers and LSPs in Sweden. "The results suggest that LSPs, to a much larger extent, present details of environmental practices included in their offerings than do shippers in their presentation of requirements" (Martinsen and Huge-Brodin, 2014, p. 114) [47]. Martinsen and Bjorklund (2012) [14] study five potential gaps in a survey of 46 LSPs and 50 shippers in the Swedish market. They show that the largest gap is addressed in the LSPs' view of their offers and how they perceive the demand from the shippers. These results are aligned with those of later research (Jazairi and Haartmann, 2020; Huge-Brodin et al., 2020) [36,44]. In these studies, LSPs demonstrate higher ambition levels as well as concrete and detailed offerings based on GLPs, while shippers demonstrate lower ambition levels for greening logistics and solicit more general and standardized requirements for green logistics services. Concerning the determinant of alignment, Björklund and Forslund (2013) [43] show that the contract can force an alignment between LSPs and shippers. By empirically investigating 52 LSPs and 103 shippers in the Swedish context, they found that companies that include environmental performance in transport contracts do not necessarily consider how to measure environmental performance and handle non-compliance.

The Dyadic Point of View

Wolf and Seuring (2010) [17] highlight the importance of the relationship between LSPs and shippers in order to understand the gaps and the ineffectiveness of the GLPs. They call for research on the need to adopt a dyadic approach for facilitating green outcomes. They study the commercial collaboration between six shippers and three LSPs. The study indicates that internal cooperation poses a more important challenge (Wolf and Seuring, 2010, p. 97) [17]. The challenge also lies in the environmental thinking of organizations. As Wolf and Seuring (2010, p. 98) [17] state, "In order to successfully integrate environmental thinking into these departments, the company needs to find staff members who are competent in logistical and environmental issues at the same time. Otherwise, the environmental responsibility lies with the environmental department of a company, which usually is not very well informed about operations and vice versa; in other words, they often 'do not speak the same language' and have difficulties in communicating".

Another challenge studied by these dyadic approaches is the interorganizational approach. Jorsfeldt et al. (2016) [46] investigate how a sustainability agenda affects the operational coordination between the buyer and the supplier. They consider a sustainability-conscious Danish company through a single case study that shows how the operational coordination between the case company and the LSP changed after the introduction of the sustainability agenda. Over time, they observe an increase in cross-functional and cross-organizational activities. They observe that, to address the sustainability challenge, "the logistics function began to play the role of 'integrator' across the functions in the

company and across the organization during the implementation of the strategic plan for the reduction of CO_2 emissions in ongoing logistics operations. The findings of this study indicate the crucial role of the logistics function as a boundary function for integrating the operational processes across companies in the supply chain" (p. 22). A last question on this subject could be the effective governance of the collaboration between LSPs and shippers in a CER context. Jorsfeldt et al. (2016) [46] have not specifically addressed the nature and extent of the evolution of the contract between the companies. It states that the contract's duration has been extended to a maximum of four years to enable collaboration on sustainability issues, but it does not provide detailed information on the specific terms and conditions of the contract. For Wolf and Seuring (2010) [17], there is no direct mention in their article of a necessary evolution of the contracts but rather that the challenge will be to implement specific procedures to ensure the new demand is "audited and monitored".

Figure 3 synthetizes our literature review of greening transport purchasing practices (GTPP). At the top of the figure, we identify the topics linked to our RQ 1 and 2, i.e., related to motivations for adopting green transportation practices and also to the analyze of contingency factors associated. In the central square, we organize the literature review on green transportation practices first according to the stakeholder point of view (LSP, shipper, or shipper/LSPs' relationship). On the shipper side, we distinguish first the research focus on the changes induced by modifications of the demand (what Pazirandeh and Jafari call "greening transport operations"). Second, we point out the studies that investigate the way that the shippers transfer these changes in their purchasing practices (GTPPs). Finally, our main interest was to identify the core literature adopting a real collaborative approach to these changes by using, as a central unit of analysis, the relationship between shippers and LSPs.

