Exploring how retail and logistics service provider managers make sense of sustainability in last mile delivery

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Abstract

Purpose – An increasing number of last mile deliveries (LMDs) pose many sustainability challenges that retailers and logistics service providers (LSPs) can address. Using cognitive frames (CFs) as a lens, this study explored how retail and LSP managers make sense of sustainable LMDs.

Design/methodology/approach – The methodological approach used is a multiple embedded case study. The data were obtained from interviews with retailers and LSPs, supplemented with secondary data for triangulation.

Findings – The findings present the operational aspects of LMDs that managers associate with sustainability and indicate that retail and LSP managers frame sustainability primarily as emission reduction. Managers indicate an externalization of responsibility and a compartmentalization of the supply chain, in which social sustainability is not associated with the last mile. Most managers indicate hierarchical CFs regarding sustainability, in which sustainability is an important topic but is subordinate to economic interests.

Practical implications – Collaboration between retailers, LSPs and other stakeholders is viewed as challenging but could alleviate some of the sustainability shortcomings and aid in the paradoxical framing and inclusion of social issues.

Originality/value – A conceptualization of managerial CFs for sustainable LMDs, together with empirical frame indicators and three propositions, is presented, providing novel insights into how paradoxical CFs could make LMDs more sustainable. This approach illuminates the possibilities for how to untangle the operational manifestations of managerial framing and adds to the empirical exploration of CFs in supply chain management.

Keywords Sensemaking, Cognitive frames, Environmental sustainability, Social sustainability, e-commerce, Urban logistics, Multiple case study

Paper type Research paper

1. Introduction

Last mile delivery (LMD), the last link of the supply chain in which an order is fulfilled for the end customer (Lim *et al.*, 2018), is a critical success factor for retailers (Hübner *et al.*, 2016). It is known to be complex and costly, posing many sustainability challenges. Some externalities involve pollution, congestion and accidents (Pourrahmani and Jaller, 2021), along with worker safety and health issues (Moncef and Monnet Dupuy, 2021). As retailers and logistics service providers (LSPs) are the main actors who execute LMDs (Huge-Brodin *et al.*, 2020), sustainability outcomes depend on both. Retailers play key roles that can influence

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sustainability because of their positions between the supplier and the end customer (Wilson, 2015) and LSPs are usually responsible for the sustainability aspect of deliveries (Huge-Brodin *et al.*, 2020). A certain awareness of sustainability is needed for a company to act upon implementing sustainability activities (Huge-Brodin *et al.*, 2020), and it is managers who make and implement decisions. As LMD complexity is increasing and delivery numbers are growing, accelerated by urbanization, e-commerce (Boysen *et al.*, 2021) and the COVID-19 pandemic (Ketchen and Craighead, 2020), the externalities caused by LMDs have become increasingly important to tackle. As retailers and LSPs are the two key actors executing LMDs, understanding what guides their sustainability actions is imperative.

Managerial views on sustainability matter, as they can impact operational outcomes and the managerial framing of sustainability issues can have unintended consequences (Hahn *et al.*, 2014). Therefore, a cognitive frame (CF) perspective can help understand how decisions regarding sustainability are made (Preuss and Fearne, 2022). CF is a "mental template that individuals impose on an information environment to give it form and meaning" (Walsh, 1995, p. 281). It is a tool for dealing with ambiguity and complexity signals (Hodgkinson and Healey, 2008; Walsh, 1995), and a paradoxical CF can aid a more nuanced sustainability understanding (Hahn *et al.*, 2014). Thus, this study uses a CF perspective to illuminate our understanding of how retail and LSP managers work to untangle the complexity of LMD sustainability challenges. This study aims to explore how managers make sense of sustainable LMDs. The research is an embedded multiple case studies that uses the conceptual CF work of Preuss and Fearne (2022) as a lens to explore the aim and answer the following research question:

RQ1. What CFs are indicated among retail and LSP managers when they make sense of their sustainable LMD operations?

This study offers a theoretically grounded analysis of the current managerial framing of sustainability in LMD. The findings of this study present the operational aspects of LMDs that managers associate with sustainability and the CF lens illuminates possibilities for how to start untangling operational manifestations. A conceptualization of CFs in sustainable LMDs is presented based on the empirical data, illustrating how the conceptual framework by Preuss and Fearne (2022) can be theorized as empirical frame indicators in a last mile context. This study also presents three propositions. The managers framed sustainability around CO_2 reduction, customer and market impact and collaboration. The framing of sustainability manifested in an ignorance of social sustainability in a last mile context. The managers also expressed an externalization of responsibility, in which customers and markets should carry responsibility for sustainability in LMDs and a tendency to reduce complexity in their understanding of sustainability. To address these challenges, this study suggests the need for paradoxical CFs to allow for a wider view of sustainability in LMDs, including more societal aspects and less operational compartmentalization.

2. Literature review

2.1 Sustainability in last mile delivery

In recent years, last mile research has become more focused on sustainability, as complexity has increased and global challenges concerning climate and social issues have become more topical. In the last mile scene, this has a direct implication for managers as company decision-makers. Table 1 illustrates the context by outlining examples of the multitude of sustainability challenges, including emissions, pollution, urban biodiversity, noise and related safety and health issues for workers, customers and city inhabitants alike. It is in this complex and often ambiguous environment, where issues such as payment models, collaboration concerns and upholding social values in new delivery schemes can cause conflicts between sustainability and business outcomes (Moncef and Monnet Dupuy, 2021),

	LMD challenge	Societal stakeholder	Sustainability aspect	Reference
1	Emissions and pollution A) Greenhouse gas emissions B) Air pollution/microparticles, including nitrogen oxide (NOX), PM10 (microparticles), and sulfur dioxide (SO_2)	Citizens/ society	Environmental	Browne *et al.* (2012), Garus *et al.* (2022), Ghaderi *et al.* (2022), Pourrahmani and Jaller (2021)
2	Energy efficiency of transport and the last mile as the most inefficient and energy-consuming part of the supply chain	Citizens/ society	Environmental	Garus *et al.* (2022), Halldórsson and Wehner (2020)
3	Clashes between urban transport and urban biodiversity	Citizens/ society	Environment	Sandström and Elander (2021)
4	Instant deliveries causing additional emissions and packaging	Citizens/ society	Environmental	Freitag and Kotzab (2020)
5	Noise levels and noise pollution	Citizens/ society	Environmental and social	Browne *et al.* (2012), Garus *et al.* (2022)
6	Traffic congestion and blocked traffic flows	Citizens/ society	Environmental and social	Browne *et al.* (2012), Pourrahmani and Jaller (2021), Simoni *et al.* (2020)
7	Environmental externalities causing social challenges in the form of health issues, such as disability, respiratory and cardiovascular diseases, sleep disturbances, and premature mortality in urban areas	Citizens/ society	Environmental and social	Browne *et al.* (2012)
8	Hazardous traffic and traffic accidents	Citizens/ society	Social	Pourrahmani and Jaller (2021), Tran *et al.* (2022)
9	LMDs impacting community development and land use and exerting pressure on city infrastructure	Citizens/ society	Social	Bissell (2020), Garus *et al.* (2022)
10	Equity and accessibility of LMD services, such as the available delivery times and opening hours that can cause segregation and the availability of deliveries to underprivileged populations	Customers	Social	de Oliveira *et al.* (2019), Garus *et al.* (2022), Ménascé (2014)
11	Technological exclusion when new technologies are adopted	Customers	Social	Garus *et al.* (2022)
12	Security of parcels and customers when picking up deliveries	Customers	Social	de Oliveira *et al.* (2019)
13	Safety of the workforce	Workforce	Social	Garus *et al.* (2022)
14	Working conditions, time pressure, and tight deadlines causing stress and potential risky behaviors for delivery workers	Workforce	Social	Boysen *et al.* (2021), Moncef and Monnet Dupuy (2021), Tran *et al.* (2022)
15	Country-specific work regulations that impact the working conditions for sharing economy delivery workers	Workforce	Social	Quadri (2021)

Source(s): Table by author

Table 1. Examples of sustainability challenges in LMDs

that managers need to make sense of sustainability. Sustainability challenges are made more complex by the transformation of LMDs and the many heterogeneous stakeholders involved (Mangano and Zenezini, 2019). The transformation of the last mile landscape refers to the introduction of innovations, such as drones and delivery robots (Boysen *et al.*, 2021), crowdsourcing and dynamic pricing (Mangiaracina *et al.*, 2019). Ambiguities are created when, for example, the use of delivery robots is both cost-efficient and green but creates social sustainability challenges involving safety and equity (Garus *et al.*, 2022). There are many different types of LMDs, such as home delivery, pick-up points and parcel lockers (Buldeo Rai *et al.*, 2019), so there are many sustainability considerations for managers. For example, the sustainability of different delivery methods is difficult to evaluate, as the environmental sustainability of LMDs depends partly on the degree to which the deliveries can substitute for customers' personal car travel and by which transport means the deliveries are organized (Bjørgen *et al.*, 2021). In addition, consumer preferences are changing (Villa and Monzón, 2021), underlining the importance of delivery speed (Bjørgen *et al.*, 2021). At the same time, consumers' possibilities to make green delivery decisions are impacted by the communication between LSPs and retailers (Sallnäs and Björklund, 2023).

