Sustainability-oriented Supplier Development in Multi-tier Supply Chains: The Role of Boundary-spanners and Boundary Objects

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Declaration

This thesis is my own work, and it has not been submitted in support of an application for another higher degree or qualification elsewhere. Any parts of the research that have been published or submitted for publication to peer-reviewed journals are clearly identified.

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Dedication

To my dear mother XING Fang and father JIA Zhanfeng, for being a source of my inspiration and support. Thank you so much and I love you.

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List of Publications

Journal articles

- Jia, M., Stevenson, M. & Hendry, L. C. (2021) A systematic literature review on sustainability-oriented supplier development. *Production Planning & Control*, ahead-of-print, 1-21.
- Jia, M., Stevenson, M. & Hendry, L. C. (2021) The boundary-spanning role of first-tier suppliers in sustainability-oriented supplier development initiatives. *International Journal of Operations and Production Management*, 41(11), 1633-1659.
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Conference contributions

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Abstract

Focal firms in supply chains regularly outsource to distant suppliers based in emerging economies to reduce labour and material costs. Given the increasing public attention on the sustainability issues that are associated with global supply chains, focal firms are now facing substantial pressure to manage their supply chains in a more socially and environmentally responsible manner. To help suppliers improve their awareness and capability in addressing sustainability challenges, many focal firms are implementing sustainability-oriented supplier development (SSD) initiatives. Yet, cascading sustainability-related practices smoothly throughout the entire supply chain using SSD initiatives is challenging. Moreover, the extant literature on SSD suffers from a significant dearth of studies that specifically focus on how suppliers engage in and benefit from SSD. Thus, this thesis contributes to filling this particular gap by investigating the implementation of SSD initiatives in multi-tier supply chains from the supplier's perspective.

The overarching research question asked is: "How do suppliers of multi-tier supply chains participate in and learn from sustainability-oriented supplier development initiatives deployed by the focal firm?". This question has been answered through three inter-related papers, including a systematic literature review (SLR) and two exploratory empirical studies. The SLR paper (Paper I) provides the state-of-the-art in the field of SSD and proposes future research directions by drawing on contingency theory. Findings from this paper provide a holistic perspective to investigate the SSD process by taking all key aspects of SSD, i.e. the contingencies, the response actions, and the performance outcomes, into consideration. It thus provides a framework for future SSD research to build on.

The two empirical papers (Paper II and Paper III) look into suppliers' engagement in either extending SSD initiatives further up the supply chain or internalising the knowledge within their own organisations. More specifically, Paper II investigates the boundary-spanning

role of first-tier suppliers in extending SSD initiatives to second-tier suppliers. In this paper, a distinction is made between compliance- and improvement-oriented boundary-spanning actions taken by first-tier suppliers. Findings from this paper also show that the social capital between the focal firm and the first-tier supplier affects whether compliance- or improvement-oriented boundary-spanning actions are taken. Paper III investigates the internalisation of the knowledge delivered by SSD initiatives within supplier organisations. By drawing on the concept of absorptive capacity and boundary objects, the paper shows how suppliers use their absorptive capacity differently in transforming and exploiting the knowledge delivered by SSD initiatives to develop the boundary objects conveyed to them by the focal firm into organisational structures and procedures that reflect their own needs.

In addition to their own individual contributions, the three papers collectively contribute by advancing the field of SSD research a significant step forward. More specifically, findings from this PhD thesis reveal both the challenges and good practices adopted when developing suppliers from multiple tiers in terms of their sustainability. The research theoretically and empirically draws out the importance of an appropriate degree of social capital between supply chain members, of well-designed boundary objects if knowledge is to be effectively transferred across the supply chain, and of understanding the supplier's perspective.

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Glossary

ABS	Association of Business Schools
BoF	Business of Fashion
BSR	Buyer-supplier Relationship
CDP	Carbon Disclosure Project
CSR	Corporate Social Responsibility
FT	First-tier Supplier
FTs	First-tier Suppliers
KP	Knowledge Provider
NGOs	Non-Governmental Organisations
OHS	Occupational Health and Safety
OM	Operations Management
RBV	Resource-based View
SSCM	Sustainable Supply Chain Management
SSD	Sustainability-oriented Supplier Development
SD	Supplier Development
SLR	Systematic Literature Review
SSM	Sustainable Supplier Management
ST	Second-tier Supplier
STs	Second-tier Suppliers
TBL	Triple Bottom Line

Chapter 1 – Introduction

1.1 Research Background and Motivations

The catastrophic Rana Plaza collapse in Bangladesh in 2013 triggered extensive global attention on labour conditions, particularly at supplier factories based in developing countries supplying Western brands (Alghababsheh and Gallear, 2020). Since then, Western brands have claimed to undertake substantial efforts with their supply chains by developing ever-stricter auditing standards and implementing sustainability-oriented supplier development (SSD) projects to help suppliers tackle sustainability challenges (Liu et al., 2018). For example, Nike has been developing tools and piloting projects with their suppliers to encourage engagement from suppliers in terms of improving the social conditions in their factories (Nike, 2020). This topic has also been popular in research, as evidenced by the large body of literature on developing suppliers in terms of their sustainability (Yawar and Seuring, 2017; Lechler et al., 2019). As a consequence, there is an expectation that these efforts should genuinely improve supplier engagement and ability to deal with sustainability challenges. It is, however, still not clear whether and how these efforts have paid off with limited evidence from the supplier side. Therefore, the aim of this study is to contribute to our understanding of how suppliers are engaged in and benefit from SSD projects initiated by focal firms in global multi-tier supply chains.

Supplier management has traditionally focused on four broad operational measures, i.e. cost, quality, flexibility, and delivery, but firms are now paying more attention to a fifth dimension – sustainability. This is particularly common for the focal firms in supply chains as they are usually regarded as being responsible for any sustainability violations by their suppliers (Hofmann et al., 2014; Villena and Gioia, 2020). Meanwhile, supply chain sustainability is a crucial component in order to advance corporate sustainability and promote broader sustainable development objectives (United Nations Global Compact, 2015). This is due to the fact that by implementing sustainability practices, firms engage with all relevant stakeholders throughout the supply chains to maximise the overall social, environmental and economic impact (United Nations Global Compact, 2015). Given the fact that a lack of capability and/or resources appear to be one of the main factors impeding independent improvements on the supplier side (Fu et al., 2012), some focal firms have carried out a variety of SSD initiatives that provide resources and relevant knowledge to suppliers to help them improve their capability in dealing with sustainability challenges in the past decade (Karaer et al., 2020).

Developing suppliers in terms of environmental sustainability has long been a hot spot in both research and practice (Carter and Rogers, 2008; Bai et al., 2010; CDP, 2020), For example, research has shown that it is necessary to take into consideration the organisational characteristics of suppliers and put them into appropriate environmental SSD projects (Bai et al., 2016). Meanwhile, the supplier engagement rate is one of the key indicators included in the evaluation framework proposed by the Carbon Disclosure Project (CDP) in reporting the carbon reduction performance of the supply chain of big brands. Moreover, the relevance of environmental sustainability, with its focus on issues such as climate change, has attracted public attention. In contrast, social sustainability has not been given as much attention as the environmental dimension (Govindan et al., 2021).

Although research in the field of SSD has witnessed an increasing trend in recent years (Yawar and Seuring, 2017), the benefits brought about by SSD for the entire supply chain are still not clear. On the one hand, the positive impact of SSD in improving sustainability performance throughout a supply chain has been identified by several studies (e.g. Zhang et al., 2017; Nguyen et al., 2019). Moreover, research has shown that buyers who deploy SSD projects go through a learning-by-doing process to enhance their ability to manage the sustainability performance of the supply base (Meinlschmidt et al., 2016). On the other hand, some studies also presented findings of delays or conditional benefits from implementing SSD (e.g. Subramaniam et al., 2019). Suppliers' ability to utilise the assistance provided by the focal firm (Liu et al., 2019) and their actions afterwards (Sancha et al., 2015a) are likely to affect whether or not SSD investments pay off. However, whether and how suppliers make use of the assistance from the focal firm and whether they face any challenges in doing so is still unclear. Therefore, there is a need for more research that examines how suppliers participate in SSD projects and utilise the resources and assistance provided to them.

Furthermore, there is an increasing trend in supplier management to pay attention to lower-tier suppliers beyond the first-tier direct suppliers (e.g. Sauer and Seuring, 2018). On the one hand, focal firms are concerned with their lower-tier suppliers' sustainability performance since many serious violations of sustainability requirements are caused by lower-tier supplier misconduct (Tachizawa and Wong, 2014). On the other hand, those violations of sustainability requirements, from any part of the supply chain, may potentially result in negative impacts on the focal firms (Grimm et al., 2014). Yet, achieving a sustainable supply network, where SSD initiatives extend smoothly to lower-tier suppliers, is still challenging (Wilhelm et al., 2016; Villena and Gioia, 2020). This is likely to be affected by a variety of factors internal and external to the supply chain (Grimm et al., 2014; Dou et al., 2018). Amongst the various factors, recent research has highlighted the important role of first-tier suppliers in spanning the

boundaries of the focal firm and lower-tier suppliers to extend SSD further up the chains (e.g. Soundararajan and Brammer, 2018). For example, whether first-tier suppliers take on the responsibility to further develop lower-tier suppliers was found to be affected by factors such as the focal firm's use of power (Wilhelm et al., 2016). However, how first-tier suppliers configure their role in diffusing SSD to lower-tiers and how they utilise the resources and knowledge gained from SSD by themselves remains under-explored.

Against this backdrop, the aim of this PhD thesis is to investigate sustainability-oriented supplier development initiatives in global multi-tier supply chains with a focus on the supplier side. To fulfil its aim, this PhD by publication presents three inter-related papers in Chapters 2, 3, and 4: (i) Paper I – a systematic review of the sustainability-oriented supplier development (SSD) literature, drawing on the lens of contingency theory (Chapter 2); (ii) Paper II – an exploratory case study on the role of first-tier suppliers in extending SSD initiatives further up the supply chain, drawing on the lens of boundary-spanning theory and social capital theory (Chapter 3); and (iii) Paper III – a longitudinal case study examining how suppliers use their absorptive capacity to learn from SSD initiatives and internalise the knowledge gained via such initiatives, drawing on the concept of boundary objects (Chapter 4).

In the next section (Section 1.2), I will briefly review the literature regarding multi-tier supplier management in terms of sustainability and provide a definition of SSD. The knowledge-intensive feature of SSD will then be summarised and the literature relevant to knowledge transfer across organisations will be reviewed. Section 1.2.4, lastly, will review relevant literature within the field of SSD. Subsequently, in Section 1.3, I will highlight the research gaps, the overarching research question, the respective research questions for the three papers, and the inter-connectedness of the three papers to answer the overall research question of the thesis. Section 1.4 will detail the research context. Sections 1.5 and 1.6 will then explain the research philosophy and research design respectively, before Section 1.7 provides a

summary of the structure of the thesis.

1.2 Literature Review

1.2.1 Managing supplier sustainability in multi-tier supply chains

The sustainable development agenda proposed by the United Nations Global Compact has emphasised the importance of sustainable development on a supply chain basis (United Nations Global Compact, 2015). On the one hand, sustainability cannot be achieved on a single-firm basis, it requires the effort of all supply chain members (Soosay and Hyland, 2015). On the other hand, benefits gained from developing suppliers in terms of sustainability are not limited to just sustainability performance improvement for suppliers, but also included a broader scope of improvements (e.g. competitive advantage) for the focal firms (Busse et al., 2016). The management of suppliers in terms of sustainability is thus gaining increasing attention from both research and practice.

Further, many focal firms are working with their suppliers beyond the first tier to improve the sustainability performance of their entire supply base. For example, PUMA has been working with its first-tier suppliers and second-tier suppliers to support them in terms of human rights protection (PUMA, 2020). However, while this is an admirable trend, the hope of seeing a significant improvement across the entire supply base in terms of sustainability has not materialised for many of the supply chains (Villena and Gioia, 2020). In fact, many serious violations of sustainability standards committed by lower-tier suppliers are still difficult to even detect and then address (Wilhelm et al., 2016; Villena and Gioia, 2020). To achieve lower-tier suppliers, literature has suggested several approaches (Grimm et al., 2014; Wilhelm et al., 2016; Lechler et al., 2019). More specifically, Tachizawa and Wong (2014) have identified three approaches for managing the sustainability of multi-tier supply chains: (1) direct approach, where focal firms have direct access to lower-tier suppliers; (2) indirect approach, where

contact with lower tiers is performed indirectly by first-tier suppliers; and, (3) work with third parties, where focal firms collaborate with or delegate responsibilities to organisations such as Non-Governmental Organisations (NGOs), consultancies and competitors that are external to the supply chain. These approaches have been developed and elaborated on by later empirical research. For example, Grimm et al. (2016) proposed that actively managing second-tier suppliers through the combined use of evaluative and collaborative practices can improve second-tier suppliers' compliance with sustainability requirements. In contrast, given the difficulties (e.g. no direct contractual relationship) of directly engaging lower-tier suppliers, the focal firms were found to be more likely to adopt the latter two approaches (Soundararajan and Brammer, 2018). For example, research studying the 'indirect approach' has identified the 'double agency' role played by first-tier suppliers where they meet the sustainability requirements of the focal firm themselves and diffuse those requirements to lower tiers (Wilhelm et al., 2016).

1.2.2 Definition of sustainability-oriented supplier development

Sustainability-oriented supplier development (SSD) expands the focus of traditional supplier development (SD) by aiming to improve supplier economic and operational performance, incorporating the goal of improving suppliers in terms of social or environmental sustainability (Busse et al., 2016). Moreover, SSD efforts with a multi-tier focus allow focal firms to better reap benefits from their investments (Karaer et al., 2020).

The earliest documented evidence of supplier development (SD) dates back to the early 1900s when the U.S. automotive manufacturer Ford implemented some SD practices to improve the capability and performance of its suppliers; however, the term "supplier development" was first introduced by Leenders (1966), who studied manufacturers' effort to increase the number of qualified suppliers and improve supplier performance (Krause et al.,

2007). Since then, Hahn et al. (1990) were among the first to provide a comprehensive definition of supplier development as "any systematic organisational effort to create and maintain a network of competent suppliers" (Hahn et al., 1990, p3). In Hahn et al. (1990), the authors proposed two types of view of supplier development: the narrow perspective, which emphasises the resources invested in to ensure a qualified supply base that can meet requirements; and, the broader perspective, which focuses on the resources and efforts invested in to improve supplier performance and capability based on long-term collaborative development. The broader view has become more dominant and has been employed more widely as manufacturing firms spend more than 50% of their sales on purchasing (Krause et al., 1998). It allows the focal firm to provide assistance by facilitating continuous and adequate improvements at the suppliers, leading to a long-term stable supply base in the evolving business environment (Krause et al., 2000). Thus, supplier development becomes one of the most critical strategic weapons for focal firms to gain competitive advantage and compete on a supply chain basis (Krause et al., 1998; Krause et al., 2000).

Supplier development practices can be categorised into indirect SD and direct SD according to the levels of involvement and investment from the focal firm (Glock et al., 2017). Indirect SD focuses on the transfer of codified knowledge such as information and facts, which usually includes three types of practices: (1) routine supplier evaluation and feedback (e.g. certification programs together with performance improvement motivation); (2) supplier improvement incentives (e.g. rewards for performance improvement, cost-sharing and increase of business opportunities); and, (3) competitive pressure among suppliers (e.g. the focal firm maintains a supply base with several suppliers) (Modi and Mabert, 2007). In contrast, direct SD focuses on the transfer of tacit knowledge in the form of know-how and thus usually includes practices like supplier training and education, personnel transfer, management involvement, and financial investment, as tacit knowledge often resides with individuals and

thus can only be demonstrated and transferred via direct contact at the individual level. (Krause et al., 2007; Modi and Mabert, 2007; Glock et al., 2017). Similar distinctions and categorisations have been made in the SSD literature (Zhang et al., 2017).

1.2.3 Knowledge transfer across organisation boundaries in SSD

As SSD is not purely driven by operational concerns, it entails more relevant internal and external stakeholders than traditional SD. For example, the sustainability department, where it exists, plays the leading role in managing supplier sustainability performance, and thus it interacts and sometimes conflicts with the purchasing function in managing the supply base (Villena and Gioia, 2020). Besides, achieving the goal of sustainable development requires sustainability-related knowledge and resources. It is thus common to see focal firms collaborate with external knowledge providers such as NGOs and consultancies which are specialists in certain sustainability aspects and can transfer knowledge to suppliers and facilitate supplier learning regarding sustainability (Meinlschmidt et al., 2016; Liu et al., 2019; Silvestre et al., 2020). Therefore, there is an issue about whether and how knowledge and information could be transferred across the boundaries of different functions and/or organisations during SSD.

There are two main streams in studying the boundary-spanning function of organisations (Schotter et al., 2017). One stream focuses on the characteristics and actions of specific individuals and/or teams as boundary-spanners to operate at the interface of intra- and inter-organisational boundaries (Aldrich and Herker, 1977; Zhang et al., 2011; Huang et al., 2016). Boundary-spanners serve as a bridge between the organisation they represent and the external environment to facilitate knowledge and information exchange (Huang et al., 2016). For example, in the context of a buyer-supplier exchange, the purchasing department from the focal firm works as a boundary-spanner to cross the boundaries of the focal firm and the supplier organisation to support information and knowledge exchange relevant to the

purchasing function and maintain the exchange relationship (Zhang et al., 2011).

The other stream focuses on the use of boundary objects to represent, transfer and develop knowledge that crosses organisational and functional boundaries in different contexts (Carlile, 2002; Benn et al., 2013; Hawkins et al., 2017). Boundary objects are any form of entity, including tools, concepts, and frameworks, that can cross the boundaries of different functions to achieve common goals (Star and Griesemer, 1989; Carlile, 2002; Benn et al., 2013; Ojansivu et al., 2021). One example of this research stream is the work by Ojansivu et al. (2021) who investigated the role of boundary objects originated from outside of an organisation in facilitating knowledge exchange and learning across different functions within the organisation.

In the context of SSD in multi-tier supply chains, both boundary-spanners and boundary objects exist. More specifically, sitting at the boundaries of two dyads, i.e. the downstream dyad consisting of the focal firm and first-tier supplier and the upstream dyad consisting of first-tier and second-tier supplier, the first-tier supplier takes on the responsibility of working as the boundary-spanner that spans the boundaries of both the focal firm and the second-tier supplier to diffuse the sustainability requirements further up the chain (Wilhelm et al., 2016). Other non-supply-chain organisations, such as NGOs and consultancies, also contribute to the boundary-spanning function by providing external knowledge and resources (Rodríguez et al., 2016b; Liu et al., 2018). Meanwhile, boundary objects such as supplier assessment systems and supplier codes of conduct developed by the focal firm are tools that are used to share knowledge and information to suppliers of multi-tiers (Meinlschmidt et al., 2016). These boundary theories focus on explaining how knowledge, especially tacit knowledge, is transferred and managed across boundaries (Carlile, 2002). However, these lenses have only recently been introduced to the supply chain management field (Fabbe-Costes et al., 2020). As SSD features in both knowledge and experience sharing and application (Busse et al., 2016), it would be interesting to study how knowledge is transferred to and managed at suppliers in SSD

by drawing on the boundary theories.

1.2.4 An overview of the sustainability-oriented supplier development literature

In the past two decades, the number of papers in the field of SSD has substantially increased (Zimmer et al., 2016; Yawar and Seuring, 2017). The positive impact of SSD on improving sustainability performance throughout a supply chain has been identified by several studies (e.g. Zhang et al., 2017; Nguyen et al., 2019). The research context is also broadened to incorporate developing countries, as the majority of suppliers are located in developing countries and are faced with sustainability challenges (Busse et al., 2016). Research in the field of sustainable supply chain management (SSCM) has long been focused on environmental and green issues more than social aspects (Carter and Easton, 2011; Govindan et al., 2021). This is even more salient in SSD research (Chen et al., 2017); and this is not surprising, given media attention and severe climate change (Carter and Easton, 2011). Besides, integrating social concerns into the study of the supply chain is more challenging as social issues are usually more difficult to detect and measure compared to environmental issues (Zimmer et al., 2016; Yawar and Seuring, 2017).

There is an increasing trend in supply chain research to pay attention to supplier management beyond direct suppliers, i.e. further into lower-tiers, as many serious violations of sustainability standards are caused by lower-tier suppliers (Sauer and Seuring, 2018; Karaer et al., 2020; Villena and Gioia, 2020). As the focal firm usually do not have a direct contractual relationship with lower-tier suppliers, the deployment of SSD in multi-tier supply chains is more likely to rely on intermediaries, such as first-tier suppliers, consulting firms, and NGOs (Wilhelm et al., 2016; Soundararajan and Brammer, 2018). Scholars have begun to study enablers and the circumstances under which first-tier suppliers will take on the responsibility to extend sustainability requirements further up the chain (e.g. Wilhelm et al., 2016). For

example, one recent survey-based research study has shown that first-tier suppliers that: i) have an integrated management system considering the triple bottom line; and ii) engage with key stakeholder networks, are more likely to cascade sustainability to lower tiers (Wilhelm & Villena, 2021). As practicing sustainability is voluntary in nature and hence largely depends on relational specific factors such as the social capital within the buyer-supplier relationship (Zhu and Lai, 2019), it would be interesting to further explore relational-specific enablers and/or barriers for first-tier suppliers' cascading of sustainability to lower tiers.

Further, sustainability cannot be achieved on a single firm basis, it requires the effort of all supply chain members (Soosay and Hyland, 2015). Implementing the SSD project is a learning-by-doing procedure for the focal firms whose knowledge and ability to develop suppliers in terms of sustainability improves over time (Meinlschmidt et al., 2016; Liu et al., 2018). Moreover, SSD involves knowledge transfer processes, with all participants learning from and interacting with each other through participating in SSD (Liu et al., 2018). Additional insights, however, are needed on how the supply chain learns and evolves in terms of sustainability via SSD initiatives (Silvestre et al., 2020). For example, research has shown that suppliers' internal sustainability actions are crucial for an investment in SSD to pay off (Subramaniam et al., 2019). However, how suppliers utilise the knowledge and resources provided by SSD and commit to practicing sustainability is still not clear. This requires further investigation into the sustainability-related learning and subsequent actions of not only the focal firms but also the suppliers. However, suppliers still face a variety of challenges, such as the limited knowledge base and ability of relevant staff (Pereira et al., 2021). Moreover, the supplier perspective is still an under-researched viewpoint in SSCM literature (Pereira et al., 2021). This indicates the need to further take the supplier perspective and suppliers' ability and actions into consideration when investigating the effectiveness of SSD projects.

Besides, learning towards sustainability within supply chains, in general, faces barriers,

such as a lack of supporting and enabling procedures, learning not being sustained, and knowledge remaining in tacit form (Yang et al., 2019). There is, thus, a need to investigate whether there are robust tools that could work to trigger and maintain the learning momentum of supply chain members in the context of SSD. In fact, apart from the barriers general to supply chains in improving sustainability performance, suppliers face additional barriers such as a lack of relevant knowledge and difficulties in changing mindsets within the organisations (Pereira et al., 2021). However, none of the previous papers obtained the perspective of suppliers from smaller units, such as sustainability department/staff and shop floor level workers, as to whether and how they could benefit from SSD efforts, leading to overall organisational improvements. Moreover, it is not clear whether SSD efforts carried out by the buyer fit with supplier needs, or whether SSD efforts can be scaled up to the broader supply base. Therefore, there is a need to further explore how suppliers learn and take actions during and after SSD in order to develop a more complete understanding of whether and how organisational level changes occur on the supplier side and what additional support and adjustments are needed.

Finally, developing suppliers is a continuous and gradual process that consists of multiple stages, where interactions evolve and take place between all participating organisations (Hultman and Elg, 2018; Rashidi and Saen, 2018). Therefore, there is a need for a holistic and longitudinal perspective. This issue is discussed in much more detail in Paper I.

1.3 Research Gaps and Questions

1.3.1 Research gaps

Based on the above literature review, the key gaps in the literature can be broadly summarised as follows:

- There is a need to develop a holistic perspective and framework to investigate the

process of developing suppliers in terms of sustainability in multi-tier supply chains;

- There is a lack of research focusing on addressing social sustainability issues via SSD initiatives in global supply chains;
- The number of studies that have focused on the development of lower-tier suppliers in global multi-tier supply chains is extremely limited, and even fewer have adopted a dyadic or triadic perspective to incorporate the role of first-tier suppliers into the study of SSD;
- Few studies have considered the knowledge exchange and learning elements of SSD, especially the impact of organisational boundaries on knowledge exchange and diffusion;
- There has been considerably less inclusion of the supplier perspective, especially the way the suppliers engage in SSD, the actual benefits they can get from SSD, and the barriers they are faced with when developing internal sustainability-related practices.

1.3.2 Research questions

From the above discussion it is found that focal firms have made substantial efforts to develop suppliers within multi-tier supply chains in terms of sustainability over the past decade (Busse et al., 2016). However, effectively implementing SSD projects is still quite challenging, especially when it comes to the social dimension of sustainability (Sancha et al., 2015a). Additional research needs to be carried out in this area. Also, in terms of investigating the impacts and effectiveness of SSD projects, there has been very little research that looks specifically into how suppliers of multi-tiers could benefit from such projects. Thus, there needs to be research that further examines whether and how suppliers take actions to internalise the knowledge and information transferred by the SSD projects to improve their ability to deal with sustainability challenges. This is important as genuine improvement on the supplier side

is necessary for SSD investments to pay off and crucial for the sustainable development of the entire supply chain (Subramaniam et al., 2019). Therefore, this study aims to understand how SSD projects are implemented by the focal firm and engaged in by suppliers in multi-tier supply chains by bringing in the viewpoints of suppliers, especially first-tier suppliers. Thus, the overarching research question is:

- *How do suppliers of multi-tier supply chains participate in and learn from sustainability-oriented supplier development initiatives deployed by the focal firm?*

In order to answer the above overall research question, the main body of this thesis is made up of three inter-related papers, each with a distinctive focus and research question(s). In Paper I, a systematic literature review (SLR) of 83 papers that have studied the SSD process was conducted to get an overview of the state-of-the-art of SSD research. All of the papers reviewed were published between 2005 and 2019 in journals within the list of 2018 Chartered ABS Academic Journal Guide. Further, to better understand the SSD process, a theoretical lens – contingency theory – was applied to reveal how performance outcomes of SSD are contingent on various factors. Therefore, the following two research questions were addressed in this paper:

- *What is the current state-of-the-art in the literature on sustainability-oriented supplier development?*
- *How can a contingency fit perspective advance our understanding of SSD and its effectiveness?*

Results from the literature review showed that there was a need to further explore how suppliers of multi-tiers engage in the SSD process. Thus, the following two papers, i.e. Paper II and Paper III, intended to investigate the SSD process from the suppliers' perspective. First, an exploratory case study of an SSD project focusing on occupational health and safety (OHS) issues, which belong to the social dimension of sustainability, that was initiated by a Western

fast-fashion brand was undertaken in Paper II. This paper sought to explore the boundary-spanning role of first-tier suppliers in diffusing SSD initiatives upstream to lower-tier suppliers. Drawing on social capital theory and boundary-spanning theory, the paper addressed the question of :

- *How does the social capital that exists between a first-tier supplier and a downstream, focal firm affect the way in which the first-tier supplier fulfils its boundary-spanning role in disseminating SSD initiatives to upstream, second-tier suppliers?*

Findings from Paper II showed that the cognitive and relational capital that exists in the downstream relationship between the first-tier suppliers and focal firm affects whether first-tier suppliers adopt compliance-oriented or improvement-oriented boundary-spanning actions in their upstream relationships with second-tier suppliers. Therefore, first-tier suppliers' engagement in multi-tier SSD project was found to affect how effective SSD project can be in developing second-tier suppliers. However, limited attention was given to whether and how suppliers could benefit from the knowledge and skills delivered by SSD projects over time. Paper III thus intended to investigate the learning and internalisation of the knowledge delivered by SSD projects at the supplier side. Paper III was informed by the theory of boundary objects – a concept that has recently been introduced to the supply chain management research field (Fabbe-Costes et al., 2020). In addition, the use of the concept of absorptive capacity also adds explanatory power to the field's understanding of learning processes and loops. In order to capture the evolving and dynamic features of the learning and knowledge internalisation process during SSD, the study adopted a longitudinal research design. In doing so, the following research question was posed:

- *How do suppliers use their absorptive capacity to explore, transform and exploit knowledge that is transferred by the buyer using boundary objects during SSD initiatives?*

As is evident from the research focus and research questions, the three papers follow a common thread, which is to investigate the phenomenon of sustainability-oriented supplier development projects in multi-tier global supply chains. As such, all three studies complement each other to realise the overall research aim and answer the overall research question.

