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When Global is Not Enough: Applying a Paradox Lens to Sustainability Transitions in Interorganizational Systems

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ABSTRACT

Sustainability transitions within global interorganizational systems, such as supply chains, networks, or industries, often face various knotted tensions. These include both sustainability tensions and global-local tensions that multinational enterprises (MNEs) and their business partners, often small and medium enterprises (SMEs), must navigate. Particularly, the tension between global strategies and local contexts challenges MNEs' proactive approaches to managing sustainability emerges. We apply a paradox lens to understand how MNEs address sustainability tensions within global interorganizational systems. Our study focuses on an interorganizational system operating in Europe and China, directed by four MNEs within the food packaging industry, as it transitions to using bio-based plastics. Our findings reveal that while the MNEs adopt a global approach to sustainability, their efforts are often hampered by local circumstances, stalling the sustainability transition. This study contributes to the literature in two ways: (1) We conceptualize tensions as potential breaking points in sustainability transitions within interorganizational systems, arguing that MNEs can effectively address these tensions by adopting a *glocal* approach to paradox management. (2) We demonstrate that tensions within interorganizational systems often form part of complex, knotted chains that MNEs and their business partners must collaboratively address.

1. Introduction

For the past decades, multinational enterprises (MNEs) have been under growing stakeholder pressure to advance sustainability transitions (Kim and Davis, 2016; Tura et al., 2019). Sustainability transitions refer to “a fundamental transformation towards more sustainable modes of production and consumption” (Markard et al., 2012: p. 955), where corporate sustainability is often conceptualized as consisting of three pillars: the environmental, social, and economic dimensions of sustainability (Bansal and Song, 2017; Hahn et al., 2015; Weinberger et al., 2015). Examples of sustainability transitions in different industries include the reduction of carbon dioxide emissions (e.g., Theißen et al., 2014), improving social workplace conditions (e.g., Schrage and Rasche, 2022) in the consumer goods industry, and waste reduction in product packaging through circular economy practices or biodegradable materials (e.

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g., Chabowski et al., 2023).

The literature on international business (IB) has examined MNEs' efforts in sustainability transitions from various angles, including their strategies (Kozlenkova et al., 2021), capabilities (Maksimov et al., 2019), and roles in driving sustainability (Hartmann et al., 2021; Montiel et al., 2021; Patala et al., 2021). However, companies' sustainability objectives often compete with each other and their economic objectives, leading to sustainability tensions (Bansal and Song, 2017; Hahn et al., 2015). Such tensions “occur between different levels, in change processes and within a temporal and spatial context” (Hahn et al., 2015, p. 297). They are often paradoxical, characterized by being contradictory yet interdependent and persistent over time (Schad et al., 2016). The environments in which MNEs operate—often global, interorganizational systems like global supply chains, networks, or industries consisting of many interconnected business relationships (Holm et al., 1996)—span both industrial and emerging economy contexts, potentially leading to further (intercultural) tensions (Bu et al., 2023; Doh et al., 2016; Schrage and Rasche, 2022). Therefore, MNEs' pursuit of sustainability transitions involves a complex set of tensions, ripe for scholarly inquiry.

In IB scholarship, it is assumed that MNEs' challenges should be examined in the context of a network of connected business relationships (e.g., Holm et al., 1996). Hence, it is surprising that little research has been conducted on MNEs' role in addressing tensions in sustainability transitions within global, interorganizational systems—especially considering that addressing such tensions in the context of interorganizational systems is far more complex than within single organizations (Jarzabkowski et al., 2019, 2022), where most research on sustainability tensions has taken place (e.g., Hahn et al., 2014, 2015).

We adopt a paradox perspective (Smith and Lewis, 2011) to sustainability transitions in global, interorganizational systems, arguing that this approach is necessary for two reasons: First, the complex and globalized environments in which MNEs operate are rife with interrelated tensions that companies need to address proactively to harness the creative potential inherent to paradox (Lewis, 2000; Smith and Lewis, 2011). Especially when addressing sustainability demands, these tensions might otherwise paralyze actors, hindering successful business conduct (Schuessler et al., 2023). In practice, companies, including MNEs and SMEs within such systems, address the tensions of systemic sustainability transitions in various ways. For example, some MNEs conduct social audits to improve working conditions for production workers at independent (often much smaller) supplier firms (Schrage and Rasche, 2022), while other MNEs apply joint instruments to reduce environmentally harmful carbon emissions (Theißen et al., 2014), or, as relevant in this study, attempt to establish more sustainable materials across the entire interorganizational system, involving other MNEs and their SME business partners. Understanding how such efforts work as approaches to address paradoxical tensions in global, interorganizational systems is crucial, as only a balanced, proactive approach to sustainability tensions will ensure successful sustainability transitions as well as long-term sustainable business conduct (Hahn et al., 2014).

Second, MNEs have expanded business activities to foreign (emerging) markets to reduce costs and benefit from growth markets as well as lower regulatory standards (Dunning, 1980). Therefore, the global, interorganizational systems in which today's MNEs operate span both industrial and emerging economy contexts, as well as business partners of different firm sizes (both MNEs and SMEs) and institutional backgrounds. This heightens the complexity of interorganizational systems while giving rise to global-local tensions, where globally operating (often industrial country) MNEs need to adapt their approaches to local (emerging economy) contexts that are often highly different from their home markets in terms of culture, power of the state and law enforcement, social security systems, and financial and labor markets (Barkemeyer and Figge, 2014; Jain and De Moya, 2013; Miska et al., 2016; Muller, 2006). It also highlights MNEs' potential to foster sustainable development (Holtbrügge and Dögl, 2012; Kolk et al., 2017; Kolk and van Tulder, 2010; van Zanten and van Tulder, 2018) and further economic prosperity and global social equity (Bansal, 2005; Kolk et al., 2018). If their business is conducted responsively to local needs, MNEs can be seen as major players in addressing global sustainable development challenges (Luo et al., 2019; Meyer, 2004; Reimann et al., 2012; Valente and Crane, 2010), and more research is needed on their roles and practices (Meyer and Peng, 2016; Yu et al., 2023).

Hence, this study aims to answer the research question:

How do MNEs manage tensions of sustainability transitions in interorganizational systems that span across emerging and industrial country contexts?

To address this question, we conducted a single case study (Yin, 2014) of a global interorganizational system related to bio-based plastics for food packaging between Europe and China. Bio-based plastics for food packaging are produced from renewable feedstock sources such as starch, waste materials, or algae. Transitioning from petroleum-based plastics to bio-based plastics requires complex international and interorganizational collaboration. For the purpose of investigating the complex international and interorganizational collaboration entailed in this sustainability transition, we conducted and analyzed 18 in-depth interviews with representatives of 12 firms in this system, including plastics producers, packaging producers, brand owners, and retailers in Europe and China, complementing our primary interview data with 167 documents from these firms and their stakeholders.

Our study makes two contributions: First, we add to the literature on IB and sustainability by analyzing a global, interorganizational system that consists of industrial and emerging market contexts. Our findings reveal that sustainability transitions surface conflicting goals inherent to corporate sustainability, which are related to global-local tensions. We find that the entanglement of sustainability tensions and global-local tensions necessitates a *glocal* approach (building on Bartlett and Ghoshal, 1999) to sustainability, in order to advance sustainability transitions. While not all interorganizational systems are global (e.g., local supply chains or national insurance systems, Jarzabkowski et al., 2022) and not all global systems are interorganizational (e.g., MNEs), we stress that addressing sustainability tensions in systems that are both global and interorganizational is especially challenging, as they are prone to various, entangled tensions that need to be addressed simultaneously, requiring a *glocal* approach throughout the process.

Second, we contribute to the literature on paradox by showcasing inter-organizational paradox handling in light of knotted tensions (Sheep et al., 2017), and how these knotted tensions unfold in an interorganizational setting. This finding highlights the importance of considering tensional knots as a whole, especially in global, interorganizational systems, as they impact the overall equilibrium of

paradoxical poles in the network (Jarzabkowski et al., 2022). We argue that MNEs need to address these contradictions as part of chains of knotted tensions. Our framework emphasizes the crucial role of knotted tensions in global, interorganizational systems and has significant implications for both research and practice.

2. Theoretical development

2.1. Interorganizational paradoxical tensions in sustainability transitions

Confronted with global poverty, escalating climate change, biodiversity loss, environmental pollution, and other grand challenges (George et al., 2016), scientists and researchers from across multiple disciplines (e.g., Grin et al., 2010) have long urged interorganizational systems to make greater progress in transitioning to more sustainable practices. From the growing body of research on organizational paradoxes, however, we know that efforts to implement system-wide sustainability transitions come with a variety of paradoxical tensions (Hahn et al., 2015; Pamphile, 2022), i.e. contradictory yet interrelated elements that persist over time (Schad et al., 2016).

As researchers, applying a paradox lens to sustainability transitions enables us to analyze how firms can adopt a proactive approach to navigating “sustainability paradoxes” (Hahn et al., 2014). For scholars and practitioners alike, adopting such an approach involves accepting the inevitability and dynamic interrelatedness of tensions and the need to deal with these in a balanced rather than a defensive manner, i.e. to adopt a paradox perspective or mindset. Unlike a defensive approach that prioritizes efforts to address one pole of a paradox over others or even strives to ignore the paradoxical nature of tensions altogether, a balanced approach from a paradox perspective involves a ‘both/and’ rather than an ‘either/or’ mindset (Lewis, 2000).

Any large-scale sustainability transition involves addressing all three pillars of environmental, social, and economic sustainability, each of which typically unfolds in contradictory demands, generating multiple tensions in efforts to address one or the other demand. Since sustainability transitions need to be implemented by and across multiple organizations, moreover, this increases the likelihood of exacerbating tensions and their mutual impacts, often leading to what we term ‘breaking points’ that can ultimately lead to paralysis (Hahn et al., 2015).

Previous research also, highlights the relevance of international business for sustainability transition (Chapman et al., 2020; Yu et al., 2023), which often spans both emerging and industrial markets (Xiao et al., 2019) through the involvement of MNEs and internationally active SMEs and requires both global and local business practices (Barkemeyer and Figge, 2014; Jain and De Moya, 2013; Miska et al., 2016; Muller, 2006). To date, however, few studies have empirically explored the complexities entailed in tackling the interorganizational paradoxical tensions that unfold in sustainability transitions across contrasting country contexts. Three notable exceptions include a recent paper by Schrage and Rasche (2022) on how contrasts between national business systems impact firms’ relative capacities to handle a business-social paradox, a study by Sharma and Bansal (2017) of how business-NGO tensions unfold in joint sustainability projects, and Xiao et al.’s (2019) analysis of buyer-supplier relations in sustainable supply chain management.

Notwithstanding the valuable insights yielded from these three studies, their focus was in all cases confined to the management of only two poles of sustainability (i.e., social vs. economic or environmental vs. economic tensions) and/or on dyadic relationships (i.e., between buyers and suppliers or businesses and NGOs) rather than on tackling the complexity of interorganizational systems that may include multiple MNEs and their SME business partners across continents within a system of interorganizational relationships facing numerous paradoxical tensions between all three pillars of sustainability.

One paper that has insightfully explored interorganizational paradoxes in a multi-actor and multi-country system is Jarzabkowski et al.’s (2022) analysis of the knottedness of several social-economic tensions in enabling rapid financial responses to disaster relief. These authors found that achieving overall and enduring dynamic equilibrium (Smith and Lewis, 2011) depends on how tensions are knotted and re-knotted through actors’ proactive responses to paradox, with ‘paradox knots’ referring here to a recognition of how responding to one of multiple paradoxes affects the salience of other paradoxes (Sheep et al., 2017). Drawing upon and extending insights from this and the other three papers mentioned above, our own study sets out to cast light on how several MNEs handled paradox multiplicity in effectuating sustainability transitions within an interorganizational system comprising business relationships extending across continents.