Both retailers and LSPs play important roles in making LMD more sustainable (Bask *et al.*, 2016). However, retail and LSP interests might not converge when LSPs focus on cost reduction rather than environmental issues and when retailers are occupied with competing to satisfy customer needs (Kiba-Janiak *et al.*, 2021). Retailers have mostly been passive toward sustainable LMDs (Kudla and Klaas-Wissing, 2012); their interest in environmental issues seems to decline when criteria such as price, reliability and load factor take precedence, leaving sustainability aspects dependent on the LSPs (Huge-Brodin *et al.*, 2020). Retailers in end-consumer-oriented industries are more likely to be interested in and bring pressure to the sustainable activities of LSPs (Kudla and Klaas-Wissing, 2012), but many issues remain, as there is a lack of trust and knowledge sharing, which blocks the adoption of sustainable practices in the retailer–LSP relationship (Huge-Brodin *et al.*, 2020). With the several barriers to adopting sustainable practices, including organizational, financial, retailer–LSP market, retailer–consumer market, governmental and technological (Sallnäs and Björklund, 2023), there is a need to understand the subjective interpretations retailers and LSPs have (Reinecke *et al.*, 2023). As managers are primary stakeholders in the cascading effects impacting sustainability (Prataviera *et al.*, 2023), this study explores how managers make sense of sustainability in LMDs by using CFs as an analytical lens.

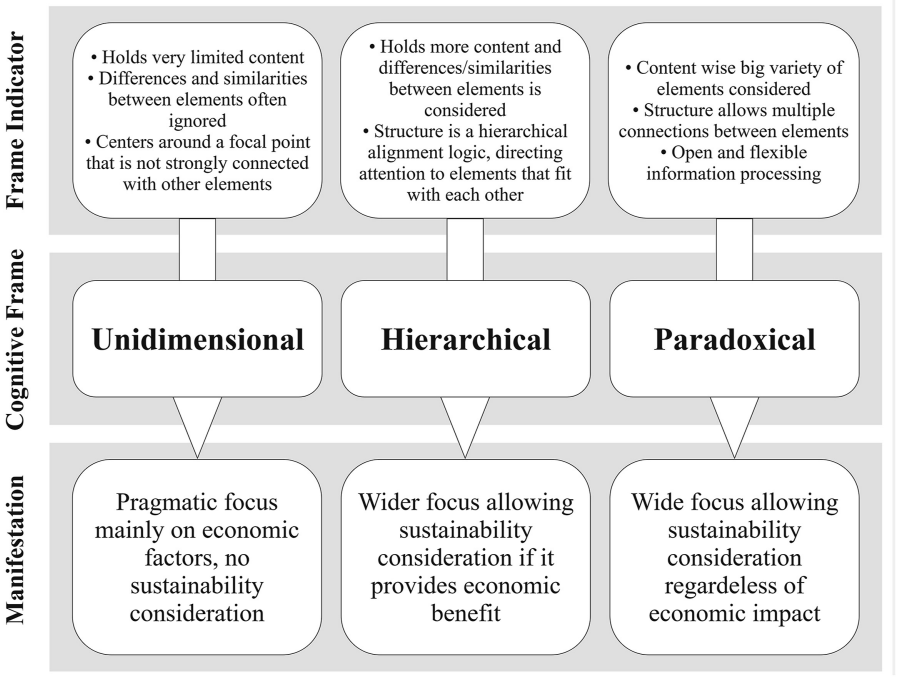
2.2 Managerial cognitive frames

There is a growing need to examine cognitive and behavioral aspects of supply chain management (Fahimnia *et al.*, 2019). CFs are part of sensemaking, i.e. the process of constructing meaning (Weick, 1995) and play crucial roles in managing sustainability tensions in organizations (Carmine and de Marchi, 2022). Depending on their CFs, individuals interpret information differently (Weick *et al.*, 2005). Managers use CFs to make sense of various complex and ambiguous signals (Hodgkinson and Healey, 2008; Walsh, 1995). Cognitive elements and their links make up a CF (Hayes-Roth, 1977). The complexity of a CF is impacted by its structure and content, as well as the interaction between these two (Preuss and Fearne, 2022). The content of a CF relates to the domain (Hahn *et al.*, 2014), such as sustainability, and the elements of the frame relate to how a person distinguishes or groups the attributes within this domain (Scott *et al.*, 1979). When looking at CFs, one should consider structure in the sense of content and logic (Hahn *et al.*, 2014). CFs are not static but change over time and are likely to become more complex as a person gains experience (Rousseau, 2001). CFs can therefore be both extended and transformed, as well as diffused within organizations, to become collective action frames (Benford and Snow, 2000). While CFs have been discussed as crucial for understanding the conditions under which companies can

address sustainability challenges in their supply chains (Corsini *et al.*, 2022; Hahn *et al.*, 2014; Preuss and Fearne, 2022; Xiao *et al.*, 2019), little is known about the CFs that retail and LSP managers hold in the context of LMDs or about their operational manifestations.

Decision-making is often viewed as a rational process, and the sensemaking part is neglected (Ericson, 2010), even if the process is entwined with sensemaking as an underlying dynamic (Boland, 2008; Ericson, 2010). Sensemaking provides the retrospective reflexive context and foundation for decision-making, and decision-making gives the direction and purpose necessary for navigating and making choices (Boland, 2008). When performing tasks, CFs provide managers with a structure for their assumptions and boundaries for what to include in their sensemaking (Smith and Tushman, 2005). Once CFs have been used to interpret an ambiguous environment, managers are likely to respond on that basis, leading to different sustainability decision-making processes (Hahn *et al.*, 2014). Therefore, the CF perspective constitutes an important viewpoint for exploring sustainability in LMDs. Building on previous sustainability-related CF conceptualizations by Hahn *et al.* (2014) and the work on integrative complexity by Suedfeld and Tetlock (1977), among others, Preuss and Fearne (2022) conceptualized three different CFs held by supply chain managers: *unidimensional*, *hierarchical* and *paradoxical*. In their conceptualization, adapted to a framework for this study (Figure 1), they illustrate how the CFs that managers hold make a difference in how they address sustainability challenges in the supply chain.

The framework presented in Figure 1 depicts the ideal conceptualizations used in this study as an analytical lens. A unidimensional frame is indicated by a narrow view, and it focuses on one core element, such as cost or economic gain. A manager with this frame will most likely not consider sustainability (Preuss and Fearne, 2022), and this "business-case"



Source(s): Adapted from Preuss and Fearne (2022)

Figure 1.
A framework for managerial cognitive frames

frame is deeply rooted among managers (Menon, 2022) and embedded in organizations (Cornelissen and Werner, 2014). A hierarchical CF is indicated by a supply chain manager who focuses on alignment and economic issues but is willing to consider additional dimensions of sustainability if these align with other interests (Preuss and Fearne, 2022). Paradoxical sensemaking is beneficial for learning, but convenience might prevent managers from adopting paradoxical sensemaking (Pinnington and Meehan, 2023). In a paradoxical frame, the structure of the frame includes many connections between the frame elements so that flexible information processing and openness to new information are possible (Hahn *et al.*, 2014; Suedfeld and Tetlock, 1977). In the case of a supply chain manager, a paradoxical frame allows multiple elements beyond cost or economic gains, making the manager aware of and likely to consider sustainability aspects regardless of their economic relevance (Preuss and Fearne, 2022). A paradoxical CF indicates that the manager can accept tensions between conflicting elements and can observe a wider variety of sustainability aspects; however, both time and other resources are needed for the manager to adopt a paradoxical CF (Hahn *et al.*, 2014). Effective replacement of a unidimensional CF necessitates sensebreaking to pave the way for adopting a new frame (Menon, 2022). To engage with the paradox, a manager needs to allow malleable categorial boundaries and appreciate differences, as well as act to solve tensions collaboratively (Sharma and Bansal, 2017). Sustainability is driven by company policy and strategy, but individual managers are responsible for the implementation process (Preuss and Fearne, 2022), so their CFs manifest in operations (Hahn *et al.*, 2014).

3. Research methodology

3.1 Embedded multiple case study

To explore how managers make sense of sustainable LMDs and what operational manifestations follow, this study adopted an embedded multiple case study approach to provide rich, nuanced data that can enhance the theoretical understanding of CFs in the last mile context. Case studies enable in-depth analyses and rich insights (Yin, 2018), and multiple case studies allow for the contrasting of results (Ellram, 1996). The focal point of the present study is the individual manager within an organization, but as Rousseau (2001) and Weick (1995) pointed out, there is a socialization aspect to cognitive processes. Therefore, managers can be seen as embedded cases within their respective organizations. The unit of analysis is the manifested sensemaking that can indicate the CF of a manager and thus explains how the manager makes sense of sustainable LMDs. The analytical lens is the framework in Figure 1, which is juxtaposed with the secondary data representing the organization's view on sustainability and the view presented in the literature.