1.4 Research Context: The Fast-fashion Supply Chains in China

The supply chains of Western fast-fashion brands based in China have been selected as the research context for the empirical parts of the thesis – Paper II and Paper III. Fast-fashion is a term used to describe the business model that reacts rapidly to the market and offers new lines of fashion products every season to meet customer demand (Environmental Audit Committee, 2019). This type of business features quick turnarounds and lower prices and the fast-fashion industry was worth £32 billion to the UK economy in 2017 (Environmental Audit Committee, 2019). Companies that rely on this business model have faced increasing scrutiny for their sustainability performance over the years (BoF & Mckinsey, 2021). One of the major concerns regarding this type of business model is that it appears to encourage over-consumption and thus generate excessive waste (Environmental Audit Committee, 2019). According to the most recent report by Business of Fashion (BoF) and Mckinsey on the fashion industry, it has been found that a solid reputation in sustainability is one of the most important factors to gain the trust of younger fashion consumers (BoF & Mckinsey, 2021).

In the past decade, fast-fashion companies have made some efforts to develop suppliers in terms of sustainability. For example, Inditex proposed a Workers at the Centre 2019-2022 Strategy, under which they implemented sustainability-oriented supplier development projects with over 600 suppliers in 2020 (Inditex, 2020). However, slow progress in improving supplier conditions, especially setbacks due to the pandemic, means that such brands will need to do more work to make those efforts effective.

As of 2019, China was still the top sourcing region for fast-fashion brands in the world (Textile Today, 2019). A report by the European Commission has shown that 29% of the clothing imports to the 27 member states of the European Union were supplied by China in 2019, with Bangladesh and Turkey accounting for a further 19% and 11% each (Eurostat, 2019). Moreover, the textile and apparel exports of China accounted for 37.6% and 31.3% respectively of world textile and apparel exports, and China has been ranked first place for more than eight years (World Trade Organization, 2019). This leading position in textile and apparel production and export makes China an important global player in realising sustainable development in this industry. However, the constantly improving manufacturing ability sometimes conflicts with the need to pay more attention to environmental impact and worker welfare issues. For example, the use of harmful and toxic chemicals and improper treatments of the wastes have been shown to cause severe harm to the environment such as water pollution (Wang et al., 2020). Since most fast-fashion brands outsource textile and garment manufacturing into developing countries such as China and Bangladesh, where the working conditions of the workers are relatively poor, there is a major concern related to the social side of sustainability in the fast-fashion industry (Villena and Gioia, 2020; Wang et al., 2020). For example, over-time working is still found to be one of the major issues in supplier factories in China (Villena and Gioia, 2020; Jones, 2021). Therefore, the fast-fashion supply chain in China provides a rich and appropriate setting for the empirical research conducted in papers II and III, with the broad aim of understanding the cascading of sustainability-oriented supplier development initiatives focusing on social issues in global supply chains.

1.5 Research Philosophy: Pragmatism

1.5.1 Research paradigms

Research philosophy refers to the underpinning beliefs and assumptions at play when one tries

to develop knowledge in a certain area (Karlsson, 2016; Saunders et al., 2016). The beliefs and assumptions include the nature and existence of the reality (ontology), the nature of general knowledge to enquire into the world (epistemology) and the values of the researcher that influence the research process (axiology) (Saunders et al., 2016; Easterby-Smith et al., 2018). It is important to think through the philosophical issues before undertaking Business and Management research because they can affect the quality of the research and a justifiable research philosophy is especially fundamental to a Business and Management research project (Easterby-Smith et al., 2018). Moreover, the research philosophy will inform the entire research design, including research approach, methodological choice, research strategies, time horizon, techniques, and procedures (Saunders et al., 2016).

At the two ends of the philosophical spectrum are 'positivism' and 'constructivism' (Åhlström, 2016). Positivism follows a deductive logic that seeks to analyse the nature of reality in an objective way using the simplest key elements; in contrast, constructivism follows an inductive logic that emphasises the complexity of the 'whole reality' (Elkjaer and Simpson, 2011; Saunders et al., 2016; Easterby-Smith et al., 2018). Researchers holding a positivism stance should be independent and irrelevant to the reality they are studying while those holding a constructivism stance are part of the reality that is being observed and their personal experience and understandings affect the way they analyse the reality (Elkjaer and Simpson, 2011; Easterby-Smith et al., 2018).

The philosophical stance I hold is 'pragmatism' which originates in the writings of early twentieth-century American philosophers and is regarded as a compromise position between 'Positivism' and 'Constructivism' (Saunders et al., 2016; Easterby-Smith et al., 2018). The pragmatism paradigm emphasises the fit between the goal and the method, and focuses on "what works" (Morgan, 2014; Weaver, 2018). Pragmatism is particularly suitable for studying processes that are relevant to knowledge and learning and has the potential to offer new insights

(Easterby-Smith et al., 2018). Section 1.5.2 below discusses the pragmatism stance in detail before explaining the fit between this stance and this research in Section 1.5.3.

1.5.2 Pragmatism

The shift toward pragmatism as a research paradigm emerged through its association with mixed-method research which did not fit in the metaphysical paradigm (Morgan, 2014). Pragmatism, as a philosophical movement that focused on the practical consequences of social reality, was introduced in the 1870s by Charles Sanders Peirce (1839-1914) and further developed by the 19th- and 20th-century classical pragmatists William James (1842-1910) and John Dewey (1859-1952) (Weaver, 2018; Kelly and Cordeiro, 2020). James emphasised the personal and subjective aspects of meaning and described pragmatism as a paradigm that could steer clear of the interminable metaphysical debate (Weaver, 2018). Further, Dewey sought to reorient the philosophy toward an emphasis on human experience instead of abstract concerns (Morgan, 2014). From his standpoint, experiences create meaning by bringing beliefs and actions into contact with each other. He defined action as conducting experiments under controlled situations and beliefs as those theories guiding experiments (Morgan, 2014; Weaver, 2018). Moreover, prior experiences and beliefs will offer us only possibilities but not a certainty because experiences are context-dependent and thus there is a chance that our prior experiences and beliefs are not sufficient to guide actions in a given context (Biesta, 2010; Morgan, 2014). This is when research comes into play to create a thoughtful reflection and careful decision-making process (Morgan, 2014). Besides, the researchers are inseparable from the problems under research and the research process relies on both beliefs and actions (Morgan, 2014; Frost and Shaw, 2015). Therefore, pragmatism offers a specific view of knowledge which claims that the only way we can acquire knowledge is through the combination of action and reflection (Biesta, 2010).

Pragmatism places the research questions at the centre and links all methodological decisions to the research questions (Saunders et al., 2016). It appreciates the use of multiple methods, different world views, assumptions, and forms of data collection and analysis (Creswell and Creswell, 2018). Multi-method research is heavily rooted in pragmatism, which allows for both scientific objective rigour and contextual inter-relational exploration (Hunter and Brewer, 2015; Frost and Shaw, 2015). Pragmatists always emphasise using methods that enable credible, well-founded, reliable, and relevant data to be collected that are able to advance the research (Saunders et al., 2016). This philosophical stance has the potential to offer new insights to answer "how" and "why" questions about organisation practices that remain difficult to address by more conventional approaches (Elkjaer and Simpson, 2011). More specifically, pragmatism focuses more on the social nature of real-time actions that constitute living and lived experience and seeks to understand practical problems of an organisation as a dynamic and emergent process of meaning-making (Elkjaer and Simpson, 2011).

In summary, pragmatism is a philosophical position that reconciles both objectivism and subjectivism, facts and values, accurate and rigorous knowledge and different contextualised experiences (Saunders et al., 2016). It emphasises that research involves decisions about which goals are most meaningful and which methods are most suitable (Weaver, 2018). In addition, it enables researchers to deal with complex, dynamic organisational processes where actions may need to be adapted over time and/or according to the context (Kelly and Cordeiro, 2020). Pragmatism, thus, is proposed as a way forward that can offer a potential radical alternative to dominant paradigms that have been used in Business and Management studies (Elkjaer and Simpson, 2011).

1.5.3 The fit between pragmatism and this research

Considering the discussion above, I have chosen the pragmatism perspective as I believe it

represents a suitable ontological and epistemological underpinning for my research for the following reasons. First, pragmatism values the exploration of the interconnectedness of prior beliefs and experiences, the knowing process, and the actions in the research process (Kelly and Cordeiro, 2020). The study of sustainability-oriented supplier development is still in an early stage which requires a set of workable theoretical bases and practical approaches for both researchers and managers to improve our understanding of this phenomenon. It, on the one hand, is rooted in the widely discussed Sustainable Supply Chain Management field where mature theories and practices have been developed; it, on the other hand, has its unique characteristics such as being knowledge-intensive (Meinlschmidt et al., 2016). Holding a pragmatism stance allows me to design this research based on the principles and beliefs from existing theories, while at the same time to incorporate reflections from the empirical data gathered during the research process to further elaborate on and develop those theories. This is evidenced by the fact that theories have been used throughout this research.

Second, a central tenet in pragmatism is the view that all research should produce useful and actionable knowledge that is of practical relevance instead of focusing on metaphysical debates about the nature of truth and reality (Kelly and Cordeiro, 2020). It is argued to be the most practical philosophy that provides the intellectual tools to challenge assumptions, to understand practical problems and issues in new and deeper ways, and to provide practical solutions to practical problems in Business and Management studies (Elkjaer and Simpson, 2011). Pragmatism also invites new ways of engaging with the dynamics of Business and Management study (Elkjaer and Simpson, 2011). Both the researchers studying SSD and the practical problems under study may change and evolve during the research process. Therefore, the dynamic and practical perspective provided by pragmatism is appropriate to study this phenomenon.

1.6 Research Design

1.6.1 Research method

Pragmatism emphasises the fit between the methodology and the goals of the research (Weaver, 2018). This research was designed in the spirit of pragmatism as evidenced by choosing the most suitable approaches to address specific problems in respective problem settings within the scope of the overarching research question. More specifically, the entire PhD project is designed as a two-step procedure. The first step is to get an overview of current understandings of the SSD process and identify research gaps for further investigation. In doing so, I followed the systematic literature review methodology elaborated by authors such as Tranfield et al. (2003) and Denyer and Tranfield (2009). This methodology has been widely applied in the Business and Management field to get an overview of the state-of-the-art of a certain topic. By reviewing relevant literature, I got a clear idea in terms of how research to date has contributed to our understanding of the sustainability-oriented supplier development process and what the research gaps are in this area.

Results and insights obtained from the first step guided the design for the following second step – the empirical study section. An abductive approach was chosen as it emphasises the interaction between the underpinning theory and empirical data collected, thus contributing to theory elaboration and development (Saunders et al., 2016; Voss et al., 2016). This approach is appropriate for the following reasons: (1) the empirical research is explorative in nature as research in SSD is still in an early stage with several inconsistent conclusions observed from prior literature; (2) themes and patterns identified from the literature have constructed the initial conceptual framework and the theoretical underpinnings of the empirical research, which can further guide the data collection; and, (3) by integrating observations and findings from empirical data, this step intends to contribute to elaborating and developing existing theories

(Saunders et al., 2016; Voss et al., 2016).

In both of the empirical papers, I adopted a case study approach to answer 'How' questions (see Section 1.3). As research within the field of SSD is still in its nascent stage, the case study method is considered to be appropriate. This is because case study research allows researchers to investigate the subject of the case, and the interaction between the subject and its context in real-life settings (Saunders et al., 2016; Yin, 2018). Case research also allows multiple sources of data, including interviews, observation, conversation, internal surveys and archival records, to be used to study the same phenomenon and thus increase reliability (Voss et al., 2016). Further, the majority of case study research on SSD has adopted a buyer perspective (Rogers et al., 2019) while this research has a focus on the supplier side and collected data from multiple actors involved in SSD projects. Data was collected separately for Paper II and Paper III. The methods used to collect data were also different. In Paper II, both interviews and observation data are key data sources; while in Paper III, the primary data source is semi-structured interviews.

1.6.2 Data collection and analysis

Case study protocols were used in both of the empirical papers, which helped guide the data collection process and contributed to the rigour of the research (see Appendix 1 and 2). A variety of data sources were used for data triangulation, including semi-structured interviews, observation notes of key events, audit reports, and factory visit reports. Data collection was conducted in two phases for Paper II and Paper III respectively, where each was with a different supply chain. A common organisation to the data collection for both papers was the consultancy firm where I was based for three months during the data collection period for Paper II. I kept in good contact with the firm and collected data from them for Paper III later on.

Data collection for Paper II took place from September to December 2019 in China. As

mentioned above, during this time I was based in a consultancy firm, which was one of the key actor organisations included in the SSD project. Therefore, I was able to carry out observations of key events before, during and after the implementation of the SSD project over the course of the entire data collection period. Therefore, in addition to semi-structured interviews, a large volume of observation notes was also collected. The interviews focused on the boundary-spanning actions of first-tier suppliers and the interactions among all parties within the relationship network comprised of the focal firm, the first-tier suppliers and the second-tier suppliers. Meanwhile, observations were conducted and resulted in detailed notes about the communications and actions between all parties involved in the SSD project. In addition, secondary data, such as corporate sustainability documents and project materials, were reviewed to complement interviews and observation notes. More detailed information about data collection for Paper II can be found in Chapter 3.

Data collection for Paper III lasted over a year from October 2020 to October 2021. Due to the outbreak of the pandemic and the travel restrictions, I adapted the original data collection plan to carry out all interviews and observations of key events online within the time zone of China. During this period of time, I had regular interactions with all parties involved in this year-long project. The majority of interviewees were interviewed at least twice, including at the start and end of the project. The first round of interviews focused on suppliers' knowledge base and their learning expectations, and the second round of interviews focused on their opinion and experience of the SSD project, their main takeaways, and their plans for the next stage. In addition, observation notes and secondary data were also collected to facilitate data triangulation. More detailed information about data collection for Paper III can be found in Chapter 4.

All data collected has been transcribed. Data analysis began with reading the transcripts several times to increase the familiarity with the data before proceeding to the coding process.

The iterative coding process was grounded in the qualitative data whilst taking into consideration key concepts from the underpinning literature, and supported by qualitative data analysis software *Nvivo*.

1.6.3 Research rigour

Research rigour reflects the complexity of the research design and the critical thinking of the entire research process (Goodman et al., 2020). It is also imperative to maintain rigour in the research to ensure confidence in the findings and conclusions. Therefore, multiple approaches have been undertaken to ensure the rigour of this PhD research. More specifically, the literature review paper followed a transparent and rigorous systematic literature review procedure, while the two empirical papers applied the research quality measures from Yin (2018) to the research design. Moreover, the use of theories in all three papers further enhances the overall rigour of this PhD research. A more detailed discussion of the research design, data collection and analysis methods, and the rigour of the research process for each individual paper is provided in the following chapters (Chapter 2-4).

1.7 Structure of the Thesis

The Introduction Chapter of the thesis first provided the background and motivation for this PhD research (Section 1.1), followed by a review of relevant literature (Section 1.2) and a summary of the research gaps and the overall research question (Section 1.3). To answer the overall research question, Section 1.3 further detailed the inter-connectedness of the three papers and the respective focuses and research questions in the three papers that constitute the main body of this thesis. The research context was detailed in Section 1.4. Finally, the research philosophy (Section 1.5) and method adopted in this research (Section 1.6) were explained.

In the next chapters, the three papers will be presented before the concluding chapter is

provided (Chapter 5). Each of the three papers will start with a background that describes the development and current publication status of the paper.

Chapter 2 – Paper I: A Systematic Literature Review on Sustainability-oriented Supplier Development

Production Planning & Control, (2021), ahead-of-print, 1-21.

2.1 Background to Paper I

This systematic literature review paper has been accepted by *Production Planning & Control*, which is a 3-star journal in the ABS list. It was initially submitted to the journal in May 2020 and finally accepted in July 2021 after two rounds of major revision. Since completing this extensive literature review, I have continued to track new publications in the field of SSD. Papers published in 2020 and 2021 in the field of SSD further investigated topics such as social SSD in multi-tier supply chains (e.g. Govindan et al., 2021), the implementation strategy of SSD projects (e.g. Karaer et al., 2020), the dynamics in achieving sustainability in supply chains focusing on the learning processes (e.g. Silvestre et al., 2020), and supplier involvement in SSD projects (e.g. Pereira et al., 2021). Results from these papers, on the one hand, further reinforce the conclusions of the SLR paper in terms of suggesting that more attention is needed on the social dimension, supplier perspective and the development of lower-tier suppliers. They, on the other hand, inspired me as to further investigating the knowledge transfer and learning

processes within SSD projects. Therefore, in addition to this SLR, a wider literature review covering the most recent key publications in SSD and the literature relevant to knowledge transfer across organisational boundaries and learning processes is also carried out in Chapter 1, Section 1.2.

This paper was written in collaboration with my supervisors: Professor Linda Hendry and Professor Mark Stevenson. As the first author, I did the majority of the work for this paper, which can be counted as 80% of the total work, while my co-authors contributed the remaining 20%. More specifically, I initiated the idea of doing a review of the literature in the field of SSD, conducted the literature review following the SLR method, strengthened the contribution by applying the contingency theory lens, wrote the first full draft of the paper, and led the process of addressing reviewer comments in the two rounds of revisions. My supervisors, as my co-authors, guided me in all of the stages. More specifically, they inspired me to follow the SLR method and to use theory to add richness to the discussion. They also enhanced the writing style and the publication attractiveness of the paper. My co-authors have certified below that they agree with my above claim in terms of my contribution in carrying out this piece of research and preparing the paper for publication.

Professor Linda Hendry

Date: 9th February 2022

Professor Mark Stevenson

Date: 9th February 2022

2.2 Abstract

Many buying firms are implementing sustainability-oriented supplier development (SSD) projects. This paper provides a systematic literature review on the SSD process and develops a future research agenda. A total of 83 papers are analysed according to their research content and using contingency theory variables, i.e. contingencies and response actions, and contingency forms of fit that influence performance outcomes. Although there has been a considerable focus on contingency factors in the SSD literature, explicit use of the contingency fit perspective has been limited. A conceptual framework is developed and supported by a series of research recommendations to provide a holistic view of SSD and a starting point for future research. To the best of our knowledge, this is the first paper to focus specifically on reviewing the SSD literature. The contingency theory lens provides a promising theoretical perspective for understanding how SSD initiatives can be successfully embedded in the supply chain.

Keywords: Sustainability-oriented supplier development; contingency theory; systematic literature review; sustainable supply chain.

2.3 Introduction

Effective supplier management is very important in the current global context as many firms are spending a larger amount of money on purchasing goods and services from external suppliers (Zimmer et al., 2016; Rashidi and Saen, 2018). Supplier management has traditionally focused on four broad operational measures of supplier performance, i.e. cost, quality, flexibility, and delivery (Awasthy and Hazra, 2019); but firms are now paying more attention to a fifth dimension – sustainability. Sustainability cannot be achieved by buying firms alone (Soosay and Hyland, 2015), yet such focal firms are frequently held responsible by the media, non-governmental organisations (NGOs), and activists for sustainability oriented

violations in their supply network (Hofmann et al., 2014; Zimmer et al., 2016). For example, China Labour Watch, a US-based NGO, has been conducting site investigations of Apple suppliers since 2011 and publishes reports when labour rights violations are detected (China Labour Watch, 2019). Such disclosures of supplier violations have caused direct reputational damage and economic loss to Apple, thereby underlining the importance of supplier management (Yang and Zhang, 2017).

A lack of sustainability oriented capabilities is one of the main causes of supplier violations (Fu et al., 2012). To achieve long-term strategic development goals (Reuter et al., 2010), there is an incentive for buying firms to manage and develop their supply base more proactively to fulfil sustainability goals (Liu et al., 2018) instead of abandoning poor performing suppliers altogether (Blome et al., 2014). As a result, an increasing number of firms have started to implement sustainability oriented supplier development practices and regard this as a route to gaining competitive advantage (Blome et al., 2014; Liu et al., 2018), i.e. benefits that are not limited to direct sustainability performance improvements (Busse et al., 2016).

Sustainability-oriented supplier development (SSD) expands the focus of traditional supplier development (SD) by going beyond the aim of improving suppliers' operational performance to incorporate the goal of sustainability (Yang and Zhang, 2017). SD is generally defined as any effort made by the buying firm to improve supplier performance or capability (Krause et al., 1998) for the benefit of the buying firm (Zhang et al., 2017). SSD is thus defined as any initiative aimed at improving supplier sustainability performance or capability to meet two or more elements of the triple bottom line (TBL) (Busse et al., 2016; Kumar and Rahman, 2016). The TBL emphasises the simultaneous achievement of economic/business, social, and environmental benefits (Elkington, 1998; Gimenez and Tachizawa, 2012). Thus, it has been

argued that SSD is an important contemporary topic that requires further research attention (Liu et al., 2018).

To define SSD, it is first necessary to clarify that there are two independent types of practice that can be used to develop suppliers: indirect SD and direct SD (Wagner and Krause, 2009). Indirect SD focuses on the transfer of codified knowledge (Krause et al., 2007), which usually includes: competitive pressure among suppliers, supplier improvement incentives, and routine supplier evaluation and feedback. Direct SD focuses on the transfer of tacit knowledge, including via supplier training and education, staff exchange, management involvement, and financial investment (Krause et al., 2007; Modi and Mabert, 2007; Glock et al., 2017). Similar distinctions have been made in the literature specific to SSD (e.g. Zhang et al., 2017).

In addition to the term SSD, some studies (e.g. Grimm et al., 2014; Yadlapalli et al., 2018) refer to related terms such as sustainability-oriented supplier collaboration and sustainability-oriented supplier assessment. All three terms contribute to achieving overarching sustainable supplier management (SSM), although each contributes in a different way. The three terms are not mutually exclusive, and the exact scope of each approach differs somewhat across studies. Sustainability-oriented supplier assessment emphasises selective, evaluative and monitoring strategies for ensuring compliance without necessarily seeking to bring about change (Grimm et al., 2014). It is complemented by sustainability-oriented supplier collaboration, which focuses more on a supportive and collaborative relationship between the buyer and supplier to achieve SSM (Grimm et al., 2014; Ni and Sun, 2018). SSD entails elements from both of the above approaches because it is constituted by both indirect and direct initiatives but with a focus on the effort initiated and led by the buying firm. We thus understand SSD as being about one-way supportive initiatives from the buyer with a long-term outlook towards investments in developing suppliers in terms of their sustainability.

A significant number of publications related to SSD have emerged in recent years (Yawar and Seuring, 2018), and several literature reviews have been published that incorporate SSD, as detailed in Table 1. From the table it can be seen that a systematic literature review (SLR) approach has been adopted in most prior studies to create a transparent and replicable procedure (Denyer and Tranfield, 2009). All prior studies, however, have integrated SSD as part of a broader SSM study, with only two looking more specifically into either SSD practices to address social issues (Yawar and Seuring, 2017) or analytical approaches to SSD (Zimmer et al., 2016), thereby limiting the depth of their coverage of this important topic. Thus, a comprehensive literature review on all aspects of SSD is missing. Importantly, more than one third of the papers included in this literature review (33 out of 83, cf. Section 2.5.1) have been published since 2017. Therefore, these papers could not have been considered in previous literature reviews. Such a surge in research attention on SSD underlines the important, contemporary nature of this topic, and it means there is a need to re-examine the current state-of-the-art within SSD research and identify priorities to guide future research.

For the above reasons, there is a clear need for a comprehensive literature review on SSD. This paper thus presents a contemporary SLR specifically on all aspects of SSD. An overview of the extant literature plus an analysis of SSD practices adopted and performance outcomes is provided to answer the first of our two research questions:

- **RQ1:** What is the current state-of-the-art in the literature on sustainability-oriented supplier development?

SSD goes beyond traditional SD. It is a more complex process typically involving a wider range of stakeholders and inter-/intra-organisational factors. Thus, it is argued that better performance is more likely to be achieved if there is a consistent yet adaptive approach to SSD. This is in line with contingency theory, which suggests that it is the ‘fit’ between organisational

actions in response to intra-/inter-organisational factors (contingency factors/contingencies) in the long run that determines organisational performance (Sousa and Voss, 2008). With this in mind, we further investigate the reviewed papers in terms of how they studied SSD and its performance outcomes from a contingency fit perspective. In doing so, we intend to address our second research question:

- **RQ2:** How can a contingency fit perspective advance our understanding of SSD and its effectiveness?

Table 1. Survey of relevant literature reviews

Paper	Topic covered	Analysis focus	Methodology covered	Sustainability focus	Time horizon	Theoretical lens	SLR or not
Gimenez and Tachizawa, 2012	Sustainability-oriented supplier assessment & collaboration	Enabler and performance outcome	Empirical papers	TBL	1996-2011	-	SLR
Zimmer et al., 2016	Sustainability-oriented supplier selection & development & monitoring	Analytical models employed to achieve SSM	Analytical papers	TBL	1997-2014	-	SLR
Chen et al., 2017	Sustainability-oriented supplier development & collaboration & monitoring	Collaboration within the supply chain	Not limited	TBL	1998-2015	-	SLR
Yawar and Seuring, 2017	Sustainability-oriented supplier assessment & development & monitoring	Strategies employed to manage social issues within supply chain	Not limited	Social issue	2000-2013	-	Non-SLR
Jia et al., 2018	Sustainability-oriented supplier assessment & collaboration	SSM achievement in developing countries	Not limited	TBL	2000-2016	-	SLR
This review	Sustainability-oriented supplier development	All aspects of SSD	Not limited	TBL	Until end of 2019	Contingency theory	SLR

In addressing the two research questions, this paper provides in-depth coverage of all aspects of SSD, evaluating the state-of-the-art in the field. It identifies a promising theory lens – contingency theory – to further study the complex and dynamic features of SSD and outlines several important avenues for future research. Finally, implications for practitioners are provided, including the need to establish a performance evaluation system, to identify important contingencies and to pay more attention to the deployment actions when carrying out SSD.

