

# Exploring paradoxes in sustainable supply chain management – Insights from multi-tier supply chains

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## Abstract

This exploratory study offers empirical insights on sustainability tensions and their management in multi-tier supply chains (SCs) by adopting a paradox lens. Semi-structured interviews were conducted with companies located at different SC levels and analyzed by applying a qualitative content analysis. The results show that sustainability tensions are closely interlinked and arise along all SC stages and at different levels – systemic, SC and organizational. By revealing general sustainability tension in multi-tier SCs, the results provide the basis for future studies in the context of paradox research and sustainable supply chain management.

**Keywords:** sustainable supply chain management, paradoxical tensions, multi-tier supply chains

## Introduction

The management of sustainability in supply chains (SCs) is often associated with the emergence of various tensions and conflicts (Brix-Asala et al., 2018; Xiao et al., 2019). Tensions may arise between present and future temporal contexts or between competing elements of economy, society, and environment (Hahn et al., 2015). Despite of the complex and multi-faced nature of corporate sustainability and sustainable supply chain management (SSCM), research has mostly sought to address tensions by adopting win-win and trade-off perspectives. This instrumental logic has been criticized for being too simplistic to cope with the complex and multi-faced nature of sustainability and its management (e.g. Hahn et al., 2015; Van der Byl & Slawinski, 2015). Due to these shortcomings, the adoption of a paradox lens has been proposed as an alternative view to make sense of sustainability tensions in SSCM research (Matthews et al., 2016; Xiao et al., 2019).

Moreover, for uncovering the true complexities and dynamic nature of SCs, scholars have stressed the need to adopt more multi-tier and network perspectives (Mena et al.,

2013; Tachizawa & Wong, 2014). Nevertheless, SSCM research still largely focuses its analysis on the management of first-tier suppliers and dyadic relationships – especially when exploring SCs empirically (Mena et al., 2013; Villena & Gioia, 2018). Managing SCs has become more challenging because of outsourcing and global sourcing trends that have resulted in longer and more fragmented SC structures. This is especially relevant in the context of sustainability, as the most severe issues are commonly generated by suppliers in the second tier or even further upstream in SCs, which are often located in countries with low(er) environmental and social standards (Tachizawa & Wong, 2014; Villena & Gioia, 2018). Together with increasing stakeholder pressure, these reasons have resulted in increased efforts to manage and ensure the sustainability along multiple SC levels. However, limited visibility and knowledge (Carter et al., 2015), conflicting institutional contexts of SC members (Busse et al., 2016) and the need for short-term economic profitability (Wu & Pagell, 2011) are just some examples of the challenges and complexities in multi-tier SSCM (MT-SSCM) that may result in the emergence of paradoxical sustainability tensions.

Given the lack of empirical research on paradoxical sustainability tensions and multi-tier SCs, our study seeks to enlarge the current body of literature by answering the following questions: (1) *What types of paradoxical tensions can emerge when managing sustainability in multi-tier supply chains?* and (2) *How do companies respond to these paradoxical tensions?*

## **Theoretical background**

### *Paradoxical sustainability tensions in supply chains*

Paradoxical tension can be defined as “*contradictory yet interrelated elements that exist simultaneously and persist over time*” (Smith & Lewis, 2011, p. 382). Paradox thinking has been proposed as an approach to cope with contradictory elements by explicitly acknowledging tensions among desired sustainability outcomes for the purpose of developing better management strategies (Hahn et al., 2015, 2018). It creates leeway for companies aiming to contribute to sustainable development through the adoption of an integrative view that weights environmental protection and social matters as ends themselves, instead of simple means for profit maximization (Hahn et al., 2010, 2018).

Even though various tensions have been addressed by SSCM scholars, only few studies have adopted an explicit paradox perspective – despite of its potential usefulness for the research field (Matthews et al., 2016). Brix-Asala et al. (2018) investigated what paradoxical tensions emerge in the SC of Fairphone and how the social enterprise copes with these tensions. Xiao et al. (2019) studied how purchasing and sustainability managers within buying firms make sense of paradoxical tensions in SSCM and their responses to these intra-organizational tensions. Longoni et al. (2019) explored paradoxical tensions between a social enterprise and its SC stakeholders and how it manages different stakeholder relationships. Given this lack of paradox research in SSCM, more studies are still needed to expand the understand of how to manage paradoxical sustainability tensions in SCs.