3.2 Selection of cases and data collection

The selection criteria in this study followed a purposeful criterion logic to focus on information-rich and high-quality cases (Patton, 2002). The case companies were retailers and LSPs, as they jointly executed LMDs. Retailers in consumer-oriented businesses were chosen because they were more likely to be interested in the sustainable activities of LSPs (Kudla and Klaas-Wissing, 2012). Companies of different sizes with different product segments representing a variety of retail environments and with a substantial presence in e-commerce were selected. The interviews were conducted during autumn 2021 and spring 2022, and retailers were interviewed first. The LSP selection criteria were that they worked with the retailers interviewed and had substantial LMD experience. The case company was first selected, followed by the managers to be interviewed. The manager selection criteria were that they were operationally involved with LMDs and had significant work experience in e-commerce. In addition, the managers needed to have positions of such managerial

relevance that their opinions had strategic value within their organizations. These criteria were chosen because they implied that managerial CFs could be expected to have an impact on operations. All managers included in the study also shared the socio-political background and having working experience in European and Nordic organizations, so they could be assumed to share basic societal values. The managers were chosen to obtain rich information, and the selection of the appropriate respondents could be considered more important than their number (Saunders and Townsend, 2016). In this study, there were 13 cases: 8 retailers and 5 LSPs. An overview of the cases can be found in Table 2.

Semi-structured interviews were conducted to obtain new and previously unidentified insights (Patton, 2002). An interview guide was developed based on the last mile and sustainability literature, and feedback from other researchers was sought to ensure quality. The guide contained background questions to understand the professional background of the manager and the company, followed by questions about what the manager thinks about sustainability in LMDs, delivery strategies, general strategies and sustainability, as well as ad-hoc questions related to the respondents' answers. Each interview was recorded and transcribed. As the use of secondary data can strengthen theory building by triangulation of evidence (Eisenhardt, 1989) and enhance the validity of a study (Yin, 2018), secondary data were collected to obtain a thorough understanding of each case company (Eisenhardt, 1989). Special attention was given to capturing data sources that allowed for investigating a broader range of attitudinal and behavioral issues (Yin, 2018). For the retailers, observations that were captured in screenshots of what delivery options they offered at checkout were collected.

3.3 Coding and analysis

Cognitive processes and structures are not obvious to outsiders or even the persons themselves, but they can be identified from both reports and behaviors (Scott *et al.*, 1979). A simultaneous coding process, outlined in Figure 2, was utilized to explore the data. CFs are made up of two things: the *context-specific content* that can be described as attributes (Hahn *et al.*, 2014; Menon, 2022; Scott *et al.*, 1979) and the relationship between these attributes (Menon, 2022) that describe *the CF structure* (Hayes-Roth, 1977; Preuss and Fearne, 2022). Thus, the analysis process focused on simultaneously discerning between the CF context-specific content of the frames, here named *content domain* and the CF *structure*. The theoretical framework in Figure 1 provides three CF structures: unidimensional, hierarchical and paradoxical (Preuss and Fearne, 2022).

The context-specific *content domain* consists of elements that could be exemplified by specific operational activities to make LMDs sustainable, such as purchasing electric vehicles with the aim of emission reduction. Structural coding (Saldaña, 2009) was used in the first cycle to discern what content elements emerged from the data. As seen in Figure 2, these elements were grouped into themes utilizing pattern coding and further grouped into the CF *content domain* (Hahn *et al.*, 2014). The outcome of this process is visible in the results section in Figure 3. The content domain can be described as the operations that managers associate with sustainable LMDs. This content was compared to the areas of LMD sustainability found in the literature (Table 1) and to the secondary data to understand what content and topics were not mentioned.

As the content domain is intertwined with how a manager might make sense of it and associate the different content elements, a simultaneous process of understanding what *CF structures* could be indicated in the data took place. During the first cycle of coding, *in vivo* coding of quotes was used to capture the managers' languages, worldviews and perspectives (Saldaña, 2009). An abductive theory matching approach was then adopted (Dubois and Gadde, 2002) in coding cycle two to elaboratively match the *in vivo* quotes with the frame indicators in the theoretical framework (Figure 1). This analysis focused on determining

Case	Description	Respondent	Secondary data	Interview language
RER1	An international retail chain selling sports equipment and clothing. It has 5,000 stores with over 50,000 employees and an online presence in 42 countries. The HQ is in Switzerland	Director of E-commerce	Sustainability reports/ statements, CV, observation screenshots	English
RER2	An online food and grocery scale-up company from Finland that has a presence in three countries. The company is a small- and medium-sized enterprise with fewer than 200 employees	Founder (COO)	Sustainability reports/ statements, CV, observation screenshots	English
RER3	The grocery division of a Finnish daily consumer goods provider with over 20,000 employees that has a presence in eight countries	Logistics Manager	Sustainability reports/ statements, CV, observation screenshots	Finnish
RER4	A Nordic pet food and equipment chain with a presence in three countries. It is midsized, with fewer than 1,000 employees	Logistics Operations Manager	Sustainability reports/ statements, CV, observation screenshots	English
RER5	The grocery division of a Finnish daily consumer goods provider with over 40,000 employees and a presence in three countries	Manager of Grocery E-commerce	Sustainability reports/ statements, CV, observation screenshots	Finnish
RER6	A retailer of clothing and surplus goods with fewer than 200 employees. Its only stores are in Finland, but its online shop sells globally, with a strong focus on the US market	Supply Chain Director	Sustainability reports/ statements, CV, observation screenshots	English
RER7	A department and online store selling various products from clothing and cosmetics to electronics. It has fewer than 1,000 employees and sells online to 17 countries	Head of Logistics	Sustainability reports/ statements, CV, observation screenshots	Finnish
RER8	A Nordic electronics and whiteware retailer with fewer than 1,000 employees and a presence in six countries	COO	Sustainability reports/ statements, CV, observation screenshots	Finnish
LSP1	A Finnish-founded LSP that specializes in environment-friendly LMDs	Founder (CEO)	Sustainability reports/ statements, CV	Finnish
LSP2	An LSP focusing on scale-up LMDs and parcel lockers and has a strong technology focus in its development. The company has fewer than 500 employees and operates in five countries but is currently expanding operations in Europe	Head of Operations, Finland	Sustainability reports/ statements, CV	Finnish

Table 2.
Overview of the case companies

(*continued*)

Case	Description	Respondent	Secondary data	Interview language
LSP3	A logistics and mobility services company from Finland that operates in three countries and has fewer than 1,000 employees, but it also has a wide network of affiliated logistics partners	COO	Sustainability reports/ statements, CV	Finnish
LSP4	A Nordic logistics and postal services company that has expanded its delivery services in recent years and focuses on peer-to-peer deliveries. It has approximately 20,000 employees and operates in seven countries	Head of Distribution and Sorting	Sustainability reports/ statements, CV	Finnish
LSP5	An SME focusing on LMDs and consumer-oriented services. It currently operates only in Finland and has fewer than 200 employees	CEO	Sustainability reports/ statements, CV	Finnish

Source(s): Table by author

Table 2.

whether similar frame indicator logic could be found in the empirical data. It is important to note that the *in vivo* quotes functioned as a chain, in which logic, structure and associations emerged throughout the interview, not in a single quote. The connections between elements and themes that emerged in the content domain coding supported this process. The resulting *empirical frame indicators*, presented in Table 4, describe how the frame indicators in Figure 1 appear when managers make sense of sustainable LMDs.

3.4 Quality of research

The quality of the study was ensured through various measures reported in Table 3. Multiple sources of evidence were utilized and a chain of evidence was established through the theoretically derived interview guide and the structured coding process, ensuring construct validity (Ellram, 1996; Yin, 2018). Quotes were used to support the chain of evidence and to strengthen the most important findings (Stuart *et al.*, 2002). Objective data collection was feasible because of access to original data sources (Voss *et al.*, 2002). Preliminary results were presented to respondents and retail and LSP managers at a webinar to validate the findings.

4. Results

4.1 Operational manifestations of cognitive frames in sustainable LMDs

In this study, CFs are utilized as an analytical lens when describing the operative activities that managers associate with sustainable LMDs. This content seems to make up the content domains of a CF and can, in a last mile context, be categorized into three general themes: CO_2 and emission reduction, market impact and stakeholder collaboration (Figure 2). Analysis was also made about the content not described by the managers. It is apparent that environmental challenges are well acknowledged on a general level; however, the discussion lacks details and nuances that include, for example, biodiversity, and there is no discussion of air pollution or noise impact. Nevertheless, some positive impacts, such as LMDs being enablers of the circular economy, are highlighted. The managers did not include social