The remainder of this paper is structured as follows. Section 2.4 describes the method used to select and review papers and outlines the theoretical lens used in the paper. A descriptive analysis of the literature, along with an analysis of the SSD practices and performance outcomes, are then provided in Section 2.5. Section 2.6 presents an analysis of the literature through the contingency theory lens before Section 2.7 discusses the gaps and future research directions. Finally, the paper concludes in Section 2.8.

2.4 Research Method

2.4.1 Systematic literature review process

A SLR enables a more objective and replicable approach to reviewing the literature to be adopted through transparent, inclusive and explanatory searching, retrieving, and filtering principles (Colicchia et al., 2012). It also aids in building a solid and dependable chain of evidence about the findings from prior studies (Denyer and Tranfield, 2009). Thus, SLRs have contributed substantially to knowledge building and development (Tranfield et al., 2003; Durach et al., 2017). A SLR process is therefore followed in this research, as outlined in Figure 1 and detailed below.

	Criteria	Rationale
Stage 1 **Identifying papers**	1.1 Keywords search in Scopus with no timeframe restrictions	Broad keywords without limit on the year of publication allowed to thoroughly uncover all relevant literature
↓ *1068 papers*	1.2 International peer-reviewed journals in English	Attempt to include high-quality published studies with the broadest audience
Stage 2 **Paper selection and evaluation**	2.1 Included papers from ABS Guide 2018 listed journals (604 papers)	ABS Guide – the most widely used and accepted quality indicator
	2.2 Excluded irrelevant articles after abstract analysis (124 papers)	Papers only focusing on the economic dimension or not focusing on supplier development cannot contribute to answering the research questions
	2.3 Excluded less relevant articles after full-text analysis (75 papers)	The main focus is not on any aspects of SSD
↓ *83 papers*	2.4 Included eight additional papers from citation check (83 papers)	Checked papers covered by the surveyed literature reviews to retrieve relevant work that had not been captured
Stage 3 **Paper synthesis and results reporting**	3.1 Developed Microsoft Excel database	Recorded the papers and classified them into different headings and sub-headings for analysis
	3.2 Descriptive analysis and thematic analysis	To identify trends and gaps in order to answer the research questions

Figure 1. The systematic literature review process

2.4.1.1 Stage 1 – Identifying papers

Scopus was selected as the core database for this research because of its wide coverage of social science journals (Ansari and Kant, 2017) and because it is widely used in other supply chain management literature reviews (e.g. Durach et al., 2015), including in the field of supplier management (Zimmer et al., 2016; Glock et al., 2017). The search string used to retrieve literature is constructed of synonyms of supplier development and sustainability, as summarised in Table 2. A range of terms was used due to their interchangeable nature to obtain as much pertinent literature as possible. Such a search strategy was used in previous literature review exemplars from the SSD field (e.g. Zimmer et al., 2016; Yawar and Seuring, 2017). Examples of widely used alternatives to supplier development include supplier engagement (e.g. Liu et al., 2018), supplier collaboration (e.g. Yawar and Seuring, 2018), and supplier management (e.g. Chen and Chen, 2019). Meanwhile, the triple bottom line, sustainable, green and social are all widely used keywords employed by studies related to sustainability (Zimmer et al., 2016). As a first proxy for quality, only international peer-reviewed academic papers were selected without any limit on the year of publication, resulting in a total of 1,068 papers.

Table 2. Systematic literature review search strings

	Searching string used
Supplier development	TITLE-ABS-KEY ("supplier engagement" OR "engaging supplier" OR "supplier development" OR "developing supplier" OR "supplier relationship management" OR "managing supplier relationship" OR "supplier management" OR "managing supplier" OR "buyer supplier relationship" OR "supplier collaboration" OR "collaborating supplier" OR "vertical integration")
	AND
Sustainability	TITLE-ABS-KEY ("triple bottom line" OR "TBL" OR sustainability OR sustainable OR green OR environmental OR ethical OR social OR “sustainability stewardship” OR responsible OR multi-tier OR lower-tier OR sub-tier)

2.4.1.2 Stage 2 – Paper selection and evaluation

Durach et al. (2017) emphasised the need to consider quality as well as subject content when determining the article selection and evaluation criteria. Thus, we followed a transparent

process with pre-specified inclusion and exclusion criteria based on relevance and quality considerations to filter the papers (as shown in Figure 1):

(1) ABS List: Papers published in journals included in the 2018 ABS Academic Journal Quality Guide were retained, thereby reducing the sample to 604 papers. This approach was adopted in prior SLRs, such as in Zorzini et al. (2015), using an earlier version of the ABS list.

(2) Abstract analysis: The abstracts of the 604 papers were screened with an initial focus on the research context. Research that was not set in a sustainable supply chain context was excluded, reducing the sample to 219 papers. The remaining papers were carefully examined to determine whether or not they are relevant to SSD, resulting in a database of 124 papers.

(3) Full-text analysis: The full text of the remaining 124 papers was assessed to determine whether or not a paper covered at least one aspect of SSD. Papers using other terms, such as supplier relationship management or supplier collaboration, were retained if they explicitly mentioned any supplier development practices in relation to sustainability. This reduced the sample to 75 papers.

(4) Further searching for relevant papers: We revisited the literature reviews from Table 1 to identify any relevant papers missed by our process. This supplemented the sample by a further eight papers. This added additional insight but was not a sufficiently large number of papers to suggest our process was not robust. The final database was therefore comprised of 83 papers.

2.4.1.3 Stage 3 – Paper synthesis and results reporting

A data extraction form was created to record content from the 83 papers, including descriptive data (e.g. research method and context) and thematic information (e.g. contingencies and

deployment actions) to aid the synthesis and analysis of the papers. This structured approach can reduce human bias (Denyer and Tranfield, 2009). Codes for descriptive analysis (e.g. research context and use of theory) were gained from prior literature reviews (e.g. Zorzini et al., 2015) and themes for thematic analysis were mainly informed by contingency theory. Thus, this theory lens and its relevance to SSD are presented next followed by a summary of the codes for thematic analysis before reporting the descriptive and thematic analysis results in Section 2.5 to address the research questions.

2.4.2 The theoretical lens - Contingency theory

There has been a growing trend in the Operations Management (OM) field to benefit from applying theories from other academic disciplines (Zorzini et al., 2015). Referring to theories from other fields can build stronger and more valuable insights (Barratt et al., 2011); it also helps further understanding of OM problems, which are often cross-disciplinary in nature (Sousa and Voss, 2008). The sustainable supply chain management (SSCM) field of research has recently been informed by contingency theory (Sauer and Seuring, 2018). The field has extensively examined the contingencies that affect how sustainability can be extended further up the chain to suppliers (e.g. Gimenez and Tachizawa, 2012). Further, the theory has been used to identify relevant contingencies and identify their impact on sustainability practices (e.g. Wilhelm et al., 2016). For example, Tachizawa and Wong (2014) applied the lens to review the contingencies identified in previous papers and develop propositions on how these contingencies may affect the decisions and strategies employed to manage lower-tier suppliers in terms of sustainability. However, the literature offers only limited insight into the central argument of contingency theory (Sousa and Voss, 2008) – the fit between the contingencies and the management process in order to survive or to attain higher performance. To fit the set of contingencies across different contexts, organisations need to design and adjust their

management processes to achieve sustainable supply chain management on an individual basis (Grötsch et al., 2013). Thus, the concept of fit from contingency theory can be used to further explore all aspects of SSD and its effectiveness, revealing the fit between the actions taken, the different sets of contingencies and how this affects SSD performance outcomes.

In line with recent studies in the SSCM literature (e.g. Sauer and Seuring, 2018; Silvestre et al., 2020), which have referred to the contingency perspective proposed by Sousa and Voss (2008) to identify contingencies, we employ this approach and go one step further than previous studies by using their classification of the different forms of fit – selection, interaction, and system – to review the papers. Each of the three different forms of fit consists of at least two variables from the set of contingency variables, response variables, and performance variables (Sousa and Voss, 2008). Contingencies are usually high inertia factors that can hardly be influenced or manipulated by a single firm or manager, and thus firms need to adapt to these in order to obtain better performance; response variables are actions or practices taken by an organisation to deal with current or potential contingencies; and performance variables are measurements used to evaluate the contingency effects generated by contingencies, response variables and the fit between the two (Sousa and Voss, 2008; Grötsch et al., 2013).

Figure 2 illustrates the classification framework adapted from Sousa and Voss (2008), which will be employed as a starting point for addressing RQ2. The selection approach assumes that fit is a congruence between contingency factors and response actions without considering the impact of the contingency-response pair on the performance variable. Meanwhile, the interaction and system approaches consider all three variables. The interaction approach focuses on contingency-response action pairs and the impact of each individual pair on the performance variable, while the system approach broadens this to multiple contingency factors and response actions simultaneously and holistically to also consider the interactive feature

among different variables and contingency-response pairs (Sousa and Voss, 2008). The system approach can be further divided into the partial-system and full-system approach, with the former only considering the individual effects of each contingency/response action while the latter takes mutual interactions into consideration (Sousa and Voss, 2008). This classification framework is a comprehensive foundation for contingency-based OM research to study the impact of contextual conditions and the adaptive features of OM processes (Wong et al., 2011).

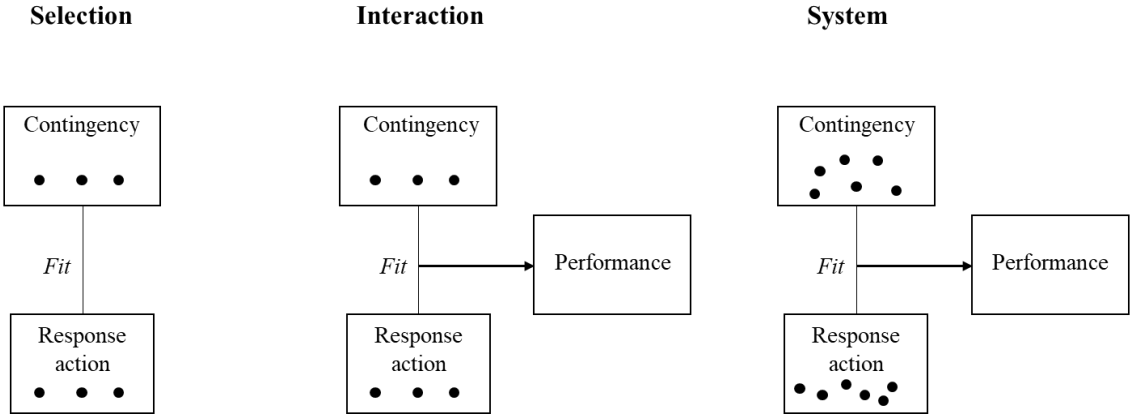

Figure 2. The three forms of fit (Adapted from Sousa and Voss, 2008)

By its very nature, SSD is a dynamic process that requires an adaptive perspective since it entails multiple stakeholders, various implementation options, and a diversified supply base (Liu et al., 2018; Tong et al., 2018). Research into SSD is still at a nascent stage of development, with little attention having been given to the fit approach; however, various underlying contingencies have been identified in prior studies (e.g. Tachizawa and Wong, 2014). As Sousa and Voss (2008) suggested, identifying an exhaustive list of contingencies serves as an important first step, paving the way for the further application of contingency research. Hence, there appears to be a logical fit between the theoretical lens – contingency fit – and the study of SSD. Moreover, by applying the contingency theory lens to guide our analysis, we respond to recent calls to use theory to strengthen the theoretical contributions of SLRs and add to theory development in the field of SSCM (Seuring et al., 2020). Thus, the reviewed papers

were categorised based on the forms of fit they employed (either implicitly or explicitly) to structure the analysis.

Based on the above analysis, the codes employed to categorise the papers for thematic analysis include: contingencies, response actions, performance outcomes and employed form of fit – selection, interaction, and system. All of them are gained from the contingency research framework proposed by Sousa and Voss (2008). To ensure consistency in coding the papers that use different terms, each paper was evaluated according to the definitions of the above codes. For example, papers using terms such as enablers and antecedents were categorised as papers covering the theme 'contingencies' if they discussed the impact of these factors on SSD. Sub-codes (e.g. buyer-side contingencies and the adoption of SSD practices) emerged from the papers during the reviewing process and are discussed under respective themes in Section 2.5.2.2 and Section 2.6. As an example, contingency factors affecting SSD were broken down into sub-codes according to the source: buyer side, supplier side, buyer-supplier dyad, and external. When a new code emerged, we went back and forth among relevant papers that discussed the same topic to finalise the naming and the scope of the code. Besides, the categorisation of the SSD practices into direct and indirect SSD practices was borrowed from previous SD papers (e.g. Krause et al., 2007) and SSD papers (e.g. Zhang et al., 2017). Multiple researchers were involved in determining and validating the coding process.

2.5 Overview of the Literature – Research Question 1

2.5.1 Journal distribution, sustainability scope and research method

Table 3 demonstrates that the 83 papers are distributed across 31 different journals, with 16 journals publishing two or more papers. The table also shows that SSD has received increasing attention over time. More specifically, more than one third (33 out of 83) of the papers were published in the past three years (2017-2019).

Table 3. Distribution of the papers by journal and year

Journal	Number of papers	2005-2009	2010-2014	2015-2019
Journal of Cleaner Production	12		2	10
Journal of Purchasing and Supply Management	8		2	6
International Journal of Production Economics	7		3	4
Supply Chain Management: An International Journal	6	2	1	3
International Journal of Operations and Production Management	5	1	2	2
Journal of Business Ethics	4	1		3
Journal of Supply Chain Management	4		2	2
Corporate Social Responsibility and Environmental Management	3		2	1
European Journal of Operational Research	3		1	2
International Journal of Physical Distribution and Logistics Management	3			3
Production and Operations Management	3	1		2
Benchmarking	2			2
Business Strategy and the Environment	2			2
Computers and Industrial Engineering	2			2
International Journal of Production Research	2		1	1
Journal of Environmental Management	2			2
Annals of Operations Research	1			1
Applied Economics	1			1
California Management Review	1	1		
Competition and Change	1		1	
Global Business and Economics Review	1			1
International Review of Retail, Distribution and Consumer Research	1			1
Journal of Business Logistics	1		1	
Management of Environmental Quality: An International Journal	1			1
Management Research Review	1		1	
Management Science	1			1
Politics & Society	1	1		
Production Planning and Control	1			1
Regulation and Governance	1			1
Review of International Business and Strategy	1			1
Supply Chain Forum	1		1	
Total	83	7	20	56

Meanwhile, Table 4 classifies the literature according to the (non-economic) sustainability dimension covered in each paper, i.e. environmental sustainability, social sustainability, and sustainability in general. There are 38 papers in the third category, examining sustainability in general without going into deeper discussion of environmental or social sustainability individually. For example, the evaluation criteria employed by Luzzini et al. (2015), in investigating the performance outcomes of SSD practices, are social and environmental compliance. However, no further specific measurement items are used to distinguish between compliance performance for each sustainability dimension. The research provides a general discussion of SSD without having any specific focus on either dimension.

Papers discussing the extension of CSR to suppliers also generally fall into this category as they usually consider both social and environmental issues together. Only a few papers have tried to distinguish between the management strategies for each dimension (e.g. Akman, 2015; Rogers et al., 2019), although even here this is done without further differentiating between their impact on performance outcomes.

Table 4. Sustainability scope of the retrieved papers

Sustainability scope	Definition	Number of papers	2005-2009	2010-2014	2015-2019	Sample papers
Environmental	SSD practices aimed at making suppliers more environmentally friendly	27	2	8	17	Vachon and Klassen, 2006; Ehrgott et al., 2013; Nguyen et al., 2019
Social	SSD practices aimed at making suppliers more socially responsible	18	3	3	12	Mamic, 2005; Sancha et al., 2015a; Awasthy and Hazra, 2019
Sustainability in general	SSD practices aimed at making suppliers more sustainable in general	38	2	9	27	Keating et al., 2008; Harms et al., 2013; Sancha et al., 2019

Table 5 presents a summary of the research methods employed in the reviewed papers. The sample includes 6 theoretical papers, i.e. 3 literature reviews and 3 conceptual frameworks. Of the 57 empirical papers, most adopt a single research method – either a case study (30 papers) or survey (25 papers). Vachon and Klassen (2006) and van Hoof and Thiell (2015) are the exceptions, both employing a mixed-methods approach based on a combination of case study and survey research. Meanwhile, of the analytical papers, some also incorporated an empirical element. For example, Dou et al. (2018) applied action research principles to a Decision-Making Trial and Evaluation Laboratory (DEMATEL) model by first establishing the DEMATEL model and then applying it in practice. Their research furthered understanding of how SSD affects performance outcomes. Finally, behavioural experiments were conducted by Rogers et al. (2019), focusing on individual-level decision-making processes as part of SSD implementation, which complements other studies that focused on an organisational level analysis using different research methods.

Table 5. Research method applied by the papers

			Number of papers	(Sample) Papers
Research method	Theoretical	Review	3	Gimenez and Tachizawa, 2012; Zimmer et al., 2016; Yawar and Seuring, 2017
		Conceptual framework	3	Hajmohammad and Vachon, 2016; Akhavan and Beckmann, 2017; Sauer and Seuring, 2018
	Empirical	Case study	30	Mamic, 2005; Huq et al., 2014; Liu et al., 2019
		Survey	25	Vachon and Klassen, 2006; Luzzini et al., 2015; Sancha et al., 2019
		Mixed method	2	Vachon and Klassen, 2006; van Hoof and Thiell, 2015
	Analytical	Modelling	16	Bai and Sarkis, 2010; Bai et al., 2016; Awasthy and Hazra, 2019
		Modelling + empirical	3	Akman, 2015; Thakker and Rane, 2018 ; Dou et al., 2018
	Experimental	Behavioural experiment	1	Rogers et al., 2019

The above descriptive analysis has shown that there is scope for more research on the social dimension of SSD. Future studies could also distinguish between social and environmental SSD as the two dimensions are indeed different and thus require specific approaches (Wilhelm et al., 2016). Adopting a longitudinal perspective or applying more experimental approaches is also advocated to provide new insights that would complement case study, survey and modelling work.

2.5.2 Overview of the empirical papers

2.5.2.1 Research perspective, use of theory, and research context

As shown in Table 6, most of the 57 empirical papers adopted (either explicitly or implicitly) a focus on the buyer's involvement in SSD, whereas 17 papers incorporated the supplier's perspective (either the supplier's perspective only or a multi-stakeholder perspective). An explicit discussion of other actors, e.g. NGOs and consulting companies, was found in only 4 papers. The dominant unit of analysis is the buyer-direct supplier dyad whereas only 8 papers explicitly extended this in some way to lower tier suppliers. Table 6 also summarises the theoretical lenses adopted in prior work, with 36 papers using an established theory frame to

some degree. A total of 19 different theories have been used, with 17 papers utilising multiple theories.

Table 6. Research perspective, unit of analysis, and use of theory

		Number of papers	(Sample) Papers
Research perspective	Buyer perspective only	38	Vachon and Klassen, 2006; Lepplt et al., 2013; Sancha et al., 2019
	Supplier perspective only	6	Lee and Klassen, 2008; Wu, 2017; Chen and Chen, 2019
	Multi-stakeholder perspective	13	Grimm et al., 2014; Rodríguez et al., 2016a; Liu et al., 2018
Unit of analysis	Buyer-direct supplier dyad	49	Mamic, 2005; Ehrgott et al., 2013; Liu et al., 2019
	Buyer-multi-tier supplier relationship	8	De Marchi et al., 2013; Aßländer et al., 2016; Lechler et al., 2019
Use of theory	(Natural) Resource-based view	12	Pagell et al., 2010; Kumar and Rahman, 2016; Yadlapalli et al., 2018
	(Neo-) Institutional theory	9	Blome et al., 2014; Tachizawa et al., 2015; Yawar and Kauppi, 2018
	Transaction cost economics	6	Vachon and Klassen, 2006; Huq et al., 2014 ; Sancha et al., 2019
	Relational view	4	Sancha et al., 2015a; Rodríguez et al., 2016a; Sancha et al., 2019
	Stakeholder theory	4	Pagell et al., 2010; Ehrgott et al., 2013; Kumar and Rahman, 2016
	Agency theory	4	Aßländer et al., 2016; Yadlapalli et al., 2018; Lechler et al., 2019
	Dynamic capability view	2	Foerstl et al., 2010; Reuter et al., 2010
	Resource dependence theory	2	Leppelt et al., 2013; Lo et al., 2018
	Social capital theory	2	Rodríguez et al., 2016a; Rodríguez et al. 2016b;
	Absorptive capacity theory	1	Liu et al., 2019
	Antecedent theory	1	Large et al., 2011
	Critical success factor theory	1	Grimm et al., 2014
	Contingency theory	1	Ni and Sun, 2018
	Goal setting theory	1	Busse et al., 2016
	Legitimacy theory	1	Stekelorum et al., 2018
	Network theory	1	van Hoof and Thiell, 2015
	Prospect theory	1	Chen and Chen, 2019
	Self-determination theory	1	Roehrich et al., 2017
	Stewardship theory	1	Aßländer et al., 2016

The resource-based view (RBV) and institutional theory are the most commonly adopted theories when studying SSD, appearing in 12 and 9 papers, respectively. RBV emphasises the unique organisational resources that can be leveraged to form sustainable competitive advantage (Barney, 1991). Accordingly, SSD is regarded as an approach that augments the resource base of the buyer, supplier, dyad, or supply chain, which can benefit the diffusion of sustainability along the supply chain (e.g. Ehrgott et al., 2013). Institutional theory

emphasises, for example, the substantial influence of the institutional setting on isomorphic behaviour. It has been used to explain factors that drive SSD practices in the supply chain. Of the 36 papers, 20 were published after 2015. Research studies have broadened the range of theoretical lenses used to now also include, for example, social capital theory and contingency theory (e.g. to examine the impact of SSD on performance outcomes) and both absorptive capacity theory and stewardship theory (e.g. to explore the role of suppliers).

Table 7 summarises the country and industry contexts studied in prior work. There has been a rapid increase in studies in the last 5 years that have incorporated a developing country focus, meaning the developed world no longer dominates the literature. This research shift better reflects the distribution of suppliers in global supply chains and the acute nature of sustainability problems often associated with some developing countries (Busse et al., 2016). Cross-country research, including both developing and developed countries, has also seen a recent upsurge although the majority of research conducted in developing countries thus far concentrates on a single-country context, such as China (e.g. Sancha et al., 2019) or India (e.g. Yawar and Kauppi, 2018). In terms of the industry sector, studies based on a developed country context cover a relatively broad range of sectors, including ten of the eleven main sectors listed by The Global Industry Classification Standard (Standard & Poor's and Morgan Stanley Capital International 2017), i.e. all except for the real-estate sector. The consumer discretionary sector (e.g. apparel and textiles) has gained the most attention – in both the developed and developing worlds – due, for example, to its labour-intensive nature and history of sustainability issues (Zorzini et al., 2015). Research in developing countries is thus far comparatively narrow in scope. The consumer oriented staple goods sector (e.g. food and beverages) is the second most researched industry whereas service sectors such as financials and healthcare have received only limited attention despite, for example, the widespread global outsourcing of call centres and software development.

Table 7. Country and industry context

		Developed	Developing countries	Developed &
Overall	Total	20	20	11
	2005-2009	3	1	3
	2010-2014	11	3	0
	2015-2019	6	16	8
Country setting	Single country	13	17	-
	Multiple countries	7	3	11
Industry sector setting	Consumer	11	13	4
	Materials	10	6	4
	Industrials	8	6	4
	Consumer staples	4	9	2
	Financials	4	0	0
	Information	3	6	5
	Energy	3	0	0
	Health care	2	3	2
	Utilities	2	0	0
	Communication	1	1	1

From the above it is concluded that more cross-context research is needed to investigate SSD in a global supply chain setting given that supply chains are increasingly dispersed around the world (Grimm et al., 2014). Meanwhile, studies that extend the unit of analysis to the multi-tier supply base would also help to address end-to-end sustainability issues in supply chains.

2.5.2.2 SSD practices and performance outcomes

This subsection presents a summary of SSD practices and performance outcomes, as shown in Table 8. The summary of performance outcomes is presented here as it is an element that responds to both research questions and connects them together. Most studies refer to the combined use of direct and indirect SSD practices, which supports the argument by Zimmer et al. (2016) that SSD is a continuous improvement process that is usually comprised of both evaluative and developmental initiatives which are likely to reinforce each other. Training/education is the most discussed direct SSD practice and regular evaluation and feedback is the most widely used indirect SSD practice. Other direct SSD practices such as management involvement (e.g. joint process design) and financial investment (e.g. direct asset investment) are not widely used or discussed in much detail as they require a longer term

outlook and a more deeply engaged level of involvement by both the buyer and supplier.

Table 8. Practices and performance outcome measurements

	Dimensions	Specific items	Number of papers	(Sample) Papers
Direct SSD practices	Training/ education	Technical training, training on codes of conduct, sustainability knowledge transfer workshop/courses, etc.	50	Mamic, 2005; De Marchi et al., 2013; Sancha et al., 2019
	Personnel transfer	Site visit, joint team, visit suppliers' premises, invite suppliers to buyers', etc.	25	Andersen and Skjoett-Larsen, 2009; Hoejmose et al., 2013; Yadlapalli et al., 2018
	Management involvement	Build top management commitment of supplier, formal long-term plan/contract, process/product design with supplier, etc.	10	Locke et al., 2009; Aɬan et al., 2016; Liu et al., 2018
	Financial investment	Direct financial support, asset investment, assist with obtaining loan from the bank, etc.	8	Mamic, 2005; Rodríguez et al. 2016b; Yawar and Kauppi, 2018
Indirect SSD practices	Evaluation and feedback	Corrective action plan, regular audit/evaluation with feedback, etc.	34	Mamic, 2005; Tachizawa et al., 2015; Yawar and Kauppi, 2018
	Improvement incentives	Better terms and conditions in the contract, cost-sharing, increase of business, etc.	12	Locke et al., 2009; Porteous et al., 2015; Liu et al., 2018
Performance outcome	Operational	Cost, delivery, quality, responsiveness, innovation, HR, BSR	17	Reuter et al., 2010; Blome et al., 2014; Sancha et al., 2019
	Social	Occupational health and safety, human rights, awareness	13	Locke et al., 2009; Sancha et al., 2015a; Ni and Sun, 2018
	Environmental	Energy, waste, emission, environmental reputation	11	Lee and Klassen, 2008; Yadlapalli et al., 2018; Chen and Chen, 2019
	Economic	Profit/EBIT, income, return on asset, sales	8	Perez-Aleman and Sandilands, 2008; Rodríguez et al. 2016b; Subramaniam et al., 2019
	No impact	Social – labour rights, wages & working hours, reputation Economic – return on asset, sales, resource efficiency Operational – cost, delivery, quality, responsiveness, BSR	5	Distelhorst et al., 2015; Kumar and Rahman, 2016; Yang and Fang, 2017
	Negative impact	Economic – Sales/EBIT/ financial strength Operational – Technical capabilities/ purchasing performance	3	Large and Thomsen, 2011; Ehrgott et al., 2013; Sancha et al., 2019

Of the 57 empirical papers, 35 papers discussed the performance outcomes of SSD. Research has employed a variety of performance measurement dimensions and items (see Table 8), ranging from sustainability-relevant dimensions (i.e. social, environmental and/or economic) to operational dimensions, suggesting SSD outcomes are not limited to sustainability performance improvements. Almost all of the papers reported a positive impact on either buyers or suppliers or both. For example, Subramaniam et al. (2019) found that SSD

contributes to improving suppliers' social performance and subsequently to the buyers' social, economic and operational performance. This indicated that improvements on the supplier side are good for both parties, that they may be a prerequisite for the SSD effort to fully pay off on the buyer side, and that the performance outcome of SSD is not limited to sustainability oriented dimensions only.