In order to effectively address paradoxical tensions, making sense of the nature of tensions can serve as basis for developing adequate management strategies (Hahn et al., 2015). Smith and Lewis (2011) propose a framework that differentiates organizational paradoxical tensions into four categories: *performing*, *learning*, *belonging* and *organizing*. Paradoxical tensions can emerge within and between these categories, which represent core elements and activities of organizations. Since corporate sustainability is a multi-level concept, tensions may also emerge between organizations and larger systemic

levels (e.g. Brix-Asala et al., 2018; Hahn et al., 2015). *Table 1* presents Smith and Lewis' (2011) categorization of paradoxical tension by adjusting it to a SSCM context.

*Table 1 - Categorization of paradoxical sustainability tensions*

<b>Paradoxical tensions</b>	<b>Description</b>
<b>belonging</b> ( <i>identities, views</i> )	<i>Belonging tensions</i> emerge from divergent identities and competing views regarding social and environmental sustainability. In a SC context, these tensions typically arise between two SC members with different values or conflicting perspectives and views on sustainability (e.g. Hahn et al., 2018; Smith & Lewis, 2011)
<b>learning</b> ( <i>routines, systems</i> )	<i>Learning tensions</i> arise from the simultaneous need to radically depart from current (unsustainable or less sustainable) business practices and build upon existing routines and structures for the future. In many cases, these routines and structures are strongly determined by larger levels (e.g. Hahn et al., 2015; Smith & Lewis, 2011).
<b>organizing</b> ( <i>structures, processes</i> )	<i>Organizing tensions</i> stem from difficulties to determine the methods for achieving certain outcomes and goals. These tensions arise when structures and processes of companies and/or their SCs conflict with desired social and environmental goals (e.g. Smith & Lewis, 2011; Xiao et al., 2019).
<b>performing</b> ( <i>goals</i> )	<i>Performing tensions</i> emerge from the variety of social, environmental and economic goals of companies and the SC in which they are embedded. These tensions usually stem from conflicting goals imposed by multiple (internal and external) stakeholders that are aimed to be achieved (e.g. Brix-Asala et al., 2018; Smith & Lewis, 2011).

With regards to the research questions, the following working definition for paradoxical sustainability tensions, which serves as basis for this study, is derived: Paradoxical sustainability tensions arise from opposing activities and elements stemming from different levels (organizational, supply chain and/or systemic) that contradict with social-ecological goals for sustainable development.

#### *Management strategies for paradoxical tensions*

In order to successfully manage paradoxical tensions, many scholars propose that organizations accept and embrace sustainability tension, instead of avoiding the contradictory and interrelated demands (Smith & Lewis, 2011; Van der Byl & Slawinski, 2015). Accepting contradictions is often seen as a fundamental step that separates the integrative view from the instrumental view that prioritizes financial outcomes over environmental and social goals (Hahn et al., 2015; Hahn & Figge, 2011). Given the complex nature of paradoxical tensions that often asks for iterative cycles of thinking and acting, different management strategies have been proposed to respond to paradoxical tensions.

By making use of *Separation* strategies, organizations facilitate the management of paradoxical tensions by keeping the two opposing poles separated – either *Temporal* or *Spatial* (Hahn et al., 2015; Smith & Lewis, 2011). *Temporal separation* deals with two contradictory and interrelated poles at different points in time, while *Spatial separation* copes with two contradictory and interrelated poles by situating them at different social or physical locations (*horizontal*) or at different levels, e.g. systemic and organizational (*vertical*).

Using *Contextualizing* strategies alleviates tensions by putting sustainability goals and standards into a broader context (Xiao et al., 2019). Organizations using this strategy show some flexibility regarding their sustainability goals and expectations to achieve subordinate objectives. For instance, structural challenges and contextual differences across geographic regions are taken into account when defining sustainability goals for making them more workable.

The use of *Synergizing* strategies facilitates the management of paradoxes through true attempts to accommodate or link two opposing poles (Hahn et al., 2015; Smith & Lewis, 2011). Companies using this management strategy cope with paradoxical tensions by transforming situations in a way that contradictory demands can be pursued simultaneously, without having to resolve the actual tension (Poole & Van De Ven, 1989; Smith & Lewis, 2011).