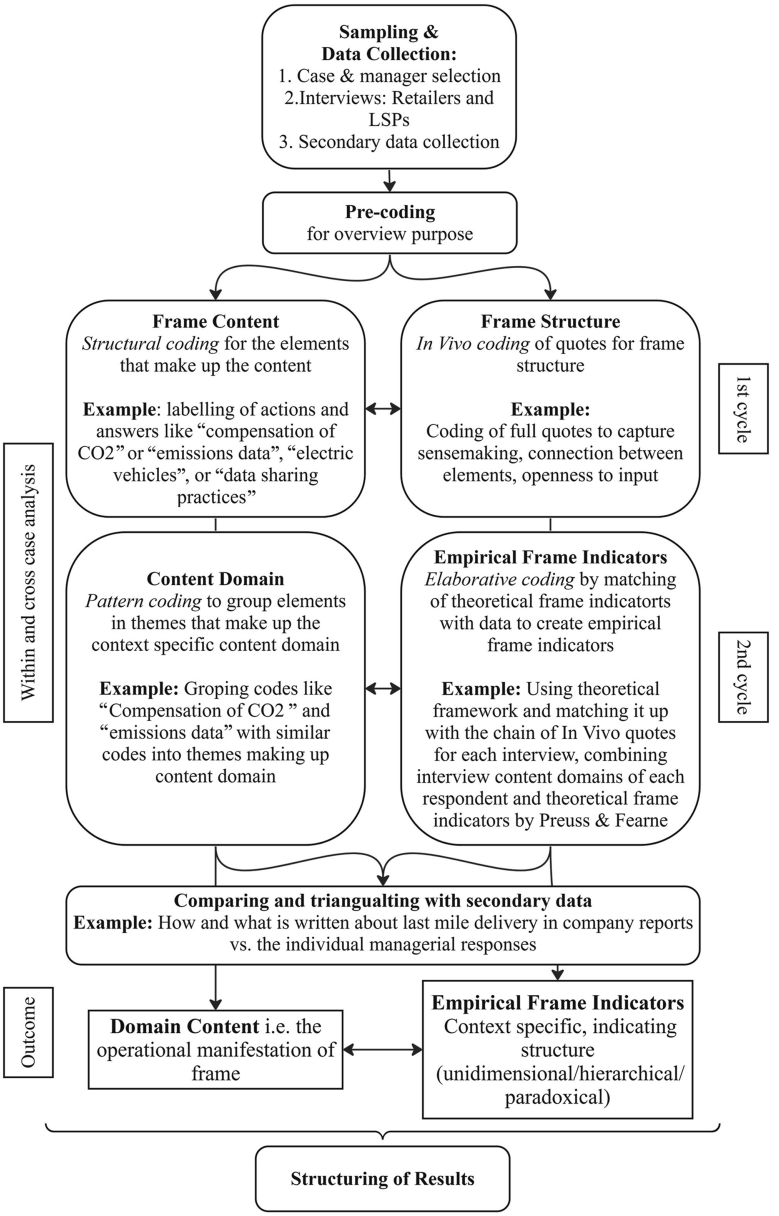


Figure 2.
Data collection and analysis process

sustainability aspects, such as accessibility for customers or the effects that LMDs can have on society at large.

4.1.1 Focus on emission reduction. Emissions were the most prominent sustainability theme for all managers. All respondents, except for LSP5 and RER3, outlined some types of emission reduction plans that their companies had adopted. LSP1 started its business with

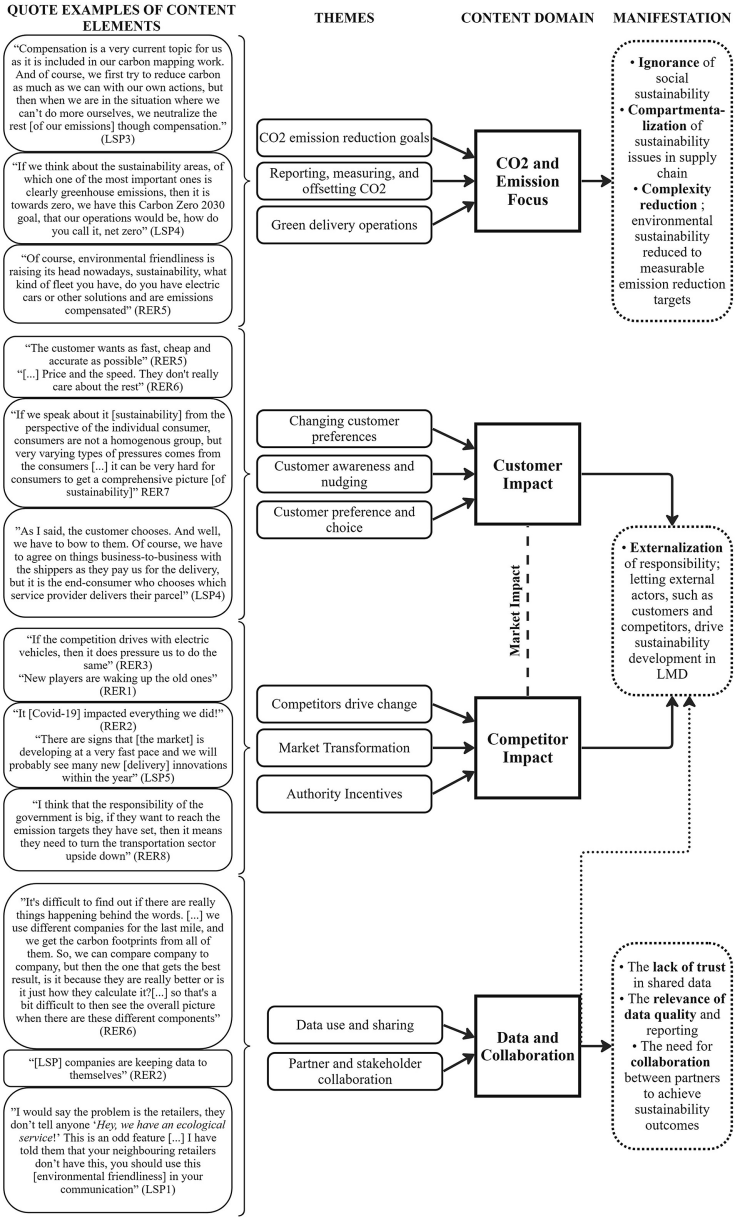


Figure 3.
The operative LMD sustainability actions structured in accordance with CF manifestation

the goal of providing only green delivery, and it strives to "continue improving toward infinity" to have carbon-negative operations one day. LSP4 is in the process of moving toward fossil-free transport and targeting "net zero." LSP2 refers to emission reduction being "in its DNA," while LSP3 aims at carbon neutrality by 2030. LSP5 stated that its customers were increasingly asking for emission data, but it has no reduction goals yet. RER1 acknowledged

	Quality measure implementation
Construct validity	• Theory and constructs were defined, and a theoretical framework was used for analysis • Feedback on coding schemes, theory implementation, and processes was sought from researchers not involved in the study • Triangulation of multiple data sources to corroborate the analysis • Analysis results were presented to respondents and retail/LSP experts at a webinar to validate findings
Internal validity	• Quality of evidence was achieved through a structured coding process to ensure pattern recognition provides consistency • Quotes were used to support the chain of evidence and strengthen the most important findings • Multiple data sources were used to reflect the lens of cognitive frames and corroborate the evidence • Rereading and recording the data in several iterative sessions—sequential analysis of data insights across all data sources • The context of the companies was verified through several documents • Interviews were conducted in the first language of the informants to ensure they were able to express their answers clearly and precisely • The interview guide was reviewed by fellow researchers for feedback • Objective data collection was feasible due to access to the original data sources
External validity	• Reporting of the structured and multi-stage iterative coding process to separate emerging themes and higher-order patterns • Based study in theory • Limitations were accounted for and discussed in the study • Triangulation of data and the use of multiple cases to aid generalizability
Reliability	• The research process was explained in the methods, aided by examples • Maintenance of a systematic case database of documents • Use of NVivo to ensure proper storage and management of data

Source(s): Table by author

Table 3.
Quality measures implemented

	Unidimensional	Hierarchical
Retailers	RER1, RER3	RER4, RER5, RER6, RER7, RER8
LSPs	LSP3, LSP5	LSP1, LSP2, LSP5
Empirical frame indicators	• Sustainability exists in strategy, but the relevance for LMDs is limited • Sustainability can become relevant if the market demands it (i.e. the economic imperative) • Customers are only interested in price and speed of delivery • Social sustainability is not relevant or interesting • Other actors are mainly seen as competitors; partners cannot always be trusted	• Sustainability, mainly CO_2 reduction, is relevant for LMDs • There is an interest in green values if they adhere to business interests or *eco-efficiency* thinking • Society, stakeholders, and customers are aware of and interested in environmental sustainability • Social sustainability is a concern downstream of the supply chain (retailers) • Other actors and partners are viewed as potential collaborators to achieve sustainability goals

Source(s): Table by author

Table 4.
The empirical frame indicators

emission reduction in the company strategy but mentioned no specific targets for logistics. RER2 wanted to offset all delivery emissions. The sustainability documents for both RER1 and RER3 outlined carbon neutrality targets for 2025, reducing emissions and offsetting when they could not be reduced through other means. RER3 did not mention these targets but said that they have standards for measuring and "know what they are driving with." RER4 expressed that it has set targets and has started collecting emission data since 2020. RER5 said that it was "very interested in all this [emission reduction] and was very willing to develop," which was in accordance with its company goal of reducing emissions by 90% by 2030. RER6 had a strong focus on carbon offsetting to achieve sustainability. RER7 was skeptical of carbon offsetting as a tool for emission reduction and said that the focus should be on reducing real operational emissions. RER8 said that it only has "eco-delivery" and that it does not engage in offsetting.

Sustainable LMDs were described as green delivery services. Optimization and efficient routing were mentioned in all the interviews as the main ways to reduce emissions, showing an affinity for *eco-efficiency* in which environmental and economic gains meet (York and Rosa, 2003). The respondents emphasized not driving in vain or with empty vans. Electrification of the fleet and the use of low-emission biofuels were also mentioned by all managers. For retailers, the cost of such options was still prevalent as an impacting factor. The use of environmentally friendly packaging, as well as renewable energy (e.g. solar panels) to power terminals, was viewed as part of green delivery. As components of sustainable LMDs, recycling and reverse logistics services, especially those that promote a circular economy, were mentioned by LSP4, LSP3, LSP5 and RER8. Varying from other responses, LSP5 said that offering consumer services that promote a circular economy constitutes LMD sustainability. This emphasis on green delivery was not present in the secondary materials of the retailers, even if transport and renewable energy sources were mentioned. The secondary data of LSP4, LSP3, RER3, RER5 and RER7 had very specific and clear emissions targets. Transport was seen as a source of emissions, but only RER7 specifically mentioned LMDs in its sustainability reporting. The link between the general sustainability goals in the secondary data and the managers' replies was rather weak. LMD was not seen as an integral part of the sustainability work but rather an operative function, and this separation was clear in all the data. There were contradictory answers regarding carbon offsetting and a slight contradiction between environmental and customer service values. For example, when asked about LMD priorities, LSP2 shifted between environmental values and the customer experience, expressing a tension in which it underlined environmental values but represented operations that were algorithmically honed toward customer experience.