A few papers have reported a negative impact arising from SSD. For example, although Sancha et al. (2015a) reported a positive impact on supplier social performance, the authors reported a negative impact on buyer economic performance, measured by indicators such as sales. The use of different measurement items across studies may explain such inconsistencies or contradictions, and thus the further identification of both valid and comparable measurement items is crucial to consolidating findings across studies. Meanwhile, Locke et al. (2009) reported positive impacts on social conditions derived from improved operational efficiency, whereas in Yawar and Seuring (2018) this is derived from improved economic conditions. Such findings suggest that the connection between different performance dimensions requires further investigation.

Further, Distelhorst et al. (2015) found no improvement from suppliers participating in off-site managerial training and suggested future research should investigate the impact of other types of SSD practices. It has been acknowledged that the combined use of different SSD practices may generate better performance as SSD is a continuous improvement process that is usually comprised of both evaluative and developmental initiatives (Zimmer et al., 2016). Thus, deployment strategies can also affect the performance outcomes of SSD. In addition, the specific positive impact depends on contextual factors. For example, Ni and Sun (2018) found that the deployment strategy should match the contextual factors, such as stakeholder pressure, to reap the desired benefits. It is therefore argued here that both the various contingencies and deployment strategies can affect the performance outcomes of SSD. This is in line with the

contingency theory perspective. Thus, the following section reviews the papers using a contingency theory lens by first examining the elements of contingency theory – contingencies and response actions (i.e. deployment strategy) – and then the forms of fit employed to further our understanding of SSD.

2.6 Contingency Perspective – Research Question 2

2.6.1 The contingencies and response actions

2.6.1.1 Contingencies

Prior studies have identified a variety of contingencies, with 72 papers within the set of reviewed papers discussing at least one contingency factor that would affect the performance outcome of SSD (as shown in Table 9). Given the multi-stakeholder nature of SSD (Rodríguez et al. 2016b; Ni and Sun, 2018), contingency factors identified from the literature are categorised into buyer-side, supplier-side, buyer-supplier dyad, and external contingencies. In particular, although many organisational level contingencies are identifiable from the literature, there has been less attention on individual level contingencies (e.g. decision-making preferences and capability).

More attention has been given to contingencies external to the buyer-supplier relationship and to contingencies on the buyer side. In terms of the external contingencies, institutional pressure is a key driving force behind SSD, especially when complementary to buyers' sustainability requirements (Distelhorst et al., 2015). The characteristics of the SSD practices/process (e.g. coverage and cost) is another widely discussed factor. For example, Rashidi and Saen (2018) found that SSD is a dynamic process that requires a gradual or stepwise approach. Relatively less attention has been given to characteristics such as the market context, the complexity of the sustainability concept, or the interrelationship among several contingencies. It is common that there are multiple contingencies that affect SSD and thus

investigations into the interrelationship amongst them are needed to identify the most important contingencies for SSD that require the most attention (Grimm et al., 2018).

Table 9. Contingencies

	Types	Specific items	Number of papers	(Sample) Papers
Contingencies	External	Characteristics of SSD process/practices Institutional pressure Impact of external organisations Market context Complexity of sustainability Interrelationship among different contingencies	31	Mamic, 2005; Fu et al., 2012; Hultman and Elg, 2018
	Buyer side	Commitment to sustainability Sustainability relevant capability and knowledge Supportive resources/strategies Organisational context factors Goal of the SSD Behavioural factors	31	Locke et al., 2009; Blome et al., 2014; Awasthy and Hazra, 2019
	Supplier side	Sustainability relevant capability and knowledge Organisational context factors Commitment to sustainability Profitability Behavioural factors	24	Dou et al.,2014; Roehrich et al., 2017; Nguyen et al., 2019
	Buyer-supplier dyad	BSR Supplier integration level Characteristic of supply base Geographical/cultural distance Agency problems	23	Vachon and Klassen, 2006; Rodríguez et al. 2016b; Sancha et al., 2019

From the buyer side, commitment to sustainability is the most discussed factor, but this commitment has to be embedded throughout the entire organisation at both an organisational and individual level (Locke et al., 2009) and supported by operational level actions (Wan Ahmad et al., 2016) if it is to have a positive impact on the performance outcomes of SSD (Andersen and Skjoett-Larsen, 2009). Meanwhile, having the necessary upfront financial resources is crucial to success as SSD implementation can be costly (Bai et al., 2016) and budgets are difficult to change in the short term (Trapp and Sarkis, 2016). Some other types of contingencies are discussed more infrequently in the literature, e.g. the goal of SSD and behavioural factors. Individual-level contingencies are given little attention with only one recent paper explicitly discussing the impact of a behavioural factor – psychological distance – on the decision-maker. By taking the psychological distance, i.e. the view that events that are

spatially or temporally further away are perceived as having increasingly discounted consequences for the decision-maker, Rogers et al. (2019) surprisingly found that decision-makers care as much for the social dimension as they do for the economic dimension, but less for the environmental dimension.

From the supplier side, supplier knowledge and capabilities relevant to sustainability have been given the most attention (e.g. Dou et al.,2014), followed by organisational contextual factors such as company size and country context, which are covered in several analytical studies (e.g. Bai et al., 2016). Less attention, however, has been paid to suppliers' level of commitment towards and awareness of SSD and to sustainability in general. These factors will influence suppliers' follow-up actions after SSD as it requires a supplier to genuinely internalise what has been learned through SSD to address the sustainability challenges it faces. Also, behavioural and individual-level contingencies, such as the risk preference of suppliers, have received little attention.

A good buyer-supplier relationship (BSR) within the buyer-supplier dyad can have a positive impact on the successful implementation of SSD practices (Sancha et al., 2019), while an adversarial BSR may exert a negative impact (Lechler et al., 2019). Meanwhile, the characteristics of the supply base, such as the size of the supply base, have been considered in several studies as they can affect the goal, duration and effectiveness of SSD. For example, some recent studies have considered SSD within the context of a multi-tier supply base (e.g. Sauer and Seuring, 2018) and identified several contingencies that are important to achieving SSM (e.g. Grimm et al., 2014). However, these studies have considered contingencies from a general perspective, with the exception of Aßländer et al. (2016) who specifically investigated the agency or stewardship role of first-tier suppliers. Further, previous research (e.g. Wilhelm et al., 2016) has found that the first-tier supplier can play a 'double agency role' by meeting the sustainability requirements of the buyer themselves and diffusing the requirements to its

own suppliers within a multi-tier supply chain. It would be interesting to further examine how first-tier suppliers successfully fulfil this dual role and the challenges they face in doing so.

2.6.1.2 Response actions

Table 10 shows that the discussion of response actions is mainly in relation to SSD practices. Some papers have discussed the use of different types of SSD practices to respond to different contingencies. More specifically, direct SSD practices are mainly used to assist in developing supplier capabilities, while indirect practices are more often used to respond to institutional pressures (Zhang et al., 2017). Meanwhile, employing an analytical approach to evaluate and rank SSD practices – by taking industry, company size, and profitability factors into account – has been discussed in a few papers (e.g. Bai et al., 2016), but coverage was limited to environmental SSD practices only. This type of response action is mainly used in response to contingencies from the supplier side (e.g. supplier sustainability relevant capability and knowledge or organisational context factors). Many papers have however proposed using SSD as a tool – the adoption of SSD practices to develop suppliers in terms of their sustainability but without specifying how SSD could be deployed. For example, Ehrgott et al. (2013) studied the impact of environmental SSD but did not include any discussion regarding the deployment strategy. This action is the one that has been discussed the most and used in response to various contingencies from the buyer side, such as commitment to sustainability.

Response actions that could complement the use of SSD practices, such as tailoring the SSD process according to contingencies like the supplier country context or capability gap (e.g. Locke et al., 2009), or taking the multi-stage and dynamic nature of SSD into consideration (e.g. Hultman and Elg, 2018), localising SSD, and facilitating good BSRs (e.g. Busse et al., 2016) were less discussed. Even less attention has been given to collaboration with other organisations, which is mainly employed in response to contingencies from the external

environment (e.g. NGOs) to access capabilities and resources that could complement those of the buyer (Rodríguez et al. 2016b). Specific actions include accessing lower tiers by collaborating with first-tier suppliers (e.g. Lechler et al., 2019) and horizontal collaboration to share out the costs of SSD (e.g. Mamic, 2005). However, more research is needed to further investigate one of the big issues within such collaborations – ways of achieving goal/strategy alignment between actors in terms of sustainability and SSD (e.g. Rodríguez et al., 2016a).

Table 10. Response actions

	Types	Specific items	Number of papers	Most discussed contingencies	(Sample) Papers
Response actions	Configuration in the use of SSD practices	Differentiate between direct/indirect SSD practices Rank of SSD practices Combined use of different SSD practices	30	Supplier side contingencies (14)	Keating et al., 2008; Bai et al. 2016; Awasthy and Hazra, 2019
	Adoption of SSD practices	Deploy SSD practices without specifying details	22	Buyer side contingencies (16)	Leire and Mont, 2010; Ehrgott et al., 2013; Liu et al., 2019
	Actions taken to complement the use of SSD practices	Adjust the deployment strategy according to supplier capability/needs Dynamic perspective of the process Localization/standardization of SSD process Build good buyer-supplier relationships	14	External contingencies (9)	Mamic, 2005; Locke et al., 2009; Yawar and Seuring, 2018
	Collaboration with other organisations	Collaboration with external stakeholders Collaboration with first-tier suppliers Collaboration with business partners Horizontal collaboration with other buying firms	10	External contingencies (6)	Mamic, 2005; Rodríguez et al., 2016a; Liu et al., 2018

2.6.2 Contingency fit perspective

Although only Ni and Sun (2018) have explicitly referred to contingency theory, most of the remaining papers reviewed in this SLR do at least partly employ a contingency perspective. For example, Andersen and Skjoett-Larsen (2009) explored contingencies and the corresponding response actions but without explicitly mentioning contingency theory. From a contingency fit perspective, such research employs a selection fit approach, contributing to exploring important relationships between the context and specific actions taken in the SSD

process. Adopting a fit perspective approach to exploring SSD can contribute to theoretical advancement on the contingencies and how they influence value creation via inter-organisational interactions during SSD (Rodríguez et al., 2016a). Thus, the forms of fit employed by the papers and how this furthers our understanding of SSD are discussed next.

The selection and interaction approaches focus on how a single contingency factor affects a single response, which helps explore contingency-response pairs in a certain context. The system approach focuses on a holistic view, which is supposed to take the many contingencies, response alternatives and performance measurements and their interactions into consideration simultaneously (Sousa and Voss, 2008). Table 11 presents the three forms of fit informed by Sousa and Voss (2008) and the number of papers from this review belonging to each form, demonstrating a substantial use of the selection approach (45 papers). The use of the interaction (17 papers) and system approaches (14 papers) is considerably lower. Amongst the papers adopting the system fit approach, 4 papers adopted a partial-system fit approach while the rest of the papers (10) adopted a full-system approach.

Table 11. Employed form of fit

Form of fit	Definition	Number of papers	(Sample) Papers
Selection	Fit is a congruence between one contingency factor and one response action	45	Mamic, 2005; Fu et al., 2012; Rashidi and Saen, 2018
Interaction	Focuses on pairs of contingency-response actions and the impact on performance of each pair individually	17	Perez-Aleman and Sandilands, 2008; Distelhorst et al., 2015; Chen and Chen, 2019
System	Considers multiple contingency factors and response actions simultaneously and holistically	14	Lee and Klassen, 2008; Bai et al., 2016; Nguyen et al., 2019

2.6.2.1 Selection fit approach

Within the selection fit approach category, 29 papers explored multiple contingencies, and 16 papers examined only one pair of contingency-response relationships. Amongst them, 10 papers examined more than one contingency and their mutual interactions, showing their potential to move a step further to the full-system perspective in order to explore the impact of

pairs of contingencies on the performance outcome. For example, Sauer and Seuring (2018) examined the mutual interactions between two contingencies – suppliers' direct environment and their criticality to the buyer and responding actions accordingly – to demonstrate the need to consider these contingencies simultaneously when deciding on the appropriate response actions. They, however, did not include any discussion regarding the outcomes. Two papers (Dou et al., 2018; Grimm et al., 2018) within this category did however further examine the interrelationship amongst several contingencies and identified the most critical ones according to their relative importance. This fit approach adds to our understanding in terms of identifying contingency-response pairs, but it does not add to our understanding of how the contingencies and contingency-response pairs affect the outcome of SSD or how to make SSD more effective in a given context.

2.6.2.2 Interaction fit approach

This approach relates the contingency-response pair to the performance outcome. Most of the papers adopting this approach only examined one contingency and subsequent response action. For example, Sancha et al. (2019) found that the use of SSD practices is dependent on the level of supplier dependence, leading to different performance outcomes. In fact, this approach has been proposed to help identify the most important or critical contingency-response pairing amongst several pairs (Sousa and Voss, 2008). Some of the papers within this category have identified more than one contingency or response action, but only studied one contingency-response pair and its impact on the performance outcome. For example, Blome et al. (2014) identified several contingencies such as top management commitment that can drive SSD, but only examined the impact of the procurement strategy-use of SSD practices pair on the performance outcome. This paper, however, suggested a combined use of both selection and interaction fit to identify several different contingency-response pairs. Further, there are 2

papers that examined more than one contingency-response pairs and their respective impact on the performance outcome. For example, Zhang et al. (2017)found that the use of indirect SSD and direct SSD practices as response actions to institutional pressure and a supplier capability gap respectively, could both lead to improved performance. However, none of the papers in this category were able to detect critical contingencies or critical contingency-response pairs via comparing the performance outcomes of different pairs of contingency-response actions. Thus, there remains important scope for future research to study more than one pair of contingency-response relationships simultaneously and compare the results across different pairs to identify critical pairs that require more attention or investment.

2.6.2.3 System fit approach

The use of the system form of fit is argued to be the strongest approach as it makes the most powerful contribution to our understanding of how the outcome of SSD is affected and of how to fit different contexts by developing the response actions using the available SSD practices, complementary resources and strategies. Amongst the papers that employ the partial-system approach, Ni and Sun (2018) examined the fit between each of the two contingencies – environmental dynamism and stakeholder pressure – and the combined use of both direct and indirect SSD practices using the survey method. In doing so, they concluded that the use of both practices under high environmental dynamism or stakeholder pressure works best. Besides, studies employing a full-system approach are primarily analytical papers that focus on the environmental dimension (e.g. Bai et al., 2019) (6 out of 10, as shown in Table 12). For example, Bai and Sarkis (2010) applied rough set theory to rank different SSD practices as a deployment strategy in response to various interacted contingencies (e.g. buyer sustainability capability and knowledge, supplier size, etc.) and examined the impact of different contingency-response pairs on both the operational and economic performance at suppliers.

Such an approach was able to identify the fit between various contingencies and response actions simultaneously and the contingency-response pairs that could derive higher performance, thus informing decision-making within SSD.

Lee and Klassen (2008) and Rodríguez et al. (2016b) have presented the only empirical studies employing a full-system approach. Rodríguez et al. (2016b), for example, found that different sets of resource combinations between the focal firm and an NGO are needed to achieve different performance goals when deploying SSD initiatives. Prior research employing this approach has raised the importance of considering more than one contingency-response pair and the interactive nature of the contingencies. However, more use of the system fit approach is still needed as SSD usually consists of several stages, multiple stakeholders and various contingencies that may interact with each other to affect the response actions and performance outcomes. One interesting future research direction would be the use of the system fit approach to identify if there are any conflicting contingencies, i.e. where two or more contingencies suggest contradictory ways of using a particular type of response action, as suggested by Sousa and Voss (2008).

Table 12. Papers employing the System fit approach

Papers	Contingency – response pairs	Specific contingencies – response actions – performance outcomes	Method/Dimension/ Form
Busse et al., 2016	External/buyer-supplier dyad – Actions taken to complement the use of SSD practices	Complexity of sustainability/socio-economic /spatial/linguistic/cultural distance – Build good buyer-supplier relationships – Improved sustainability situation at suppliers	Empirical Sustainability in general System-partial
Ni and Sun, 2018	External – Configuration in the use of SSD practices	Environmental dynamism/stakeholder pressure – Combined use of different SSD practices – Improved environmental, social and economic performance at buyers	Empirical Sustainability in general System-partial
Thakker and Rane, 2018	Buyer side/external – Actions taken to complement the use of SSD practices	Commitment to sustainability/sustainability relevant capability and knowledge/supportive resources/institutional pressure/characteristics of SSD process/practices – Dynamic perspective of the process – Performance outcome on environment aspect at suppliers	Analytical Environmental System-partial
Lechler et al., 2019	Buyer-supplier dyad – Actions taken to complement the use of SSD practices/collaboration with other organisations	Goal conflict/information asymmetry – Standardisation of SSD process/horizontal collaboration with other buyers – Address agency problems/improved compliance at suppliers	Empirical Sustainability in general System-partial
Lee and Klassen, 2008	Supplier side – Configuration in the use of SSD practices	Size & commitment to sustainability & sustainability relevant capability and knowledge – Differentiate between direct/indirect SSDs – Improved environmental management capabilities at suppliers	Empirical Environmental System-full
Bai and Sarkis, 2010	Buyer side/supplier side – Configuration in the use of SSD practices	Buyer sustainability relevant capability and knowledge & supplier size & profitability &industry – Rank of SSD practices – Performance outcome on environmental and operational aspects at suppliers	Analytical Environmental System-full
Bai et al., 2010	Buyer side/supplier side – Configuration in the use of SSD practices	Buyer sustainability relevant capability & supplier size/profitability/industry – Rank of SSD practices – Performance outcome on environmental and operational aspects at suppliers	Analytical Environmental System-full
Bai et al., 2016	Buyer side/supplier side – Configuration in the use of SSD practices	Buyer sustainability relevant capability & supplier learning ability/size/profitability – Rank of SSD practices – Performance outcome on environmental and operational aspects at suppliers	Analytical Environmental System-full
Rodríguez et al. 2016b	Buyer side/buyer-supplier dyad/external – Collaboration with other organisations	Buyer sustainability relevant capability and knowledge/supportive resources & fair relationship & NGOs knowledge and bridging capability – Collaboration with external stakeholders – Improved social condition at suppliers	Empirical Social System-full
Karaer et al., 2017	Buyer-supplier dyad/external – Configuration in the use of SSD practices	The characteristic of supply base & market opportunity – Combined use of different SSDs – Performance outcome on environment aspect at suppliers	Analytical Environmental System-full
Tong et al., 2018	Buyer side/supplier side/external – Actions taken to complement the use of SSD practices/collaboration with other organisations	Behaviour factors of the buyer & supplier & impact of external organisations – Dynamic perspective of the process & collaborate with external stakeholder – Performance outcome at suppliers	Analytical Sustainability in general System-full
Awasthy and Hazra, 2019	Buyer side/supplier side – Configuration in the use of SSD practices	Sustainability relevant capability & commitment to sustainability of the buyer & supplier – Differentiate between direct/indirect SSDs – Performance outcome on social and economic aspects at buyer & suppliers	Analytical Social System-full
Bai et al., 2019	Supplier side/external – Configuration in the use of SSD practices	The characteristics of the SSD practices & supplier sustainability relevant capability and knowledge – Rank of SSD practices – performance outcome on environmental performance at suppliers	Analytical Environmental System-full
Nguyen et al., 2019	Supplier side/external – Configuration in the use of SSD practices	Sustainability relevant capability and knowledge & impact of external organisations – Differentiate between direct/indirect SSDs – Performance outcome on environmental performance at suppliers	Analytical Environmental System-full

2.7 Discussion

This section presents a summary of the research gaps identified and proposes an agenda for future research derived from addressing the two research questions above. A conceptual framework that connects the proposed research opportunities is also presented (Figure 3).

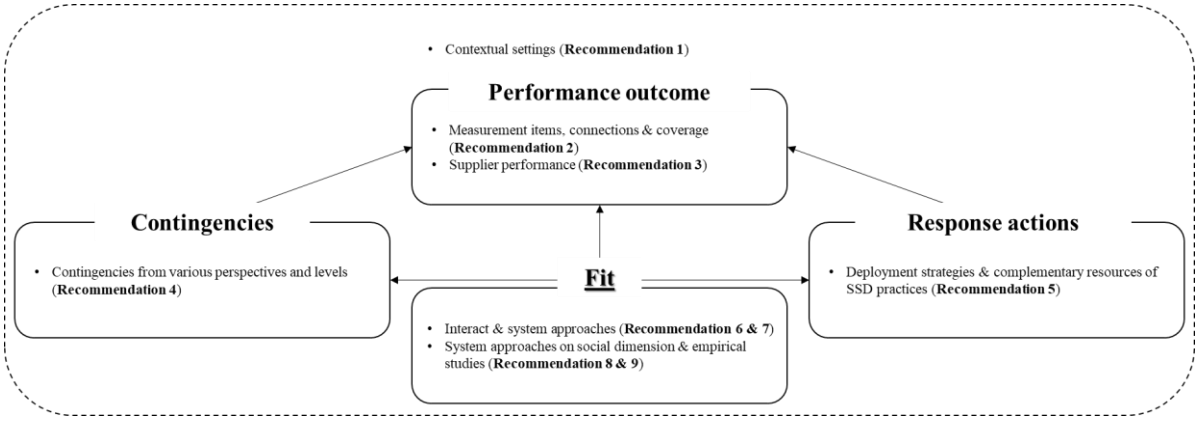

Figure 3. Conceptual framework of SSD for future research

In answering RQ1, it was found that increasing attention has been paid to the social dimension of sustainability in recent years. However, most research still tends to investigate SSD in general terms, without going into more depth on either the environmental or social dimension to distinguish between the different strategies suitable for each dimension or their impact on performance outcomes. It is important to distinguish between the social and environmental dimensions of sustainability as they require different efforts and investments (Wilhelm et al., 2016) and are also found to attract different levels of attention from decision-makers (Rogers et al., 2019). Hence, the deployment of SSD should first be contextualised according to the types of sustainability issues being addressed and the goals of SSD (Ni and Sun, 2018). Meanwhile, it is also acknowledged that the research context under study has evolved in recent years, from developed countries to developing countries and cross-country contexts. This may raise the importance of considering contextual differences and also calls for research that employs a multi-stakeholder perspective to consider the roles of suppliers and other collaborators (e.g. NGOs, local authorities, and professional agencies). Thus, future

research should go beyond the dyadic buyer-supplier relationship to consider multiple stakeholders. More specifically, incorporating upstream lower tiers beyond the first-tier supplier will help to address end-to-end sustainability issues in supply chains; and it will also help to understand how pressures exerted by downstream consumers affect decision-making, including in terms of the investments made in and the focus of SSD, at the upstream end of the supply chain (Kraft et al., 2020). Furthermore, SSD in triadic (Friedl and Wagner, 2016) or even quadratic (Meqdadi et al., 2020) relationships, consisting of traditional and non-traditional supply chain actors such as competing buyers, NGOs and social enterprises in global supply chains, requires further investigation. This indicates the following future research recommendation:

- **Research recommendation 1.** Future research on SSD should give greater consideration to specific contextual factors, including the type of sustainability issue to be addressed, the tiers of the supply chain to reach, the country context and the roles of the various stakeholders involved in global supply chains.

The results of SSD can be complex and affected by various factors. It is acknowledged that performance outcomes are not limited to the sustainability dimension and that a buyer's performance is affected by supplier improvements (Sancha et al., 2015a). As the final aim of SSD is to reduce risks and improve sustainability for the entire chain (Busse et al., 2016), it is suggested that research should continue to expand the focus from the buyer side to the supplier side as improvements on the supplier side may be a prerequisite for the SSD effort to fully pay off on the buyer side (Subramaniam et al., 2019). Meanwhile, the interrelationship amongst different dimensions of performance requires further investigation using consistent and comparable measurement items (Yawar and Seuring, 2017). In doing so, the economic and operational rationale behind certain attitudes and behaviours towards carrying out or

participating in SSD (Yawar and Seuring, 2017) can be further revealed. This will enable a better understanding of participants' motivations, attitudes and behaviours towards implementing and being involved in SSD. Thus, we recommend researchers consider the following in future research on SSD:

- **Research recommendation 2.** When measuring the performance outcomes of SSD, it is important to consider specific improvements, such as relating to the different dimensions of sustainability, broader improvements that can be expected by supply chain members, as well as the interconnections between different improvement aspects.
- **Research recommendation 3.** Future research should consider examining the performance outcomes of SSD for the supply side first, as supplier improvements are considered a prerequisite for ensuring the SSD effort fully pays off on the buyer side.

In addressing RQ2, the remaining two elements of the contingency fit perspective – contingencies and response actions – were first examined. It has been found that the literature provides an exhaustive list of contingencies. However, less attention has been paid to the supply side, especially suppliers' commitment to sustainability, which has been identified as a critical contingency (Dou et al., 2018) that affects performance outcomes. In fact, commitment from first-tier suppliers was found to significantly influence sustainability performance improvements in multi-tier supply chains (Aßländer et al., 2016). Factors that will affect collaboration with first-tier suppliers and with other intermediaries in extending SSD further up the supply chain also requires investigation. For example, leadership style – an indicator of the top management commitment of the focal firm – is worthy of further investigation as this may affect the level of support provided by the focal firm in the multi-tier SSD process (Dou et al., 2018). Besides, almost all contingencies identified are at the organisational level, with very limited attention having been given to the role of individual-level contingencies. SSD

includes interactions between individuals in the participating organisations (e.g. audit personnel, sustainability managers, etc.), meaning that these individuals' perceptions, judgments, and preferences will significantly affect SSD (Rogers et al., 2019). It is thus necessary to take contingencies such as individual motivation, commitment, and relational resources into consideration. In addition, factors from the end-consumer side are also worthy of further exploration as recent SSCM research (e.g. Kraft et al., 2020) has revealed that consumer demand and consumer consciousness of sustainability affect whether buyers/focal firms support or invest in the supply base.

In terms of the response actions, the use of either direct and/or indirect SSD practices was mostly proposed in response to various contingencies. Specific deployment actions and necessary adjustments regarding the implementation of different SSD practices (e.g. tailoring them according to the supplier capability gap), and the development of a portfolio of diversified SSD practices and tools, require further investigation. Besides, collaboration with other actors that are situated beyond the dyadic buyer-supplier relationship has been less discussed. Thus, response actions and adjustments regarding collaborating with multiple actors both internal and external to the supply chain in a triadic or quadric relationship is also worthy of further investigation as successful SSD requires aligned goals, values, and routines between multiple actors (Rodríguez et al., 2016a). For example, SSD practices adopted and deployed by the buyer interact with any assistance received from a third-party, jointly affecting the improvements at the supplier side (Nguyen et al., 2019). In addition, horizontal collaboration with other buyers (Friedl and Wagner, 2016) in sharing supplier development investments and collaboration with NGOs or other business partners to address tensions between social and commercial goals (Meqdadi et al., 2020) also represent promising future research directions in the context of SSD. Thus, we propose the following recommendations for future research:

- **Research recommendation 4**. It is important to consider and further examine the impact of contingencies on SSD, both from the upstream supplier side/perspective and the downstream consumer side. Individual level contingencies and how they interact with organisational level contingencies should also be given more attention.
- **Research recommendation 5**. More research is needed to investigate the buyers' portfolios of SSD practices and the tools they use across different settings in responding to the various goals of SSD. Further exploration into collaboration with the multiple actors involved in different SSD projects is also needed.