## **Methodology**

This study explores which paradoxical sustainability tensions emerge in multi-tier SCs and uncovers managerial response to address these paradoxes. An exploratory case study that allows to gather data from multiple sources for gaining in-depth understanding of the complexities and tensions in sustainable multi-tier SCs is conducted (Eisenhardt & Graebner, 2007). The design of this research can be described as a single-case study that consist of multiple embedded units of analysis (Yin, 2014). In comparison to a multiple case study design, a single-case design allows to achieve a higher degree of generalization by gaining deeper knowledge about the observed phenomenon and its context (Eisenhardt & Graebner, 2007). A single-case research seems therefore particularly suitable for uncovering general emerging paradoxical sustainability tensions and management strategies from a SC perspective.

The study focuses on three industries (consumer electronics, electric vehicle, textile) known for their global and complex SCs that cause a variety of social and environmental issues – making them particularly interesting for a MT-SSCM study (Mena et al., 2013). The data sampling mirrors the structure of a generic (multi-tier) SC to gain general insights and a holistic understanding about the complexities and emerging tensions in SSCM. We gathered data from companies with different roles and at different positions in the SCs of the three selected industries. These companies can be categorized into “top-tier firms” (with direct contact to end-customers), “mid-tier firms” (e.g. manufacturers, intermediate producers) and “lower-tier firms” (e.g. raw material producers, refiners). Moreover, we included data from third-party organizations (e.g. NGOs, certifiers) to gain additional insights and perspectives.

Overall, 39 semi-structured interviews with high level managers were conducted face-to-face or by phone between April 2018 and February 2020. All interviews were recorded and fully transcribed with the consent of the interviewees. As of right now, 19 interviews (13h 58min) with companies of the consumer electronics industry (11 interviews) and electronic vehicle industry (8 interviews) have been analyzed and their results are presented in this paper. Furthermore, secondary material in the form of online documents is considered at a later stage of the study in order to obtain further information and triangulate the primary interview data.

The data analysis follows the Gioia-methodology (Gioia et al., 2013) that has proven to be sound in previous paradox research (e.g. Xiao et al., 2019). In the first step, we started to inductively craft first-order concepts for “paradoxical tensions” and “management strategies”. In the second step, a category system that summarizes the first-order concepts into second-order themes was developed. In the third step, the second-order themes for the paradoxical tensions were further related to Smith and Lewis’ (2011)

categorization of paradoxical tensions, whereas the management strategies were related to other relevant paradox literature (e.g. Hahn et al., 2015; Xiao et al., 2019).

## Results

### *Paradoxical sustainability tensions in multi-tier supply chains*

To structure the presentation of the identified paradoxical sustainability tensions, one pole of the presented paradoxes always includes a social-ecological goal that belongs to the *performing* dimension (Smith & Lewis, 2011). These general social-ecological goals were identified for each of the multi-tier SC stages by analyzing the gathered data. The contradictory poles are categorized into *belonging* (divergent identities and views), *learning* (need to build upon existing routines and systems), *organizing* (competing structures and processes in implementing) and *performing* poles (economic goals) (Smith & Lewis, 2011). These contradictory poles of the paradox belong to any of the four categories for paradoxical tensions – either stemming from a systemic, SC or organizational level.

Table 2 – Identified paradoxical sustainability tensions in multi-tier supply chains

SC stages	Production and Refinement of Primary materials			Manufacturing		Retail and Use	
Social-ecological goals ( <i>performing</i> )	Integration of disadvantaged	Responsible sourcing	Traceability of primary materials	Responsible manufacturing	Improve sustainability	Longevity of consumer products	
Contradicting poles	Codes / Actors	Codes / Actors	Codes / Actors	Codes / Actors	Codes / Actors	Codes / Actors	Total codes
vs. divergent identities and views ( <i>belonging</i> )	7 / 2	3 / 1	2 / 2	19 / 9	8 / 3	0 / 0	39
vs. need to build upon existing routines and systems ( <i>learning</i> )	2 / 2	14 / 7	15 / 11	17 / 6	22 / 10	0 / 0	70
vs. competing structures and processes in implementing ( <i>organizing</i> )	4 / 3	8 / 3	0 / 0	2 / 2	8 / 4	0 / 0	22
vs. economic goals ( <i>performing</i> )	19 / 4	9 / 5	3 / 3	15 / 6	16 / 7	2 / 2	64
Total codes	32	34	20	53	54	2	195

Table 2 presents a general overview of the overarching social-ecological goals (*performing* poles) at their respective (multi-tier) SC stage and relates them to their contradictory poles (*belonging, learning, organizing* or *performing*). These social-ecological goals together with the contradictory poles create the identified paradoxical sustainability tensions. All social-ecological goals can be clearly related to one single SC stage except for ‘Traceability of primary materials’, which is positioned between two stages because of its relevance for both of them. Due to space restrictions, the presentation of results will not dive into details. Instead, we will highlight the most representative examples for each of the four categories of paradoxical tensions.