2.2. Global-local tensions in international management

Developing and effortfully integrating interorganizational relationships as a system of interdependent actors engaging in close interaction is a critical strategic option for MNEs seeking to strengthen their capabilities for expansion in new and growing markets (Jones et al., 1997; Kim et al., 2006). In interorganizational research, such systems can refer to entire networks of interlocked relationships. In this paper, we define interorganizational systems according to the widely cited definition elaborated by Laumann, Galaskiewicz, and Marsden (1978, p. 458) as “a set of nodes (e.g. persons, organizations) linked by a set of social relationships (e.g. friendships, transfer of funds, overlapping membership)”. Examples of such interorganizational systems include industrial networks (Jarzabkowski et al., 2022) and global supply chains (Schrage and Rasche, 2022; Xiao et al., 2019).

From IB theory, however, we know that efforts to achieve integration and consistent practices across global interorganizational systems are often frustrated by a mismatch or decoupling between global strategies and the capacities of local actors to respond in accordance with (unrealistic) expectations that fail to take account of context-specific differences (Bartlett and Ghoshal, 1999, 2002). This particular global-local tension is attributed primarily to cultural and geographic distances and the ensuing challenge of ensuring integration among actors in interorganizational systems, including difficulties in linking and harnessing the dynamic capabilities of

multiple organizations to attain integration to foster greater progress on sustainability. Such tensions arising from cultural and geographic distances (e.g., [Lowson, 2003](#); [Pedersen and Andersen, 2006](#)) have been found to hinder the sustainability aims and efforts of MNEs due to disparities in local responsiveness to top-down initiatives ([Svensson et al., 2016](#)). Here we align with scholars who argue that in implementing sustainable practices these distances must be considered through taking account of local experiences and including local actors ([Cho and Kang, 2001](#); [Mamic, 2005](#)). In short, this is because the greater the differences between emerging and developed countries the greater are the challenges entailed in coordinating interorganizational relationships to the extent needed for collectively and consistently implementing coherent sustainability agendas. These challenges stem in large part from the disparate and often insufficient capacities and resources of local actors within such interorganizational relationships to handle paradoxical sustainability tensions effectively without diverging from the overall agenda.

The challenges of overcoming sustainability tensions in interorganizational systems are further attributable to the intrinsic difficulties of harnessing the synergistic benefits of sufficiently integrating relationships between global and local organizations (e.g., [Liu and Almor, 2016](#)). Prior research has confirmed that MNEs that fail to take sufficient account of and incorporate context-specific factors into their interorganizational relationships with local businesses tend to face difficulties in implementing their sustainability goals and standards ([Akhtar et al., 2020](#); [Ciliberti et al., 2009](#)). Again, these difficulties are inevitably exacerbated and further complicated when MNEs operate across emerging and industrial countries, where local circumstances and needs will differ to an even larger extent ([Bu et al., 2023](#); [Doh et al., 2016](#)). By contrast, [Dimitratos et al. \(2004\)](#) have shown that closer alignment with local conditions can strengthen the international performance of MNEs.

The extent to which sufficient integration is achievable within interorganizational systems also depends on how closely the varying capabilities and degrees of sustainable business practices of the different MNEs involved in the collaboration are linked. Here prior research indicates that being well-connected to other MNEs with strong sustainability approaches and capabilities can drive organizations to reevaluate their global operations and strategies (e.g., [Chen et al., 2019](#); [Gruchmann and Seuring, 2018](#)). This positive outcome relates to and depends not only on the respective sustainability management capabilities of each MNE, however, but also on efforts to develop interorganizational relationship capabilities that facilitate MNEs to become “embedded in a network of organizations” ([Sandberg et al., 2021, p. 99](#)). By proactively participating in such networks, organizations in turn can gain what [Möller and Svahn \(2003\)](#) term new “network management capabilities” generated by the strength and effectiveness of their interorganizational relationships to which each organization contributes in different ways. All these factors, including the varying extent and particular combination of capabilities within interorganizational relationships, will impact the overall level of resources and processes developed for sustainability ([Akhtar et al., 2020](#)).

In the IB literature, scholars recognizing these challenges and tensions of transnational interorganizational endeavors have classified the positive efforts of global firms to meet local conditions as an approach termed ‘glocalization’ (e.g., [Beveridge et al., 2022](#); [Svensson et al., 2016](#)). A portmanteau of globalization and localization, the term was first popularized by sociologist Roland [Robertson \(1992\)](#) and denotes an approach whereby economic growth is achieved not only by global organizations influencing local market conditions but by enabling local organizations to protect and maintain their local conditions without being dominated by globalization. As such, glocalization entails that MNEs expand their global strategic outreach while at the same time adapting their operations to meet local conditions to increase local responsiveness, effectively recognizing the need to ensure integration between within interorganizational systems.

Glocalization also closely relates to and promotes various aspects of sustainability ([Barkemeyer and Figge, 2014](#); [Jain and De Moya, 2013](#); [Miska et al., 2016](#); [Muller, 2006](#)). For example, [Mol and Lee \(2023, p. 3\)](#) argue that MNEs “must pursue practices that are viewed locally as legally, normatively and/or culturally responsible”. According to [Svensson et al. \(2016\)](#) “glocal business sustainability refers to the interconnection and interdependence between local and global performance of sustainability issues”. In sum, taking account of the glocal complexity of business sustainability across geographical and temporal contexts is advocated as a means to support the growth of interorganizational relationships and build the capacities of all their key actors to deal more effectively with paradoxical tensions.

For all of the promising potentialities of this proposed approach, however, and despite some valuable prior research in the field of paradox on global-local tensions in general ([Beveridge et al., 2022](#); [Svensson et al., 2016](#)), we still lack in-depth studies on how global-local tensions interrelate with sustainability tensions arising from the competing demands of social, environmental, and economic sustainability. Although it is well-recognized that this is a matter of balancing paradoxes across an interorganizational system, research has only recently begun to pay greater attention to the precise nature of the balancing required. Some studies have focused on the dynamic equilibrium of single paradoxes within organizations (e.g., [Jay, 2013](#); [Tracey and Creed, 2017](#)), while others have explored multiple paradoxes within interorganizational systems (e.g., [Cunha and Putnam, 2019](#); [Schad and Bansal, 2018](#)).

[Jarzabkowski et al. \(2022, p. 1478\)](#) have defined the dynamic equilibrium aimed for as an ongoing accomplishment involving “mutually reinforcing balance among the multiple paradoxes of an interorganizational system”. This conceptualization implicitly recognizes that disequilibrium and power imbalances are intrinsic to – or even default characteristics of – interorganizational systems ([Hingley, 2005](#); [Williams et al., 2019](#)), as is the proliferation of more or less salient or latent paradoxes among respective actors in such extensive networks. As [Jarzabkowski et al. \(2022, p. 1478\)](#) elaborate, “when the paradoxes are in disequilibrium, the interorganizational system experiences a crisis, as it becomes difficult to pursue its goals while also satisfying the interests of the participating organizations”. In exploring this phenomenon, scholars have developed the concept of “paradox knots” ([Sheep et al., 2017](#)) to refer to such multiple co-occurring, inseparably entangled and interdependent tension. Again, however, the implications for dynamic equilibrium within the context of interorganizational systems have not been studied at global level. Furthermore, and despite the increased number of studies on MNEs and sustainability in recent years, the IB literature lacks research advancing our understanding of how MNEs effectively manage global-local paradoxical tensions interrelated with sustainability tensions across emerging and industrial

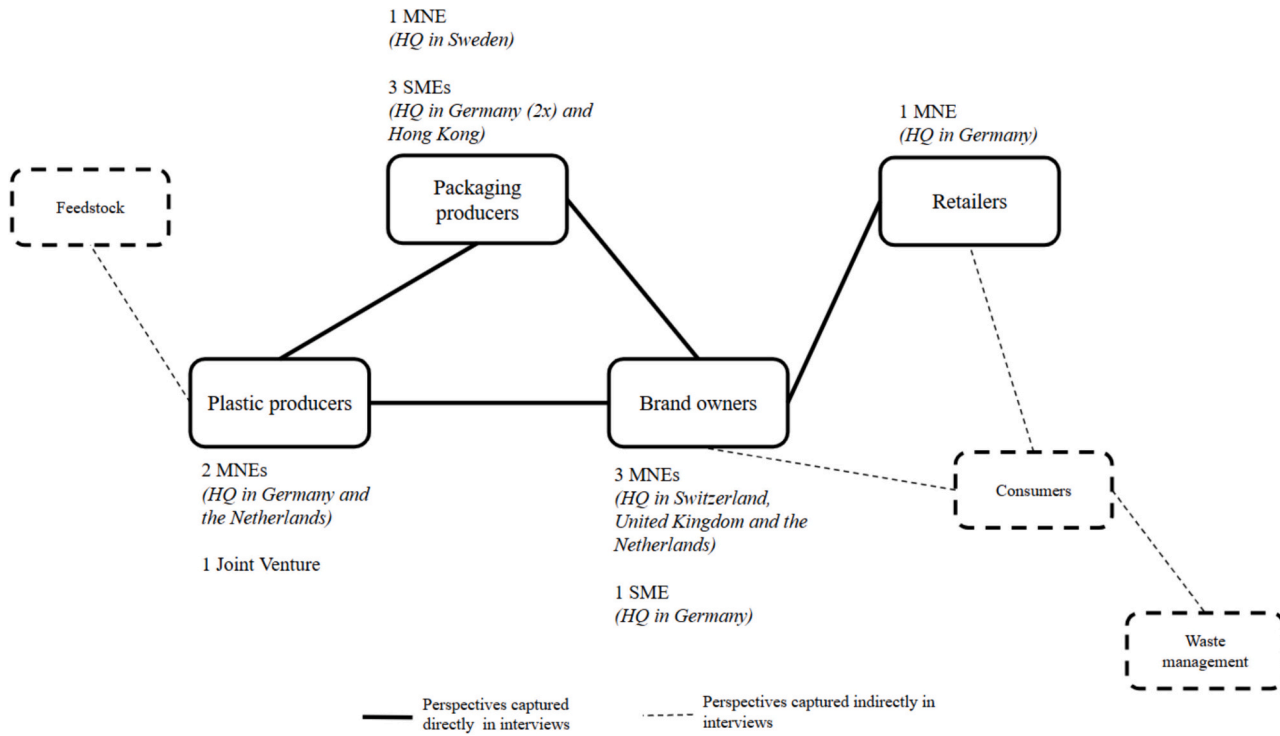


Fig. 1. Simplified schema of global interorganizational system of bio-based food packaging.

county contexts as part of interorganizational systems.

3. Methods

3.1. Research context and case selection

To understand how MNEs manage the tensions of sustainability transitions in global interorganizational systems, we conducted a qualitative single-case study (Yin, 2014) based on semi-structured interviews complemented by rich documentary data related to the food-packaging industry. The level of access we attained in this in-depth investigation enabled us to probe and interact with key actors from our research context to explore the experiences, motives, and opinions of representatives from the participating firms in detail (Rubin and Rubin, 2011).