Further, SSD is a complex process involving multiple actors and stages that requires a holistic approach to be adopted (Liu et al., 2018). It is found that more than half of the papers employed the selection form of fit, which does not include an analysis of performance outcomes. This is deemed a reductionist approach (Sousa and Voss, 2008) that breaks SSD down into its constituent parts, arguably oversimplifying the inter-related nature of different aspects of SSD. Non-reductionist approaches for examining all aspects of SSD are advocated, and thus the use of interaction and system approaches are proposed to further advance our understanding of SSD and its effectiveness. Such approaches provide a more genuine and system oriented perspective instead of examining each aspect independently. Future research would benefit from explicitly employing the contingency theory perspective, instead of an enabling or impeding perspective, to investigate contingencies, response actions, and how they fit. For example, Sancha et al. (2019) examined the performance outcomes of different types of SSD practices before concluding that direct SSD practices are needed to successfully extend sustainability up the supply chain. Moreover, SSD projects usually require substantial investments and resources from the buying firm meaning a thorough analysis of the performance outcomes is important when making decisions about the SSD process (Bai et al.,

2016). Besides, SSD involves knowledge transfer processes, with all participants learning from (and interacting with) each other through participating in SSD (Liu et al., 2018). Interactions evolve and take place between different actors over time (Hultman and Elg, 2018). For example, there can be multiple rounds of decision making in the SSD process where regulatory inspections by a local authority interact with the assistance provided by the buyer, affecting the decisions of the buyer (Tong et al., 2018). In addition, upfront investments in SSD usually take time to pay off, thus requiring a multiple-stage perspective to be adopted in order to capture the decision dynamics (Nguyen et al., 2019). Thus, the adaptive and dynamic nature of SSD should also be taken into consideration. It, therefore, becomes important that research frameworks and SSD practices also evolve. Thus, we propose the following research recommendations:

- **Research recommendation 6.** All aspects of SSD, including the contingencies, response actions and performance outcomes, and their interrelationships should be considered when investigating SSD and its effectiveness.
- **Research recommendation 7.** More use of the interaction and system fit perspectives is needed in research to capture the complex, dynamic and evolving nature of SSD.

Papers employing an interaction approach have mainly examined the impact of a single contingency-response pairing and the corresponding performance outcome while multiple inter-related contingency-response pairs exist in SSD. Prior research (Grimm et al., 2018) has shown that the multiple contingencies in SSD are inter-related and that they have different degrees of influencing power. Research however has adopted a select fit approach, which does not consider the performance outcome. Therefore, more research is needed to take multiple pairs into consideration, to determine if any pairing appears to be the most critical one in a given context, and if there are any conflicting contingencies, i.e. where two or more

contingencies suggest a conflicting way of using a particular type of response action. More specifically, if a certain contingency-response action coupling is found to be critical and contributes greatly to achieving a favourable outcome, then resources should be allocated in this direction (Sousa and Voss, 2008). Papers employing a system fit approach contribute to identifying effective actions in response to various contingencies. For example, Ni and Sun (2018) found that the combined use of different types of SSD practices leads to better performance in a high stakeholder pressure situation. However, a large proportion of prior studies (e.g. Bai et al., 2019) adopted an analytical approach to evaluating different pairs of contingency-response action relationships in terms of environmental sustainability only. More research is thus needed to expand the focus to the social dimension of sustainability or investigate both dimensions simultaneously. Meanwhile, empirical studies may add richness, further explaining the fit identified by analytical papers. The above analysis thus indicates the following recommendations for research:

- **Research recommendation 8**. Multiple contingency-response pairs should be taken into consideration simultaneously as such use of the contingency fit perspective could identify either multiple ways of achieving fit or critical contingency-response action pairs, thereby informing decision-making surrounding SSD.
- **Research recommendation 9**. More use of the system fit perspective is needed in SSD to address social sustainability issues. Moreover, more empirical data could contribute to further understanding the fit identified among different contingency-response pairs.

2.8 Conclusions

This paper set out to review the literature on SSD. The systematic approach we followed provided a transparent and replicable platform for our subsequent analysis and classification using the contingency theory lens. The paper complements prior reviews from Table 1 by

providing in-depth coverage of all aspects of SSD. In response to RQ1, we find that SSD has received increasing attention over time but that there is scope to further investigate many specific contextual factors, such as the sustainability issues to be addressed, the country context and the involvement of other stakeholders. It is also important to further investigate the specific items used to measure performance outcomes from SSD. In response to RQ2, analysis regarding the two elements of the contingency perspective – contingencies and response actions – shows that more attention needs to be paid to contingencies from the supplier or the buyer-supplier dyad perspective, and that more research is needed to further unpack the response actions. Besides, by reviewing the papers using the contingency fit framework, it is suggested that future research should make more use of the interaction and system approaches to capture the complex, dynamic and evolving nature of SSD.

This paper makes three main contributions to the literature. First, it is the only SLR specifically on SSD that investigates all aspects of SSD, and thus complements other relevant SLRs with a holistic perspective to present the state-of-the-art in this field. Second, it applies the contingency theory lens to shed light on how the performance outcomes of SSD can be impacted by contingency factors, response actions and the fit between the two. It has identified a promising theory lens – the contingency fit perspective – for studying the complex and dynamic SSD process, which goes beyond many prior SSD studies that have focused on contingency factors only without considering the corresponding response actions and their impact on performance outcomes. In doing so, the paper also responds to calls to generate a comprehensive list of contingencies within a given field of research to establish a foundation for further research that identifies critical contingencies that explain the greatest variance in performance (Sousa and Voss, 2008). Third, it provides a framework for future SSD research and has proposed various promising avenues for further study.

The paper also offers three key managerial implications. First, it shows that it is necessary to establish a comprehensive performance measurement framework that can fully capture the benefits derived from SSD. Second, it reminds managers that the deployment of SSD projects requires a holistic and adaptive view, which considers the various contingencies, especially from the supplier side, and the deployment strategies that could fit those contingencies to attain better performance. For example, when initiating a training session for suppliers in another country, it may be useful to consult local professional agencies and customise the training to fit local sustainability requirements and supplier needs. Third, the paper has highlighted the importance of identifying critical contingencies of SSD, which informs managerial decision-making in terms of how best to invest resources to support SSD.

Finally, it is important to acknowledge the limitations in our work. Although we sought to be inclusive in our approach to searching, evaluating and selecting papers, it is possible that our search criteria limited the breadth of our sample, thereby leading to some omissions. We did however attempt to overcome this by augmenting our database organically and cross-checking our set of papers against those from prior literature reviews.

Chapter 3 – Paper II: The Boundary-Spanning Role of First-Tier Suppliers in Sustainability-oriented Supplier Development Initiatives

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3.1 Background to Paper II

The preliminary findings from the systematic literature review (Paper I) indicated that there was a need to conduct further research on the implementation of SSD projects in multi-tier supply chains. In particular, relatively few papers have investigated the intermediary role of first-tier suppliers. A case study protocol was thus developed prior to conducting this piece of empirical research (see Appendix 1). While working on the first paper in September 2019, I had the opportunity to research the SSD projects implemented by Western fast-fashion brands with their suppliers based in China. I therefore went back to China to collect data for this paper. Due to the residency at a consultancy firm, i.e. the external knowledge provider of this paper, I managed to collect multiple sources of data, including interviews, observation notes, and documentary data.

It is worth noting that two theories, i.e. the boundary-spanning theory and the social capital theory, are applied in this paper to provide insights into how first-tier suppliers fulfil their role in extending SSD up to second-tier suppliers. More specifically, the unique position of the first-tier supplier who sits at the boundary of the upstream dyad consisting of first-tier supplier and second-tier supplier, and the downstream dyad consisting of first-tier supplier and the focal firm allows the first-tier supplier to work as a boundary-spanner in the multi-tier SSD project. In addition, sustainability-related practices can be heavily affected by the social capital between members within the network relationship (Zhu and Lai, 2019). Social capital theory, together with the boundary-spanning theory, were thus applied in this paper to guide the research design and enhance the contributions.

An early version of this paper was accepted by the 27th European Operations Management Association (EurOMA) Conference held by the University of Warwick, UK in June 2020 (online) under the title of "Sustainability-oriented supplier development: a social capital perspective". Meanwhile, in the format of a key part of the entire PhD project, it was presented at the Doctoral Seminar of the 27th EurOMA conference, where helpful comments and suggestions were received from the faculty and peer PhD students. The feedback helped with the elaboration of the social capital theory, the clarification of the methodology, and the development of the theoretical and practical contributions.

This paper now has been accepted by the *International Journal of Operations & Production Management* (IJOPM), which is a 4-star journal in the ABS list. It was initially submitted to the journal in December 2020 and finally accepted in September 2021 after three rounds of revision. The focus of this paper was refined based on the feedback from the reviewers. For example, discussion around the role of the external knowledge provider was removed following reviewer's suggestion to keep the focus of the paper on the role of first-tier suppliers. Meanwhile, comments and suggestions from the three rounds of revision helped with

further clarifying the categorisation of the two types of boundary-spanning actions and the measurement of the social capital, and developing the final conceptual framework to theorise the findings.

Both the conference version and the published version were written in collaboration with my supervisors: Professor Linda Hendry and Professor Mark Stevenson. As the first author, I have done the majority of the work on this paper, which can be counted as 80% of the total work, while my co-authors have contributed the remaining 20%. I initiated the main ideas, conducted the literature review, and travelled to China to be based in the consultancy firm for three months to collect the data. I also did the transcription and data analysis, and wrote the first full draft of the paper. My co-authors supported me through every step along the way, including providing suggestions and insights, and refining the arguments before each submission. In particular, it is because of their encouragement that I decided to aim high to go for IJOPM, and to successfully navigate through the subsequent tough revision process. My co-authors have certified below that they agree with my above claim as to my contribution in carrying out this piece of research and preparing the paper for publication.

Professor Linda Hendry

Date: 9th February 2022

Professor Mark Stevenson

Date: 9th February 2022

3.2 Structured Abstract

Purpose: To study how first-tier suppliers (FTs) operate as boundary-spanners between the focal firm and second-tier suppliers (STs) in extending sustainability-oriented supplier development (SSD) initiatives up the supply chain.

Design/methodology/approach: An exploratory multi-case study approach in the apparel industry is adopted, comprised of four cases focused on occupational health and safety (OHS) issues. The paper uses primary semi-structured interviews and observation data and secondary documents; and it is informed by boundary-spanning and social capital theory.

Findings: The influence of downstream social capital on the upstream boundary-spanning actions of FTs is highlighted. More specifically, it is found that the cognitive and relational capital that exists in the downstream relationship between a FT and the focal firm affects whether the FT adopts compliance-oriented or improvement-oriented boundary-spanning actions in their upstream relationships with STs. Particularly important aspects of cognitive and relational capital are highlighted while the phenomenon of FTs adding their own personal interpretation to sustainability requirements when fulfilling their boundary-spanning role is identified.

Research implications: A distinction is made between compliance-oriented and improvement-oriented boundary spanning actions. A deeper insight into the boundary-spanning role of FTs in extending SSD initiatives up the supply chain to STs is provided along with a deeper understanding of how this role is impacted by social capital.

Practical implications: Focal firms should seek to build adequate cognitive and relational capital with their FTs before deploying SSD initiatives in order to extend their reach further upstream in the supply chain. In doing so, it is also important to be cognisant of the social capital that exists between FTs and STs.

Originality/value: The paper contributes to the SSD literature by going beyond the buyer-FT

dyad to examine the FT's boundary-spanning role in the wider buyer-FT-ST chain relationship. The study theoretically and empirically draws out the importance of relation-specific assets through the social capital lens.

Keywords: Sustainability-oriented supplier development; multi-tier supply chains; boundary spanning; social capital theory.

Paper type: Research paper

3.3 Introduction

Focal firms are facing increasing pressure from external stakeholders, including non-governmental organisations (NGOs) and regulatory bodies, to enhance the sustainability of their supply chains (Grimm et al., 2014). Consequently, many have proactively undertaken sustainability-oriented supplier development (SSD) initiatives. These initiatives expand the focus of traditional supplier development – aimed at improving economic and operational performance – to incorporate the goal of improving supplier social and/or environmental performance (Busse et al., 2016; Liu et al., 2018). It has been argued that SSD can enhance the entire chain, as supply chains that integrate social and environmental resources are more difficult to replicate, providing a competitive advantage of benefit to all firms (Carter and Rogers, 2008).

Achieving a truly sustainable supply chain, where SSD initiatives cascade to lower-tier suppliers, remains very challenging (Wilhelm et al., 2016; Villena and Gioia, 2020). Indeed, complex supply networks, characterised by an absence of direct control (Tachizawa and Wong, 2014), a lack of information transparency, and limited public scrutiny (Mena and Schoenherr, 2020; Villena and Gioia, 2020) make it difficult for focal firms to directly access lower-tier suppliers where the most serious sustainability violations often occur (Sauer and Seuring, 2018; Soundararajan and Brammer, 2018). Yet external stakeholders frequently hold focal firms responsible for any sustainability issues along their supply chains (Grimm et al., 2014). For example, big brands such as Nike have suffered huge reputational losses due to non-adherence detected in their lower-tier suppliers (Grimm et al., 2014; Villena and Gioia, 2020). These reputational losses have occurred despite Nike claiming to have undertaken substantial efforts to enhance suppliers and support their development (Nike, 2020).

In general, three main options have been discussed and applied to manage the sustainability of multi-tier supply chains, i.e. direct control, relying on first-tier suppliers, and

working with a third party (Tachizawa and Wong, 2014). Given the difficulties associated with directly engaging with lower-tier suppliers, focal firms may be more likely to recruit first-tier suppliers (FTs) and third parties, both of which can play an intermediary role in working directly with the lower tiers (Grimm et al., 2014; Soundararajan and Brammer, 2018). Indeed, recent research has highlighted the importance of FTs for disseminating sustainability requirements upstream. For example, Wilhelm et al. (2016) identified contingency factors affecting whether FTs engage in undertaking this so-called boundary-spanning role, including the focal firm's use of power. In this role, FTs act as the disseminator and monitor of sustainability standards whilst also acting as the assimilator of knowledge, thereby providing assistance to lower-tier suppliers. Such a role has been found to be dependent on how FTs interpret sustainability requirements and take actions, but the antecedents explaining how FTs configure their role remain under-explored (Soundararajan and Brammer, 2018).

Disseminating sustainability is partly voluntary in nature, making it reliant on the presence of social capital – an important relation-specific asset derived from network relationships that consists of three dimensions: structural, cognitive and relational capital (Nahapiet and Ghoshal, 1998; Zhu and Lai, 2019). As an example, relational capital, such as in the form of trust between the focal firm and its FTs, has been found to play a particularly crucial role in achieving successful multi-tier supplier management in terms of sustainability (Grimm et al., 2014). Furthermore, social capital can influence value creation by affecting the accessibility, anticipation, motivation and exploitation capability of knowledge transfer (Nahapiet and Ghoshal, 1998). It is argued here that the social capital between the focal firm and first tier may affect the way in which FTs fulfil their boundary-spanning role in extending SSD initiatives up the chain. This however requires empirical investigation; hence, this research seeks to address the following question:

- **RQ:** How does the social capital that exists between a first-tier supplier and a downstream, focal firm affect the way in which the first-tier supplier fulfils its boundary-spanning role in disseminating SSD initiatives to upstream, second-tier suppliers?

To address this research question, we adopt a case study approach in the context of a social SSD project focused on Occupational Health and Safety (OHS) issues, as deployed by one focal firm in the apparel industry with its FTs and second-tier suppliers (STs). Social misconduct remains largely invisible, and some suppliers are known to have undertaken superficial actions to 'mock comply' with strict auditing and certification requirements (Huq and Stevenson, 2020). Such a situation makes it especially important to investigate how lower tiers can be successfully engaged in SSD. The main contribution of this research is in drawing out the impact of social capital on refining and substantiating the boundary-spanning role of FTs related to SSD. The findings inform decision-makers in focal firms about the importance of building adequate cognitive and relational capital with FTs in order to reap the full benefits of SSD initiatives.

The remainder of this manuscript is organised as follows. The theoretical background is provided in Section 3.4 before Section 3.5 outlines the research method. Section 3.6 provides a detailed description of the empirical findings, followed by a discussion in Section 3.7. Finally, conclusions, implications and future research directions are outlined in Section 3.8.

3.4 Theoretical Background

The theoretical background is organised into three subsections. SSD is first defined, followed by a summary of key constructs from the boundary-spanning literature and their application in the context of SSD. The final subsection defines social capital and outlines its relevance to SSD.

3.4.1 Sustainability-oriented supplier development (SSD)

Supplier development (SD) initiatives in general refer to efforts made by the focal firm that go beyond the explicit buyer-supplier contract to enhance a supplier's capability to accrue performance benefits, such as reduced costs and improved quality (Krause et al., 2007). They are typically divided into direct and indirect SD initiatives based on the involvement level of the focal firm, the extent of their investment, and the goal of the SSD initiative (Zhang et al., 2017). Direct initiatives are considered better for improving suppliers' capabilities and include practices such as training and on-site consultations; whilst indirect initiatives are widely applied to ensure basic compliance, including providing improvement incentives and conducting audits (Krause et al., 2007; Zhang et al., 2017). The extant literature specifically on SSD has extensively examined the managerial practices employed to develop FTs and the associated outcomes of these practices (Rogers et al., 2019); but most of this work has been from the focal firm perspective.

In the context of multi-tier SSD initiatives, the focal firm is often dependent on FTs in extending SSD initiatives up the supply chain using their direct contractual relationships with both the focal firm and STs (Grimm et al., 2014). Focal firms provide assistance to this endeavour by developing the FTs' ability to assume responsibility for developing STs through SSD initiatives (Busse et al., 2016; Mena and Schoenherr, 2020). However, no prior research has looked closely at how and why FTs take on this responsibility. We will unpack this further using boundary-spanning and social capital theory literature, as introduced below.

3.4.2 Boundary-spanning role in the context of SSD

Boundary theory argues that "a central task of organisations is to manage their boundaries with other organisations that supply critical resource inputs or are responsible for the disposal of their outputs" (Zhang et al., 2011, p. 319). Boundary-spanning includes both individual and

organisational level actions, where individual actors play an important role in maintaining micro-macro linkages (Schotter et al., 2017). Different boundary-spanners that are assigned boundary-spanning work sit on the boundary of an organisation, supporting organisational functions and maintaining effective links with elements of the environment, e.g. with business partners (Aldrich and Herker, 1977). In the context of a buyer-supplier exchange, purchasing agents or departments from the focal firm, for example, are responsible for interactions and coordination with salespersons or the sales department from the supplier firm to support the purchasing strategy and maintain the exchange relationship (Zhang et al., 2011).

The boundary-spanning role can also be carried out by individuals or groups who are not officially assigned this responsibility (Schotter et al., 2017). For example, in the context of multi-tier supply chains, sustainability staff or the sustainability departments from the FTs not only fulfil the requirements of the focal firm but also take on the responsibility of diffusing those requirements to STs (Wilhelm et al., 2016). Therefore, FTs, as non-traditional boundary-spanners that are independent of the organisation they both represent (focal firm) and target (ST), assume responsibility for carrying out boundary-spanning actions by exploiting their unique position of being at the boundaries of both the upstream and downstream dyads.

Boundary-spanning specifically regarding sustainability in a multi-tier supply chain context can be challenging. First, it requires goal alignment between the purchasing and sustainability functions in the focal firm; otherwise, FTs may disengage from the boundary-spanning role (Wilhelm et al., 2016). Second, as an independent organisation, sustainability staff from FTs have been found to interpret the sustainability requirements of the focal firm in a positive or negative way, leading to either supportive or unsupportive boundary-spanning actions, respectively (Soundararajan and Brammer, 2018). More specifically, some FTs interpret the requirements as an opportunity to improve STs' capabilities and therefore engage in supportive procedures, such as constructive dialogue and knowledge sharing events; but

others adopt a threatened, defensive attitude and engage in more limited dialogue and knowledge sharing (Soundararajan and Brammer, 2018). Soundararajan and Brammer's (2018) research presented the dichotomy between adopting a positive or negative boundary-spanning role when diffusing sustainability requirements up the supply chain. Further, the authors suggested that future research should examine how this role varies across different contexts as this may result in the focal firm imposing their requirements in different ways.

Specifically in the context of SSD, where the goal can be either to pursue improvement or achieve compliance (Zhang et al., 2017), technical assistance and knowledge sharing from the focal firm have been found to positively affect the behaviour of FTs and the actions they take (Mena and Schoenherr, 2020). Therefore, it is argued that the boundary-spanning role of FTs can be organised into two categories, i.e. compliance-oriented and improvement-oriented. The compliance-oriented boundary-spanning role is associated with actions such as sharing information with STs that is exclusively relevant to the audit (Grimm et al., 2014; Zhang et al., 2017) in order to achieve compliance with local and/or international requirements. In contrast, the improvement-oriented boundary-spanning role aims to go beyond compliance to pursue further improvements, and hence this includes actions such as dedicated training and consultancy sessions, and joint actions intended to achieve the improvement goals set out by SSD (Busse et al., 2016; Zhang et al., 2017; Soundararajan and Brammer, 2018). We reason that such a categorisation better fits the SSD context than a straightforward positive *versus* negative distinction (Soundararajan and Brammer, 2018). This is because compliance-oriented actions imply a certain degree of dialogue and knowledge sharing – even if this is only relevant to achieving compliance – and thus they too can make a *positive* contribution (towards meeting audit requirements).

3.4.3 Social capital theory and its relevance to SSD

SSD provides a platform for knowledge transfer and diffusion to occur, enabling FTs to acquire new knowledge and leverage it to improve sustainability within their firms and suppliers (Villena and Gioia, 2020). Prior research has shown that social capital can influence how suppliers practice sustainability in buyer-supplier relationship networks (Zhu and Lai, 2019; Alghababsheh and Gallear, 2020). Thus, in the context of multi-tier SSD initiatives, the way in which FTs leverage the knowledge gained via SSD to practice boundary-spanning actions towards STs may depend on the social capital built in their relationship with the focal firm.

Social capital, in general, can be further divided into three distinct dimensions – structural, cognitive, and relational capital – that differ from each other in terms of how they affect knowledge transfer and development (Nahapiet and Ghoshal, 1998). First, structural capital is generated from the ties between members within a network. Second, cognitive capital, including shared language and codes, and shared values and goals, provides shared representation, interpretation and systems of meaning among parties. Third, relational capital is concerned with the resources derived from personal relationships formed through past interactions, which usually includes norms, trust and reciprocity, and identification (Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005; Krause et al., 2007). Definitions of the different aspects of each social capital dimension are provided in Table 13. All three dimensions can contribute to providing accessibility to, and clarifying the purpose of, knowledge transfer; however, the motivation to leverage knowledge is determined exclusively by relational capital, and the ability to exploit knowledge is derived from cognitive capital (Nahapiet and Ghoshal, 1998).

Table 13. Definition of social capital aspects

Social capital dimensions	Social capital aspects	Definition (Nahapiet and Ghoshal, 1998; Inkpen and Tsang, 2005; Krause et al., 2007)
Structural capital	Network tie	The fundamental aspect of social capital that deals with the specific ways in which network members are related.
Cognitive capital	Shared language and codes	A conduit to exchange, preserve and combine sets of meaning through shared vocabulary and terminology.
	Shared values and goals	When members within a network have similar perceptions of how they should interact with one another.
Relational capital	Norms	The degree of consensus within a network.
	Trust and reciprocity	Belief in the good intentions and concerns of exchange partners and a commitment or duty to undertake some activity in the future.
	Identification	The process whereby members take the values or standards of other members or groups as a comparative frame of reference.

In general, social capital plays a critical role in supply chain management (Zhang et al., 2017), and social capital theory has been increasingly applied in supplier development research (e.g. Krause et al., 2007; Preston et al., 2017; Alghababsheh and Gallear, 2020). Prior research has attempted to distinguish between the three dimensions of social capital and their relative power, with relational capital being found to have a more substantial impact than the other two dimensions, especially when the buyer-supplier dyad is pursuing strategic goals (e.g. Villena et al., 2011). Meanwhile, Preston et al. (2017) found that suppliers with a stronger ability to exploit the knowledge transferred upstream can gain greater benefits. Further, recent research in the field of sustainable supply chain management has found that social capital affects the sustainability practice and performance at the supplier side (Zhu and Lai, 2019). No prior research, however, has examined how social capital within the buyer-supplier dyad affects the knowledge transfer that takes place during SSD. Thus, this research aims to explore this phenomenon by studying how social capital within the buyer-FT dyad affects the upstream boundary-spanning work of FTs in the context of SSD.

3.5 Research Method

The nascent state of the literature on the boundary-spanning role of FTs in SSD calls for an exploratory study. We thus develop and elaborate on the limited available literature using case

study research. Case research is especially suitable as it allows for a thorough examination of complex, real-life issues with little prior empirical evidence, potentially leading to new, in-depth insights (Barratt et al., 2011; Huq and Stevenson, 2020). Further, the case study method enables researchers to collect rich data from multiple sources, such as interviews, observations and documents to support triangulation (Barratt et al., 2011). We have adopted a multi-case study design, made up of four cases, allowing for depth but also breadth of exploration to achieve our aim of theory development and elaboration following abductive reasoning (Ketokivi and Choi, 2014; Voss et al., 2016). Four measures of research quality from Yin (2018) were applied to the research design, as summarised in Table 14 and used in case study exemplars from the SSD literature (e.g. Rodríguez et al., 2016b).