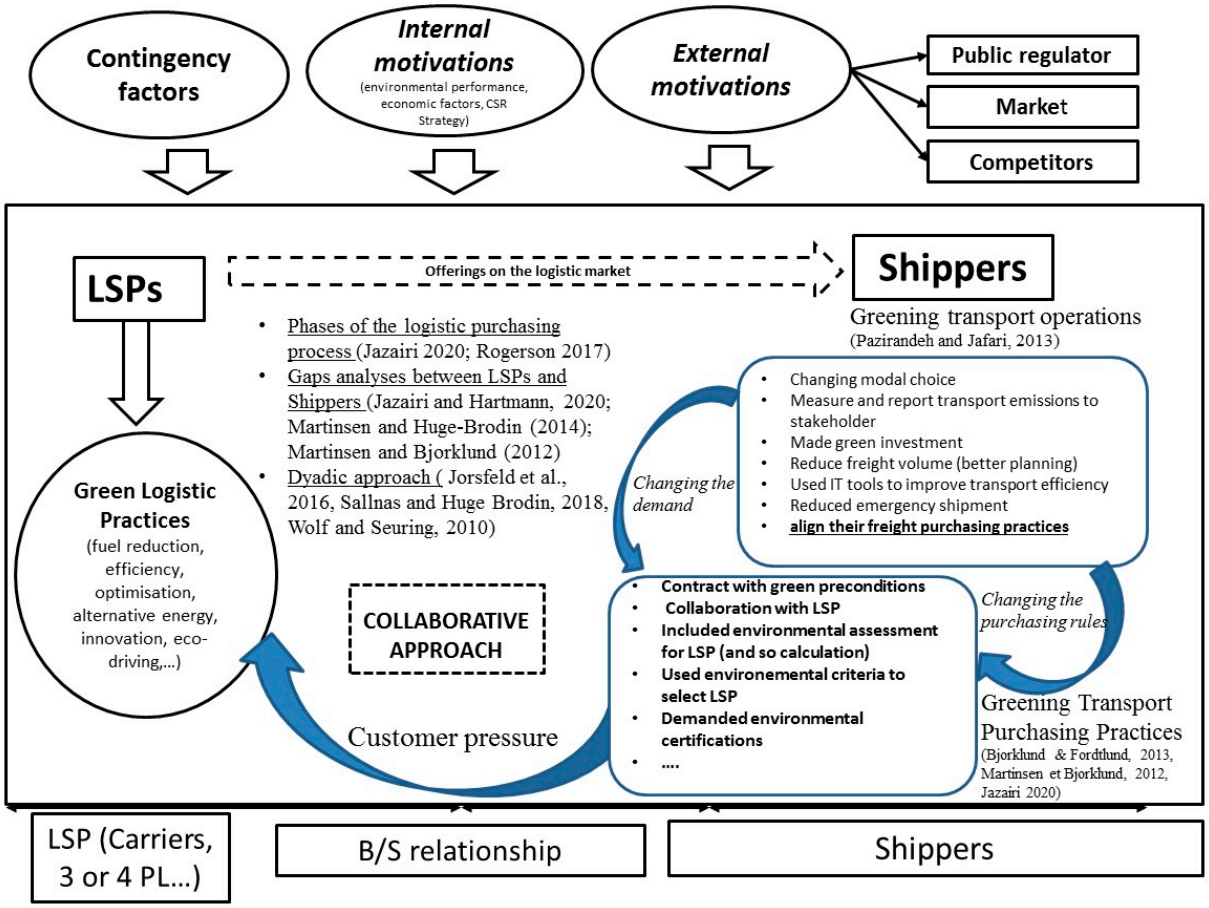

Figure 3. Synthesis of the literature review on green transportation practices [13,14,17,36,40,43,46–49].

If there are some research studies on the respective impacts of CER deployment on PSL practices and on the evolution of transport purchasing practices to date, there are few approaches that focus on what happens in the center of Figure 3, that is, on how we advance together towards the CER goal and in particular on virtuous collaborative practices in this matter. Similarly, the articles highlight the difficulty of bringing out CER objectives among the stakeholders (lack of perceived value by shippers of CER services for PSLs and difficulties in valorizing the inclusion of these CER clauses in purchasing practices for shippers). It is legitimate to question the interest in voluntary programs initiated by the state (such as SmartWay in the US or Fret 21 in France) that would stimulate and frame practices.