Our interest in the role of interorganizational systems and inter-relationships in such systems in sustainability transitions led us to focus on the ongoing transition of the global food-packaging industry towards the use of bio-based plastics. Unlike conventional plastic polymers reliant on petroleum-based chemicals, bio-based plastics are seen as a sustainable alternative based on polymers produced from renewable feedstock sources, with food packaging being one example of one of the possible applications of bio-based materials (Wackett, 2019). The term 'bio-based' thus refers to the fact that such plastics are produced from feedstock sources rather than to the end of their product life, in which case they would be referred to as biodegradable or compostable plastics (Nazareth et al., 2022). We selected our case as an especially suitable setting for investigating MNEs' approaches to tackling sustainability tensions in international interorganizational relationships, basing our case selection on the following three criteria:

- a) At the time of our study, bio-based plastics were rapidly expanding as a new technology primarily due to a decline in the global price of oil as the main raw material of conventional plastic packaging, which resulted in significant sustainability tensions.
- b) Food packaging is known to have significant impacts on consumers' purchasing decisions, being widely perceived by consumers as closely related to issues of health and safety.
- c) Since several MNEs and SMEs were involved, the case promised to yield especially valuable insights into how global interorganizational systems can navigate multiple tensions. (As an example of this collaborative approach, the plastics-producing and brand-owning MNEs organized regular joint workshops to advance the sustainability transition.)

Fig. 1 shows a schema of the interorganizational system of bio-based food packaging we studied. The four boxes outlined and interconnected with unbroken bold lines refer to the MNEs and SMEs from which we interviewed key representatives: plastic producers, packaging producers, brand owners, and retailers. The three boxes outlined with dashes – 'Feedstock', 'Consumer' and 'Waste management' – indicate parts of the wider network referred to by our interviewees. Although we did not directly interview representatives of these sectors and groups actor, the perceptions relayed by our MNE interviewees of these components of the network provided us with crucial insights into how sustainability tensions unfolded and were handled throughout the overall system.

Whilst preserving the anonymity of our interviewees and the firms they represented, we briefly summarize here the most relevant elements of each entity to highlight their regional scope and activities and their respective roles within the interorganizational system. Thus, as indicated in the text outside the boxes in Fig. 1, we interviewed seven representatives from three plastic producers: a large MNE headquartered in Germany with an income of approximately €8 billion; an MNE headquartered in the Netherlands with general sales of around €700–900 million per year; and a joint venture created to promote the production and commercialization of high-quality bio-based plastics. Our interviewees from all these firms reported having regular contacts with packaging producers and with brand owners. We interviewed four representatives from four packaging producers: an MNE headquartered in Sweden with net sales of between €10–12 billion; and three SMEs, of which two were headquartered in Germany and one in Hong Kong. The Swedish MNE is a general producer of packaging, while the three SMEs all had business models focused on sustainable materials. Our interviewees from all these firms reported having regular business contacts both with plastic producers and brand owners. We interviewed four representatives from four brand owners: three MNEs with business activities in Europe and Asia; and one SME headquartered in Germany which at the time of our data collection was serving only the local market. None of the brand owners had a particular sustainability-oriented business model. One of the MNEs had over 200,000 employees, and another had 350,000. Two of the brand owners were consumer goods companies two sold prepared foods. We also interviewed three representatives from a leading international retail company.

3.2. Data collection

Combining in-depth semi-structured interviews with publicly available and internal documents from firms within the system of interorganizational relationships, our real-time data collection proceeded over a six-year period from 2014 to 2021. Crucially for the richness of our data, the first author was embedded in key research contexts of our case study: in China in 2014 and Europe in 2015. This author gained knowledge of the relevant industry and various cultural contexts within the interorganizational system through having worked in the chemical industry in Germany and China and by studying the Chinese language and culture. Although her previous industry contacts aided our selection of interview partners and enabled her embeddedness in the system of interorganizational relationships by gaining access to the three plastics producers, none of our interviewees had any pre-established relationship with the first author. Instead, she used her previous contacts to gain access to and focus on a different value chain than the one she had focused on, enabling her to leverage her knowledge of the wider industry without entering the field with set expectations or

interpretations of interorganizational relationships. Throughout these first two years, the author thus had privileged access to interview partners and internal documents. In the subsequent period 2016–2021, she continued to have regular exchanges with industry actors and observed numerous industry events, including global trade fairs, further enriching her deep knowledge of the industry.

3.2.1. Semi-structured interviews

In total, in the period 2014–2015, we conducted 18 interviews with managers from 12 companies, including three managing directors and 15 representatives from different departments (R&D, Marketing and Sales, Packaging, and Sustainability, etc.) to capture as many aspects and perspectives as possible, yielding in-depth insights into these actors' perceptions and experiences of how tensions unfolded and were handled. We focused on this period in particular as the timeframe in which the MNEs in our case study first undertook joint efforts to implement bio-based packaging and as a period marked by increasing sustainability tensions related to the declining global price of oil at the time. These interviews served as primary data of our empirical study but were triangulated and expanded over time with the help of secondary data (see below).

The 18 semi-structured interviews were conducted by the first author either on location or online with actors in Germany, the Netherlands, Sweden, UK, Hong Kong, and China. In five cases these were conducted in person on company premises to gain greater trust and a more profound experience of the research context and sense of the context-specific atmosphere, while 13 were held via telephone in accordance with the preferences of these interviewees. All were conducted in English, except one held in German (the native language of the first author) to put the interviewee at ease. All participants agreed to being audio-recorded on the condition that any subsequent usage of information remains anonymous. Lasting between 30 and 90 min, the interviews produced a total of 611 min of recorded data subsequently transcribed by the first author, resulting in 205 pages of primary data.

In addition to attaining an understanding of the overall interorganizational system, our questions focused on eliciting buyers' and suppliers' perspectives related to four themes: (a) the general role of sustainability and sustainability-related goals in the respective firms; (b) our interviewees' relational perspectives vis-à-vis other firms such as suppliers and customers, etc.; (c) the perceived benefits of bio-based food packaging and petroleum-based food packaging; and (d) the role and influence of international activities and global market trends on the dynamics and tensions of the sustainability transition. We also used the first round of interviews to identify further relevant interviewees from the system. We then returned to the field and conducted expert member checks, presenting and discussing the preliminary findings of our data analysis with industry representatives to and validate our initial insights and further refine our understanding of the case.

3.2.2. Documentary data

To complement and triangulate the insights derived from our semi-structured interviews, we collected 167 documents from all key actors involved in the system, i.e., from firms within the system and relevant stakeholders, combining these documents to build a rich database on the industry covering the period 2014–2021, including the role of fluctuating oil prices vis-à-vis the transition pursued in this timeframe. These documentary data served as secondary data and helped us to identify and analyze how the experiences and practices related and referred to by our interviewees were translated into written accounts and communications and also how the MNEs' sustainability efforts had proceeded and materialized in the years since the interviews were conducted, manifesting over time. In addition to MNE and SME public documents (such as reports, websites, press statements) and non-public documents (such as internal presentations and strategy documents), we thus also collected documents from NGOs, governmental organizations and other stakeholders to attain a better understanding of local contexts. [Table 1](#) provides an overview of the dataset.

3.3. Data analysis

In analyzing our data to derive an empirically grounded answer to our research question of how MNEs navigate the tensions arising from sustainability transitions in global interorganizational systems, we undertook a multi-step analysis of the sustainability transition, building theory abductively by iterating between interpreting data and developing theory, meaning our analyses were informed by theoretical frameworks and our choice of theoretical frameworks in turn was guided by our data ([Peirce, 1955](#); [Timmermans and Tavory, 2012](#)). We further customized our analytical approach ([Fendt and Sachs, 2008](#); [Gehman et al., 2018](#)) by applying a paradox lens ([Smith and Lewis, 2011](#)) in our focus on the role of interorganizational relationships in the sustainability transition and in particular on how multiple paradoxes were navigated through the joint practices undertaken by the MNEs. Although the overall system we studied comprised multiple interorganizational relationships between MNEs as well as relationships with and between SMEs at global and local levels, our rationale for zooming in on the MNEs' practices was that these were the most powerful entities and thus the only actors capable of steering the sustainability transition across the overall interorganizational system. Indeed, what makes our case especially interesting is that these different MNEs joined forces to drive the transition in collaboration with their SME business partners. [Table 2](#) provides details of how we used the different types of data in our analysis.

As we organized and coded our data ([Gioia et al., 2013](#); [Strauss and Corbin, 1997](#)), we continuously sought to understand how

Table 1
Data overview.

	Plastic producers	Packaging producers	Brand owners	Retailers	Stakeholders
Interviewees	<i>P1, P3, P7, P8, P9, P16, P18</i>	<i>P2, P4, P10, P13</i>	<i>P5, P6, P12, P14</i>	<i>P11, P15, P17</i>	N/A
Documentary documents	45	18	6	8	90

company representatives perceived and responded to the contradictory demands arising in the interorganizational sustainability transition. As the study unfolded, we turned to paradox literature after the first author had collected the data as tensions were emerging across the interviews leading us to frame this paper through the lens of paradox theory and IB. Further, to enhance readability, we present our analysis below as a series of three steps, though in practice the multi-step process of data analysis was not linear but iterative.

3.3.1. Step 1: Identifying relevant themes

To better understand our setting and case, we first sought to ascertain and understand the key challenges that emerged in the context of the sustainability transition and specifically in the shift from petroleum-based to biobased plastics. Each of the three researchers in our team first independently delved deep into the data, noting how the interviewees described the challenges and contradictions they faced. As noted, the first author had the opportunity to shadow one MNE closely, facilitating a stronger grasp of the “local landscape” (Miles and Huberman, 1994). While we do not formally analyze data from this shadowing period in this paper, her experience afforded an in-depth understanding of one MNE's day-to-day reality that helped inform our interpretations. For example, since the first author was deeply engaged in the field while the second and third authors were not, our conversations as a team helped us to resolve and clarify any ambiguities and complexities in the data.

3.3.2. Step 2: Coding

In the course of open coding (Gioia et al., 2013; Strauss and Corbin, 1997), having allocated more than 150 open codes in a prior step, including through discussing these as a research team, several key preliminary themes emerged that called for deeper analysis, including sustainability tensions and the importance of local context. Guided by our data and the literature on sustainable supply chain management, business networks, and sustainability in IB, we proceeded to develop two refinements in the second step of data analysis. First, we sought evidence of instances of environmental-economic, social-environmental, and social-economic tensions. (Examples of these instantiations of sustainability-related tensions in our data are summarized in Table 3.) As a second refinement, we discerned and coded patterns in the MNEs' approaches to these tensions, allocating these two categories. (Table 4 provides illustrative examples from our data of our allocation of these patterns to second-order themes and aggregate dimensions.)

3.3.3. Step 3: Further refining the analysis

Having developed a refined focus on tensions and approaches, we continued to analyze our data with a stronger focus on (1) the tensions that occurred related to sustainability, (2) the strategies that MNEs adopted to navigate these tensions, and (3) how local contexts influenced these tensions and strategies. We iteratively identified the MNEs' global approach to sustainability tensions and how this approach seemed to be challenged by local context. To validate these three aspects that comprise our aggregate dimensions,

Table 2
Use of data in the analysis.