Table 14. Indicators of research quality of Paper II: Validity and reliability

Criteria	Research phase			
	Design	Case selection	Data collection	Data analysis
Construct validity (*suitable measures for the concepts being studied*)	- Interview questions derived from previous research on SSD - Participate in the entire SSD project to access multiple sources of data	- N/A	- Multiple sources of information: interviews, observation notes and documentary data - Participation in the training sessions and on-site consultations, and observing the interactions between the actors	- Triangulate data from multiple sources - Data coding in an abductive way to allow for emerging topics - Case study report validated by informants to avoid researchers' bias
Internal validity (*causal relationships between variables and results*)	- Develop a framework based on well-established boundary-spanning and social capital literature	- N/A	- Choose the most knowledgeable informants as interviewees from multiple actors - Interviews fully transcribed and sent to interviewees for checking - Observation and diary notes focus on the actions of, and the relationship resources between, actors	- Record alternative explanations - Enfold results into the boundary-spanning, social capital and SSD literature - Go back and forth between the data and the literature to avoid researcher bias
External validity (*generalizability of the findings*)	- Select a highly relevant industry with major social sustainability risks - Multiple case study design	- Literal sampling using replication logic	- Clearly describe the case context and situation - Conduct interviews with key informants - Keep written notes of the interactions between, and actions taken by, the actors	- Pattern-matching for analytical generalisation to the boundary-spanning, social capital and SSD literature
Reliability (*replicability of the research design and results*)	- Develop a case study protocol and database	- Record case selection criteria - Specify the sources of data to be collected	- Develop a semi-structured interview schedule, and record all interviews - Keep a written record of the observation notes and the documents reviewed	- Discussion of all interim results between all researchers, including those who did not collect the data - Keep a record of the coding process in NVivo

3.5.1 Research context and case selection

We have focused on the apparel industry, with a particular interest in FTs operating in China. As a labour-intensive industry, the apparel industry has been under prolonged global scrutiny for its sustainability performance (Huq and Stevenson, 2020). Meanwhile, China holds a leading position regarding the production and exportation of apparel, accounting for 30.8% of world apparel exports in 2019 (World Trade Organization, 2020). Yet, non-adherence to sustainability requirements, including excessive overtime, has been repeatedly detected in

Chinese suppliers (Villena and Gioia, 2020), prompting several Western buyers to launch SSD projects across multiple tiers of their supply chains in China (Nike, 2020). We decided to explore the Occupational Health and Safety (OHS) issue as it remains a major social sustainability concern, as highlighted by tragic events such as the Rana Plaza collapse, which has not been sufficiently addressed despite ever-stricter audits (Alghababsheh and Gallear, 2020). In addition, big brands such as Nike have identified OHS issues as one of their top two priority issues to address in the coming years (Nike 2020). It therefore follows that the apparel industry in China provides a rich research setting for conducting empirical research on SSD that is focused on OHS issues.

We grounded our study in an SSD project initiated by a multinational apparel brand (A1) for its suppliers based in China as an important part of the brand's entire SSD agenda. The project included a concentrated two-day training session on OHS issues plus a follow-up on-site consultation for the second-tier suppliers that sought to evaluate whether mandated improvements had been accomplished following the training. The project was chosen because: 1) it was meant to improve suppliers' capabilities in managing OHS issues by providing them with relevant knowledge in a systematic way and with necessary support afterwards, 2) it was deployed by A1 in collaboration with an external knowledge provider (T1) that has expertise in sustainability knowledge and the deployment of SSD projects, and 3) one of the researchers was based in T1 for six weeks covering before, during and after the project, building trust with staff from T1 and A1 thereby providing the research team with access to this project and opportunities to observe every event.

The case is defined as the boundary-spanning role of FTs in a bid to elaborate our understanding of how FTs practice their boundary-spanning role and how this role is affected by the social capital that exists in the FT-A1 relationship network. Heeding Ketokivi and Choi's (2014) duality criterion of being situationally grounded but at the same time seeking a sense of

generality, we selected different cases from the same SSD project context. This choice provided us with the opportunity to observe the contextual idiosyncrasies in this specific context, to ensure consistency and to reduce extraneous variation under the guidance of the theoretical constructs from social capital and boundary-spanning theory (Eisenhardt, 1989; Ketokivi and Choi, 2014). A sense of generality was established by incorporating newly emerged concepts, i.e. empirical elaborations, to achieve theory elaboration via abductive reasoning (Ketokivi and Choi, 2014).

We developed a list of potential FTs based on the information provided by A1 and T1 following literal replication logic in order to provide similar and complementary findings (Voss et al., 2016; Yin, 2018). This helps in constructing a whole picture of an under-explored phenomenon, i.e. the boundary-spanning role of FTs. More specifically, we selected FTs that met the following criteria: 1) the FT has been delegated the responsibility from A1 to manage and ensure the compliance of STs, and there is no direct governance from A1 of the STs, 2) the FT is a critical supplier to A1 and has been doing business with A1 for more than five years, and 3) the representatives from both the FT and its STs who attended the SSD project are dedicated staff managing OHS issues within their organisation on a daily basis.

We ultimately secured the acceptance of four FTs (FT1 to FT4) that both proactively participated in the SSD project and were willing to share their insights, leading to four cases. Four cases is within the suggested range of cases for striking a suitable balance between complexity and volume of data in order to reach a satisfactory level of depth of understanding of the phenomenon under study (Eisenhardt, 1989; Barratt et al., 2011). We also gained access to multiple sources of data relating to the four FTs we selected, such as observations throughout the SSD project, including during two STs on-site consultation events, where ST1 supplies FT1 and ST2 supplies FT2.

As discussed in the following sub-section, the data collection methods included, among

other approaches, the use of interviews. A purposive sampling method was used to select participants for the interviews. As the unit of analysis is the boundary-spanning role of the FTs, key informants within the A1-FT-ST chain are those who both participated in the SSD project and are in charge of daily communication. We interviewed one such key informant from each FT and from A1, and two such key informants from T1. In addition, we also interviewed one such key informant from each of the two STs that were provided with an on-site consultation.

3.5.2 Data collection

A case study protocol guided the data collection stage (see Appendix 1). The protocol specified a detailed data collection plan, including the interview schedule, the events to be observed, and the documents to be reviewed when on site (Yin, 2018). The research team had regular interactions with all parties involved in this study before, during and after the SSD project. With the support of T1's staff and a six-week residency in T1, one researcher was able to carry out observations during the entire project in addition to conducting interviews. Thus, opportunities for data collection included interviews, project update meetings, informal conversations, and participation in and observation of the training sessions and on-site consultations. The duration of the interactions varied from the observation of the two-day training session to short, informal conversations with relevant staff during lunchtimes. Thus, multiple sources of data, including interview transcripts, observation notes, and relevant documents such as training materials, provide rich qualitative data and add to data triangulation (Chakkol et al., 2018; Yin, 2018).

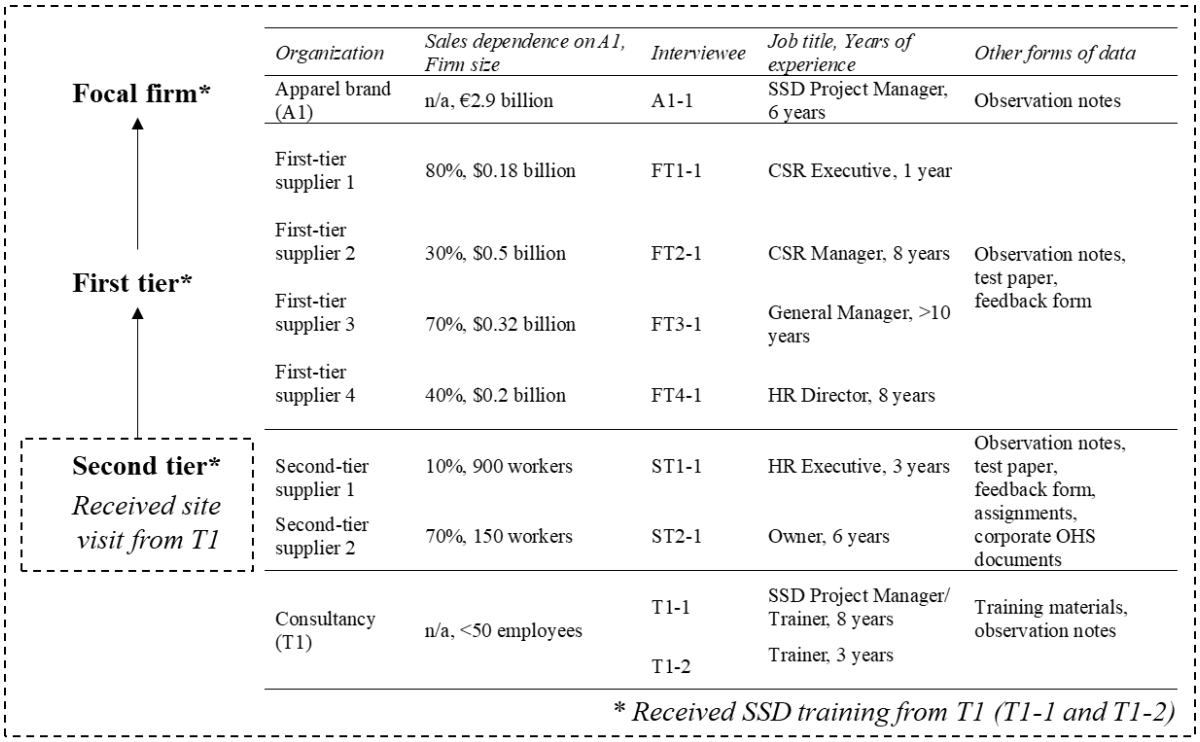
Firstly, in terms of the interviews, a total of twelve face-to-face interviews were conducted as follows: A1 (2), FTs (4), T1 (2), STs (2), and two follow-up debriefing interviews with both A1 and T1 after each site visit to the second-tier supplier factories. The interviews focused on two main topics: the boundary-spanning actions of FTs and the interactions among

parties within the A1-FT-ST set of relationships. For example, we asked the FTs if and how they were further assisting their suppliers based on the takeaway points from the training. On average, each interview lasted 40 minutes, and all interviews were audio-recorded, accompanied by written-up notes validated by the interviewees, and transcribed, resulting in 151 pages of transcripts. All interviews were conducted in Chinese. Unclear issues were clarified through follow-up online interactions in a chat group created during the training session. Example interview questions for the focal firm, FTs, STs and external knowledge provider are provided in an Appendix.

Secondly, a total of 240 hours of observations were conducted during the six-week residency in T1. More specifically, detailed notes were taken about the communications and actions between the different parties involved in the project, the two-day training and on-site consultations, and during and after the formal interviews. The observation notes focused on recording the interactions, including formal and informal chats between the FTs, A1 and STs, the actions taken by the FTs regarding the dissemination of the SSD initiative and sustainability requirements, and the social capital between the different parties.

Moreover, we reviewed key documents, such as corporate documents, training materials, and test papers, that provided information about the SSD project, the context, regulations, and OHS awareness and practices of the STs. Observation notes and secondary data complemented the interview data and contributed greatly in revealing the social capital residing between the focal firm and FTs and the past actions taken by the FTs. Data collection culminated in two debriefing interviews with A1 and T1. At this point, no new themes were identified; instead, ideas expressed by A1 and T1 had all been documented based on previous interviews and captured in diary notes. Therefore, the four cases were enough to reach a satisfactory level of theoretical saturation. Data collection, therefore, stopped as it was concluded that additional data would not have increased our understanding of the research

question (Eisenhardt, 1989; Huq and Stevenson, 2020). Figure 4 provides an overview of the firms accessed, the informants interviewed, and the additional sources of data collected.



Organization	*Sales dependence on A1, Firm size*	*Interviewee*	*Job title, Years of experience*	*Other forms of data*
Apparel brand (A1)	n/a, €2.9 billion	A1-1	SSD Project Manager, 6 years	Observation notes
First-tier supplier 1	80%, $0.18 billion	FT1-1	CSR Executive, 1 year	
First-tier supplier 2	30%, $0.5 billion	FT2-1	CSR Manager, 8 years	Observation notes, test paper, feedback form
First-tier supplier 3	70%, $0.32 billion	FT3-1	General Manager, >10 years	
First-tier supplier 4	40%, $0.2 billion	FT4-1	HR Director, 8 years	
Second-tier supplier 1	10%, 900 workers	ST1-1	HR Executive, 3 years	Observation notes, test paper, feedback form, assignments, corporate OHS documents
Second-tier supplier 2	70%, 150 workers	ST2-1	Owner, 6 years	
Consultancy (T1)	n/a, <50 employees	T1-1	SSD Project Manager/ Trainer, 8 years	Training materials, observation notes
		T1-2	Trainer, 3 years	

** Received SSD training from T1 (T1-1 and T1-2)*

Figure 4. Overview of the key informants and sources of data

3.5.3 Data analysis procedure

Data analysis began with reading the transcripts several times to increase familiarity with the data before proceeding to open coding. During the open coding process, data relevant to the actions taken by the FTs to extend the SSD initiative and to the relationship resources between the FTs and the focal firm were coded inductively. This process was supported by qualitative data analysis software (*N-Vivo*), which facilitated the retrieval and management of data (Rodríguez et al., 2016b).

The codes derived from open coding were then collapsed into higher-order codes, which were labelled using established constructs from both boundary-spanning literature and social capital theory. At this stage, we adopted an iterative approach to refining the codes, moving back and forth between relevant theory and data. More specifically, prior theoretical

research (e.g. Inkpen and Tsang, 2005) informed the foundations of the research while empirical studies that used the theoretical constructs helped to make sense of them in this context (e.g. Krause et al., 2007). This also helped to establish and refine the link between inductive codes and the constructs from the literature and enabled us to empirically substantiate constructs such as shared values and goals. Moreover, boundary-spanning actions identified were collated with constructs from prior literature and elaborated to fit the research context. We also categorised the boundary-spanning actions identified from our research into two categories to supplement prior research, i.e. compliance-oriented and improvement-oriented actions. Therefore, the coding process was grounded in the qualitative data whilst taking into consideration key concepts from the literature (Ketokivi and Choi, 2014). Figure 5 summarises the coding structure derived from the process.

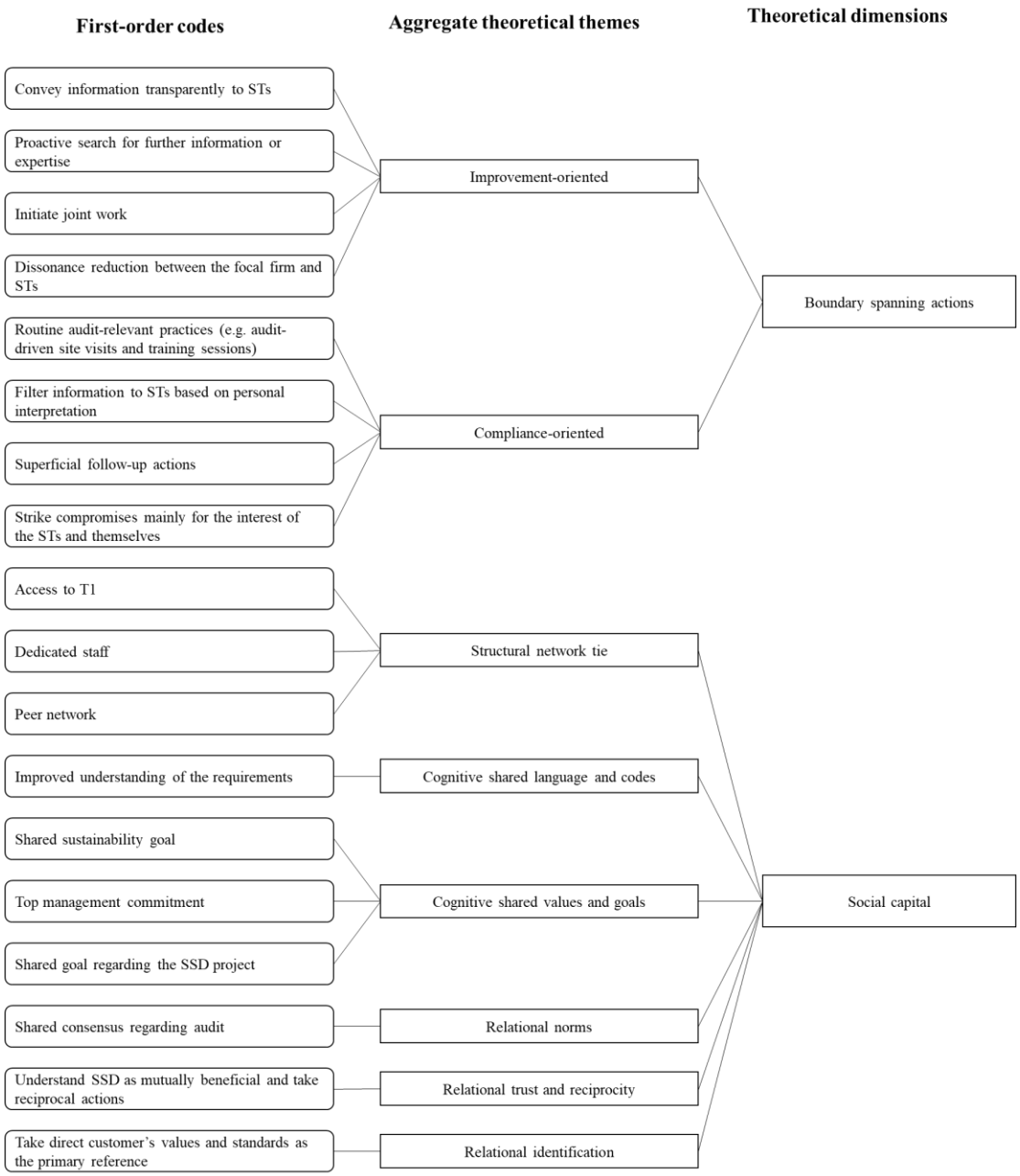


Figure 5. Coding structure of Paper II

3.6 Findings

Section 3.6.1 provides a summary of the boundary-spanning role fulfilled by the FTs, unpacking this into specific boundary-spanning actions. The social capital that exists in the four FT-A1 dyads is then presented in Section 3.6.2 to explore how this affects FTs' boundary-spanning roles. Table 15 presents examples of the empirical evidence, including illustrative quotes and observation notes.

Table 15. Summary of sample empirical evidence

Aggregate theoretical themes	First-order codes	Sample evidence from a variety of data sources (e.g. interviews, observation notes, and document analysis)
Improvement-oriented actions	Convey information transparently to STs	"I've passed all the relevant information and materials [for mandated improvements] to them [staff from ST1]." (FT1-1) All relevant documents and information were found to be passed to both ST1-1 and two other relevant staff from ST1 by FT1-1 during the site visit. (Observation notes, December 2019) "In addition, we will share all we have learned from the training with our suppliers and tell them to ask us for help if have any difficulties." (FT3-1) FT3-1 showed her notes and draft plan to transfer the knowledge to suppliers who did not come to the training. (Observation notes, November 2019)
	Proactive search for further information or expertise	"Both of them [FT3-1 and FT4-1] are indeed very active and willing to learn and do something." (A1-1) "Teachers [T1 and T2] have shared all relevant knowledge with us, we have to learn by ourselves next. I've drafted a plan for the work to be done and things to learn further." (FT3-1) "I'll further search relevant material on the internet and further consult the experts if I'm confused about anything." (FT4-1)
	Initiate joint work	"FT3-1 was always highly responsive and quite proactive in investing time and money to ensure the compliance of their suppliers." (A1-1) "I've contacted an equipment contractor to help redesign the firefighting equipment of one supplier as I now think it needs to be upgraded." (FT3-1) FT3-1 presented her text messages and phone call records with an equipment contractor during the interview. (Observation notes, October 2019)
	Dissonance reduction between the focal firm and STs	"I often tell my suppliers to be frank and honest with me in terms of any problems they have. Do not ask other agencies to help them conceal. I'll try my best to provide assistance and also check with my clients [A1] to see how we should address the problems" (FT3-1) "I told my suppliers to cherish this opportunity [to participate in this SSD project], we can learn a lot of useful knowledge without needing to pay. I told them this is very important as OHS issues are of vital interest to every worker." (FT3-1)
Compliance-oriented actions	Routine audit-relevant practices	Both FT1-1 and FT2-1 kept carrying out routinized interactions with their suppliers; however, these were mainly based on the auditing requirements from A1. (Observation notes, December 2019) "I have visited my STs as usual and helped them with the mandated improvement assignments." (FT1-1) "It requires continuous interactions and monitoring on a daily basis." (FT2-1) "My suppliers and I attended lots of training sessions focusing on achieving auditing compliance in the past." (FT3-1) "We've got our own COC [code of conduct] which is constituted of all basic audit requirements from various customers to make sure our suppliers could meet the [audit] requirements from all customers…we are the main player to carry out routinized monitoring and management." (FT4-1) "It is always the FTs who directly contact us in terms of SSD or audits, he [FT1-1] regularly visited us, especially during audits." (ST1-1) "Our annual fire drill is usually carried out with the help of her [FT2-1 and her team]." (ST2-1)
	Superficial follow-up actions	"I gave them the forms you gave me for them to work on." (FT1-1) "I provided them [STs] with samples and templates for them to use as references." (FT2-1) FT1-1 didn't help ST1-1 as it is found that he didn't clearly know how to work on the mandated tasks and was not able to provide genuine help to his ST; FT2-1 provided wrong samples to ST2-1 and didn't take it seriously at all (Observation notes, December 2019).

	Filter information to STs based on personal interpretation	"From my point of view, their factories [ST2] don't have a high risk in terms of noise or dust, so they don't need to worry about the occupational health assessment for workers" (FT2-1) During the on-site consultation, FT2-1 kept making excuses (e.g. overlap in STs with other FTs; low worker awareness, etc.) for the reason why she paid more attention during the audits only. (Observation notes, December 2019) "When I provide training [to suppliers], I won't tell them any national standard/law or associated penalties, I feel like it's too much [abstract] for them, I'll only let them know what is required by audits." (FT4-1) FT4-1 kept raising very specific problems he has in his supplier factories. He wanted his suppliers to get more operational guidance from the training for the sake of passing the audit, rather than improvements on awareness. (Observation notes, November 2019)
	Strike compromises mainly for the interest of STs and themselves	"For most of the STs, they've got a really poor situation [infrastructure] which makes them can hardly benefit from such training." (FT1-1) "We really need to be informed in advance before formal audits and I need time to get to know those factories. I have to provide them with templates or samples, otherwise they don't know what to do. Besides, you cannot really raise everyone's awareness." (FT2-1) FT2-1 listed several difficulties that she thought make it impossible to pursue further improvement during the site visit to her supplier, ST2. (Observation notes, December 2019) "What we really need from such training is to help us address the problems from previous audits one by one. I don't think they [STs] need to know those national standards sort of thing." (FT4-1)
Structural network ties	Access to T1; Peer network; Dedicated staff	"We can get in touch [with T1] if needed. We [FT1 and ST1] also had some chat with A1 and other suppliers." (FT1-1) FT2-1 is the CSR Manager of FT2 who is in charge of all CSR relevant issues. (Observation notes, October 2019) "They [A1 and T1] provided us with the access to communication afterwards, e.g. the chatgroup." (FT3-1) "The teachers [T1 and T2] delivered a really good training ... We had a chance to meet other suppliers [FTs]" (FT4-1) "We offer technical support to the project. We helped A1 finalize the content and delivery format after several rounds of discussion." (T1-1, T2-1) The concentrated training session provided many informal communicating opportunities. Some attendees stayed in the same hotel; others had lunch and dinner gatherings where they discussed the challenges they faced and actions taken. (Observation notes, October/November 2019)
Cognitive shared language and codes	Improved understanding of the requirements	"For me, it [the training] enhanced my understanding of relevant knowledge of the national standards." (FT2-1) "I've learned a lot from the training, it's really standardised and professional, we've learned a lot." (FT3-1) "It [the training] is really good in terms of the suggestions on management skills and provided a systematic view for OHS work." (FT4-1) All attendees scored over 70% on the test after the training session. (Summary and analysis of the test and feedback, November 2019)
Cognitive shared values and goals	Shared sustainability goal	"He [FT4-1] indeed wants to make some efforts, but in a more straightforward way [auditing-driven focus] …She (FT3-1) is always very responsive to our requirements. And I know that her boss is taking OHS management very seriously. They've invested a lot on infrastructure" (A1-1) "OHS issues are relevant to human beings' lives; we have to take it seriously." (FT3-1) "We are very proactive in terms of OHS issues. I always communicate with A1-1 and ask her to provide us more such training sessions which involve not only us but also our suppliers [STs] together to let them [STs] directly access the requirements and learn." (FT4-1) Both FT3-1 and FT4-1 had an aligned understanding with A1-1 about the need to manage OHS issues and a long-term goal of sustainability in general. (Observation notes, November 2019)
	Top management commitment	"I know that her [FT3-1] CEOs all put a lot emphasis on this, and I know she has made a lot of efforts as well." (A1-1) "Our CEO put a lot of emphasis on OHS issues. We have invested a large amount of money into appropriate equipment, and we are all willing to learn new things, influenced by our CEO." (FT3-1)

	Shared goals regarding the SSD project	"I really cherish the chance to get such a good training. We can learn relevant knowledge without having to pay. What is more important, from my perspective, is to apply the knowledge to our daily operations; we are not here to find solutions for passing audits." (FT3-1) A1-1 was frustrated about the fact that some of the attendees do not understand her intention to deploy this SSD project and understood this project as a different format of pre-audit tutorial. (Observation notes, November 2019) Several attendees expressed their feeling that the training is not specific enough to guide them to solve the problems they face, primarily audit non-compliance, from the follow-up feedback questionnaire. (Summary and analysis of the test and feedback, November 2019)
Relational norms	Shared consensus in terms of the audit	"They [FTs and STs] are well aware of one thing, that our requirements are reasonable and achievable." (A1-1) "There are audits every year and we are aware of the checklists and are well-prepared." (ST1-1) "They [STs] have a basic understanding regarding what is required from the client [A1]." (FT2-1) "We have installed all relevant personal protective equipment for our workers [as instructed by A1]." (ST2-1) "Our client's requirements are reasonable and achievable, not like other international standards such as BSCI." (FT3-1) "Just like he [the boss of A1-1] said, their requirements are practical." (FT4-1) At the beginning of the training, the manager of the sustainability department [the boss of A1-1] has stated again that their requirements are reasonable, and all of the attendees have positively responded to this statement. (Observation notes, October 2019) The keyword throughout the whole training session was 'audit', which seems to be the main issue the attendees care about. (Observation notes, October/November 2019)
Relational trust and reciprocity	Understand SSD as mutually beneficial and take reciprocal actions	"She [FT3-1] has got a good understanding of what I'm trying to achieve through this SSD project. He [FT4-1] indeed wants to make some efforts, but in a more straightforward way [auditing-driven focus]." (A1-1) "We really appreciate our client for providing this chance free of charge for us. It's a shame that not all of my suppliers are able to come...by attending this training and also interacting with other FTs, I also figured out some deficiencies our suppliers have in their OHS management scheme…this [the SSD project] really helps a lot…" (FT3-1) FT3-1 showed me her phone call records and the text messages with subcontractors regarding the planned work to upgrade some of the equipment. (Observation notes, October 2019) "We really appreciate that our client [A1] could provide such chances [SSD projects] for us so that we can catch up with the pace of the client [A1]." (FT4-1)
Relational identification	Take direct customer's values and standards as the primary reference	"As you can see, [ST2-1] does not really care about anything from the training. [FT2-1] would prepare all materials required on her behalf [ST2-1] and will do cover-ups for her firm [ST2], so [ST2-1] did not have the awareness or the intention to take any actions." (T1-1) ST2-1 asked FT2-1 for help with any issues raised by A1 or T1 during the on-site consultations. She did not check any of the requirements or details provided by the trainers during the training; instead, she only worked on the templates and documents provided by FT2. (Observation notes, December 2019) "I always tell my suppliers that my client [A1] won't ask us to do anything that we're not capable of. So we need to follow all that required by our clients; in doing this, we are responsible for all three of us [A1, FT3, FT3's suppliers]" (FT3-1)

3.6.1 Boundary-spanning actions

Based on the discussion in Section 3.4.2, the boundary-spanning actions taken by the FTs in SSD were categorised into compliance-oriented and improvement-oriented actions, as summarised in Table 16. The table includes actions that had previously been identified in the literature and are supported here by empirical evidence as well as some compliance-oriented actions that are, to the best of our knowledge, presented here for the first time. More specifically, we found that when FTs primarily adopt a compliance-oriented boundary-spanning role, they tend to strike compromises between the focal firm and second tier, mainly to protect the interests of STs and themselves in the context of SSD. Meanwhile, personnel from two FTs were found to add their own personal interpretation when diffusing information to STs, filtering out important content relevant to SSD.