No managers reflected on social sustainability without being prompted. When prompted, LSP1 queried, "Could you clarify what you mean by 'social sustainability'?" When asked, the managers described social sustainability as taking care of the health and well-being of the workforce. The retailers associated it with human rights issues downstream of the supply chain. Descriptions of social actions were vague, and the managers were quick to proceed to other topics. RER4 and RER5 touched upon social sustainability when discussing subcontractors and how it can affect the image of a company that buys its services. In this context, the managers were concerned about their own companies' images if they would be associated with the discussions on the working conditions that surrounded some LMD providers. Social sustainability was present as a topic in the sustainability strategies of retailers and LSPs, but the focus was on workforce well-being and, for the retailers, on human rights downstream of the supply chain. This indicates a compartmentalization in which social sustainability is seen as existing mainly in a certain supply chain context, not necessarily in LMDs.

4.1.2 Market impact, data and collaboration. Sustainability was seen as something that consumers should prioritize or a development that comes from competition or authorities. For retailers and, to some extent, LSPs, an externalization of responsibility was detectable. All case companies, except for LSP5 and RER1, showcased sustainability as a core strategy in their sustainability reports. Nevertheless, the retail managers indicated that it is customer demand, competition, or LSPs that must initiate sustainability actions. For example, RER2 thought that additional costs for green deliveries should be an additional service that customers could choose at checkout. Kiba-Janiak *et al.* (2021) noted that it is primarily retailers who should focus on end-customer needs. In this study, the end-consumer focus was essential for both retailers and LSPs, and customer experience was highlighted by both. Even if some managers thought that customers were increasingly interested in sustainability, all managers agreed that end customers prioritize price and speed. This indicates that LMD sustainability is framed as external, depending on customer demand. However, for example, retailers RER8, RER7, RER5 and RER2 acknowledged that they could nudge customers toward choosing more green delivery methods by placing certain delivery providers on top of the list at checkout. In terms of shipping options in online stores, only RER2 had one shipping option marked as sustainable, and there was no explanation for what constituted this sustainability. Even if customer experience was described at length, social sustainability issues, such as accessibility and safety, were not discussed in detail. LSP4 mentioned parcel safety, and LSP3 stated the geographical availability of services. In the secondary material, the customer experience was also highlighted. The secondary material of RER7 and LSP3 stressed the importance of inspiring customers toward sustainable consumption, emphasizing customers' responsibility to be sustainable, illustrating where the managerial and organizational framing seem to converge. RER6 stated that it does not offer free delivery to its customers, as this would make them order "unnecessary stuff."

All managers were aware of the current transformation of LMDs and mentioned that competition was becoming tougher. Increased technology use was mentioned in all interviews. The managers were keen on benchmarking their operations with competitors and emphasized how sustainable LMDs can be sources of competitive advantage. The actions of cities, municipalities and other authorities were also seen as impacting sustainability developments in LMDs. Practical challenges, such as parking spaces, were something that cities could improve. LSP5 predicted that cities would create lower emission zones and RER8 thought that the government should take more tangible actions regarding the transport sector to reduce emissions.

LSPs faced increasing demands from their clientele to provide emission reporting. However, emission data sharing and accuracy were sources of tension between retailers and LSPs. RER6 and RER7 felt that LSPs might withhold emission data and missing measurement standards increase mistrust. LSP1, on the other hand, was frustrated that retailers did not communicate the data shared with them with end consumers. All LSPs said that they provided emission reports to retailers. As the execution of LMDs is a joint activity for retailers and LSPs, there are also elements of externalization toward the respective retail/LSP partners. In the interviews, the actuality that sustainability is a general phenomenon affecting all of society was accentuated in the way the managers talked about collaboration with stakeholders. Customers and partners were focal, but authorities and other organizations, such as certification bodies, were also mentioned. Reporting standards and certification were topics that materialized in the secondary data and were mentioned as tools for transparency and collaboration. Previously, it has been concluded that retailers are passive regarding LMD sustainability (Kudla and Klaas-Wissing, 2012), while most of the responsibility has been given to LSPs (Huge-Brodin *et al.*, 2020). However, this study suggests that retailers do not feel they have full control but do have an interest in taking active roles in sustainable LMDs.

4.2 Empirical frame indicators in sustainable LMDs

This section is a theoretically grounded description of the empirically derived frame indicators that describe how managers make sense of sustainability in LMDs. This section presents the CFs that the data indicate managers hold when making sense of sustainable LMDs. Empirical frame indicators were developed based on the theoretical framework (Figure 1) to discern the content and structure that could indicate a CF in a last mile context. These indicators, manifested in the sustainability actions and observed in the data, are presented in Table 4, together with a grouping of managers in accordance with how they seem to frame sustainable LMDs. For both retailers and LSPs, the main CF content considers environmental sustainability, paired with aligned topics that support the balance between business interests and emission reduction goals. The CF content domains (Figure 2) of all managers remained similar, but the relative importance of activities, the way content was discussed, and the importance of sustainability activities varied in accordance with either a more unidimensional or hierarchical structure.

Out of 12 managers, 8 indicated predominantly *hierarchical CFs*, in which sustainability is an important topic but is subordinate to economic interests. Four managers indicated thinking that aligned with *unidimensional CFs*. Although some managers acknowledged the complexities, none of the respondents could be said to indicate paradoxical CFs regarding sustainable LMDs. Common for the managers indicating *unidimensional CFs* was focusing on LMD optimization for profit reasons rather than environmental considerations. They all shared instrumental and profit-driven views of LMDs and had little interest in sustainability. They also tended to view other actors and stakeholders more as competitors than as partners. Common among managers indicating *hierarchical CFs* was that their companies had sustainability as one of their core values, but the operational execution showed that economic interest was prioritized, even if the managers themselves acknowledged the importance of environmental sustainability. These managers had more positive views of stakeholders as sustainability collaborators. There was no notable variation in content or structure that would differentiate between LSPs and retail managers.

5. Discussion

As the literature depicts, the LMD scene is undergoing a transformation. In addition, ambiguities are created by the complexity of sustainability challenges. The value of using CFs as a lens in this context lies in the possibility of understanding the underlying sensemaking that forms the basis for decision-making, as managers use their CFs to reduce complexity and ambiguity (Porac and Thomas, 2002; Walsh, 1995). As managers are key stakeholders in the cascading effects that impact sustainability practices in organizations (Prataviera *et al.*, 2023), this study shows what operational aspects are associated with sustainable LMDs and how CFs as a lens can guide the discussion on how sensemaking manifests in operational activities. The examples from previous literature compiled in Table 1 illustrate how ambiguity and complexity is created by the multifaceted sustainability challenges, including noise, pollution, emission and biodiversity concerns, as well as social considerations for both customers, workers, and society at large. Using the framing perspective, this study shows that even though these nuances are available in literature, in an LMD context, managers are primarily concerned with environmental concerns in the form of CO2 measurement and reduction. As the framing is either unidimensional or hierarchical, these considerations do not seem to leave space for the complexity that previous research illustrates. Figure 4 conceptualizes how the content and structure of managerial CFs appear when managers make sense of sustainable LMDs. In Figure 4, the ideal-type frames (unidimensional, hierarchical and paradoxical) have been organized in accordance with their operational content domain, as presented in the results. In the results, the unidimensional

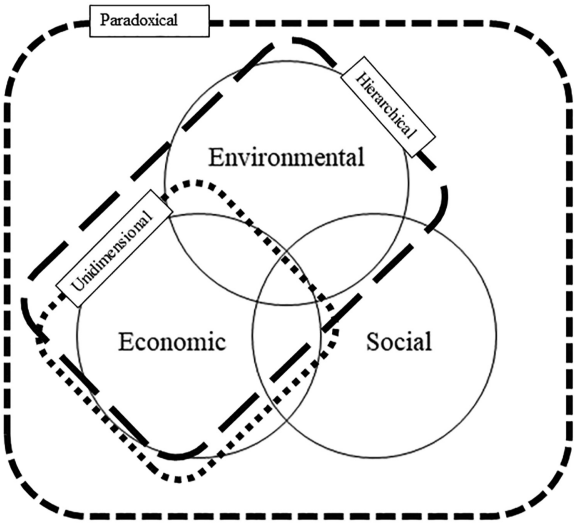


Figure 4.
A conceptualization of managerial cognitive frames in sustainable LMDs

frame has been indicated by a pragmatic profit-focused stance on LMDs, while the hierarchical frame has extended the view through eco-efficiency thinking and an emphasis on environmental values and emission reduction schemes, but both CFs have largely ignored social sustainability. This could partly be due to the retrospective nature of sensemaking (Boland, 2008; Choo, 2002), which highlights the emergence of activities that could be described as generic responses to sustainability. This study suggests that paradoxical CFs and acknowledging a broader spectrum of sustainability challenges could be necessities for company LMD operations to become more sustainable. For this to happen, managerial CFs must broaden in scope and nuance, indicating the need for deliberate sensebreaking (Menon, 2022) to enable a paradoxical frame.