5. Conclusions

This study conducted an SLR of 28 articles to explore the existing body of knowledge on the implementation of green practices through a commercial collaboration between the LSPs and shippers. The analysis helped in identifying the main themes under which the selected articles were classified. We also detected several research gaps, which guided the future scope of research. For example, we found an overrepresentation of the Scandinavian context in the studies related to this topic (>50% of the 28 articles) while, in this geographic area, road transport of goods represents less than 6% of the European activity versus 8% for the sole French country (EUROSTAT, 2019) [79] studied in only one article of the panel. We also found that even though green transportation practices are constructed in the relationship between the shippers and LSPs, only 35% of the studies investigate, at the same time, the practices of both actors. Moreover, when they study both actors, only four of them adopt a real dyadic approach looking at how the practices are constructed in the collaboration between a shipper and its LSP. It seems to be an important gap to fill in future research because the review reveals the conflict between these actors (Wolf and Seuring, 2010) [17]. These actors manage a lack of trust and deal with a low level of environmental information within the supply chain.

This literature review also contributes to increasing the understanding of recent developments in the area of environmental sustainability in the logistics sector. Figure 3 provides a comprehensive framework of existing work on the topic.

Finally, this work provides some theoretical and practical implications. From a theoretical perspective, it integrates the literature in the logistics and purchasing management fields by identifying and classifying the main research streams related to the adoption of green transportation practices. It also provides some gaps to fill in future research, such as the investigation of the Scandinavian sector and adopting a real dyadic approach to the phenomenon. Hence, the study demonstrates the need to mobilize all transport and logistics stakeholders, drawing on the stakeholder's theory (Hart, 1995) [80], and shows that the interaction between several actors provides a favorable context for institutional isomorphism (Di Maggio and Powell, 1983) [81]. From a practical perspective, this work details several avenues toward conducting initiatives in order to enhance the development of green practices when one outsources transportation with better knowledge of the motivations and pitfalls of the adoption of these practices.

However, this research also has limitations linked with that kind of SLR approach. First, this study may have omitted relevant knowledge by not including papers in progress. Secondly, this research is time-bound (2023), and the legal framework of EPR (Extended Producer Responsibility; Lifset et al., 2013 [82]) has evolved significantly since then, which should influence the acceleration of CER deployment in supply chains. For example, in France, the law effective January 1, 2023, mandates the expansion of "greenhouse gas emissions reports" to include Scope 3 for companies with more than 500 employees. Moreover, this work is, by nature, descriptive and does not yet provide new propositions on the topic. In fact, this work is just the first piece of broader research conducted with an empirical base in order to reify how the dyad of a shipper and LSP are jointly implementing green transportation practices.

Author Contributions: Conceptualization, all authors.; methodology, G.M.B., R.C. and Y.M.; software, Y.M.; validation, G.M.B., R.C. and Y.M.; formal analysis, all authors; investigation, all authors; resources, all authors; data curation, all authors; writing—original draft preparation, all authors; writing—review and editing, all authors; visualization, all authors; supervision, G.M.B. and R.C.; project administration, G.M.B. and R.C.; funding acquisition, G.M.B. and R.C. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the ADEME institution (French Environmental and Energy Management Agency), grant n° 2066C0004.

Data Availability Statement: All articles analyzed in this systematic review have been cited in the "References Section" and are available in the journals that published them. No new data were created or analyzed in this study.