Table 16. Boundary-spanning actions taken by each first-tier supplier

Boundary-spanning actions	References (novel actions from our empirical data marked by *)	FT1	FT2	FT3	FT4
Improvement-oriented					
Convey information transparently to STs	Zhang et al. (2011)	x	-	x	-
Proactively search for further information or expertise	Marone (2010); Soundararajan	-	-	x	x
Initiate joint work	Marone (2010); Huang et al. (2016);	-	-	x	-
Dissonance reduction between the focal firm and STs	Zhang et al. (2011); Huang et al. (2016); Chakkol et al. (2018)	-	-	x	-
Compliance-oriented					
Routine audit-relevant practices (e.g. audit-driven site visits and training sessions)	Huang et al. (2016); Chakkol et al. (2018); Soundararajan and Brammer, 2018	x	x	x	x
Filter information to STs based on personal interpretation	*	-	x	-	x
Superficial follow-up actions	Soundararajan and Brammer (2018)	x	x	-	-
Strike compromises mainly for the interest of STs and themselves	*	x	x	-	x

From Table 16 it can be seen that the four FTs behaved differently when carrying out boundary-spanning actions. In general, both improvement-oriented and compliance-oriented boundary-spanning actions were practiced by all of the FTs except FT2, which only practiced compliance-oriented actions. FT3 adopted a more improvement-oriented boundary-spanning role while the three remaining FTs primarily adopted a compliance-oriented role in the context

of SSD. FT3 transparently passed information to STs, proactively engaging in further learning and joint work with STs, and exhibiting an intention to reduce the dissonance between A1 and STs regarding OHS issues. In contrast, although FT1 also transparently transferred knowledge, it focused more on striking compromises between A1 and the STs and did not carry out any proactive actions. Meanwhile, personnel from FT2 and FT4 filtered out information based on their own judgement and interpretation of what needed to be passed up the chain. Yet, FT4 still exhibited a propensity to carry out active learning while FT2 only superficially assisted STs in order to achieve audit compliance. Sections 3.6.1.1 and 3.6.1.2 below provide more detailed findings regarding the compliance-oriented and improvement-oriented boundary-spanning actions carried out by the four FTs, respectively.

3.6.1.1 Compliance-oriented actions

The FTs engaged in knowledge and information sharing events focused on audit-relevant content in a bid to achieve compliance. For example, *routine audit-relevant practices* such as audit-driven site visits and training sessions intended to ensure the compliance of STs were carried out by all four FTs. This is because the FTs were assigned responsibility for diffusing sustainability requirements to STs and for monitoring their sustainability performance. One of the FTs (FT1-1) mentioned that: "*I have visited my STs and helped them with the mandated improvement assignments*". Meanwhile, ST1-1 confirmed that "*It is always the FTs who directly contact us in terms of OHS issues, he* [FT1-1] *regularly visited us, especially during audits…he* [FT1-1] *came to us after the training session and asked us to finish the assignments*".

Further, in terms of knowledge and information sharing via site visits, FT2 and FT4 were found to *filter information to STs based on personal interpretation,* only diffusing information that they thought would be useful for passing future audits. For example, FT4-1 argued that: "*STs do not need to know the underlying reasons and national laws and standards.*

All they have to know is what and how they must do things in order to pass the audits". Such subjective filtering undermined the impact of the training on FTs and STs as the primary intention of A1 when deploying the SSD project and training sessions – "*to help suppliers* [both FTs and STs] *gradually establish OHS management systems within their firms via SSD projects instead of just passing audits*" – was being omitted and therefore not diffused up the chain.

Meanwhile, regarding the consultations and assistance provided to STs after the training session, *superficial follow-up actions* were exhibited by FT1 and FT2 who provided templates for STs to complete. The templates were prepared based on FTs' understanding and interpretation of the assignments. ST1-1 was aware of the requirements and tried to complete the assignments with assistance from FT1-1; however, he was not able to accomplish the task adequately as both he and FT1-1 had made little effort to assimilate the knowledge delivered during the training. The situation was even worse for ST2-1 who only filled in the forms required based on the templates and sample answers provided by FT2-1, who was found to have misunderstood the requirements. Further, FT2-1 attempted to shield ST2 from the gaze of A1. A1-1 and T1-1 were aware of this and expressed their disappointment, admitting that this approach could not help STs to genuinely improve. During the debriefing meeting, T1-1 explained to A1-1: "*As you can see, …* [ST2-1] *does not really care about anything from the training, …* [FT2-1] *would prepare all materials required on her behalf* [ST2-1] *and will do cover-ups for her firm* [ST2]*, so …* [ST2-1] *did not have the awareness or the intention to take any actions*".

Moreover, when FTs primarily focused on audit-relevant performance they sought to *strike compromises mainly for the interest of the STs and themselves* and attempted to justify why it is difficult to practically apply the knowledge acquired from the training at STs. This is in contrast to A1's intention behind carrying out the SSD project – a step towards achieving better social conditions for all critical suppliers. Three out of the four FTs, i.e. FT1, FT2 and

FT4, complained that the training content was too high-level and theoretical to guide practical solutions to STs' problems or non-compliances. In particular, FT4-1 argued that: "*There is a need to tell us how to address the issues our STs have to avoid incidents…for example, we have a problem regarding the use of doors to ensure safety. What we want to know is how to achieve compliance given our current situation instead of being told that it is against the law*". Further, FT2-1 stressed the difficulties in meeting the requirements of SSD and sought to justify her actions, such as her provision of templates and sample answers.

3.6.1.2 Improvement-oriented actions

When the FTs carried out improvement-oriented boundary-spanning actions, they engaged in knowledge and information sharing events that were broader in scope than purely audit-driven thinking and that were aimed at pursuing further improvements beyond compliance. More specifically, FT1, FT3 and FT4 were found to go beyond compliance-oriented actions by also carrying out improvement-oriented actions in order to pursue the goal of SSD set by the buyer. For example, both FT1-1 and FT3-1 *convey information transparently to STs,* as instructed by A1-1, such as by sharing notes and printed materials from the training with STs. Meanwhile, both FT3-1 and FT4-1 were found to *proactively search for further information or expertise*. They were both actively engaged in the training sessions and expressed their willingness to learn more after the training to better assimilate knowledge and provide further assistance to their suppliers. This is also confirmed by A1-1, who mentioned that: "*both of them* [FT3-1 and FT4-1] *are indeed very active and willing to learn and do something*".

In terms of the assistance provided by FTs to their STs after the training session in order to pursue further improvements, FT3-1 went beyond all of the other FTs to *initiate joint work* with her suppliers. As an example, she participated in redesigning the firefighting equipment in one of her suppliers' factories, which she realised (after the training where she had been

involved in a discussion with T1-1 and other attendees) was unable to satisfactorily protect the workers. FT3-1 also engaged in reconciliation between the focal firm and her STs. More specifically, FT3-1 outlined her efforts to persuade STs that A1's requirements were reasonable and achievable. She also asked her STs to be open and honest with her instead of spending time and money on mock compliance. Her effort paid off as A1-1 confirmed that FT3-1 and her suppliers were doing relatively well in the audits and were proactively responding to the SSD initiative. Thus, *dissonance reduction* was also only evident from FT3.

3.6.2 Social capital and its relevance to boundary-spanning actions

Table 17 summarises the social capital exhibited within the four FT-A1 dyads. The table also presents the manifestation of each social capital aspect identified in previous empirical research and that is contextualised for SSD in this research. *Relational identification* is, to the best of our knowledge, drawn on and contextualised here for the first time in SSD. In general, all three dimensions of social capital exist to some degree in all four FT-A1 dyads. More specifically, *structural capital* in the form of *network tie*; c*ognitive capital* in the form of *shared language and codes* and *relational capital* in the form of *norms* are present in all four dyads. These however are the only aspects of social capital present in the FT1-A1 and FT2-A1 dyads whereas a greater variety of cognitive and relational capital aspects exist in the FT3-A1 and FT4-A1 dyads. Section 3.6.2.1 below presents more detailed findings on the social capital that exists within each FT-A1 dyad before Section 3.6.2.2 links the social capital within each downstream dyad to the upstream boundary-spanning actions taken by each FT.

Table 17. Social capital within each FT-A1 dyad

Social capital dimensions and aspects	Manifestations from previous empirical research	Manifestations in this research	FT1-A1	FT2-A1	FT3-A1	FT4-A1
Structural						
Network tie	Information sharing (Krause et al., 2007); Contractual control; Monitoring control (Zhu and Lai, 2019)	Access to T1; Dedicated staff; Peer network	x	x	x	x
Cognitive						
Shared language and codes	Language and codes; Narratives (Zhu and Lai, 2019).	Improved understanding of the requirements	x	x	x	x
Shared values and goals	Goals and values (Krause et al., 2007); Degree of similar visions, ambitions and values (Preston et al., 2017)	Shared sustainability goal;	-	-	x	x
		Top management commitment;	-	-	x	-
		Shared goal regarding the SSD project	-	-	x	-
Relational						
Norms	Consensus on how to cooperate (Preston et al., 2017)	Shared consensus regarding audit	x	x	x	x
Trust and reciprocity	Mutual trust and respect (Preston et al., 2017); Reciprocity; Cooperation; Interaction (Zhu and Lai, 2019)	Understand SSD as mutually beneficial and take reciprocal actions	-	-	x	x
Identification	-	Take direct customer's values and standards as the primary reference	-	-	x	-

3.6.2.1 Social capital within each FT-A1 dyad

All four dyads exhibited at least a basic level of social capital. More specifically, all four FTs have a contractual relationship with A1 as well as newly developed connections with T1 and other peer FTs via SSD, thereby constituting the same variety of *structural capital* in the form of *network tie* within each dyad. All four dyads also reported an improved understanding of sustainability requirements after the training, indicating enhanced *cognitive capital* in terms of *shared language and codes*. In terms of *relational capital*, there was a strong *norm* – i.e. a shared consensus regarding the importance of audit compliance – within all four dyads. This worked well for motivating FTs to make efforts towards passing audits at the STs in order to maintain their business relationship with the focal firm. For example, FT2-1 confirmed that the audit requirements were reasonable and achievable and talked about several actions, such as training, for cascading compliance requirements to her suppliers. However, this strong consensus reinforces audit-driven thinking and can become a barrier to further improvements

beyond compliance. This sometimes discouraged independent thinking and a willingness to pursue further improvement even when firms were provided with additional assistance via SSD. For example, some FTs were confused about the intention behind the SSD project and misinterpreted it as a new type of audit or pre-audit tutorial. A1-1 was aware of this situation and explained: "*A few suppliers came to ask me if our auditing requirements have changed as there was additional knowledge not relevant to existing audit requirements included in the training*".

The four dyads differed in terms of the variety of cognitive and relational capital aspects, with a greater variety of *cognitive* and *relational* capital found within the FT3-A1 and FT4-A1 dyads. More specifically, FT3 and FT4 shared the same goal regarding long-term sustainability development with A1. This helped to overcome audit-driven thinking and go beyond compliance, indicating a reasonable level of *shared values and goals*, thereby enhancing *cognitive capital* within the two dyads. FT4-1, for example, stated that: "*We are not just focusing on passing the audits, we want to keep track of our suppliers regarding their OHS performance and make sure that they are actually practising sustainability on a daily basis instead of just for the sake of passing audits*". These two FTs also developed their own standards and requirements in addition to those of A1. In terms of *relational capital*, FT3 and FT4 showed some level of mutual understanding with A1 regarding the intention behind the SSD project – they believed it would help them improve and keep up-to-date with A1's sustainable development agenda. In addition, they expressed an intention to undertake several activities after the training, indicating the presence of *trust and reciprocity*.

Moreover, the FT3-A1 dyad had the greatest variety of *cognitive* and *relational* capital. *Cognitive capital* in the form of *shared goal regarding the SSD project* and *top management commitment* were only identified between FT3 and A1. More specifically, FT3-1 understood the SSD project as a chance for her to develop knowledge and skills to pursue further

improvements in the long-term at the second-tier level, indicating a *shared goal regarding the SSD project* with A1. With regards to *top management commitment*, she explained: "*Our CEO put a lot of emphasis on OHS issues. We have invested a large amount of money into appropriate equipment, and we are all willing to learn new things, influenced by our CEO*". Meanwhile, *relational capital* in the form of *identification* was only evident in the FT3-A1 dyad, where FT3-1 showed a recognition of the values and standards of A1 and asked her suppliers to try to undertake everything required by the focal firm.

Although no evidence of *relational identification* was found within the remaining FT-A1 dyads, it was identified within the upstream dyad of FT2-ST2. More specifically, FT2 diffused its own values and standards regarding OHS towards ST2 instead of those of A1. As a result, ST2-1 did not take any steps towards completing the mandated improvement assignments of A1; instead, she simply followed the instructions received from FT2-1 and filled in the templates without checking the original assignments. Moreover, during the site visit, ST2-1 was not able to answer any questions directly. Instead, all questions relevant to the assignments and corresponding actions were answered on her behalf by FT2-1. In fact, ST2's OHS documents were prepared superficially by ST2-1 and FT2-1 together purely to deal with checks from local authorities and to pass A1's audits.

3.6.2.2 Social capital and its impact on boundary-spanning actions

From Table 16 and Table 17, it can be seen that with at least a basic variety of each social capital dimension in place, all of the FTs practiced compliance-oriented boundary-spanning actions. However, the FTs differed with regards to their propensity to carry out further improvement-oriented boundary-spanning actions, which is explained by differences in the variety of cognitive and relational capital. With the greatest variety of cognitive and relational capital in place between FT3 and A1, FT3 carried out all of the improvement-oriented boundary-spanning actions identified. More specifically, *cognitive capital* in the form of *top*

management commitment and *shared goals regarding the SSD project* and *relational capital* in the form of *identification* were only identified in the FT3-A1 dyad. This might suggest that these aspects of social capital are necessary for facilitating improvement-oriented actions, as FT3 was the only FT exclusively practicing all improvement-oriented boundary-spanning actions.

In contrast, the least variety of cognitive and relational capital was identified in the FT1-A1 and FT2-A1 dyads, leading to mainly compliance-oriented boundary-spanning actions being conducted. However, FT1 still differed from FT2 in terms of transparency in transferring information to STs. This may be linked to the *relational identification* that existed within the FT2-ST2 dyad, which resulted in FT2's propensity to filter out information before transferring it to ST2.

3.7 Discussion

In this section, we discuss our empirical findings in relation to the prior literature in order to answer the research question. In doing so, we theorise the impact of social capital in the downstream dyad, i.e. the focal firm-FT dyad, on the upstream boundary-spanning actions taken by FTs in the context of SSD, as depicted in Figure 6 and further explained below. Figure 6 illustrates that the nature of the boundary-spanning actions undertaken by FTs is primarily influenced by the level of cognitive and relational capital in their relationship with the focal firm. To facilitate improvement-oriented actions, a higher level of both cognitive and relational capital is needed. Such a conceptual framework provides a platform for further theoretical and empirical advancement of boundary-spanning research in the field of SSD in multi-tier supply chains.

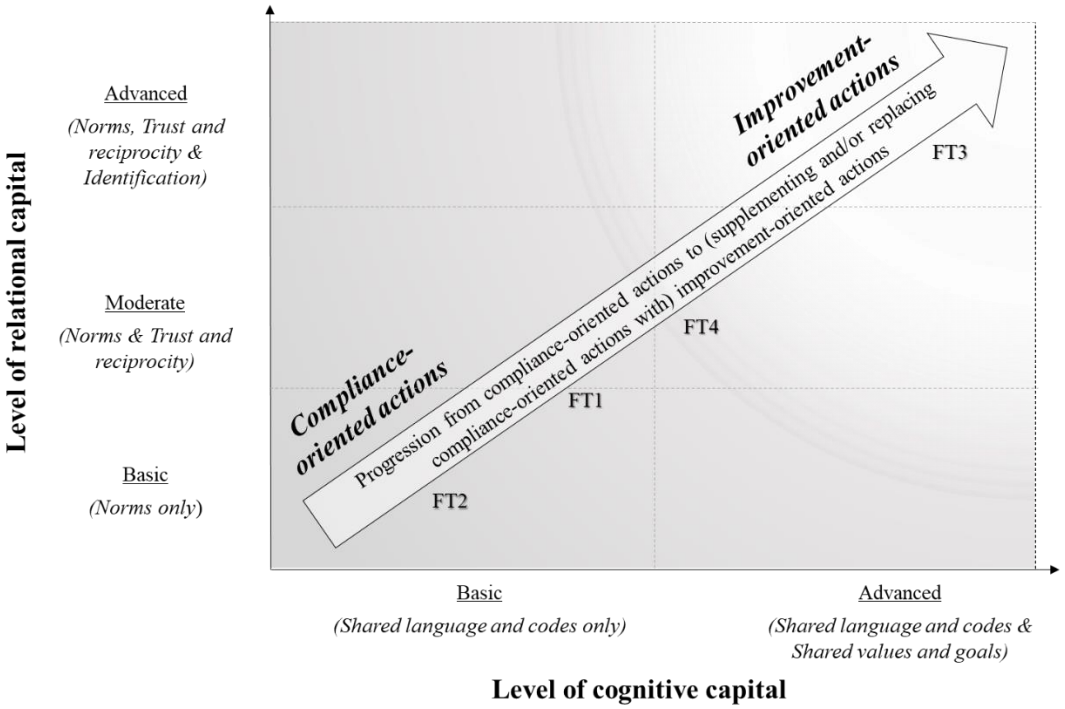


Figure 6. Conceptual framework theorizing the impact of downstream social capital on the upstream boundary-spanning actions of the first-tier supplier

Studying the interactions between the focal firm, first-tier and second-tier suppliers in the context of SSD through the lens of boundary-spanning and social capital theory has enabled us to identify some important research implications. First, while the boundary-spanning construct has previously been mainly applied to study individual boundary-spanners at the interface between an organisation and its external environment (e.g. Chakkol et al., 2018), we apply it at the organisational level within a buyer-FT-ST setting in the context of SSD. Our findings, which are consistent with Wilhelm et al. (2016), shown that because FTs are embedded in both the buyer-FT and FT-ST dyads they are delegated responsibility by the focal firm not only for complying with sustainability requirements at their own sites but also for ensuring requirements are diffused further upstream to STs. This boundary-spanning role is fundamentally built on the network ties (Preston et al., 2017; Alghababsheh and Gallear, 2020) established between the FT and the focal firm. Therefore, we propose our first proposition:

- **Proposition 1.** The structural capital between a focal firm and first-tier supplier provides a foundation for enabling the first-tier supplier to fulfil its boundary-spanning role in SSD.

Second, a categorisation of the boundary-spanning actions taken by FTs in SSD has been proposed based on synthesising relevant literature and empirical substantiating this to provide a more in-depth and nuanced exploration of how FTs play their complex boundary-spanning role in SSD. More specifically, it has been illustrated that compliance-oriented and improvement-oriented boundary-spanning actions are undertaken by FTs in the context of SSD. The categorisation and the specific actions identified expand on the dichotomy between positive and negative boundary-spanning roles proposed by Soundararajan and Brammer (2018). For example, we have found that all FTs engaged in knowledge and information transfer activities but that the level of information transparency differed across FTs according to their purpose and personal interpretation. FTs that primarily focus on passing audits, i.e. that do not share a long-term sustainability goal with the focal firm, tend to carry out compliance-oriented actions. Thus, our study adds explanatory power to why FTs carry out the boundary-spanning role in different ways.

Third, this research adds further insight into the distinct impact of cognitive and relational capital aspects on the boundary-spanning actions of FTs in SSD, as depicted in Figure 6. The literature has highlighted the importance of cognitive and relational capital in facilitating knowledge transfer within the buyer-supplier dyad. More specifically, cognitive capital facilitates knowledge exploitation through shared language and codes, which provides access to different parties for knowledge transfer and for clarifying potential benefits (Nahapiet and Ghoshal, 1998), and by establishing shared goals between the focal firm and its FTs for clarifying what is expected and how it will be achieved (Krause et al., 2007). Relational capital

is critical in pursuing strategic goals (Villena et al., 2011) as it is the only social capital dimension that motivates knowledge transfer (Nahapiet and Ghoshal, 1998). The existence of social capital in the buyer-supplier dyad is an important factor to consider when it comes to understanding the sustainability-relevant actions carried out at the supplier side (Zhu and Lai, 2019). Furthermore, it is expected that different dimensions and aspects of social capital may affect suppliers' actions in different ways.

Our findings show that shared language and codes primarily only assist in clarifying audit requirements and the need to comply with them, while norms provide consensus between the focal firm and FTs that motivate FTs to meet audit requirements. Such a basic level of cognitive and relational capital leads to compliance-oriented boundary-spanning actions in SSD (as shown by the cases of FT2 and FT1 in Figure 6). This finding is consistent with prior research (e.g. Preston et al., 2017; Alghababsheh and Gallear, 2020), showing that shared language and codes facilitate the communication of explicit requirements and that norms serve as a basis for cooperation.

Moreover, our findings show that in order to drive improvement-oriented boundary-spanning actions there is a need for cognitive shared values and goals. This helps to clarify what is specifically required for sustainability and the SSD project. In addition, when trust and reciprocity are in place, FTs are aware of the need to take more proactive actions to develop STs, which means they go beyond basic compliance (as shown by the case of FT4 in Figure 6). Higher levels of cognitive and relational capital are required to facilitate further improvement-oriented actions. For example, in the case of FT3, where there is also identification in place within the FT3-A1 dyad plus a higher level of shared values and goals, FT3 practices all improvement-oriented actions. We thus extend prior studies that have discussed the positive impact of cognitive and relational capital on sustainability-relevant actions and performance at the supplier side as a whole (e.g. Alghababsheh and Gallear, 2020) by unpacking these two

dimensions of social capital into their specific aspects. Further, while the literature suggests that cognitive capital and relational capital complement each other (Nahapiet and Ghoshal, 1998; Preston et al., 2017) to enhance sustainability efforts (Zhu and Lai, 2019), we provide additional insights into how they jointly work. We show that a combination of a moderate or advanced level of relational and cognitive capital facilitates improvement-oriented actions in SSD. Based on the above analysis, we propose the following:

- **Proposition 2.** The level of cognitive and relational capital affects how the first-tier supplier carries out its boundary spanning role in SSD.
  - **Proposition 2a.** *A basic level of both cognitive and relational capital leads to compliance-oriented boundary-spanning actions only.*
  - **Proposition 2b.** *A more advanced level of both cognitive and relational capital enhances the motivation of a first-tier supplier to engage in improvement-oriented boundary-spanning actions.*

We have also identified a potential negative impact brought about by relational capital, as proposed in previous research (e.g. Villena et al., 2011), when relational capital is limited to norms only and this is strongly aligned between the two parties. More specifically, with a shared consensus around achieving audit compliance, all four FTs were motivated to carry out routine audit-relevant practices that helped STs pass audits. The norm reinforced compliance-oriented thinking and negatively influenced the motivation of FTs to undertake additional actions that sought to further develop STs over time. This finding lends support to previous research on the potential rigidity of norms (e.g. Nahapiet and Ghoshal, 1998; Preston et al., 2017), which can hinder knowledge transfer when the norm is reinforced over time, and on the critical impact of relational capital (Villena et al., 2011). Going beyond audit compliance relied on norms being combined with other aspects of relational and cognitive capital, such as in the

case of FT3. Drawing on the above, we propose the following additional proposition:

- **Proposition 3.** A rigid relational norm between a focal firm and first-tier supplier negatively affects the motivation of the first-tier supplier to undertake improvement-oriented boundary-spanning actions in SSD.

In addition to the findings regarding the impact of social capital within the downstream dyad on the boundary-spanning actions taken by the FTs, our data also provides insights into the impact of the relational capital that exists in the upstream dyad on the way in which FTs carry out boundary-spanning actions. Our findings show that it can be problematic when identification is present in the upstream dyad but not in the downstream dyad, inducing superficial follow-up actions aimed exclusively at achieving compliance in SSD. Specifically, identification was present in the upstream FT2-ST2 dyad but not in the downstream FT2-A1 dyad. As a result, ST2 was prepared to adopt whatever FT2 suggested as the standard but FT2 was pursuing its own self-interest rather than acting purely on behalf of A1.

3.8 Conclusions

The challenges faced by focal firms in managing sustainability in multi-tier supply chains have contributed to the transfer of responsibility for the sustainability of upper supply chain tiers from focal firms to FTs (Soundararajan and Brammer, 2018). Research, however, has only just begun to explore the contingencies (e.g. Wilhelm et al., 2016) or behavioural factors (e.g. Soundararajan and Brammer, 2018) that affect the boundary-spanning role of FTs in diffusing sustainability initiatives up the chain to STs. Our study builds on prior studies by shedding light on the boundary-spanning actions taken by FTs in extending SSD initiatives to STs and how social capital affects the way in which FTs leverage knowledge from SSD in fulfilling their boundary-spanning role.

3.8.1 Implications for research

In answering our research question, we found that social capital plays an important role in determining how FTs practice boundary-spanning actions related to SSD. The complexity of the sustainability dimension of SSD, which can extend beyond contractual bonds, makes the success of SSD particularly reliant on relation-specific assets, i.e. social capital. In general, the level of cognitive and relational capital affects how first-tier suppliers carry out boundary-spanning actions in SSD. More specifically, cognitive capital in the form of shared values and goals, and relational capital in the form of trust and reciprocity and identification facilitate improvement-oriented boundary-spanning actions in SSD. Meanwhile, excessive relational capital, for example, in the form of a rigid norm that represents a strong agreement on audit compliance only, can generate unfavourable impacts.

Our study also highlights differences in terms of how FTs practice boundary-spanning actions in the context of a social SSD project. FTs undertook either improvement or compliance-oriented actions to diffuse SSD initiatives further upstream. Personal interpretation, for example, was added by some FTs, leading to compliance-oriented actions. Overall, this paper makes three main contributions:

1. It provides a refined and substantiated version of the boundary-spanning role fulfilled by FTs in extending social SSD initiatives up the supply chain, achieved by empirically grounding the study in a social SSD project in a multi-tier supply chain. It thus contributes to the boundary-spanning literature by applying this concept to theorise on the role of FTs in SSD given their unique position between the focal firm and second tier. It also extends prior literature on multi-tier sustainable supply chain management (e.g. Soundararajan and Brammer, 2018) by adding greater granularity to the boundary-spanning role and actions.

2. It examines the impact of social capital on the boundary-spanning role of FTs. Specifically, this contribution stems from unpacking the impact of different levels of relational and cognitive capital and their combination on how FTs leverage the knowledge gained from SSD in carrying out boundary-spanning actions related to SSD. To the authors' knowledge, this is the first study to systematically examine the impact of social capital aspects and their interrelationship in such detail. In doing so, it also contributes to the wider SD literature (e.g. Krause et al., 2007; Preston et al., 2017) that has identified the impact of social capital on operational performance by taking into consideration sustainability-relevant performance.
3. It improves our understanding of the potential negative impact of excessive relational capital, as suggested in previous research (e.g. Villena et al., 2011). Our findings provide new insight by showing that excessive relational capital is problematic and can reinforce compliance-oriented thinking in FTs, thereby undermining the effectiveness of SSD initiatives.