Source of data	Type of data	Use in the analysis
Interviews	18 interviews with managers from 12 companies that lasted between 30 and 90 min, in total 611 min of interviews (205 pages of transcript). Interviewees: Managing directors (3) and representatives from different departments: R&D (4), Marketing & Sales (6), Packaging (2), and Sustainability (3)	First round of coding <ul style="list-style-type: none"> • Uncovering the influence of interorganizational relationships on sustainability transitions across emerging and industrial country contexts • Unit of analysis: Interorganizational relationships of MNEs and SMEs at global and local level
	These interviews focused on four themes: (a) general company information and the general sustainability goals (b) relational perspectives on other companies (suppliers, customers, etc.) (c) bio-based food packaging and petroleum-based food packaging, (d) the role of international activities We collected 167 documents provided by companies from the interorganizational system and their stakeholders. Public documents:	Second round of coding <ul style="list-style-type: none"> • Identifying instances of how MNEs manage sustainability tensions that occur in sustainability transitions • Unit of analysis: Sustainability tensions and global-local tensions
Documentary data	<ul style="list-style-type: none"> • reports • websites • press statements • documents provided by stakeholders such as non-governmental and governmental organizations (to understand local contexts) Internal (non-public) documents: <ul style="list-style-type: none"> • internal presentations • strategy documents 	<ul style="list-style-type: none"> • Triangulating facts and observations; enhancing the validity of our insights; contextualizing processes by investigating the overall system the interorganizational relationships are embedded within • Analyzing how the experience and practices related in interviews were translated in the written word • Unit of analysis: Interorganizational system of MNEs and SMEs at global and local level

Table 3

Illustrative examples of sustainability tensions.

	Environmental-economic tension	Social-environmental tension	Social-economic tension
Plastics Producer	<p>“In the bioplastics area, we have the ability to make bio-based polyamide, as an example, or a bio-based [brand name]. It is a polyester. But at the moment, the cost for us to make that relative to what they can – the customer can buy using petroleum-based isn't that attractive. But I think, as more and more customers demand this, as more and more end users demand this, we are there with the technology. We know how to do it. We've got all of the certifications. And it's really just a matter of that demand coming.” P8</p>	<p>“Although the area of land used for growing crops for bioplastics today is minimal, and projected to remain so in the years to come, there remains a concern among certain parts of our society about the use of food crops for other applications than food and feed. Over the next decades, world population will grow and global demand for biomass for food and industrial applications is expected to increase.” DOC1</p>	<p>“Today's feedstocks for bioplastics are grown on arable land. For both today and projections up to 2019, we can demonstrate that land use for bioplastics production is minimal and in no way competing with food [...] The European Bioplastics Association publishes market size data for the existing and future years on an annual basis. [...] The data shows that, for example, in 2019, land used for growing feedstocks for bioplastics will account for only 0.02 % of global agricultural area, a number which leads to the conclusion that bioplastics are in no way competing with land used for food.” DOC1</p>
	<p>“One of them is an economic point, which is related to the fact that the bio-products don't have the economy of scale. They are all produced in small pilot plants, and so the economics are not in favor at the moment. Obviously when you get to the point of building a plant you get closer but still there is a gap.” P16</p>	<p>“For each individual application, environmental safety, cost efficiency and the social consequences have to be examined for a product's entire life cycle.” DOC4</p>	<p>“For each individual application, environmental safety, cost efficiency and the social consequences have to be examined for a product's entire life cycle.” DOC4</p>
Packaging Producers	<p>“We do not have customers, and we will not win customers that only buy their packaging on an economical basis because, if this is the main focus, then you'll end up with conventional packaging.” P2</p>	<p>“I think the organization that we have, although it's called environment, very often, it's also about social, but mostly social in terms of social responsibilities in sourcing, social aspects of recycling, rather than the typical occupational health and safety that's led by other teams.” P10</p>	<p>“Today, it is very low on the agenda in China, yes, while we start with the one level up. We participated in the European Union-China summit a couple of weeks ago. And our Vice President was just speaking in front of the Parliament and in front of a Chinese delegation, highlighting these opportunities. [...] And I can tell you, from our experience, it can come when motivation from the government will start.” P4</p>
	<p>“And we feel that dependence on oil and fossil-based materials is something that we have to reduce, on one hand, because, of course, of pollution and releasing carbon that is already sequestered by the planet, release it to produce oil and fuels and then try to capture and sequester it again is very expensive.” P10</p>	<p>“Our vision to make food safe and available everywhere remains clear and strong. Our processing and packaging solutions provide food safety, quality, flavor and nutritional value, and extend shelf life. Food in a [company name] package can be transported and stored for several months, without the need for either refrigeration or preservatives. This significantly improves access to food for people around the world and we act to make sure this potential is fulfilled.” DOC7</p>	<p>“For decades, plastics have made a significant contribution to better living conditions, more sustainable products and waste prevention with their unique combination of light weight, versatility, performance, durability and cost-effectiveness. However, in the face of their omnipresence, industry, commerce and consumers alike are challenged to use, reuse, dispose of, recycle them and ultimately properly utilize them in a responsible way. Bio-based and biodegradable plastics offer attractive opportunities to meet all aspects of this requirement.” DOC6</p>
Brand Owners	<p>“It [bio-based packaging] is requested by our marketers – I don't want to say by the hour, but very, very often. It is absolutely important. And it is our target in the future to replace fossil-fuel-based raw materials with bio-based raw materials as much as possible. But as [company name] is buying those materials in thousands of tons, it – we definitely can't deny that we're also looking for the cost. And currently, the cost structure simply doesn't allow us to replace our current resin.” P6</p>	<p>“And you have a real problem that Styrofoam [a common take-away food packaging material] alone has got enormous toxicity to landfill, but also to humans because half the Asians put their Styrofoam into a microwave. When they eat that fried rice and they get to the bottom of it, it's melted. It's part of the actual Styrofoam. And it is – you can read about why it is on the Internet, about toxicity and about – but it is pure cancer.” P12</p>	<p>“But you have to think of not only the health of your workers, but you also have to think of the impact on landfill and the environmental footprint. They don't know – the first question they ask you is, “But, Ms. [name], I can't afford to buy more.” So you're literally dealing with 0.0004 cents. You're dealing with something that's bought in massive bulk.” P12</p>
		<p>“It's always about the best possible taste experience, plus better</p>	<p>“In addition to our own employees, we work with hundreds of partners, thousands of suppliers, and millions of farmers around</p>

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Table 3 (continued)

	Environmental-economic tension	Social-environmental tension	Social-economic tension
	<p>“At the moment a very small number of consumers would want to pay more for packaging, which at the end you only throw in the trash bin. So at this moment it doesn't have an awful lot of value if you buy food products if it's packed in something that is bio-based. So it's very hard to mark a premium for it.” P14</p>	<p>nutrition, plus clear communication that what you're communicating doesn't cost the earth. For the latter, that it doesn't cost the earth, of course packaging may also play a role. So it's nice to tell the story about: tastes good, does good. But doesn't cost the earth. That's our differentiation, tastes good, does good, gives good nutrition or whatever else, or gives livelihood to small farmers and doesn't cost the earth.” P14</p>	<p>the world. Our aim is to help develop thriving and resilient communities as part of a secure long-term supply chain.” DOC10</p>
	<p>“So bio-based products are not being used, mainly because of the price. We met a lot of suppliers. We listen to them. We analyze their solution. But still it's not sufficient enough for us to convince the buying department to go for this type of product.” P11</p>	<p>“So, historically if you come back to the bio-based materials, first it was made out of starch and therefore food. And the big concern was that people thought it was a waste to use food to create plastic.” P11</p>	<p>“I'd say that questions around packaging are one of the most commonly asked queries we get asked by our customers. However, if you consider that we sell thousands of food items per day, we're still only talking about single-figure queries each day. The thing that stresses me greatly in the UK is that people have lost responsibility for what they purchase. So people happily eat a sandwich or drink a coffee and then just think it's perfectly fine to leave that wrapping on the tube, on the side of the street or wherever. So I think there's an interesting dichotomy between the questions that people ask and the actual behavior of mainstream customers.” P17</p>
Retailer	<p>“Right now what we're doing is to buy renewable energy, so the energy we use through our energy contracts is all renewables. And then on top of that what we are seeking to do is to improve through our store level, so right now we have a project to understand our energy consumption better. We're installing in-store management systems to see how we can drive energy efficiency. The third step is to work through our supply chain and be as efficient as possible throughout our supply chain. That side to be honest is work in development and we're not there yet. So we're focusing on ourselves first.” P17</p>	<p>“An inescapable fact as we head forward is that we have a continually growing population and continually growing urbanization. Now I'm a country-boy at heart, so I don't really like cities and great urban centers, but unfortunately they are the only way that we can handle our growing populations efficiently and effectively.” P17</p>	<p>“In this respect, [retailer name] also declares its ambition to contribute to a living income for those producing for [retailer name]'s own brand/no-name supply chains by assessing and eventually paying a living wage by 2030.” DOC 11</p>

Table 4
The MNEs' global paradox approach challenged by local context.

The MNEs' global paradox approach to the sustainability tensions			Global paradox approach is challenged by local context
Focusing on sustainability goals	Collaboration and long-term relationships	Establishing social acceptability as a pre-condition	The global-local tension
<p>Plastics Producer</p> <p>"Sustainability is one of our main topics. So we're heavily involved. So we see ourselves as, let's say, actually the market leader in market development. So that means we do a lot of work in order to increase awareness, in order to, let's say, educate, if you can say that, in order to advocate for especially biopolymers. And we do that in China as well as elsewhere." P7</p> <p>"A lot of brand owners have sustainability targets, right? So a bio-based material [...] can help them towards reducing their carbon footprint, right? So there's definitely value there. And the reduction of carbon footprint, okay, very crudely, could be reaching out to the consumer. But it's really reaching out more to the investor." P8</p> <p>"So you must really have a certain feeling to – or ambition or goal to act eco-friendly. And so this is what our customers focus on. And as we do the same, then it is quite – well, then there is a common understanding." P2</p>	<p>"So, the role of this group is to discuss with customers and understand through the whole value chain whether that is an added value to the product that justifies building a new plant. I think what differentiates us from the rest of the other groups is really that we're working together with customers to try to exploit new possibilities, new materials and understanding their needs in the area of sustainability to push the project through." P16</p> <p>"Aligning our business closely to the needs of our customer needs is an important element of our strategy. We will therefore continue to develop our sector focus in a systematic and structured way in the future." DOC8</p> <p>"And that helps create relationships for life if you put it this way because we very often develop these products together with our suppliers. So the relationship we have with them is always geared towards research, innovation, long-term positioning, and growing together." P10</p>	<p>N/A</p>	<p>"The companies working in Europe are pretty much engaged and looking also to incorporate sustainability aspects in their own strategy. But on the other side you have the production in many cases occurring in Asia. So here in Asia, I would say China, sustainability per se is not yet a focus. But when you talk to many companies in Europe, they produce in China and they are interested in seeing how to translate the concept from an Asian point of view. But from a sustainability aspect I'd say that China is not that, so there's not a lot of customer pool or market pool in China. It's more in Europe." P16</p> <p>"The reason why the bio-based industry in China is so big is because they're producing their goods there and shipping them over to the US or to Europe. But the question is how much of those [things] are really used in China." P13</p>
<p>Packaging Producers</p> <p>"We do this because we recognize that we can only create a more sustainable future by addressing the interconnected nature of the environmental, social and economic challenges we face. Our solutions work because they are joined up." DOC 3</p>	<p>"As a mid-sized company which is also in competition with bigger ones, I think partnership is the key [...] It's more a partnership approach than anything else. The customer's not really a customer. You want to make friends a little bit." P13</p>	<p>N/A</p>	<p>"Recycling works when all the necessary actors are in place and well-connected. A weak or missing local link – such as a lack of efficient municipal collection systems – is a challenge. [...] Our work is present in local recycling initiatives in more than 70 markets." DOC 7</p> <p>"We try to reduce the number of our suppliers. One of the reasons is because we want to harmonize. [...] That currently is not that possible in China, or at least it wasn't in the past. We are also trying now to change to fewer suppliers and having a bigger portfolio there. But that is difficult from two aspects. One is simply the size of the country and then also the capacity of those suppliers." P6</p>
<p>Brand Owners</p> <p>"They're quite familiar with our sustainability targets. And when something new comes up in their knowledge, they immediately share it with us." P6</p> <p>"I was very lucky that one of my customers is a top-end five-star hotel group who said, 'No matter the price, I need to look at the health and well-being of my staff.' So they're truly congruent to their office place responsibility to values and principles." P12</p>	<p>"Well, I think good suppliers mean that you make less mistakes – that you have access to new ideas. So it's innovation. It's renovation. But it's also to run the existing business smoothly." P5</p> <p>"We want to – the few suppliers we selected as global partners – we want them to grow as well together with us because that helps us to have a standardized quality all across the globe. And of course it helps the supplier to grow as well." P6</p>	<p>So we definitely can't have bio-based material where – we mentioned that already – where it goes into food competition. [...] Where people die of starvation, we can't take food in bio-based material or in something what is really in competition to food. So that doesn't work at all." P6</p> <p>"We thoroughly believe you shouldn't waste food in a world where we'll soon need to feed nine billion people. We thoroughly believe you shouldn't use food to burn it or as packaging waste. Food needs to be eaten. [...] So now of course we're looking at bio-based packaging but so far we haven't been using it." P14</p>	<p>"So you have the problem in the UK where most of the packaging doesn't reach the recycling streams, so most of it goes to the landfill, so obviously there's another driving force behind – yeah you know it's going to go to waste. But if you're in Germany or the Netherlands most of the stuff, at least glass, is being recycled. If</p>