Acknowledgments: We would like to express our sincere gratitude to our respective research center and the administrative staff for their continuous assistance.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. FIT. *ITF Transport Outlook 2021*; OCDE: Paris, France, 2021. [CrossRef]
2. Ghosh, P.; Jha, A.; Sharma, R. Managing carbon footprint for a sustainable supply chain: A systematic literature review. *Mod. Supply Chain Res. Appl.* **2020**, *2*, 123–141. [CrossRef]
3. Koberg, E.; Longoni, A. A systematic review of sustainable supply chain management in global supply chains. *J. Clean. Prod.* **2019**, *207*, 1084–1098. [CrossRef]
4. Ellram, L.M.; Murfield, M.L.U. Environmental sustainability in freight transportation: A systematic literature review and agenda for future research. *Transp. J.* **2017**, *56*, 263–298. [CrossRef]
5. Marchet, G.; Melacini, M.; Perotti, S. Environmental sustainability in logistics and freight transportation: A literature review and research agenda. *J. Manuf. Technol. Manag.* **2014**, *25*, 775–811. [CrossRef]
6. Johnsen, T.E.; Miemczyk, J.; Howard, M. A systematic literature review of sustainable purchasing and supply research: Theoretical perspectives and opportunities for IMP-based research. *Ind. Mark. Manag.* **2017**, *61*, 130–143. [CrossRef]
7. Dzhengiz, T.; Niesten, E. Competences for environmental sustainability: A systematic review on the impact of absorptive capacity and capabilities. *J. Bus. Ethics* **2020**, *162*, 881–906. [CrossRef]
8. Centobelli, P.; Cerchione, R.; Esposito, E. Environmental sustainability in the service industry of transportation and logistics service providers: Systematic literature review and research directions. *Transp. Res. Part D Transp. Environ.* **2017**, *53*, 454–470. [CrossRef]
9. Evangelista, P.; Santoro, L.; Thomas, A. Environmental sustainability in third-party logistics service providers: A systematic literature review from 2000–2016. *Sustainability* **2018**, *10*, 1627. [CrossRef]
10. Meyer, T. Decarbonizing road freight transportation—A bibliometric and network analysis. *Transp. Res. Part D Transp. Environ.* **2020**, *89*, 102619. [CrossRef]
11. Jazairy, A.; von Haartman, R.; Björklund, M. Unravelling collaboration mechanisms for green logistics: The perspectives of shippers and logistics service providers. *Int. J. Phys. Distrib. Logist. Manag.* **2021**, *51*, 423–448. [CrossRef]
12. Bask, A.; Rajahonka, M.; Laari, S.; Solakivi, T.; Töyli, J.; Ojala, L. Environmental sustainability in shipper-LSP relationships. *J. Clean. Prod.* **2018**, *172*, 2986–2998. [CrossRef]
13. Jazairy, A. Aligning the purchase of green logistics practices between shippers and logistics service providers. *Transp. Res. Part D Transp. Environ.* **2020**, *82*, 102305. [CrossRef]
14. Martinsen, U.; Björklund, M. Matches and gaps in the green logistics market. *Int. J. Phys. Distrib. Logist. Manag.* **2012**, *42*, 562–583. [CrossRef]
15. Nilsson, F.R.; Sternberg, H.; Klaas-Wissing, T. Who controls transport emissions and who cares? Investigating the monitoring of environmental sustainability from a logistics service provider's perspective. *Int. J. Logist. Manag.* **2017**, *28*, 798–820. [CrossRef]
16. Rahman, M.M.; Ahmed, R.; Mashud, A.H.M.; Malik, A.I.; Miah, S.; Abedin, M.Z. Consumption-based CO_2 emissions on sustainable development goals of SAARC region. *Sustainability* **2022**, *14*, 1467. [CrossRef]
17. Wolf, C.; Seuring, S. Environmental impacts as buying criteria for third party logistical services. *Int. J. Phys. Distrib. Logist. Manag.* **2010**, *40*, 84–102. [CrossRef]
18. Tranfield, D.; Denyer, D.; Smart, P. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *Br. J. Manag.* **2003**, *14*, 207–222. [CrossRef]
19. Pereira, C.R.; Christopher, M.; Da Silva, A.L. Achieving supply chain resilience: The role of procurement. *Supply Chain Manag. Int. J.* **2014**, *19*, 626–642. [CrossRef]