A paradoxical CF is likely to hold a more complex structure and more cross-associated elements, thus the possibility of thinking about LMDs from a wider perspective. Some retailers discussed image issues relating to logistics subcontracting, focusing on the impact that social issues had on their companies' images rather than incorporating these in how they work with LMDs. The retailers mentioned that social issues exist downstream of the supply chain, compartmentalizing the supply chain in terms of sustainability. In a supply chain context, previous CF research has found that it is convenient for managers to distance themselves from social sustainability challenges, as they present as paradoxical and ambiguous (Pinnington and Meehan, 2023). This lack of social consideration can also be exemplified by the discussion about parking. Parking was considered an issue for LMDs and was framed as a blocker for operations, not as a hindrance for citizens. A paradoxical CF demands accepting the coexistence of contradictory demands and ambiguity (Smith and Tushman, 2005) and manifests through a widened understanding of and explicit attention to sustainability (Preuss and Fearne, 2022). In the light of the findings, one example of a paradoxical framing could be acknowledging the societal aspect of parking that includes not only the viewpoint of LMD execution but also the of societal impact. When LMD research is reviewed, the societal perspective is evident, as can be seen in Table 1. However, for this type of societal acknowledgment to happen, a manager would need to be more reflexive and to associate a wider range of sustainability issues with LMDs.

A paradoxical CF could enable this type of thinking because paradoxical CF frame indicators suggest a larger variety of considered elements and multiple connections between them (Hahn *et al.*, 2014; Preuss and Fearne, 2022). Taking a critical look at social sustainability has been identified as a research need in LMDs (Moncef and Monnet Dupuy, 2021). It is not likely that social sustainability issues will be addressed if managers do not associate them with LMDs. Thus, the following propositions are suggested:

P1a. Sustainability in LMD is framed as environmental sustainability by managers.

P1b. A more paradoxical view of sustainable LMDs is needed to consider the complexity of social sustainability in parallel with economic and environmental aspects.

The framework by Preuss and Fearne (2022) does not specifically mandate social or any other aspects to be included in a paradoxical frame, as the conceptualization presents ideal types. Nonetheless, empirical studies can provide nuanced context-specific insights into how managers frame operational aspects. As proposition one suggests, the managerial framing was predominantly environmental, and in the light of the examples found in literature, also many environmental considerations, such as microplastics or pollution were mostly ignored. A paradoxical frame could indeed deepen the understanding and consideration of all sustainability aspects, not just the social one. But the absence social considerations highlights the managerial importance of the study findings and theorizes the possibilities of a paradoxical framing that seems to be lacking at this moment. It is to be expected that not many managers have paradoxical frames and that managers who hold them are pioneering types (Hahn *et al.*, 2014). It was only LSP1, the founder of a small LSP built on the premise of environmental sustainability, that indicated paradoxical thinking around environmental sustainability. An argument could be made for placing LSP1 in the paradoxical category because, compared with the other respondents, this manager was willing to place environmental sustainability as equal to profit and as a baseline for LMDs. However, the frame held by the manager could also be seen as a hierarchical frame, as the operations were based on environmental values, but the main priority was successful business. It was also clear that this manager did not consider social sustainability to be part of LMDs. Usually, the worldview of companies tends to separate society and business and to treat events as isolated, not part of a larger system view that sustainability complexities and paradoxes would require (Slawinski and Bansal, 2015). In this study, the LMD sustainability content domain of both a unidimensional and hierarchical CF seems to create a sort of tunnel vision, which is expressed as eco-efficiency. From the results, it is nonetheless positive to note that some elements of paradoxical thinking could be distinguished by including circular economy services as positive environmental outcomes of LMD. Sharma and Bansal (2017) suggested that flexible cognition is needed to engage ambiguity and Corsini *et al.* (2022) concluded that integrative CFs can stimulate the adoption of circular economy practices. In the LMD context, a paradoxical framing that supports operational actions is needed to widen the scope so that social sustainability issues, such as the accessibility and safety of customers and society, as well as more nuance and environmental considerations, such as biodiversity, are included, as these aspects have been highlighted by previous research as important sustainability considerations for LMD.

Preuss and Fearne (2022) noted that multifunctional and diverse experiences, as well as industrial norms, can foster paradoxical thinking and influence the CFs of managers. This supports the idea that exposing managers to a wider variety of experiences and perspectives, for example, through collaborative stakeholder efforts, could enhance paradoxical thinking. In addition, an important aspect is managers as part of their organizations and LMDs as cooperative functions between retailers and LSPs. Organizational socialization (Rousseau, 2001) affects managers' CFs, which can transform or blend over time (Cornelissen and

Werner, 2014). The results show a manifestation of externalization in which managers want other instances to drive sustainable LMD development. In this context, the influence of socialization on CFs means that collaboration could enhance paradoxical thinking. However, managers indicating unidimensional CFs were especially protective of their operations and expressed mistrust toward their partners. Managers did not engage in paradoxical thinking that could allow for the inclusion of several simultaneous and different stakeholder perspectives on how they work with sustainable LMDs. Paradoxical CFs could unleash the potential of data, collaboration and customer impact in making LMDs more sustainable and including a multitude of externalities and stakeholders. Positive change could be possible over time; as Benford and Snow (2000) noted that CFs can be tools for organizational change. As organizational socialization was not within the scope of this study, these lines of inquiry warrant further research. Based on the empirical indications in this study, the following proposition is presented to support further exploration:

P2. Deeper retailer and LSP collaboration could offer pathways to a more profound integration of sustainability and paradoxical framing in LMD.

With the many barriers posed for adopting sustainable practices, such as governmental, technological and market-based (Sallnäs and Björklund, 2023), it is positive to note how data and collaboration emerged in the study data as key content domains. In the heterogenous stakeholder environment that constitutes LMD (Mangano and Zenezini, 2019), complex challenges such as accessibility (de Oliveira *et al.*, 2019) or technological exclusion (Garus *et al.*, 2022) or country-specific regulation (Quadri, 2021) would most likely need collaborative efforts to be addressed. Thus this study provides novel insights about why LSP–retailer collaboration could help managers find wider perspectives (Preuss and Fearne, 2022) as well as learning opportunities (Pinnington and Meehan, 2023) that foster paradoxical framing in an LMD context.

As the results show, in terms of sustainability, managers frame LMD in operational rather than strategic terms. This indicates that LMD is not likely to be placed strategically in any internal sustainability discussions, as is also visible in the secondary data. The absence of LMD as a strategic topic underlines the importance of investigating sustainability in LMD from varying viewpoints. For example, Sallnäs and Björklund (2023) have identified several barriers to environmental sustainability in e-commerce that are important for both researchers and managers to acknowledge. This research adds to the barrier perspective by providing more nuanced findings on the managerial framing of sustainability, namely, an externalization of responsibility toward the customer and market, a compartmentalization of the last mile from the wider supply chain and a tendency toward complexity reduction in environmental sustainability matters that manifest as a focus on CO_2 offsetting or CO_2 emissions. This tendency seems to converge with research in a different supply chain context, where managers adopt a narrow perspective when they struggle to make sense of complexities, manifesting in avoidance of immediate action (Pinnington and Meehan, 2023). Following this line of argumentation, this study proposes the following:

P3. The prevailing framing of sustainability in LMDs:

P3a. Manifests as an externalization of sustainability responsibility toward consumers and partners.

P3b. Manifests as a compartmentalization of LMD from the supply chain.

P3c. Manifests as a complexity reduction of environmental sustainability to measurable emission reduction targets.

A fundamental challenge in paradox discussions is that teaching paradoxical thinking requires the determination of what that paradox entails in each context (Schad *et al.*, 2016). This research describes the prevailing status of sustainability in LMDs and identifies where managerial sensebreaking could potentially take place. Previous LMD sustainability research has painted a complex picture of the sustainability challenges involved (Table 1). This study and its propositions highlight the potential role of managerial sensemaking as a crucial component in addressing the complex and occasionally paradoxical sustainability challenges within LMDs. It contributes by shedding light on the importance of internalizing sustainability responsibility in LMD operations and better integrating the last mile in the supply chain. As paradoxical framing requires experiential learning (Miron-Spektor *et al.*, 2022), discerning the operational activities currently involved in making LMD sustainable constitutes a managerial contribution and a ground for future longitudinal inquiry that considers the dynamics nature of CFs.

6. Conclusion

The study contributes by theorizing research and empirical data in an explorative manner to better understand what CFs for sustainability in LMDs could entail. The analysis is a conceptually rooted delineation of how managers make sense of sustainability in LMDs and contributes to a more nuanced discussion in the operationally oriented last mile research context. This study also contributes to the literature by offering a conceptualization of CFs in sustainable LMDs, exploring the operational content domains and offering empirical frame indicators for the last mile context. Out of 13 managers, 8 indicated hierarchical CFs, in which sustainability is an important topic but is subordinate to economic interests. Five managers indicated sensemaking that aligned with unidimensional CFs. Even if paradoxical thinking emerged in the data, no manager could be said to have a paradoxical CF. The findings reveal that managers framed sustainable LMDs around the topics of emission reduction, market impact and collaboration. It seems social sustainability aspects are largely ignored and responsibility for sustainable development is seen as external, something customers or market actors should spearhead. There were indications of complexity reduction regarding environmental sustainability and a compartmentalization of the last mile from the wider supply chain. It is not likely for social sustainability issues to be attended to in LMDs unless managers consider them part of their LMD sustainability work. Paradoxical CFs acknowledging the variety and complexity of sustainability issues involved in LMDs could be necessary to include more operational measures that tackle social and environmental sustainability challenges.