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Table 4 (continued)

	The MNEs' global paradox approach to the sustainability tensions			Global paradox approach is challenged by local context
	Focusing on sustainability goals	Collaboration and long-term relationships	Establishing social acceptability as a pre-condition	The global-local tension
Retailer	<p>“And I've seen, for example, that WWF approves of this material because it's being grown sustainably, but also the people that are hired are also – they come from different areas and they're really helped by the company and so on. So you can really see that people at the very beginning are – have good intentions. And this is where I see the biggest advantage here is to make not only the plastic sustainable but also everything this – which is behind.” P11</p>	<p>“I met with Mr. [name], a co-founder of the [packaging] company, and it was clear to both of us relatively quickly that we had a similar philosophy. [...] They had been on the market for a little longer, but we were basically both startups who were looking for each other and found each other, and now we're growing together.” P15 (translated)</p> <p>“Our suppliers are positive in coming forward with new packaging options, but these are faced more towards potential sales opportunities (on both sides) rather than reducing resource consumption. They look to add value by providing new lines that could add to range and sales (this is as much to their benefit as ours).” P17</p>	N/A	<p>it's PET being recycled, they pay you to bring it back to the shop.” P14</p> <p>“We've looked at some of the bio-based plastics in the past [...] but we took that out when we discovered that it was actually potentially contaminating some of the waste streams further down the line – like once it goes into the waste stream, whether it's picked up through an office collection or from the street side collections.” P17</p> <p>“And one thing we've discovered, particularly in Hong Kong, is that sustainability just doesn't feature in the consumer's mindset. We did some research on this in the past and discovered that actually packaging is seen as a positive in Hong Kong. People want individual food items to be individually wrapped.” P17</p>

we coded a subset of related news media articles and documents across our period of study. This analysis provided support for our analysis and findings. Fig. 2 displays our data structure (Gioia et al., 2013), how we moved from first-order to second-order codes, and our aggregate dimensions.

4. Findings

Transitioning from petroleum-based to bio-based plastics for food packaging requires concerted efforts to ensure that changes are implemented at the interorganizational level. Our findings confirm this to be far from a simple endeavor, with our data showing how the firms in our case study were confronted with several tensions related to sustainability and how the MNEs engaged in different strategies to address these tensions, adapting a global paradox approach that proactively aimed at balancing the contradictory poles. Notwithstanding these efforts, the paradox approach adopted by the MNEs still proved challenging given the inherent complexity of an interorganizational transition process that included such stark contrasts between the North European contexts in which the MNEs were headquartered and the conditions in emerging markets in China where the MNEs needed to co-opt the efforts of their various suppliers and other partners in the overall transition. In particular, the sustainability transition towards bio-based food packaging stagnated due to local differences in waste streams, regulations, consumer behavior, and consumer purchasing power.

Overall, we argue that our account of our case furnishes a likely explanation for why interorganizational sustainability transitions so often lag and fall short of their goals. Put simply, although MNEs may proactively tackle tensions, their endeavors often stagnate due to a lack of consideration of local contexts. We evidence and elucidate this by presenting our findings in the following four sections focused on: 4.1 sustainability tensions in global interorganizational systems; 4.2. the MNEs' global paradox approach to sustainability tensions and their specific strategies; 4.3. the global paradox approach challenged by local problems; and 4.4. the MNEs' global paradox approach to the sustainability tensions.

4.1. Breaking point 1: Sustainability tensions in a global interorganizational system

In analyzing the perspectives of different firms within the global interorganizational system, we identified three distinct tensions related to sustainability that the firms needed to navigate: a) the environmental-economic tension; b) the social-environmental tension; and c) the social-economic tension.

4.1.1. The environmental-economic tension

The environmental-economic tension involved in the sustainability transition of the global interorganizational system we investigated relates to the significant trade-off entailed between the environmental benefits of reducing the use of petrochemical materials

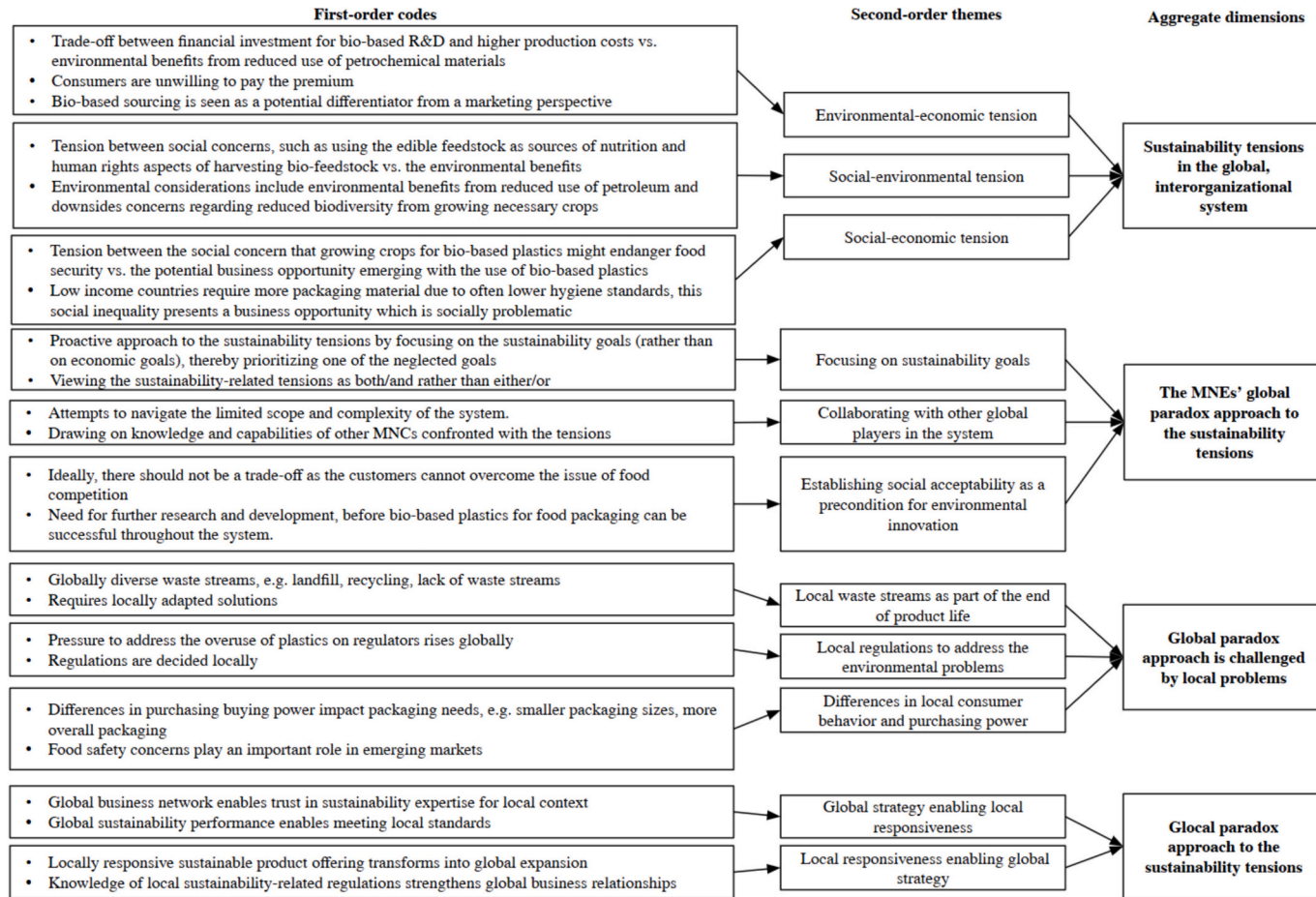


Fig. 2. Data structure.

in food packaging versus the financial investments necessary for undertaking R&D of bio-based materials. The environmental benefits of bio-based food packaging include lower greenhouse gas emissions than petroleum-based materials as well as lower “fossil resource consumption in the production of the packaging” (P16, Plastic producer). The significant economic concerns concomitant with this switch related to the limited availability of feedstock for bio-based material, with implications for costs and revenues:

It's our target in the future to replace fossil-fuel-based raw materials with bio-based raw materials as much as possible. But as [the brand owner] is buying those materials in thousands of tons [...] we definitely can't deny we're also looking at the cost. And currently the cost structure simply doesn't allow us to replace our current resin.

(P6, Brand owner)

Economic concerns were also related to costs and revenues. The relative costs of bio-based plastics compared to conventional petroleum-based plastics are highly dependent on fluctuating oil prices and the scale of production capacities. The ensuing tension between environmental goals and cost structure were further highlighted in our interview with one of the plastic producers:

I'm still quite pessimistic in a way because, so far, technologies and the feedstock are not allowing us to overcome this barrier of efficiency of the fossil industry. So only the cost of the feedstock, again, and logistics improvement can help here.

(P4, Plastic producer)

This same tension was framed as a crucial trade-off by interviewees from other firms in the system (e.g., P16). Although from a marketing perspective, the long-term benefits of bio-based sourcing included its role as a potential differentiator, most actors we spoke with saw it as a trade-off between environmental goals and keeping costs steady, typically attributing this to a combination of high production costs and consumers' limited awareness of and willingness to pay a premium for bio-based food packaging (P6).

4.1.2. *The social-environmental tension*

The social-environmental tension we identified related to the complex tensions between the benefits of using edible feedstock as sources of nutrition (DOC1, P6) and various human rights-related aspects of harvesting bio-feedstock (P10, DOC4) versus environmental considerations such as the reduction of petroleum-dependency and questions of biodiversity depending on major changes in land use. This tension surfaced in our data as competing demands between using sugar and other edible crops as food or feedstock. This appeared most salient to the brand owners we interviewed, who communicated their concerns to other firms in the network:

If the fermentation process is from sugar into plastic, then the sugar could have also been used to feed people. So, we really want to look at first feeding the people, and then secondly, we want to have a circular economy [in the food packaging industry]. We would not want to use fuel or fossil fuels. But we don't want to deprive people of their daily food. So, for example, in Mexico there was a case where corn was used for biofuel, but subsequently there was less corn available for lower-income people in the Mexican market. That also conflicts with our policy. [...] That's the dilemma that is not very easy to solve.