20. Fabbes-Coste, N.; Kacioui-Maurin, E.; Lazzeri, J.; Roussat, C.; Mendy Bilek, G. Obligation d'affichage des informations CO_2 Transport: De la règlementation aux pratiques ? *Logistique Manag.* **2016**, *24*, 145–163. [CrossRef]
21. Wolmarans, P.; Hyland, E.; Atherton, S.; Bovet, D.; Bryan, J.; Cheng, A. *Sustainability Strategies Addressing Supply-Chain Air Emissions*; National Cooperative Freight Research Program and the Transportation Research Board of National Academies: Washington, DC, USA, 2014; p. 28.
22. Bynum, C.; Sze, C.; Kearns, D.; Polovick, B.; Simon, K. An examination of a voluntary policy model to effect behavioral change and influence interactions and decision making in the freight sector. *Transp. Res. Part D Transp. Environ.* **2018**, *61*, 19–32. [CrossRef]
23. McKinnon, A. Logistical restructuring, freight traffic growth and the environment. In *Transport Policy and the Environment*; Banister, D., Ed.; Routledge: London, UK, 1998; pp. 97–109.
24. McKinnon, A.C. Logistics and the environment. In *Handbook of Transport and the Environment*; Emerald Group Publishing Limited: Bingley, UK, 2003.
25. McKinnon, A. *Decarbonizing Logistics: Distributing Goods in a Low Carbon World*; Kogan Page Publishers: London, UK, 2018.
26. Webster, J.; Watson, R.T. Analyzing the past to prepare for the future: Writing a literature review. *MIS Q.* **2002**, *2*, 13–23.
27. Seuring, S.; Müller, M. From a literature review to a conceptual framework for sustainable supply chain management. *J. Clean. Prod.* **2008**, *16*, 1699–1710. [CrossRef]
28. Abbasi, M.; Nilsson, F. Developing environmentally sustainable logistics: Exploring themes and challenges from a logistics service providers' perspective. *Transp. Res. Part D Transp. Environ.* **2016**, *46*, 273–283. [CrossRef]
29. Evangelista, P. Environmental sustainability practices in the transport and logistics service industry: An exploratory case study investigation. *Res. Transp. Bus. Manag.* **2014**, *12*, 63–72. [CrossRef]
30. Kudla, N.L.; Klaas-Wissing, T. Sustainability in shipper-logistics service provider relationships: A tentative taxonomy based on agency theory and stimulus-response analysis. *J. Purch. Supply Manag.* **2012**, *18*, 218–231. [CrossRef]
31. Lieb, K.J.; Lieb, R.C. Environmental sustainability in the third-party logistics (3PL) industry. *Int. J. Phys. Distrib. Logist. Manag.* **2010**, *40*, 524–533. [CrossRef]
32. Perotti, S.; Zorzini, M.; Cagno, E.; Micheli, G.J. Green supply chain practices and company performance: The case of 3PLs in Italy. *Int. J. Phys. Distrib. Logist. Manag.* **2012**, *42*, 640–672. [CrossRef]
33. Perotti, S.; Micheli, G.J.; Cagno, E. Motivations and barriers to the adoption of green supply chain practices among 3PLs. *Int. J. Logist. Syst. Manag.* **2015**, *20*, 179. [CrossRef]
34. Pieters, R.; Glöckner, H.H.; Omta SW, F.; Weijers, S. Dutch logistics service providers and sustainable physical distribution: Searching for focus. *Int. Food Agribus. Manag. Rev.* **2012**, *15*, 107–126.