Looking at the coding frequencies, *learning::performing* paradoxes (*need to build upon existing routines and systems vs. social-ecological goals*) were most commonly identified. Regardless of the organizational size, companies struggle to ensure sustainability because of the complexity of their SCs. One top-tier firm outlined this challenge by stating: “*given that number of parts, that number of different types of raw material and processes [...] and 40,000 plus direct suppliers, and each of these suppliers can have thousands or tens of thousands of suppliers, I would say complexity is the main challenge*” (TT-1\_EV). The complex SC structures usually result in a lack of transparency that becomes even more of an issue considering the structural problems in numerous countries of the “Global South” (e.g. low social and environmental standards, weakly enforced laws). Simply boycotting SC partners in these countries is often not possible or even desired, which is why companies need or choose to build upon the existing systems and routines to achieve their sustainability goals in the long term.

These structural problems often trigger *performing::performing* paradoxes (*economic goals vs. social-ecological goals*). For instance, lower-tier firms mentioned the tensions between the goal to minimize financial and reputational risks and the goal to integrate disadvantaged actors and regions into the SC: “*If the major brand or major sectors step out to avoid any reputational risk, this simply means that this [artisanal and small-scale miners] will continue to dig [...] and this brings precious metals and all the other minerals into the illegal market*” (LT-2\_CE). Furthermore, companies reported that attempts and measures with the aim to improve the SC sustainability often contradict with fundamental economic goals and decisions: “*contrary to what can probably be said about fairtrade coffee, we cannot sell at higher prices. [...] the traditional performance factors price, speed, professionalism and quality still count absolute. This means that you cannot gain market shares by acting more ecologically or socially responsible as a supplier*” (MT-3\_CE).

In several cases, *belonging::performing* paradoxes (*divergent identities and views vs. social-ecological goals*) were found as reasons why sustainability efforts are often not financially valued by customers. These paradoxes often emerge when buying firms restrict their sustainability demands and efforts solely to minimum standards: “*Many [purchasing managers] are strongly interested [but] say: ‘Well, purchasing decisions based on that I am not allowed to make due to my directive.’ They do not yet have these criteria in their blank, [...] instead, they restrict their focus on minimum standards*” (MT-3\_CE). Moreover, *belonging::performing* paradoxes also emerge from divergent perspectives and views of suppliers. Especially the views and perspectives regarding sustainability of suppliers in the “Global South” and Asia often compete with the social-ecological goals of Western companies. One mid-tier firm replied when being asked about the main challenges with regards to the management of sustainability in SCs: “*that [suppliers] comply. That's the main challenge. [...] And they always put this request at the lowest priority as for the normal request*” (MT-9\_EV).

Finally, *organizing::performing* paradoxes (*competing structures and processes in implementing vs. social-ecological goals*) emerge frequently from the companies' dependency on other SC members, which significantly influence the implementation of sustainability. As a consequence of this dependency, companies struggle to align their organizational and SC structures with their social-ecological goals, as they need to hold on to current business operations and a commercial logic: "And there are always discussions, always attempts to develop products, sustainable products based on renewable resources for instance [...] we, everybody has some in reserve, but nobody is willing to pay the prices" (MT-2\_CE).

#### *Paradox management strategies*

To cope with paradoxical tensions in sustainable multi-tier SCs, various managerial responses that are often interlinked can be identified. Similar to the previous part, we will only highlight examples of the most representative management strategies, which were used to address some of the previously presented sustainability tensions. The results of our analysis show that *learning::performing* paradoxes (*need to build upon existing systems vs. social-ecological goals*) are often addressed by communicating the complexities regarding the management of sustainability in the companies' SCs to customers and pressure groups (*Contextualization*). Moreover, companies collaborate with different stakeholders (e.g. via industry initiatives or public-private partnerships) to address social and environmental issues at larger industry or country levels (*Spatial Separation*).