(P14, Brand owner)

In this example, the social aspect of food security is seen as being in tension with the environmental concern linked to bio-based food packaging and a circular economy in the broader sense.

4.1.3. *The social-economic tension*

The social-economic tension emerged: One plastics producer underscored the complexity of the related social-economic tension by highlighting how the social acceptability of bio-based plastics was at odds with potential business opportunities:

The challenge is to put together all the customer needs regarding genetically modified organisms [GMOs] and competition with the food chain because every customer wants something different and so the big challenge is how we can stay competitive. And with the raw material, we could use something that is non-GMO that is not in the food value chain in a region where there is no concern with water or social practice – but then you're not economically competitive.

(P16, Plastics producer)

This quote is only one example of how the firms in this global, interorganizational system struggled to address concerns about bio-based plastics in the context of food competition. While this quote refers to GMO explicitly, the interviewee stressed the complexity of customer demands as well as hinting at regional factors influencing economic competitiveness.

4.2. *The MNEs' global paradox approach to the sustainability tensions*

Overall, the MNEs in our case study demonstrated a proactive approach to sustainability tensions accepting these as an inherent concomitant of the bio-based transition and treating the poles of the tensions in a balanced manner. In particular, we observed three proactive strategies of the MNEs in the global, interorganizational system: (a) focusing on global sustainability goals; (b) collaborating with other global actors of the global, interorganizational system; and (c) establishing global social acceptability as a precondition for environmental innovation. The first strategy was firm-based, whereas the latter two strategies aimed to pursue collaboration and alignment throughout the system at global and local levels.

4.2.1. Focusing on global sustainability goals

We observed that the MNEs in the interorganizational system pursued a proactive approach to sustainability tensions by focusing primarily on global sustainability goals rather than on economic goals. Moreover, they viewed and treated these tensions from a 'both/and' rather than a narrow 'either/or' approach. This strategy emphasized value beyond direct product-related profit. For example, one of the brand owners stated that the role of global sustainability targets communicated to investors could be to increase the use of bio-based materials and even increase the overall company value by achieving aims beyond solely financial objectives:

A lot of brand owners have global sustainability targets [as well as financial targets], right? So, a bio-based material [...] helps them towards reducing their carbon footprint, right? So, there's definitely value there. [...] All of these things can help reduce carbon footprints and therefore make a brand more valuable [also for investors].

(P8, Plastics producer)

Taking account of multiple objectives simultaneously in this way helped the MNEs proactively navigate the environmental-economic tension by widening the scope of what it meant to them to 'create value'. While this statement may be viewed as a 'win-win' situation, however, we posit that a classic win-win would be if the bio-based plastics had led to cost-benefits - focusing on the element of zooming out to a global and potentially indirect understanding of value creation rather than focusing on the direct financial value created for one specific product. While the trade-off in the case of more cost-intensive bio-based plastics would usually have led most firms to decide against purchasing them, the MNE's focus on global sustainability goals and making progress towards these goals shifts the scale to integrate the two.

Similarly, an established market position helped increase customer demand by signaling that the global availability of bio-based materials could be depended upon to increase steadily. For instance, one of the plastic producers we interviewed emphasized that their customers needed a sense of certainty around future supply:

One of our strengths is that we're a global player and that we know the [specific product] value chain [and therefore the firms in the global, interorganizational system] really well. [...] We're a solidly established company and our customers know that if we decide to make an investment, we're serious about it and we know the technology and we know the market and so they see this certainty about future supply and about the quality of the material that comes out.

(P16, Polymer producer)

By relying on their global market power, this plastic producer was confident that other firms in the global interorganizational system, in this case, their customer firms, would trust them to produce high-quality innovations and that their reputation for reliability would create demand for their innovative products. With this strategy, the plastic producer was thus reframing the tension between the environmental benefits of bio-based plastics and economic concerns arising from the low availability of feedstock.

4.2.2. Collaborating with other global actors in the global interorganizational system

Our interviewees also emphasized the vital importance of global collaboration and forging long-term relationships among MNEs in navigating sustainability- and innovation-related tensions; and we identify this engagement in collaboration as another tension-handling strategy. This strategy is reflected in the following excerpt from an interview with one of the plastic producers explained the importance of involving the entire interorganizational system:

Actually, we work really on the entire value chain. That means we not only talk directly to our customers, which are mainly [packaging producers], but we also do talk to the brand owners or farmers or municipalities and retailers. So, and then also even further down [the value chain], we talk to waste management companies [...]. So we're working really on the entire value chain.

(P7, Polymer producer)

This resource-intensive strategy was seen as necessary to help navigate the vast scope and complexity of the global interorganizational system. By drawing on the expertise and market power of the other global MNEs in the network, the firms could combine forces and balance tensions by ensuring that all actors prioritized sustainability over short-term profits. Self-evidently, however, only companies able to allocate sufficiently large resources could engage with the entire network in this way.

4.2.3. Establishing global social acceptability as a precondition for environmental innovation

Another strategy undertaken by the MNEs to navigate the social-environmental tension was evident in their efforts establish global social acceptability as a precondition for environmental innovation from a global position. For while bio-based plastics have significant environmental benefits, they would not be used unless global social problems such as food competition and responsible sourcing were simultaneously considered and addressed. As the representative of one plastics producer emphasized, ideally there would be no trade-off between social acceptability and environmental innovation, since customers would not compromise on global food security, which would always be an issue as long as bio-based plastics competed with food availability:

I would say for the majority of the customers the competition with the food chain is a big issue. So, if you can offer them a biomass that doesn't compete, this would be the ultimate solution.

(P16, Plastics producer)

This insight led to efforts for further research and development. However, while the MNEs' global approach to sustainability tensions seemed to lead to possible solutions for the transition of the global interorganizational systems from petroleum-based to bio-

based plastics for food packaging, local context-specific conditions challenged the global approach.

4.3. Breaking point 2: Global paradox approach challenged by local context

Diving into the details of the local contexts of the global interorganizational system enabled us to identify how and why the MNEs' global paradox approach to sustainability-related tensions came up against impediments to its implementation at local level. In particular, efforts to address the sustainability tensions surfaced another tension at implementation level, i.e. a tension between the global approach of MNEs and adaptation to local requirements. To illustrate how this unfolded, we offer two examples from our two main research contexts: the local context in China, as an emerging economy, and the local context in the European Union (EU), as an industrial economy. (Here we treat the 'EU' as a single region in our case study since regulations, waste streams, and cultures are deeply intertwined.)

We asked all our interviewees about the contrasting context-specific aspects of the region(s) they operated in, i.e., China and the EU for the MNEs and at least one of these two regions for the local actors in the global interorganizational system. From our data analysis we identified three key context-specific factors that challenged the MNEs' global approach to sustainability tensions surrounding the introduction of bio-based food packaging in China and the EU: *waste streams as part of the established infrastructure; regulations; and societal aspects such as differences in consumer behavior and purchasing power.*

4.3.1. Waste streams as part of the established infrastructure

As an essential part of the end-of-life process of any product, waste streams are highly relevant to sustainability practices within global interorganizational systems. Gaining an understanding of the different types of waste streams and the extent to which they are infrastructurally supported in specific local contexts is thus crucial for designing and implementing system-wide efforts to transition towards sustainability. Overlooking these local differences in decision-making related to food packaging can lead to multiple unintended consequences, with such blind spots ultimately arising as the outcome of a perspective that treats the world as a single global market.

Examples of such blind spots evident in our own data included a press release issued by one of the packaging producers in the system asserting that a coffee cup produced as a marketing giveaway at a global trade fair could be easily recycled, including in the following bold generalization (DOC 2, Packaging producer): "At the end of their life, products made from [polymer brand name] can be disposed of in existing PE recycling streams." Implicit in this claim is the assumption that recycling streams exist in all country contexts; and while this assumption was valid for the German context where the trade fair took place, visitors attending this fair from all over the world took this 'giveaway' back to places where such recycling streams did not exist. In the case of food packaging in China, waste streams have long taken a secondary role to concerns regarding food safety. As food safety cannot be taken for granted in this context, the emphasis on food safety outweighed concerns about waste streams at the time of the interviews. As evident in the following excerpt from an interview with a plastics producer, this producer (P8) recognized the temporary difference in priorities but also highlighted that the environmental problem of landfills would soon surface and trigger regulations regarding waste streams in China:

So, in Europe there are a lot of conversations around end of life or waste disposal that unfortunately Asia doesn't have yet. It's coming, but they don't have it yet. And therefore, the regulations that are driving Asia are more on the stuff that goes into the packaging for food safety and not as much yet on what happens to the packaging at the end of life. But that will come because landfills are filling up.

(P8, Plastics producer)

Addressing the sustainability tensions ensuing from the transition from petroleum-based to bio-based plastics for food packaging thus stagnated in part from a failure to take due account of local waste streams and adapt accordingly. While such differences in waste streams also existed for petroleum-based plastics, substituting these with bio-based plastics was only seen as a viable option if waste stream problems were addressed. This further highlights how sustainability issues were tied to the global-local tensions, since the differences between Europe and China, and even within-Europe country differences, challenged the global approach to sustainability tensions and required further attention as part of a successful sustainability transition.

4.3.2. Regulations

Significant differences across contexts within and between countries in regulations relating to food security, food packaging, and waste streams collectively impacted the successful transition. These variations also challenged the MNEs' global approach to sustainability tensions, again indicating how this paradox was tied to global-local tensions.

The following quote from a plastics producer highlights important gaps and differences prevailing in local regulations within Europe, in this case a lack of regulation of the cross-border shipping of waste meaning that despite a landfill ban in Germany, waste could still go to landfills in other European countries:

In Germany there's no landfill allowed anymore. The only way is composting or incineration. And we already started to drive incineration. That's why sometimes you have these big [state-run] events here. For example, there was this [event by local state] and the waste management [contract] was won by a Spanish company because they're the cheapest. Why? Because they put everything on a truck and send it to Spain and put it in the landfill because it's allowed there.

(P18, Plastics producer)

Strikingly, even for a state-organized event within an area with a landfill ban, the food packaging waste could not follow the value chain to its intended end, since due to lacking regulation, the end-of-life of their products was out of the plastic producers' scope of control or accountability. This example highlights the complex and often irrational and adverse outcomes of seemingly interrelated regulations within the same region (EU), that are, in fact, enforced very differently in local contexts across countries within that region.

In China, heightened concerns about the environmental situation were increasing pressure on the government to regulate the use of plastics. An example of such preliminary legislation being implemented came up in an interview with another plastics producer, specifically relating to the ongoing piloting of regulations in the Jilin province of north-eastern China:

Yeah, because I think there's also, specifically for China, there's now in the Northern Province – the Jilin province – sort of a new regulation that shopping bags from fossil-based products are sort of prohibited. And now there's sort of a regulation that the bags that are being sold there need to contain at least 35 % PLA. These things, of course, will help a lot, let's say, to build up the market.

(P3, Plastics producer)

While overall the environmental problems caused by the overuse of plastics and the underdevelopment of end-of-life solutions made China a challenging context for a global approach to sustainability tensions, the fact that Jilin province was testing a new regulation at the time can be interpreted as a ray of hope for bio-based plastics in China. This development in Jilin province in China was seen, by interviewees, as a positive development for bio-based sourcing in the plastics industry, as the earlier German regulation banning landfills can likewise be seen as progress around the end-of-life issue. However, at the same time, both examples given here highlight the prevailing fragmentation of the global market into locally diverse regulatory contexts. In sum, this diversity of regulatory contexts further contributed to a stagnation of the sustainability transition of the global interorganizational system.