35. Björklund, M. Influence from the business environment on environmental purchasing—Drivers and hinders of purchasing green transportation services. *J. Purch. Supply Manag.* **2011**, *17*, 11–22. [CrossRef]
36. Jazairy, A.; von Haartman, R. Analysing the institutional pressures on shippers and logistics service providers to implement green supply chain management practices. *Int. J. Logist. Res. Appl.* **2020**, *23*, 44–84. [CrossRef]
37. Lammgård, C.; Andersson, D. Environmental considerations and trade-offs in purchasing of transportation services. *Res. Transp. Bus. Manag.* **2014**, *10*, 45–52. [CrossRef]
38. Large, R.O.; Kramer, N.; Hartmann, R.K. Procurement of logistics services and sustainable development in Europe: Fields of activity and empirical results. *J. Purch. Supply Manag.* **2013**, *19*, 122–133. [CrossRef]
39. Pålsson, H.; Kovács, G. Reducing transportation emissions: A reaction to stakeholder pressure or a strategy to increase competitive advantage. *Int. J. Phys. Distrib. Logist. Manag.* **2014**, *44*, 283–304. [CrossRef]
40. Pazirandeh, A.; Jafari, H. Making sense of green logistics. *Int. J. Product. Perform. Manag.* **2013**, *62*, 889–904. [CrossRef]
41. Philipp, B.; Militaru, D. Shippers' ecological buying behaviour towards logistics services in France. *Int. J. Logist. Res. Appl.* **2011**, *14*, 413–426. [CrossRef]
42. Davis-Sramek, B.; Robinson, J.L.; Darby, J.L.; Thomas, R.W. Exploring the differential roles of environmental and social sustainability in carrier selection decisions. *Int. J. Prod. Econ.* **2022**, *227*, 107660. [CrossRef]
43. Björklund, M.; Forslund, H. The inclusion of environmental performance in transport contracts. *Manag. Environ. Qual. Int. J.* **2013**, *24*, 214–227. [CrossRef]
44. Huge-Brodin, M.; Sweeney, E.; Evangelista, P. Environmental alignment between logistics service providers and shippers—A supply chain perspective. *Int. J. Logist. Manag.* **2020**, *31*, 575–605. [CrossRef]
45. Jazairy, A.; von Haartman, R. Measuring the gaps between shippers and logistics service providers on green logistics throughout the logistics purchasing process. *Int. J. Phys. Distrib. Logist. Manag.* **2021**, *51*, 25–47. [CrossRef]
46. Jørsfeldt, L.M.; Hvolby, H.-H.; Nguyen, V.T. Implementing environmental sustainability in logistics operations: A case study. *Strat. Outsourcing Int. J.* **2016**, *9*, 98–125. [CrossRef]
47. Martinsen, U.; Huge-Brodin, M. Environmental practices as offerings and requirements on the logistics market. *Logist. Res.* **2014**, *7*, 115. [CrossRef]
48. Rogerson, S. Influence of freight transport purchasing processes on logistical variables related to CO_2 emissions: A case study in Sweden. *Int. J. Logist. Res. Appl.* **2017**, *20*, 604–623. [CrossRef]
49. Sallnäs, U.; Huge-Brodin, M. De-greening of logistics?—Why environmental practices flourish and fade in provider-shipper relationships and networks. *Ind. Mark. Manag.* **2018**, *74*, 276–287. [CrossRef]