To tackle *belonging::performing* paradoxes (*divergent identities and views vs. social-ecological goals*), many companies frequently select SC partners with a somewhat similar sustainability understanding and/or commitment (*Synthesizing*). Moreover, companies try to raise the sustainability awareness of suppliers and customers "to let them know what sustainability is and the importance of it" (TT-1\_CE) (*Synthesizing*). The same two strategies are also used to address *organizing::performing* paradoxes (*competing structures and processes in implementing vs. social-ecological goals*) for the purpose of extending the integration of sustainability activities into the core structures of companies and their SCs, which contributes to the realization of social-ecological goals.

Turning to the management strategies for *performing::performing* paradoxes (*economic goals vs. social-ecological goals*), companies also sensitize industrial customers for sustainability matters with the aim of receiving economic compensation or other support for social and ecological activities (*Synthesis*). To deal with the issues of only having limited financial and organizational resources, companies engage in the monitoring of suppliers selectively (*Spatial Separation*) and/or gradually extend their monitoring activities (*Temporal Separation*). Furthermore, the findings show that standards and certificates are commonly used with the objective to keep management expenses low and ensure that suppliers meet certain social and environmental requirements (*Synthesizing*).

#### **Discussion**

The purpose of this study was to explore sustainability tensions that arise in multi-tier SCs by adopting a paradox perspective. Moreover, it aimed to identify what management strategies are used to respond to these paradoxical tensions. *Figure 1* demonstrates the levels of emergence of paradoxical tensions by illustrating the sources of opposing elements (*belonging, learning, organizing* and *performing* poles) that contradict with the general social-ecological goal (*performing* poles) in multi-tier SCs. It also illustrates how the opposing paradox poles are interconnected and can influence each other. This general

interwovenness of competing demands and their emergence at different levels has also been outlined in other paradox research (e.g. Schad et al., 2016). Our data indicates a hierarchical structure among the opposing poles of paradoxical tensions. *Learning* paradox poles that emerge at the highest levels (systemic, supply chain) influence all other paradox poles. *Belonging* paradox poles arise solely on a supply chain level and have an impact on *organizational* and *performing* paradox poles. *Organizing* and *performing* paradox poles influence each other mutually and arise at the lowest levels (supply chain, organizational). Considering this hierarchical structure, the general proposition can be derived that tackling paradoxical tensions at higher levels should be given priority, as this can significantly enhance the management of paradoxes at lower levels.

The findings indicate that *learning::performing* paradoxes are the most difficult to address, as their opposing poles typically arise from underlying systemic issues and the fundamental complexity of most SCs. Responding to these systematic issues often requires a high level of power and resources. This might explain why companies most commonly cope with these paradoxes by contextualizing their sustainability objectives and by collaborating with stakeholders to enhance their influence on larger, underlying issues. Looking at the *performing::performing* and *organizing::performing* paradoxes, the findings show that these paradoxes strongly influence and determine each other. The conflicting poles of these paradoxes typically arise from the core demand of every company and SC to be economically profitable. The management of both paradoxes is centered around two main questions: To what extent can sustainability be integrated into the core business and process? To what extent does the company reliance on conventional business practices to be economically sustainable? Both of these questions are often determined by other SC members. It comes as no surprise that many companies often tackle *belonging::performing* paradoxes simultaneously when responding to *performing::performing* and *organizing::performing* paradoxes though attempts to align and synthesize the divergent identities and views of suppliers and customers with their social-environmental goals. The findings underline the importance of financial rewards for sustainability efforts that facilitate the deeper integration of sustainability into the core structures and processes of organizations and (multi-tier) SCs.