For managerial practice, this indicates the need to acknowledge the cognition perspective in decision-making, allowing time and resources, as well as opportunities, for cross-functional and industrial discussions that can foster paradoxical CFs. The managerial contribution highlights the need for sensebreaking and shows how paradoxical CFs could provide new pathways to understanding sustainability in operational decision-making. As paradoxical CFs can aid in problem-solving and a better understanding of the integration of social sustainability in LMDs, this research contributes to managerial learnings on understanding what paradoxical framing can mean in an LMD setting.

6.1 Limitations and future research

Current research on paradoxes widely shares the assumption that paradoxical frames or mindsets are of benefit to organizations. While this study adheres to this assumption, it can be noted that there is research indicating otherwise. The geographical context of this study, which is primarily Nordic, accounts for some study limitations and might influence the

content domains of managerial CFs. The Nordic welfare context might impact managers' views of social sustainability. This study is also limited to individual managerial frames and provides a situational snapshot. The dynamic process of CFs that are likely to change over time is a limitation of this study. Further research could consider the evolving dynamics of CFs and sensemaking over time and under varying conditions through conducting longitudinal studies with contextual data and alternate data collection techniques. As CFs are malleable and can blend or transition (Cornelissen and Werner, 2014) or can function as mediators for organizational or social change (Benford and Snow, 2000), the socialization and organizational perspectives of CFs within LMDs and their impacts on sustainability provide ample opportunities for further research.

References

Bask, A., Rajahonka, M., Laari, S., Solakivi, T., Töyli, J. and Ojala, L. (2016), "Environmental sustainability in shipper-LSP relationships", *Journal of Cleaner Production*, Vol. 172, pp. 2986-2998, doi: 10.1016/j.jclepro.2017.11.112.

Benford, R.D. and Snow, D.A. (2000), "Framing processes and social movements: an overview and assessment", *Annual Review of Sociology*, Vol. 26 No. 1, pp. 611-639, doi: 10.1146/annurev.soc.26.1.611.

Bissell, D. (2020), "Affective platform urbanism: changing habits of digital on-demand consumption", *Geoforum*, Vol. 115, pp. 102-110, doi: 10.1016/j.geoforum.2020.06.026.

Bjørgen, A., Bjerkan, K.Y. and Hjelkrem, O.A. (2021), "E-groceries: sustainable last mile distribution in city planning", *Research in Transportation Economics*, Vol. 87, pp. 1-9.

Boland, R.J. (2008), "Decision making and sensemaking", in Burstein, F. and Holsapple, C.W. (Eds), *Handbook on Decision Support Systems*, Springer Berlin, Vol. 1, pp. 55-63.

Boysen, N., Fedtke, S. and Schwerdfeger, S. (2021), "Last-mile delivery concepts: a survey from an operational research perspective", *OR Spectrum*, Vol. 43 No. 1, pp. 1-58, doi: 10.1007/s00291-020-00607-8.

Browne, M., Allen, J., Nemoto, T., Patier, D. and Visser, J. (2012), "Reducing social and environmental impacts of urban freight transport: a review of some major cities", *Procedia - Social and Behavioral Sciences*, Vol. 39, pp. 19-33, doi: 10.1016/j.sbspro.2012.03.088.

Buldeo Rai, H., Verlinde, S., Macharis, C., Schoutteet, P. and Vanhaverbeke, L. (2019), "Logistics outsourcing in omnichannel retail: state of practice and service recommendations", *International Journal of Physical Distribution and Logistics Management*, Vol. 49 No. 3, pp. 267-286, doi: 10.1108/ijpdlm-02-2018-0092.

Carmine, S. and de Marchi, V. (2022), "Tensions and outcomes in corporate sustainability: the moderating role of paradoxical frame", *Journal of Cleaner Production*, Vol. 380 No. 1, 134952, doi: 10.1016/j.jclepro.2022.134952.

Choo, C.W. (2002), "Sensemaking, knowledge creation, and decision making organizational knowing as emergent strategy", in Choo, C.W. and Bontis, N. (Eds), *The Strategic Management of Intellectual Capital and Organizational Knowledge*, Oxford University Press, New York, pp. 79-88.

Cornelissen, J.P. and Werner, M.D. (2014), "Putting framing in perspective: a review of framing and frame analysis across the management and organizational literature", *Academy of Management Annals*, Vol. 8 No. 1, pp. 181-235, doi: 10.5465/19416520.2014.875669.

Corsini, F., Marzia, N., Testa, G.-F. and Borghini, A. (2022), "The role of cognitive frames towards circular economy practices in SMEs", *Italian Journal of Management*, Vol. 40 No. 2, pp. 41-61, doi: 10.7433/s118.2022.03.

de Oliveira, L.K., de Oliveira, R.L.M., de Sousa, L.T.M., de Paula Caliari, I. and de Oliveira Leite Nascimento, C. (2019), "Analysis of accessibility from collection and delivery points: towards

the sustainability of the e-commerce delivery", *Urbe*, Vol. 11, pp. 1-17, doi: 10.1590/2175-3369.011.e20190048.

Dubois, A. and Gadde, L.-E. (2002), "Systematic combining: an abductive approach to case research", *Journal of Business Research*, Vol. 55 No. 7, pp. 553-560, doi: 10.1016/s0148-2963(00)00195-8.

Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550, doi: 10.5465/amr.1989.4308385.

Ellram, L.M. (1996), "The use of the case study method in logistics research", *Journal of Business Logistics*, Vol. 17 No. 2, pp. 93-138.

Ericson, M. (2010), "Towards a sensed decision-making approach: from déjà vu; to vu jàdé", *Management Decision*, Vol. 48 No. 1, pp. 132-155, doi: 10.1108/00251741011014490.

Fahimnia, B., Pournader, M., Siemsen, E., Bendoly, E. and Wang, C. (2019), "Behavioral operations and supply chain management – a review and literature mapping", *Decision Sciences*, Vol. 50 No. 6, pp. 1127-1184, doi: 10.1111/deci.12369.

Freitag, M. and Kotzab, H. (2020), "A concept for a consumer-centered sustainable last mile logistics", in Freitag, M., Haasis, HD., Kotzab, H., Pannek, J. (Eds), *Dynamics in Logistics. LDIC 2020. Lecture Notes in Logistics*, Springer, Cham, doi: 10.1007/978-3-030-44783-0_19.

Garus, A., Alonso, B., Raposo, M.A., Grosso, M., Krause, J., Mourtzouchou, A. and Ciuffo, B. (2022), "Last-mile delivery by automated droids. Sustainability assessment on a real-world case study", *Sustainable Cities and Society*, Vol. 79, pp. 1-14, doi: 10.1016/j.scs.2022.103728.

Ghaderi, H., Tsai, P.W., Zhang, L. and Moayedikia, A. (2022), "An integrated crowdshipping framework for green last mile delivery", *Sustainable Cities and Society*, Vol. 78, pp. 1-10, doi: 10.1016/j.scs.2021.103552.

Hahn, T., Preuss, L., Pinkse, J. and Figge, F. (2014), "Cognitive frames in corporate sustainability: managerial sensemaking with paradoxical and business case frames", *Academy of Management Review*, Vol. 39 No. 4, pp. 463-487, doi: 10.5465/amr.2012.0341.

Halldórsson, Á. and Wehner, J. (2020), "Last-mile logistics fulfilment: a framework for energy efficiency", *Research in Transportation Business and Management*, Vol. 37, 100481, doi: 10.1016/j.rtbm.2020.100481.

Hayes-Roth, B. (1977), "Evolution of cognitive structures and processes", *Psychological Review*, Vol. 84 No. 3, pp. 260-278, doi: 10.1037//0033-295x.84.3.260.

Hodgkinson, G.P. and Healey, M.P. (2008), "Cognition in organizations", *Annual Review of Psychology*, Vol. 59 No. 1, pp. 387-417, doi: 10.1146/annurev.psych.59.103006.093612.

Hübner, A., Wollenburg, J. and Holzapfel, A. (2016), "Retail logistics in the transition from multi-channel to omni-channel", *International Journal of Physical Distribution and Logistics Management*, Vol. 46 Nos 6-7, pp. 562-583, doi: 10.1108/ijpdlm-08-2015-0179.

Huge-Brodin, M., Sweeney, E. and Evangelista, P. (2020), "Environmental alignment between logistics service providers and shippers – a supply chain perspective", *International Journal of Logistics Management*, Vol. 31 No. 3, pp. 575-605, doi: 10.1108/ijlm-04-2019-0101.

Ketchen, D.J. and Craighead, C.W. (2020), "Research at the intersection of entrepreneurship, supply chain management, and strategic management: opportunities highlighted by COVID-19", *Journal of Management*, Vol. 46 No. 8, pp. 1330-1341, doi: 10.1177/0149206320945028.