4.3.3. Societal factors: Differences in consumer behavior and purchasing power

Important differences in consumer behavior and purchasing power between the developed and emerging economies in the global interorganizational system also challenged the sustainability transition and the MNEs' global approach to navigating sustainability-related tensions. Again, here the MNEs' proactive but global rather than glocal approach to the sustainability tensions failed due to lack of consideration of global-local tensions. The following illustrative quote from one of the packaging producers we interviewed highlights the need to consider and adapt to the different behaviors and purchasing power of consumers in different local contexts, including the stark contrast to most EU contexts that in much of Asia it is "a luxury" for most consumers to think about the use of natural resources given other issues perceived as far more pressing and that directly impact purchasing patterns:

Europe is pretty waste-driven and maybe not as price-sensitive as North America and even not as price-driven as Asia. And the second thing is the purchasing power. The end-consumers in Europe and in North America have much more purchasing power and are maybe also more skilled or educated in terms of resources, natural resources, or CO₂ emissions than China or India. The people [there] have different other problems than the ecological problems in the Western world. They aren't even thinking about it– yeah, because that's a luxury for them.

(P13, Packaging producer)

One representative of a global brand owner we interviewed also highlighted the importance of understanding the need for low purchase prices per unit in emerging economies. Since this priority leads to the prevalence of sales of small units across much of Asia, including of packaged food, it is a factor with far-reaching consequences that jeopardize achieving many environmental goals:

Well, in Asia at this moment, of course, we face the problem that we sell products in small packs to achieve a low point-of-purchase price, which means actually that you waste an enormous amount of packaging material because these people can't buy a five-kilo economy bucket of mayonnaise which is very packaging-efficient in regards to the content-to-packaging-weight ratio and they buy a one rupee sachet of mayo where the amount of mayo is almost the same as the amount of packaging material, so a very unfavorable package-to-product weight ratio. And you see as a consequence an enormous litter problem because all the stuff is not biodegradable, not being collected, and is basically just polluting the whole environment.

(P14, Brand owner)

This quote by a brand owner responsible for marketing the product to end-consumers within the global interorganizational system highlights the competing yet interdependent nature of the environmental goals (reducing packaging and substituting petroleum-based plastics) with the local, social conditions (consumer behavior and purchasing power). Even though more packaging may seem like a business opportunity for a packaging producer, it simultaneously challenges efforts to reduce that producers' environmental impacts. These insights show how the local conditions challenge the global approach that MNEs adopt in response to sustainability tensions.

4.4. The MNEs' glocal paradox approach to sustainability tensions

4.4.1. Global strategies and local responsiveness

Although contrasts between local contexts inherently give rise to challenges in implementing any global approach to sustainability tensions, these challenges can partly be overcome by combining global synergies of MNE collaboration with responsiveness at local level that foster improved interorganizational relationships and can ultimately help facilitate a sustainability transition. Even though such combining strategies were not common for MNEs in our case study, which indeed we identify as the very reason why the

transition was lagging, we did also find evidence in our data of some attempts at what we would consider instantiations of glocalization. For example, one representative of a plastic producer (P8) highlighted how combining the global benefits of being active across multiple countries with local expertise is key to facilitating a sustainability transition for multiple companies within a global inter-organizational system:

Especially here in Asia, because of all of the scandals, because of all of the public pressure, it's a very active regulatory environment. And it's difficult for anybody to keep up with everything. So brand owners and customers actually welcome our opinions and thoughts on what's happening in terms of the latest regulations or developments. And I think this is a real advantage that [our global company] has is that we can not only just talk about [product name] but can also bring a whole lot more to the relationship.

(P8, Plastics producer)

This quote illustrates how a sustainability transition can benefit from global actors building on local expertise, in this case an MNE drawing on experts' understanding of the local regulatory environment. This works both ways, moreover, as highlighted in the following excerpt from an interview with a packaging producer:

And then specific segments of the product, and there we can say, for example, if you go to Israel, coconut water, yeah, its extract is a natural drink. Why not put it in a bio-based package? And it contributes to the total image of modern drinks. As you know, many of them give this a character and positioning and the feeling of engaging consumers in something more than drinking, yes? [...] You probably never heard of it in Germany, but it's spreading now from North Europe to the UK. It's a hit in the United States. You can Google it and see. And I'm sure it will come to Germany.

(P4, Packaging producer)

While this packaging producer was being locally responsive to a specific type of drink, the positioning and consumer awareness of a "natural drink" with packaging that "contributes to the image of modern drinks" can lead to global synergies.

5. Discussion

Our case study findings and analysis provide valuable and empirically grounded insights into how MNEs can work together and in consultation with their SME business partners to manage the tensions that inevitably emerge from interorganizational sustainability transitions in diverse contexts across continents. In particular, we contribute to a stronger understanding of the tensions that can arise from the multiple and competing social, environmental, and economic dimensions of sustainability with our in-depth analysis of a single-case study of an interorganizational system related to the food packaging industry attempting to transition towards bio-based plastics. On the one hand, our study shows how limitations in the ways the MNEs in the system tackled these tensions from a global perspective impeded the transition. On the other hand, our findings and analysis also show the progress made by MNEs adopting a global paradox approach of accepting and balancing these multiple tensions through several strategies, including focusing on sustainability goals, collaborating in the interorganizational system, and establishing social acceptability as a precondition for environmental innovation. Nevertheless, while these strategies were genuinely aimed at proactively addressing the tensions at the global level, our case shows that in the complex contrasting settings of the interorganizational system, even a global paradox approach to sustainability tensions is not sufficient of itself to address the tensions at both global and local level. Instead, our data show how this approach was challenged by certain key specificities of the local contexts in Europe and China (i.e., differences in waste streams, regulations, and in consumer purchasing power and behavior), all of which hindered the successful industry-wide transition towards more sustainable materials.

Based on our findings, we identify and theorize a common explanation for lagging sustainability transition in global interorganizational systems, specifically by conceptualizing the tensions as breaking points along the transition journey. With these insights, our paper makes two key contributions to scholarship. First, we add to the literature on IB by suggesting that instead of applying purely global or local paradox approaches to sustainability tensions, MNEs in interorganizational systems should strive to adopt a *glocal* paradox approach. Second, we contribute to the literature on organizational paradox by showing that tensions rarely if ever unfold in isolation in interorganizational systems but must be addressed simultaneously as dynamically interlinked chains of knotted paradoxical tensions at global and local levels.

5.1. A glocal approach to tensions in transnational interorganizational systems

As we reiterated and evidenced throughout this paper, MNEs aiming at driving sustainable change in interorganizational systems need to navigate both sustainability tensions and global-local tensions collaboratively and proactively for transformation to make progress. By applying a paradox lens (Smith and Lewis, 2011) to analyze our case-study data we were able to single out these tensions and describe them in detail within a holistic account, identifying the contradictory poles of multiple paradoxes and the strengths and weaknesses of the strategies adopted by the firms in the system in dealing with them. In Fig. 3, we conceptualize these tensions as "breaking points" of sustainability transition in a conceptual model explaining why MNEs' approaches to sustainability in interorganizational systems can stagnate.

Our findings confirm that tensions emerging during sustainability transitions often relate to all three pillars of sustainability (social, environmental, and economic). As Hahn et al. (2015) have made the case, tensions are inherent to the concept of sustainability. We

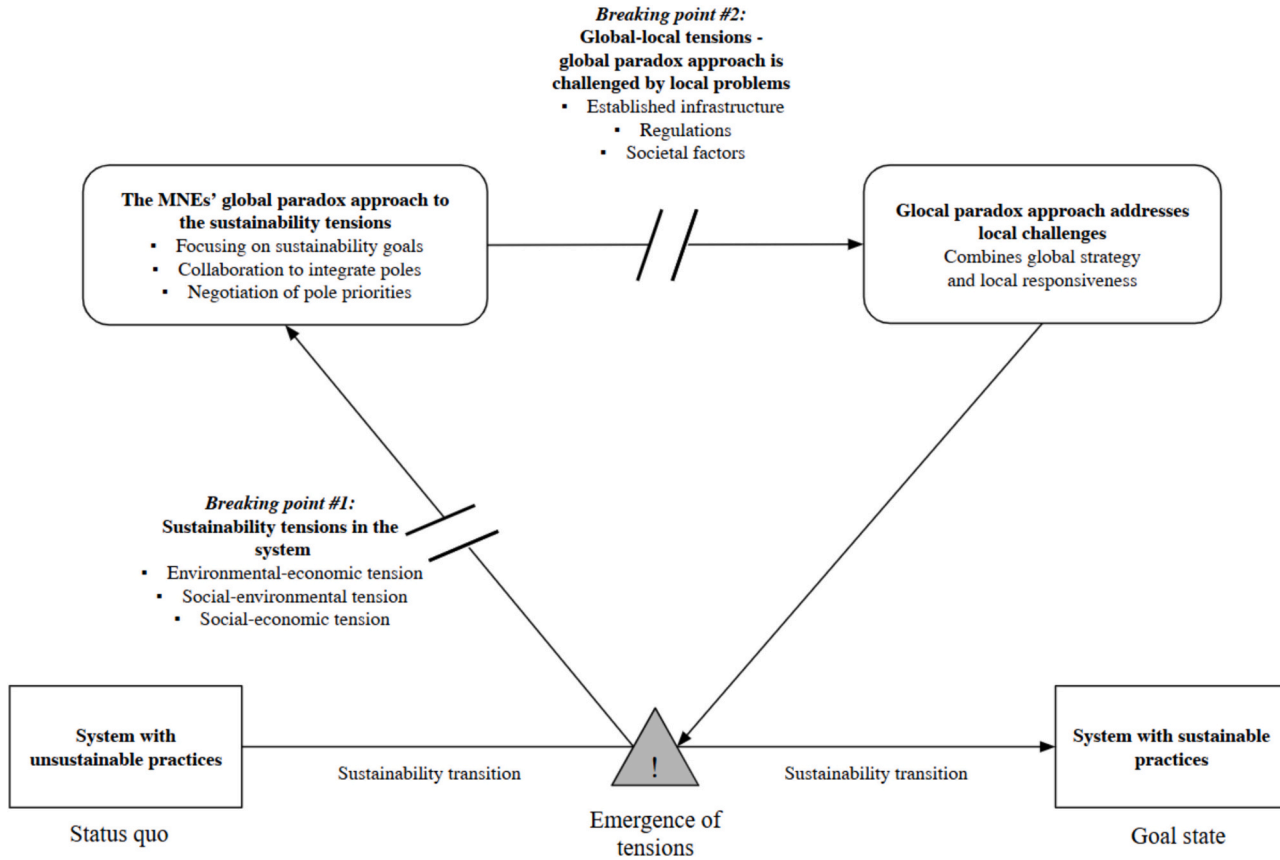


Fig. 3. Conceptualization of breaking points in sustainability transitions.

argue that these ‘sustainability tensions’ are often the first breaking point for sustainability transitions in interorganizational systems, where the economic pole is often prioritized over social and environmental objectives in an either/or manner. Interestingly, in our case study the MNEs that formed part of the interorganizational system of food packaging we studied approached these tensions in a proactive and ‘both/and’ manner with the aim of achieving real and sustainable change. Given the burgeoning scholarship in recent years that has developed theory on sustainability paradoxes, this is an important empirically based finding further confirming that managers tackling sustainability issues need to embrace a paradox approach to ensure change can occur (Hahn et al., 2014).

Our findings show that the MNEs in our case applied a *global paradox approach* reliant on intensive collaboration across the interorganizational system. As our account of this case of a transition to bio-based food packaging makes clear, although MNEs can *initiate* change as powerful actors in the system, they often cannot implement sustainability transitions on their own (Gereffi and Lee, 2016). Instead, they depend not only on other MNEs in the system but also on smaller suppliers and stakeholders in order to balance tensions collaboratively.