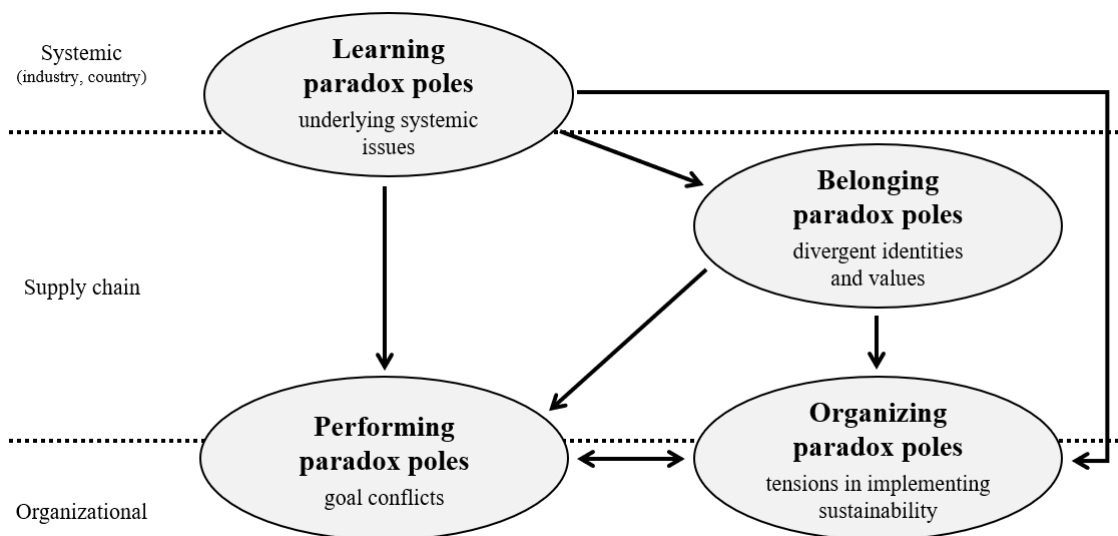


Figure 1 - Interrelations of opposing poles in (MT-)SSCM resulting in paradoxical tensions



Our research makes several contributions to the literature. The study moves away from the traditional win-win and trade-off perspectives on sustainability tensions by answering calls for empirical studies on paradoxical tensions not only in general (e.g. van der Byl and Slawinski, 2015), but also in SCs (e.g. Brix-Asala et al., 2018; Xiao et al., 2019). In contrast to other empirical studies that often focus their analysis on a single paradox (e.g. Xiao et al, 2019), a more systemic perspective is used to unveil general paradoxical tensions in (MT-)SSCM and the interwovenness of paradox poles. Even though this systemic approach may provide less detail than studies focusing on individual paradoxes, our research provides valuable insights that can serve as research directions for more in-depth studies on certain paradoxical tensions and their interrelations.

Furthermore, our study contributes to MT-SSCM research (e.g. Mena et al., 2013; Tachizawa & Wong, 2014) by answering calls for more research beyond dyadic relationships, which have been criticized for not capturing the true nature of SCs as networks (e.g. Choi & Wu, 2009). This study adopts a strong network perspective by outlining the complexities and challenges in the form of paradoxical sustainability tensions that companies with different roles and at different positions in multi-tier SCs face. Moreover, by exploring the management response to paradoxical tensions, the study indicates that driving companies for (MT-)SSCM can be found at any level of the SC. This contradicts the general proposition by Schmidt et al. (2017) that companies invest more in sustainability practices the closer they are located toward the end-customer.

However, several limitations of this study must be addressed as well. Despite being specifically designed to uncover paradoxical sustainability tensions in SCs, the interview guide for the semi-structured interviews did not include any questions that explicitly asked for “tensions” or “paradoxes”. This leads to the major limitations that the paradoxical tensions, which were identified by the authors who adopted a paradox lens, may not be perceived as such by the companies and third-party organizations in this study. Another limitation stems from the fact that several companies and third parties in the data sample do not have any business or stakeholder relationships with one or even more organizations in this study – even though attempts were made to address this through snowball sampling efforts. For that reason, the vast majority of identified paradoxical tensions lack some contextual depth, which could have been explored in greater detail otherwise. Moreover, our study neglected the individual level as a source of paradoxical tensions (e.g. Xiao et al., 2019). The final limitation that needs to be addressed is the strong eurocentric bias, as a result of the data sample primarily consisting of companies and third parties of the “Global North”.

Taking the results and limitations into account, the following research directions can be derived. First, future research could carry out in-depth analyses of the various paradoxical tensions and their management outlined in this study. Second, the eurocentrism bias could be overcome by including more companies from the “Global South” to capture their perspectives and contextual influences. For instance, this may uncover the challenges and complexities suppliers face when having to deal with the sustainability expectations and standards of buying companies of the “Global North”.

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