50. Ellram, L.M.; Golicic, S.L. The role of legitimacy in pursuing environmentally responsible transportation practices. *J. Clean. Prod.* **2016**, *139*, 597–611. [CrossRef]
51. Huang, Y.C.; Huang, C.H.; Yang, M.L. Drivers of green supply chain initiatives and performance. *Int. J. Phys. Distrib. Logist. Manag.* **2017**, *47*, 796–819. [CrossRef]
52. Bask, A.; Rajahonka, M. The role of environmental sustainability in the freight transport mode choice. *Int. J. Phys. Distrib. Logist. Manag.* **2017**, *47*, 560–602. [CrossRef]
53. Dadhich, P.; Genovese, A.; Kumar, N.; Acquaye, A. Developing Sustainable Supply Chain in the UK Construction Industry: A Case Study. *Int. J. Prod. Econ.* **2015**, *164*, 271–284. [CrossRef]
54. Walker, H.; Di Sisto, L.; McBain, D. Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors. *J. Purch. Supply Manag.* **2008**, *14*, 69–85. [CrossRef]
55. Hall, J. Environmental supply chain dynamics. *J. Clean. Prod.* **2000**, *8*, 455–471. [CrossRef]
56. Beamon, B.M. Environmental and sustainability ethics in supply chain management. *Sci. Eng. Ethics* **2005**, *11*, 221–234. [CrossRef] [PubMed]
57. Colicchia, C.; Melacini, M.; Perotti, S. Benchmarking supply chain sustainability: Insights from a field study. *Benchmarking Int. J.* **2011**, *18*, 705–732. [CrossRef]
58. Zhu, Q.; Sarkis, J. The moderating effects of institutional pressures on emergent green supply chain practices and performance. *Int. J. Prod. Res.* **2007**, *45*, 4333–4355. [CrossRef]
59. Delmas, M.A.; Toffel, M.W. Organizational responses to environmental demands: Opening the black box. *Strat. Manag. J.* **2008**, *29*, 1027–1055. [CrossRef]
60. Zhu, Q.; Sarkis, J.; Lai, K.-H. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *J. Purch. Supply Manag.* **2013**, *19*, 106–117. [CrossRef]
61. Zhu, Q.; Sarkis, J.; Cordeiro, J.J.; Lai, K.-H. Firm-level correlates of emergent green supply chain management practices in the Chinese context. *Omega* **2008**, *36*, 577–591. [CrossRef]
62. Zsidisin, G.A.; Siferd, S.P. Environmental purchasing: A framework for theory development. *Eur. J. Purch. Supply Manag.* **2001**, *7*, 61–73. [CrossRef]
63. Carter, C.R.; Kale, R.; Grimm, C.M. Environmental purchasing and firm performance: An empirical investigation. *Transp. Res. Part E Logist. Transp. Rev.* **2000**, *36*, 219–228. [CrossRef]
64. Pagell, M.; Wu, Z. Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. *J. Supply Chain Manag.* **2009**, *45*, 37–56. [CrossRef]
65. Isaksson, K.; Huge-Brodin, M. Understanding efficiencies behind logistics service providers' green offerings. *Manag. Res. Rev.* **2013**, *36*, 216–238. [CrossRef]
66. Sureeyatanapas, P.; Poophiukhok, P.; Pathumnakul, S. Green initiatives for logistics service providers: An investigation of antecedent factors and the contributions to corporate goals. *J. Clean. Prod.* **2018**, *191*, 1–14. [CrossRef]
67. Mashud, A.H.M.; Chakrabortty, R.K.; Hussain, O.K.; Choi, T.-M. Reducing emissions from production and distribution in three-echelon supply chains. *Int. J. Prod. Econ.* **2024**, *271*, 109181. [CrossRef]
68. Abrahamsson, M.; Aldin, N.; Stahre, F. Logistics platforms for improved strategic flexibility. *Int. J. Logist. Res. Appl.* **2003**, *6*, 85–106. [CrossRef]
69. Buysse, K.; Verbeke, A. Proactive environmental strategies: A stakeholder management perspective. *Strat. Manag. J.* **2003**, *24*, 453–470. [CrossRef]
70. Hart, S.L.; Ahuja, G. Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Bus. Strategy Environ.* **1996**, *5*, 30–37. [CrossRef]
71. Kohn, C.; Brodin, M.H. Centralised distribution systems and the environment: How increased transport work can decrease the environmental impact of logistics. *Int. J. Logist. Res. Appl.* **2008**, *11*, 229–245. [CrossRef]
72. Prendergast, G.; Pitt, L. Packaging, marketing, logistics and the environment: Are there trade-offs? *Int. J. Phys. Distrib. Logist. Manag.* **1996**, *26*, 60–72. [CrossRef]
73. Yang, C.-C. Assessing the moderating effect of innovation capability on the relationship between logistics service capability and firm performance for ocean freight forwarders. *Int. J. Logist. Res. Appl.* **2012**, *15*, 53–69. [CrossRef]
74. Wu, H.J.; Dunn, S.C. Environmentally responsible logistics systems. *Int. J. Phys. Distrib. Logist. Manag.* **1995**, *25*, 20–38. [CrossRef]
75. Carter, C.R.; Dresner, M. Purchasing's role in environmental management: Cross-functional development of grounded theory. *J. Supply Chain. Manag.* **2001**, *37*, 12–27. [CrossRef]
76. Touratier-Muller, N.; Ortas, E. Factors driving shippers' compliance with a voluntary sustainable freight programme in France. *J. Clean. Prod.* **2021**, *318*, 128397. [CrossRef]
77. Eng-Larsson, F.; Kohn, C. Modal shift for greener logistics—The shipper's perspective. *Int. J. Phys. Distrib. Logist. Manag.* **2012**, *42*, 36–59. [CrossRef]
78. Andersson, D.; Norrman, A. Procurement of logistics services—A minutes work or a multi-year project? *Eur. J. Purch. Supply Manag.* **2002**, *8*, 3–14. [CrossRef]
79. EUROSTAT. Le Transport Routier de Marchandises Européen en 2017. 2019. Available online: https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2019-05/datalab-essentiel-177-le-trm-europeen-en-2017-mai2019.pdf (accessed on 27 May 2019).

80. Hart, O. *Firms, Contracts, and Financial Structure*; Clarendon Press: Oxford, UK, 1995.
81. DiMaggio, P.J.; Powell, W.W. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *Am. Sociol. Rev.* **1983**, *48*, 147–160. [CrossRef]
82. Lifset, R.; Atasu, A.; Tojo, N. Extended Producer Responsibility. *J. Ind. Ecol.* **2013**, *17*, 162–166. [CrossRef]