However, although the MNEs in our case study successfully established such system-wide global collaboration, our analysis shows that their global paradox approach was not sufficient to drive sustainability transition in the food packaging industry as *local context* circumstances challenged the global paradox approach, including disparities in infrastructure such as waste streams, as well as in regulations and important contrasts in local societal factors such as consumer priorities and purchasing power. From this it became clear that even though the MNEs in the network took a paradox approach to tackling sustainability tensions, they still needed to adopt this paradox approach to the *global-local tensions* emerging in the implementation of their strategies. We conceptualize these global-local tensions as the second breaking point in the sustainability transition we observed, and one which the MNEs in our case study failed to overcome despite their paradox approach to sustainability tensions. While we found evidence of efforts to combine global integration and local responsiveness in some MNE efforts (see Subsection 4.4), these laudable efforts were not sufficient to balance the tension between global and local requirements, which were present throughout the system.

This last-mentioned insight may seem counterintuitive to some paradox scholars who have argued almost prescriptively that a paradox approach to tensions is far more likely to lead to superior outcomes (Miron-Spektor et al., 2018; Smith and Lewis, 2011). However, it will come as little or no surprise to IB scholars, who have a longstanding tradition of building theory on local responsiveness and global integration as opposites on a continuum. As Bartlett and Ghoshal (1999) have long argued, MNEs are most likely to achieve superior outcomes if they adopt glocal strategies that are not based solely on global integration or local responsiveness but combine these and the global outreach of MNEs with local expertise within network-like organizations through continuous learning, shared resources, and values. With these scholars we concur that it is only through such ‘glocalization’ global firms can hope to address local conditions (e.g., Beveridge et al., 2022; Svensson et al., 2016). In short, we argue that paradox management strategies in global interorganizational systems – like all IB strategies – require MNEs to adopt glocal strategies, especially when steering change across contrasting industrial and emerging economies (Luo et al., 2019; Meyer, 2004; Reimann et al., 2012).

As our case confirms, differences in local circumstances will invariably challenge any solely global approach to paradox management. Similarly, solely local paradox management will not generate the global coverage necessary for large-scale inter-firm sustainability transitions. Instead, MNEs should adopt a *glocal paradox approach* to the global-local tension, which combines the benefits of global scale efficiencies with the benefits of local responsiveness. We stress that this will not only require developing capabilities of sustainability management but also interorganizational relationship capabilities, i.e., of capabilities “embedded in a network of organizations” (Sandberg et al., 2021, p. 99) whereby each organization in the interorganizational system contributes different capabilities that the system as a whole can draw on in adapting to local circumstances.

The paradox literature to date (see Schad et al., 2016 for an example of an overview) has not sufficiently differentiated between levels of sustainability tensions, e.g., global versus local tensions. Moreover, the literature on sustainability transitions within interorganizational systems has lacked a holistic account of sustainability implementation. As the rationale for our own attempt to address these gaps, we believe a research focus on tensions in sustainability transitions in interorganizational systems enables a better conceptualization of the challenges resulting from the contradictory poles of sustainability-related paradoxes. It also helps to point out proactive approaches for addressing the tensions, which demand acceptance of contextual contrasts and balancing measures to mitigate interrelated tensions. Applying a paradox lens to the global-local tension enabled us to identify how a glocal approach (Bartlett and Ghoshal, 1999) and glocalization (e.g., Beveridge et al., 2022; Svensson et al., 2016), as a proactive paradox approach, has worked so well for many MNEs in achieving superior outcomes in the past.

While not all interorganizational systems are global, including local supply chains and national insurance systems (see Jarzabkowski et al., 2022), and while not all global systems are interorganizational (e.g., MNEs), we stress that addressing sustainability tensions in systems that are both global and interorganizational is especially challenging as they are prone to surface multiple entangled tensions that need to be addressed simultaneously through a (proactive) glocal approach.

5.2. Chains of knotted tensions in global interorganizational systems

Our analysis also offers important insights for the literature on organizational paradoxes. While there has been much research at micro-level (Miron-Spektor et al., 2018; Pamphile, 2022) and firm-level (Ashforth and Reingen, 2014; Jay, 2013), research on tackling paradoxes in interorganizational systems remains a rare exception (e.g., Schrage and Rasche, 2022; Xiao et al., 2019). This is an important shortcoming given that MNEs often cannot address important tensions independently, despite their economic power, but rather have to find collaborators as part of complex interorganizational systems (Jarzabkowski et al., 2019).

Our analysis of the factors causing the transition to bio-based transformation in the food packaging industry to stall further confirms that tensions rarely exist in a vacuum in interorganizational systems but emerge as complex knotted tensional systems (Sheep

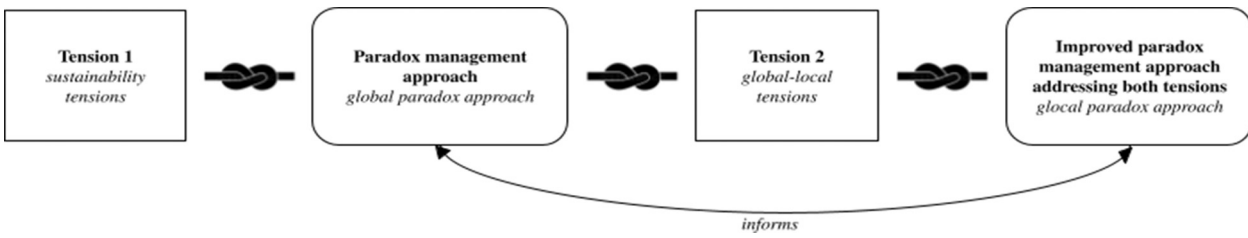


Fig. 4. Chain of knotted tensions.

et al., 2017). As a consequence of this interrelatedness of tensions, MNEs taking a proactive approach to one tension without accepting or being fully aware of its relation to another tension can undermine the overall success of their endeavors (Jarzabkowski et al., 2022).

For global interorganizational systems, this finding is important insofar as any tension in a global context will always be knotted to global-local tensions and thus will need to be addressed as part of a knotted system. While there has been some research on paradoxes in global supply chains (Schrage and Rasche, 2022; Xiao et al., 2019) and other interorganizational systems (Jarzabkowski et al., 2022), even these studies have not focused on the paradoxical knottedness of the global-local tension with other tensions, including sustainability tensions. Our paper shows how these sustainability tensions are knotted to global-local tensions through the knock-on effects of the strategies MNEs adopt to address sustainability tensions, specifically tensions arising from local circumstances and thus link to another tension that actors need to navigate. This is particularly so in the case of the tension-handling strategies of MNEs from industrial country backgrounds that enter emerging markets, which come with majorly different local context circumstances (Luo et al., 2019; Meyer, 2004; Reimann et al., 2012). This insight has important implications for overall research on knotted tensions. Despite recent work on knotted tensions by Jarzabkowski et al. (2022), who show tensions as entangled by their poles in response to disaster relief, and by Sheep et al. (2017), who show tensions as knotted in discourse, we still know little about *how* exactly tensions can be knotted. By focusing on an intentional sustainability transition rather than a response to a grand challenge (as Jarzabkowski et al., 2022, do), our case study reveals that tensions might be knotted as part of *chains of knotted tensions*. In this scenario, one tension leads to a paradox management strategy, which surfaces another tension. This tension again needs to be addressed by a more refined approach that addresses both tensions in the chain at once. Fig. 4 highlights these relationships between knotted tensions.

Conceptualizing chains of knotted tensions in this way highlights how confronting one tension necessarily leads to confronting another as both are connected to one another as links in a chain. In these chains, tensions are linked by the strategies that MNEs adapt in order to manage them. Any approach to handle sustainability tensions in a global interorganizational system will need to confront global-local tensions as it needs to be implemented in manners of both global integration and local responsiveness.

In order to handle these chains of knotted tensions, actors should not attempt to break the chain by defensively handling one or another tension but instead need to develop an overview and an understanding of the knottedness of all tensions in order to holistically deal with them in a proactive manner. This requires joint approaches to tension-handling by different (local and global) actors in the interorganizational system.

6. Managerial implications

We derive the following three key practical recommendations for MNEs to consider on the basis of our findings and analysis. First, since MNEs exist in global interorganizational systems that extend over many borders and different business logics, they should purposefully develop their awareness and resources to deal with disruptive tensions of sustainability transitions within interorganizational systems that can emerge from the adverse collision between the three pillars of sustainability (social, environmental, and economic).

Second, MNEs need to recognize that global paradox strategies tend to fail to account for tensions at the local level of global interorganizational systems. Tensions can emerge due to contrasts in the multiple local contexts of such systems, and these can accumulate to cause breaking points in sustainability transitions. Instead, MNEs should adopt global paradox strategies that combine the advantages of their global economic power within global, interorganizational systems with local responsiveness. For example, MNEs could usefully establish such capacities for combination through centers of excellence where global paradox management strategies are developed, R&D takes place, and knowledge is created (Bartlett and Ghoshal, 1999). In local branches that are independent and embedded in a global interorganizational system, these paradox approaches can be adapted to local contexts. For the MNEs in our case, this means that in the next step they need to contextualize their global strategy and leave enough flexibility for local actors to consider local circumstances to drive the bio-based transition across local contexts successfully.

Third, since MNEs operate in a system of relationships with various organizations, they need to proactively develop strategies to identify, anticipate, and respond to tensions that emerge at different points within global interorganizational systems. Importantly, MNEs need to develop the capabilities to understand the knottedness of tensions and see each tension as part of the overall chain of knotted tensions. Drawing on the capabilities of their partners in interorganizational systems is one way of achieving such capabilities. Such a holistic approach should enable MNEs to minimize tensions in global interorganizational systems more effectively and ultimately make greater progress in sustainability transitions globally.

6.1. Future research

While our research focus on a sustainability transition study extended beyond the level of any single MNE to include multiple firms' embeddedness in business networks (Holm et al., 1996), thereby contributing to an improved understanding of MNEs' management of tensions within global interorganizational systems and the influence of such an approach on sustainability transitions, future scholarship should further explore the ramifications of our findings. In particular, future research should identify MNEs' collaborative strategies, alliances, and shared goals within global interorganizational systems and the potential for smoother sustainability transitions.

Future studies should examine further the 'chains of knotted tensions' we identified in our study and introduce them as a novel concept in this paper, especially global-local tensions. More specifically, future research should explore different aspects related to the local context of global interorganizational systems that impact MNEs' sustainability transitions, including the fact that MNEs operate with local businesses in most foreign markets. The majority of these local businesses are SMEs with different orientations towards

practices of sustainability and with different organizational cultures (e.g., Yadav et al., 2018). Accordingly, future research needs to consider how sustainability transitions are developed and managed at the point of interaction between MNEs and SMEs in different countries.

Finally, in this study, we have adopted a paradox approach to understanding MNEs' sustainability transitions and their embeddedness in interorganizational systems. Such an approach to studying IB-related challenges is still quite rare in the IB literature. Given the insights yielded by our approach, we advocate for future research to connect the realms of IB and the paradox approach to understand the often contradictory nature of IB, e.g., of global versus local approaches. In sum, we believe a paradox perspective is a powerful lens for casting light on tensions within global interorganizational systems and that IB scholars should attempt to apply this approach in their research.

CRedit authorship contribution statement

Katrin Heucher: Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing. **Stephanie Schrage:** Conceptualization, Formal analysis, Visualization, Writing – original draft, Writing – review & editing. **Ibrahim Abosag:** Conceptualization, Writing – original draft, Writing – review & editing.

Data availability

The authors do not have permission to share data.

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