Kiba-Janiak, M., Marcinkowski, J., Jagoda, A. and Skowrońska, A. (2021), "Sustainable last mile delivery on e-commerce market in cities from the perspective of various stakeholders. Literature review", *Sustainable Cities and Society*, Vol. 71, pp. 1-11, doi: 10.1016/j.scs.2021.102984.

Kudla, N.L. and Klaas-Wissing, T. (2012), "Sustainability in shipper-logistics service provider relationships: a tentative taxonomy based on agency theory and stimulus-response analysis", *Journal of Purchasing and Supply Management*, Vol. 18 No. 4, pp. 218-231, doi: 10.1016/j.pursup.2012.04.001.

Lim, S.F.W.T., Jin, X. and Srai, J.S. (2018), "Consumer-driven e-commerce: a literature review, design framework, and research agenda on last-mile logistics models", *International Journal of Physical Distribution and Logistics Management*, Vol. 48 No. 3, pp. 308-332, doi: 10.1108/ijpdlm-02-2017-0081.

Mangano, G. and Zenezini, G. (2019), "The Value Proposition of innovative Last-Mile delivery services from the perspective of local retailers", *IFAC-PapersOnLine*, Vol. 52 No. 13, pp. 2590-2595, doi: 10.1016/j.ifacol.2019.11.597.

Mangiaracina, R., Perego, A., Seghezzi, A. and Tumino, A. (2019), "Innovative solutions to increase last-mile delivery efficiency in B2C e-commerce: a literature review", *International Journal of Physical Distribution and Logistics Management*, Vol. 49 No. 9, pp. 901-920, doi: 10.1108/ijpdlm-02-2019-0048.

Ménascé, D. (2014), "Economic and social issues around last mile delivery", *The Journal of Field Actions: Field Actions Science Reports*, Special Issue 12.

Menon, K. (2022), "Metaphorical mapping for sensemaking and sensebreaking of stakeholder relations in sustainability frames", *Organization and Environment*, Vol. 35 No. 5, doi: 10.1177/10860266221092167.

Miron-Spektor, E., Emich, K., Argote, L. and Smith, W. (2022), "Conceiving opposites together: cultivating paradoxical frames and epistemic motivation fosters team creativity", *Organizational Behavior and Human Decision Processes*, Vol. 171, 104153, doi: 10.1016/j.obhdp.2022.104153.

Moncef, B. and Monnet Dupuy, M. (2021), "Last-mile logistics in the sharing economy: sustainability paradoxes", *International Journal of Physical Distribution and Logistics Management*, Vol. 51 No. 5, pp. 508-527, doi: 10.1108/ijpdlm-10-2019-0328.

Patton, M.Q. (2002), *Qualitative Research and Evaluation Methods*, 3rd ed., Sage, Thousand Oaks, CA.

Pinnington, B. and Meehan, J. (2023), "Learning to see modern slavery in supply chains through paradoxical sensemaking", *Journal of Supply Chain Management*, Vol. 59 No. 4, pp. 22-41, doi: 10.1111/jscm.12309.

Porac, J.F. and Thomas, H. (2002), "Managing cognition and strategy: issues, trends and future directions", in Thomas, A.M. and Whittington, R. (Eds), *Handbook of Strategy and Management*, Sage, Thousand Oaks CA, pp. 165-181.

Pourrahmani, E. and Jaller, M. (2021), "Crowdshipping in last mile deliveries: operational challenges and research opportunities", *Socio-Economic Planning Sciences*, Vol. 78, 101063, doi: 10.1016/j.seps.2021.101063.

Prataviera, L.B., Creazza, A. and Perotti, S. (2023), "A call to action: a stakeholder analysis of green logistics practices", *The International Journal of Logistics Management*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJLM-09-2022-0381.

Preuss, L. and Fearne, A. (2022), "Cognitive frames held by supply chain managers: implications for the management of sustainability in supply chains", *Supply Chain Management*, Vol. 27 No. 6, pp. 681-695, doi: 10.1108/scm-08-2020-0364.

Quadri, R. (2021), "Platform workers as infrastructures of global technologies", *Interactions*, Vol. 28 No. 4, pp. 32-35, doi: 10.1145/3466162.

Reinecke, P.C., Wrona, T., Rückert, N. and Fischer, K. (2023), "A typology of the collaboration willingness of carriers in hinterland logistics", *International Journal of Physical Distribution and Logistics Management*, Vol. 53 No. 9, pp. 967-984, doi: 10.1108/ijpdlm-07-2022-0216.

Rousseau, D.M. (2001), "Schema, promise and mutuality: the building blocks of the psychological contract", *Journal of Occupational and Organizational Psychology*, Vol. 74 No. 4, pp. 511-541, doi: 10.1348/096317901167505.

Saldaña, J. (2009), *The Coding Manual for Qualitative Researchers*, Sage, London.

Sallnäs, U. and Björklund, M. (2023), "Green e-commerce distribution alternatives – a mission impossible for retailers?", *International Journal of Logistics Management*, Vol. 34 No. 7, pp. 50-74, doi: 10.1108/ijlm-07-2022-0271.

Sandström, U.G. and Elander, I. (2021), "Biodiversity, road transport and urban planning: a Swedish local authority facing the challenge of establishing a logistics hub adjacent to a Natura 2000 site", *Progress in Planning*, Vol. 148 No. 1, 100463, doi: 10.1016/j.progress.2019.100463.

Saunders, M.N.K and Townsend, K. (2016), "Reporting and justifying the number of interview participants in organization and workplace research", *British Journal of Management*, Vol. 27 No. 4, doi: 10.1111/1467-8551.12182.

Schad, J., Lewis, M.W., Raisch, S., Smith, W.K. and Lerner, A. (2016), "Paradox research in management science: looking back to move forward", *Academy of Management Annals*, Vol. 10 No. 1, pp. 5-64, doi: 10.5465/19416520.2016.1162422.

Scott, W.A., Osgood, D.W. and Peterson, C. (1979), *Cognitive Structure: Theory and Measurement of Individual Differences*, Winston & Sons, Great Falls, MT.

Sharma, G. and Bansal, P. (2017), "Partners for good: how business and NGOs engage the commercial–social paradox", *Organization Studies*, Vol. 38 Nos 3-4, pp. 341-364, doi: 10.1177/0170840616683739.

Simoni, M.D., Marcucci, E., Gatta, V. and Claudel, C.G. (2020), "Potential last-mile impacts of crowdshipping services: a simulation-based evaluation", *Transportation*, Vol. 47 No. 4, pp. 1933-1954, doi: 10.1007/s11116-019-10028-4.

Slawinski, N. and Bansal, P. (2015), "Short on time: intertemporal tensions in business sustainability", *Organization Science*, Vol. 26 No. 2, doi: 10.1287/orsc.2014.0960.

Smith, W.K. and Tushman, M.L. (2005), "Managing strategic contradictions: a top management model for managing innovation streams", *Organization Science*, Vol. 16 No. 5, pp. 522-536, doi: 10.1287/orsc.1050.0134.

Stuart, I., Mccutcheon, D., Handfield, R., Mclachlin, R. and Samson, D. (2002), "Effective case research in operations management: a process perspective", *Journal of Operations Management*, Vol. 20 No. 5, pp. 419-433, doi: 10.1016/s0272-6963(02)00022-0.

Suedfeld, P. and Tetlock, P. (1977), "Integrative complexity of communications in international crises", *Journal of Conflict Resolution*, Vol. 21 No. 1, pp. 169-184, doi: 10.1177/002200277702100108.

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

Villa, R. and Monzón, A. (2021), "Mobility restrictions and e-commerce: holistic balance in madrid centre during COVID-19 lockdown", *Economies*, Vol. 9 No. 2, p. 57, doi: 10.3390/economies9020057.

Voss, C., Tsikriktsis, N. and Frohlich, M. (2002), "Case research in operations management", *International Journal of Operations and Production Management*, Vol. 22 No. 2, pp. 195-219, doi: 10.1108/01443570210414329.

Walsh, J.P. (1995), "Managerial and organizational cognition: notes from a trip down memory lane", *Organization Science*, Vol. 6 No. 3, pp. 280-321, doi: 10.1287/orsc.6.3.280.

Weick, K.E. (1995), *Sensemaking in Organizations*, Sage, Thousand Oaks CA.

Weick, K.E., Sutcliffe, K.M. and Obstfeld, D. (2005), "Organizing and the process of sensemaking", *Organization Science*, Vol. 16 No. 4, pp. 409-421, doi: 10.1287/orsc.1050.0133.

Wilson, J.P. (2015), "The triple bottom line: undertaking an economic, social, and environmental retail sustainability strategy", *International Journal of Retail and Distribution Management*, Vol. 43 Nos 4-5, pp. 432-447, doi: 10.1108/ijrdm-11-2013-0210.

Xiao, C., Wilhelm, M., Van Der Vaart, T. and van Donk, P.D. (2019), "Inside the buying firm: exploring responses to paradoxical tensions in sustainable supply chain management", *Journal of Supply Chain Managemen*, Vol. 55 No. 1, pp. 3-20, doi: 10.1111/jscm.12170.

Yin, R.K. (2018), *Case Study Research and Application: Design and Methods*, 6th ed., Sage, Thousand Oaks, CA.

York, R. and Rosa, E.A. (2003), "Key challenges to ecological modernization theory: institutional efficacy, case study evidence, units of analysis, and the pace of eco-efficiency", *Organization and Environment*, Vol. 16 No. 3, pp. 273-288, doi: 10.1177/1086026603256299.

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