3.8.2 Implications for managers

To improve the effectiveness of SSD projects, focal firms need to be aware of the cognitive and relational capital that resides in their relationships with FTs. These two dimensions of social capital exert a major impact on how FTs benefit from SSD and how they undertake their boundary-spanning role related to SSD. For example, developing a shared sustainability goal, especially regarding the SSD project with FTs, contributes to enabling FTs to provide improvement-oriented assistance to STs thereby going beyond simply achieving audit compliance. Meanwhile, focal firms also need to be aware of the level of relational capital in order to avoid any potential negative consequences resulting from excessive levels. This extends to the relational capital residing in the FT-ST dyad as relational capital that exists only

in the FT-ST dyad but not the focal firm-FT dyad can negatively affect the upstream diffusion of SSD initiatives.

3.8.3 Limitations

The scope of this research was limited to a particular social SSD project in the apparel sector. Future research could examine if the conclusions apply to other contexts, such as environmental SSD projects, and to other industry sectors. Meanwhile, longitudinal research is needed to examine the connection between different types of boundary-spanning actions and performance outcomes at STs. The role of external knowledge providers such as T1 also warrants further in-depth investigation. Furthermore, it would be interesting to explore how internal alignment between the purchasing and sustainability functions affects the way in which the boundary-spanning role is performed. Unlike traditional SD, business and contractual issues and developmental issues in the context of SSD may be handled separately by the purchasing and sustainability departments, respectively. This can lead to different and sometimes conflicting means of interacting with suppliers (Villena and Gioia, 2020), which can negatively affect the willingness of FTs to accept responsibility for diffusing sustainability practices to STs (Wilhelm et al., 2016). Moreover, the present study could be extended to include a detailed investigation into the social capital within the upstream dyad, how this interacts with the social capital in the downstream dyad, and how the two jointly affect the boundary-spanning actions of the FTs. Finally, further analysis could be undertaken via an in-depth investigation of the learning and knowledge application process during SSD for both FTs and STs.

Chapter 4 – Paper III: Supplier Absorptive Capacity: Learning via Boundary Objects in Sustainability-oriented Supplier Development Initiatives

Under-review

4.1 Background to Paper III

As Paper II focused on the diffusion of SSD further upstream from first-tier supplier to second-tier supplier, it was noticed that more research is needed to understand how suppliers internalise the knowledge gained via SSD within their own organisations. Paper III thus looks into the learning processes at the supplier organisation. It is argued that the two empirical papers together provide a more complete picture of the phenomenon under study in addressing the overarching research question. A case study protocol for Paper III (see Appendix 2) was developed while working on the revisions to Paper I and Paper II, which guided the subsequent data collection and data analysis.

I maintained good contact with the consultancy firm of Paper II and developed further contact with some other Western fast-fashion brands over the course of the data collection for Paper II. Due to the travel restrictions brought by the pandemic, I was not able to go back to

China to collect data on-site. All of the data for this paper was thus collected online, including interviews, observations, supplier factory visit reports, and project update meetings. Whilst continuing the conversation on SSD projects, the data collected for this paper is with a different fast-fashion supply chain. The focal firm and the suppliers studied in this paper are a different set of organisations to Paper II. Only the consultancy firm is common to both Paper II and Paper III. Meanwhile, this paper adopted a longitudinal design, which allows for the investigation of the learning processes and loops. In discussing the findings, the concept of boundary objects and absorptive capacity are applied in this paper to provide insights into how knowledge is transferred, contextualised, and developed at the supplier organisation.

An early version of this paper was presented at the 28th EurOMA Conference and the Doctoral Seminar in Berlin, Germany, in July 2021 (online) under the title of "Sustainability-oriented supplier development: a learning perspective". Comments from the panel members and peer PhD students helped with revising the initial conceptual framework and the methodology.

We were subsequently invited to submit the paper to a special issue of a journal, and the paper is currently under review. I am the first author of this paper and I have done the majority of the work on this paper which can be counted as 80% of the total work, while my co-authors have contributed the remaining 20%. I initiated the main ideas, collected and analysed the data, and drafted the full paper. My supervisors, as my co-authors, provided insightful suggestions and feedback at all stages of the process, including while drafting the case study protocol, the conference paper, and the final submission. The future plan of this paper is to address the reviewers' comments until it gets published. My co-authors have certified below that they agree with my above claim as to my contribution in carrying out this piece of research and in writing this paper.

Professor Linda Hendry

Date: 9th February 2022

Professor Mark Stevenson

Date: 9th February 2022

4.2 Structured Abstract

Purpose: To study the learning processes and mechanisms involved in sustainability-oriented supplier development (SSD), including how knowledge is transmitted by the buyer and how it is received, understood and internalised by the supplier.

Design/methodology/approach: An exploratory longitudinal multi-case study approach is adopted. The research context is a social SSD project focusing on occupational health and safety (OHS) management at four supplier factories. The paper draws on the constructs of absorptive capacity and boundary objects. The main data source is semi-structured interviews spanning the whole project.

Findings: Suppliers' use of absorptive capacity is triggered by the transfer of boundary objects created by the buyer, namely an OHS inspection checklist and the concept of an OHS group. The findings suggest that suppliers explore the knowledge received in a similar and passive way, but transform and exploit this knowledge differently by developing the boundary objects to fit their own needs and contexts, incorporating them into their organisational structures and procedures.

Research implications: The research furthers our understanding of the processes and outputs of supply chain learning in SSD projects, including how knowledge reaches the shop floor level of the supplier. A holistic and dynamic perspective is provided on how suppliers internalise sustainability knowledge transferred from the buying firm to develop organisational structures and procedures for OHS management.

Practical implications: Buying firms should seek to develop tools, policies, or procedures that can work as boundary objects for transferring knowledge and generating a sustained impact on supplier practices. It is also important that buyers allow sufficient time for suppliers to go through the transformative learning process and that they pay sufficient attention to how suppliers translate the knowledge that is delivered to them. For the supplier, establishing

structures and procedures for OHS management can help to prepare for future audits thereby reducing audit fatigue.

Originality/value: The paper contributes to the supply chain learning literature by looking at suppliers' learning processes towards sustainability as triggered by the focal buying firm. It sheds new light on the role of boundary objects for facilitating knowledge transfer and learning between supply chain members in the context of SSD projects.

Keywords: Sustainability-oriented supplier development; Absorptive capacity; Boundary objects; Supply chain learning

Paper type: Research paper

4.3 Introduction

Sustainability-oriented supplier development (SSD) initiatives provide a platform for collaborative knowledge transfer and learning related to sustainability (Yang et al., 2019; Silvestre et al., 2020). Such learning, between a buyer and its suppliers, is difficult to replicate and can lead to the creation of competitive advantages for both firms (Bessant et al., 2003; Carter and Rogers, 2008). Supply chain learning research related to sustainability has focused on examining the approaches buyers adopt to obtain knowledge resources and disseminate knowledge to suppliers (e.g. Gong et al., 2018). For instance, it is common for buyers to engage with external knowledge providers in SSD initiatives to transfer knowledge to suppliers and facilitate supplier learning regarding sustainability (Meinlschmidt et al., 2016; Liu et al., 2019; Silvestre et al., 2020). In addition, the literature suggests that the way in which knowledge is developed at suppliers is an important factor that influences the effectiveness of SSD initiatives (Meinlschmidt et al., 2016; Pereira et al., 2021). Yet, little work has been conducted from a supplier's perspective on how they actually receive and internalise sustainability knowledge.

Literature suggests that the lens of absorptive capacity has the potential to further our understanding of supply chain learning by unpacking the knowledge flows between buyers and suppliers (Sáenz et al., 2014). Absorptive capacity refers to a firm's ability to recognise the value of external knowledge and leverage it to create value for the firm (Lane et al., 2006; Huo et al., 2021). It is applicable to studying suppliers' learning in the context of SSD since this involves suppliers being provided with sustainability knowledge that is supposed to be applied and bring about benefits to them (Sáenz et al., 2014). While the literature has consistently shown that suppliers' absorptive capacity is a key factor affecting their performance (e.g. Tong et al., 2018; Liu et al., 2019), research has primarily focused on analysing the impact of absorptive capacity on whether or not suppliers adopt sustainability practices after receiving assistance from the buyer. But this does not take full advantage of the potential of absorptive

capacity, which is a multidimensional construct that can lend itself to unpacking dynamic and evolving learning processes over time (Lane et al., 2006; Meinlschmidt et al., 2016). In particular, suppliers' use of absorptive capacity to learn over time during SSD initiatives is currently underrepresented in the supply chain learning literature. Moreover, recent research (e.g. Silvestre et al., 2020; Jia et al., 2021b) has called for studies on knowledge dissemination and absorption across organisational boundaries in supply chains, which is especially relevant to SSD initiatives as they inherently involve knowledge transfer.

An important prerequisite for absorptive capacity to take effect is the permeability of boundaries (Roldán Bravo et al., 2020). The use of boundary objects as tools to represent, transfer and develop knowledge that crosses these boundaries has been widely discussed in organisational learning literature in the context of the functional boundaries within organisations (Carlile, 2002). This includes the use of boundary objects to facilitate learning about sustainability and specific sustainability practices across functions (Benn et al., 2013; Hawkins et al., 2017). More recently, supply chain scholars have argued that the boundary object lens is also important for explaining coordination and knowledge transfer mechanisms across organisations within supply chains (Fabbe-Costes et al., 2020). In particular, Fabbe-Costes et al. (2020) examined the role played by supply chain mapping as a boundary object in achieving coordination and integration in contemporary supply chain settings. In SSD, the buyer usually creates a variety of tools that facilitate both knowledge transfer and knowledge application at the supplier side (Meinlschmidt et al., 2016; Tong et al., 2018). Yet, the mechanisms that suppliers use to manage the knowledge transferred from the buyer during SSD remain unclear.

Against this backdrop, this research intends to examine suppliers' learning processes towards internalising the knowledge gained via SSD by drawing on the constructs of absorptive capacity and boundary objects. Our research question is as follows:

- **RQ:** How do suppliers use their absorptive capacity to explore, transform and exploit knowledge that is transferred by the buyer using boundary objects during SSD initiatives?

A longitudinal multi-case study research design in the context of a social SSD project focused on occupational health and safety (OHS) management at four supplier factories has been adopted to address this research question. In particular, we look at how the four suppliers internalise sustainability-oriented knowledge by tracking the acceptance, development, and enhancement of two boundary objects, the concept of an OHS group and an OHS inspection checklist created by the buyer for the SSD project. The main contribution of this research is in unpacking the dynamic and evolving learning processes in SSD projects at the supplier side, drawing on the lens of absorptive capacity. Meanwhile, a novel boundary objects perspective is offered to theorise on knowledge dissemination and learning across the boundaries of supply chain members in SSD.

The remainder of this paper is structured as follows. Section 4.4 details the theoretical background before Section 4.5 outlines the research design. The empirical findings are presented in Section 4.6 followed by a discussion in Section 4.7 that relates our findings to prior literature and develops propositions. Finally, Section 4.8 summarises the theoretical and practical implications, and outlines future research directions.

4.4 Theoretical Background

This section explains the theoretical background to this research. In addition to providing definitions of the key theoretical constructs, i.e. absorptive capacity and boundary objects, we outline their relevance to SSD and explain how they contribute to our understanding of knowledge internalisation at the supplier side in SSD.

4.4.1 Supplier absorptive capacity within SSD initiatives

SSD focuses on developing supplier performance or capability in managing sustainability-relevant challenges (Busse et al., 2016; Jia et al., 2021a). It creates a platform for knowledge transfer and diffusion to occur, and thus it provides suppliers with the opportunity to access external knowledge and leverage it to improve their ability to manage sustainability issues within their organisations (Jia et al., 2021b). The literature on knowledge transfer between supply chain members during SSD initiatives highlights the importance of absorptive capacity for reaping the benefits of such initiatives from the buyer's perspective (Meinlschmidt et al., 2016; Silvestre et al., 2020). However, specific research into suppliers' absorptive functions is more limited, as further discussed below.

Absorptive capacity involves a firm's ability to utilise external knowledge through three sequential processes: explorative learning, to identify and acquire valuable external knowledge; transformative learning, to assimilate valuable external knowledge; and exploitative learning, to apply assimilated knowledge to create new knowledge and value for the firm (Lane et al., 2006; Lichtenthaler and Lichtenthaler, 2009). The capacity of suppliers affects the level at which they can internalise knowledge from the buyer and improve their performance (Sáenz et al., 2014; Roldán Bravo et al., 2020). Specifically in SSD, prior research has shown that suppliers' absorptive capacity affects whether SSD initiatives have the impact that is expected (Meinlschimdt et al., 2016; Tong et al., 2018; Liu et al., 2019). Tong et al. (2018), for example, used absorptive capacity to represent suppliers' ability to implement sustainability initiatives following SSD projects, but the authors did so without further unpacking what constitutes absorptive capacity. Therefore, there is still only limited knowledge about how suppliers use their absorptive capacity to learn and internalise knowledge and about what outputs are realised from these learning processes.

The SSD deployment process includes the generation, transfer and development of

tools, policies, and procedures. Knowledge-senders (e.g. buyers and/or external knowledge providers) create various tools, such as training materials and sessions, and a joint project team that crosses the boundaries of all parties involved in order to transfer knowledge and provide assistance to suppliers (Meinlschimdt et al., 2016; Liu et al., 2019). Meanwhile, new measures and policies are established at knowledge-recipients (suppliers) after receiving knowledge and assistance (Huq et al., 2014). Literature suggests that such tools, policies and procedures work as boundary objects to facilitate knowledge transfer across the boundaries of the buyer and supplier, triggering and institutionalising learning within supplier organisations (Hawkins et al., 2017; Fabbe-Costes et al., 2020). This research will further unpack the mechanisms behind how knowledge is transferred from buyer to supplier, and how learning occurs and is institutionalised at supplier organisations in SSD. In doing so, the study will draw on the construct of boundary objects, as outlined in the next subsection.

4.4.2 Boundary objects and their relevance to SSD

Boundary objects are any form of entity, including tools, concepts, and frameworks, that can cross the boundaries of different functions to achieve common goals (Star and Griesemer, 1989; Carlile, 2002; Benn et al., 2013; Ojansivu et al., 2021). The role of boundary objects in facilitating learning towards sustainability was developed in the organisational learning field. For example, the sustainability concept as a boundary object has been used to promote learning and specific practices related to sustainability across knowledge and disciplinary boundaries within an organisation (Benn et al., 2013). More recent research by Ojansivu et al. (2021) investigated the role of boundary objects that originate from outside an organisation for facilitating knowledge exchange and learning across different functions within the organisation.

The creation and management of boundary objects is a key process in developing and maintaining effective links across functions (Star and Griesemer, 1989; Carlile, 2002). For

example, Hawkins et al. (2017) showed that a "sustainability checklist" and the "concept of carbon reduction" can serve as boundary objects that play an agential role in facilitating middle managers' learning towards sustainability, and that these two boundary objects change or evolve over time in generating and institutionalising learning within organisations.

The construct of a boundary object has, however, only recently been introduced into the supply chain management research field. For example, Fabbe-Costes et al. (2020) introduced the lens of boundary objects to elaborate upon how supply chain mapping as a boundary object allows coordination and knowledge transformation to occur across supply chain members. Since knowledge transfer across the boundaries of buyer and supplier together with learning on the supplier side are at the heart of SSD (Jia et al., 2021b), the lens of boundary objects is argued to have utility for understanding knowledge transfer and learning in SSD. In addition, there are a number of barriers to sustainability-oriented learning in supply chains, such as the lack of proper tools, processes, and structures that trigger and support continuous learning, especially at the supplier side (Yang et al., 2019; Pereira et al., 2021). Literature suggests that assistance provided by the buyer via a supplier development project can trigger supplier learning (Kim et al., 2015; Gong et al., 2018; Pereira et al., 2021); however, whether and how the learning momentum can be maintained at the supplier side remains unclear.

As boundary objects are able to both trigger and institutionalise learning in organisations (Hawkins et al., 2017), it is argued that boundary objects created by the buyer in SSD for transferring knowledge to suppliers may be able to address some of the barriers to learning and facilitate continuous learning at the supplier side. This research thus examines the processes and mechanisms that explain how knowledge disseminated from the buyer is managed and developed at the supplier side by looking at the configuration and development of the tools, concepts, and frameworks that have been conveyed to suppliers through the SSD process.

4.5 Research Method

Research that seeks to understand how suppliers use their absorptive capacity to internalise knowledge gained from other supply chain members during SSD remains limited, calling for more exploratory studies (Yin, 2018; Jia et al., 2021b). Thus, this research adopted a qualitative multi-case study approach. Case research is suitable as it allows researchers to conduct a thorough examination of under-researched issues by collecting rich data from multiple sources, including interviews, observations, and documents (Barratt et al., 2011). Further, researchers suggest that an in-depth case study design using longitudinal analysis may provide the basis for understanding evolution related to sustainability capabilities (Carter and Rogers, 2008). Considering the evolving and dynamic features of learning processes and knowledge transfer processes, a longitudinal case study approach made up of four cases has been adopted. Table 18 summarises the measures taken (Yin, 2018) to ensure the quality of the case study design.

Table 18. Indicators of research quality of Paper III: Validity and reliability

Criteria	Research phase			
	Design	Case selection	Data collection	Data analysis
Construct validity	- Multiple rounds of data collection to illustrate changes and developments in SSD - Longitudinal case study to explore the learning processes	- N/A	- Multiple sources of information - Two rounds of interviews focused on the start and the development of the learning processes	- Triangulate data from multiple sources - Data coding in an abductive way to allow for emerging topics - Case study report validated by informants to avoid researcher bias
Internal validity	- Select a highly relevant industry with major social sustainability risks	- N/A	- Choose the most knowledgeable informants as interviewees from multiple actors	- Record alternative explanations - Interviews fully transcribed and sent to interviewees for validation - Go back and forth between the data and the literature to avoid researcher bias
External validity	- Multiple case study design - Draw on well-established absorptive capacity and boundary object constructs	- Literal sampling using replication logic	- Conduct interviews with multiple informants from each supply chain actor	- Analytic generalization: emerging concepts and patterns shed light on suppliers' use of absorptive capacity via boundary objects in SSD
Reliability	- Develop a case study protocol and database	- Record the case selection criteria	- Develop two semi-structured interview schedules each with a different focus and record all interviews - Keep a written record of the observation notes and documents	- Data coded and interpreted by multiple researchers - Keep a record of the coding process in N-vivo

4.5.1 Research context and case selection

We have focused on the occupational health and safety (OHS) dimension of social sustainability as it remains one of the major concerns in sustainability practice (Jia et al., 2021b). The context of this research is an SSD project initiated by a fast fashion brand (FF) headquartered in Europe for its suppliers based in China. The project lasted for over a year and data were collected over time at different stages of the entire lifecycle of the SSD project. The brand FF launched this project in order to improve suppliers' capability towards managing OHS issues by themselves, by helping each supplier to build a dedicated working group within its factory – a so-called OHS group. This represents one of the two boundary objects involved in this research. Each group was designed to be comprised of both staff with some prior OHS-relevant knowledge and shop floor managers and workers from across different departments without any prior knowledge. The key to this concept of an OHS group is to decentralise the responsibility from only one relevant staff member to a larger group of staff where each one is responsible for his or her own area, as has been the case in quality management literature. Apart from the concept of an OHS group, the other main tool (and boundary object) created by the buyer was an OHS inspection checklist, which was developed by the buyer based on past auditing experience with their suppliers. To effectively deliver these tools to suppliers, the buyer scheduled a variety of knowledge transfer events that were delegated to an external knowledge provider (KP) – a local consultancy firm – to deliver. The knowledge transfer events included classroom training sessions followed by problem-based on-site and remote consultations. There were thus different foci and corresponding knowledge transfer activities as the project progressed.

The unit of analysis is the supplier. In the context of the selected SSD project, we adopted a maximum variation purposive sampling strategy to select the cases that enable us to collect rich data to identify patterns and key themes via conducting both within-case and cross-

case analysis (Saunders et al., 2016). We thus secured access to all of the four suppliers that were involved in the selected SSD project, hereafter referred to as S1 to S4 via initial contact with the brand FF. The four suppliers were all critical suppliers to FF; however, they were different in product line, size, business relationship length and audit performance. This approach followed replication logic to provide similar and complementary findings (Yin et al., 2018). We thus ended up with four cases, which is also suggested by prior research as an appropriate number to achieve an in-depth understanding of the phenomenon under study with a suitable balance between complexity and volume of data (Eisenhardt, 1989; Barratt et al., 2011).

The four cases provided us with rich data. The primary data source was semi-structured interviews, complemented by observation notes. A purposive sampling method was used to select participants for the interviews. To make sure that we selected interviewees that were best informed of this SSD project, we followed a three-step procedure: first, we had an initial meeting with the project manager (FF1) and the project advisor (FF2) of the focal firm and the four leading consultants (KP1-KP4); second, we then asked FF1 to introduce the group leaders of the OHS groups in the four factories; third, we then asked the group leaders to select two to four OHS group members consisting of both shop floor managers and shop floor workers. We thus identified all key informants to interview, which included all group leaders and at least two group members of the OHS group from the four suppliers (S1-S4), the consultants from the KP (KP1-KP4), and both the project manager (FF1) and project advisor (FF2) from the brand FF who were involved in the entire project. Detailed information about the interviewees is explained in the following subsection as well as in Table 19.

4.5.2 Data collection

We developed a case study protocol (see Appendix 2) that specified the aim, theoretical

background, and data collection plan for the research prior to carrying out the study (Yin et al., 2018). The research team had regular interactions with all parties involved in the study throughout the entire project. Primary and secondary data were collected longitudinally over the course of the entire project. The majority of interviewees were interviewed at least twice, including at the start and end of the project. A total of 50 interviews were conducted across 26 different interviewees. The duration of each interview varied from 10 minutes to 90 minutes; and they were conducted in Chinese, the native language of the interviewees. The interview schedule was developed in English and translated into Chinese. All the interviews were audio-recorded and transcribed and accompanied by comprehensive note-taking. Key extracts from the transcripts that had potential to be relevant to the subsequent data analysis were translated back into English. Details of the interviews, the firms accessed, and the interviewees are summarised in Table 19. This table thus shows that both shop floor workers and managers and top/middle management team members were interviewed.

There were different foci for the two rounds of interview. The first round focused on suppliers' OHS knowledge base, their learning expectations, and their plans to operationalise the concept. For example, we asked the suppliers, "how do you understand the role of the OHS group?" In the second round, at the end of the project, we asked informants about what they had learned and how they were running the OHS group. In-between the two rounds of interviews, one of the researchers continued to observe the progress of the project over the course of twelve months by attending five project update meetings, having informal chats, and reviewing six factory visit reports per supplier (see Table 19). Thus, other types of data that were collected included observation notes, documents (such as training materials), and factory visit reports. Data collection culminated in a final interview with the project manager FF1, at which point no new themes were identified and it was concluded that we had achieved a satisfactory level of theoretical saturation (Eisenhardt, 1989).

Table 19. Information of the firms, interviewees, interviews, project meetings, and factory visit reports

Firm; company profile/product category	Firm size; OHS group size	Business dependence; relationship length	No. of interviews of each firm in total		Interviewee; role in this project; job title (supplier)	No. of interviews	Total interview time for interviewee	Project meeting observations/ factory visit reports reviewed
			Project beginning	Project end				
Fast fashion brand and retailer (FF), Fast fashion retailer	n/a	n/a	2	2	FF1, Project manager	2	152 min	Attended and observed 5 project meetings (total of 341 minutes)
					FF2, Project advisor	2	131 min	
External knowledge provider (KP), Consultancy	n/a	n/a	5	4	KP1, Consultant for S1&S4	3	123 min	
					KP2, Consultant for S2	2	96 min	
					KP3, Consultant for S3	2	78 min	
					KP4, Consultant for S1&S4	2	43 min	
Supplier factory 1 (S1), Accessories	418 employees, 18 members	40%, 10 years	7	4	S1-1, OHS group leader, General manager	2	27 min	6 factory visit reports (22 pages)
					S1-2, OHS group leader, Assistant manager	3	83 min	
					S1-3, OHS group member, shop floor manager	2	27 min	
					S1-4, OHS group member, shop floor manager	2	27 min	
					S1-5, OHS group member, shop floor worker	1	16 min	
					S1-6, OHS group member, shop floor worker	1	10 min	
Supplier factory 2 (S2), Homeware	70 employees, 10 members	60%, 10 years	6	5	S2-1, OHS group leader, Purchasing assistant manager	2	52 min	6 factory visit reports (20 pages)
					S2-2, OHS group leader, Purchasing manager	2	38 min	
					S2-3, OHS group member, Shop floor worker	2	18 min	
					S2-4, OHS group member, OHS executive	2	36 min	
					S2-5, OHS group member, Shop floor worker	2	20 min	
					S2-6, OHS group member, Shop floor manager	1	25 min	
Supplier factory 3 (S3), Electronics	51 employees, 6 members	30%, 8 years	4	3	S3-1, OHS group leader, General manager	2	34 min	6 factory visit reports (20 pages)
					S3-2, OHS group leader, Administrative commissioner	2	62 min	
					S3-3, OHS group member,	2	21 min	

					Shop floor worker			
					S3-4, OHS group member, Warehouse manager	1	28 min	
Supplier factory 4 (S4), Homeware	54 employees, 8 members	10%, 2 years	4	4	S4-1, OHS group leader, General manager	2	26 min	6 factory visit reports (21 pages)
					S4-2, OHS group leader, OHS manager	2	40 min	
					S4-3, OHS group member, Shop floor manager	2	22 min	
					S4-4, OHS group member, Shop floor worker	2	28 min	

4.5.3 Data analysis procedure

We followed an abductive reasoning approach to analyse the data by moving back and forth between deductive reasoning, where we drew on established constructs from the two theoretical lenses, and inductive reasoning, based on emerging themes from the empirical data (Ketokivi and Choi, 2014; Jia et al., 2021b). More specifically, the established constructs guided the design of the data collection and the development of higher-order codes. Meanwhile, new themes inductively identified from the empirical data provided us with additional theoretical insight, thus contributing to theory elaboration. Such an abductive approach thus allowed us to gain sufficient depth and breadth of exploration to achieve our aim of theory elaboration and development on supplier absorptive capacity and the role of boundary objects in SSD projects (Ketokivi and Choi, 2014).

We developed a system of codes to explore the data we collected. Theoretical constructs, such as explorative learning and boundary objects, were generated from the literature. Themes relevant to boundary objects were empirically substantiated and coded based on their status in the context of this research. For example, data about the generation of the two boundary objects was coded into ‘boundary objects created by the buyer’ as a subcode of explorative learning. Meanwhile, inductive codes, such as ‘identify additional knowledge gaps’, inductively emerged from the data. The coding process was supported by qualitative data analysis software (*N-Vivo*). Finally, Figure 7 presents the coding structure derived from the data analysis process.

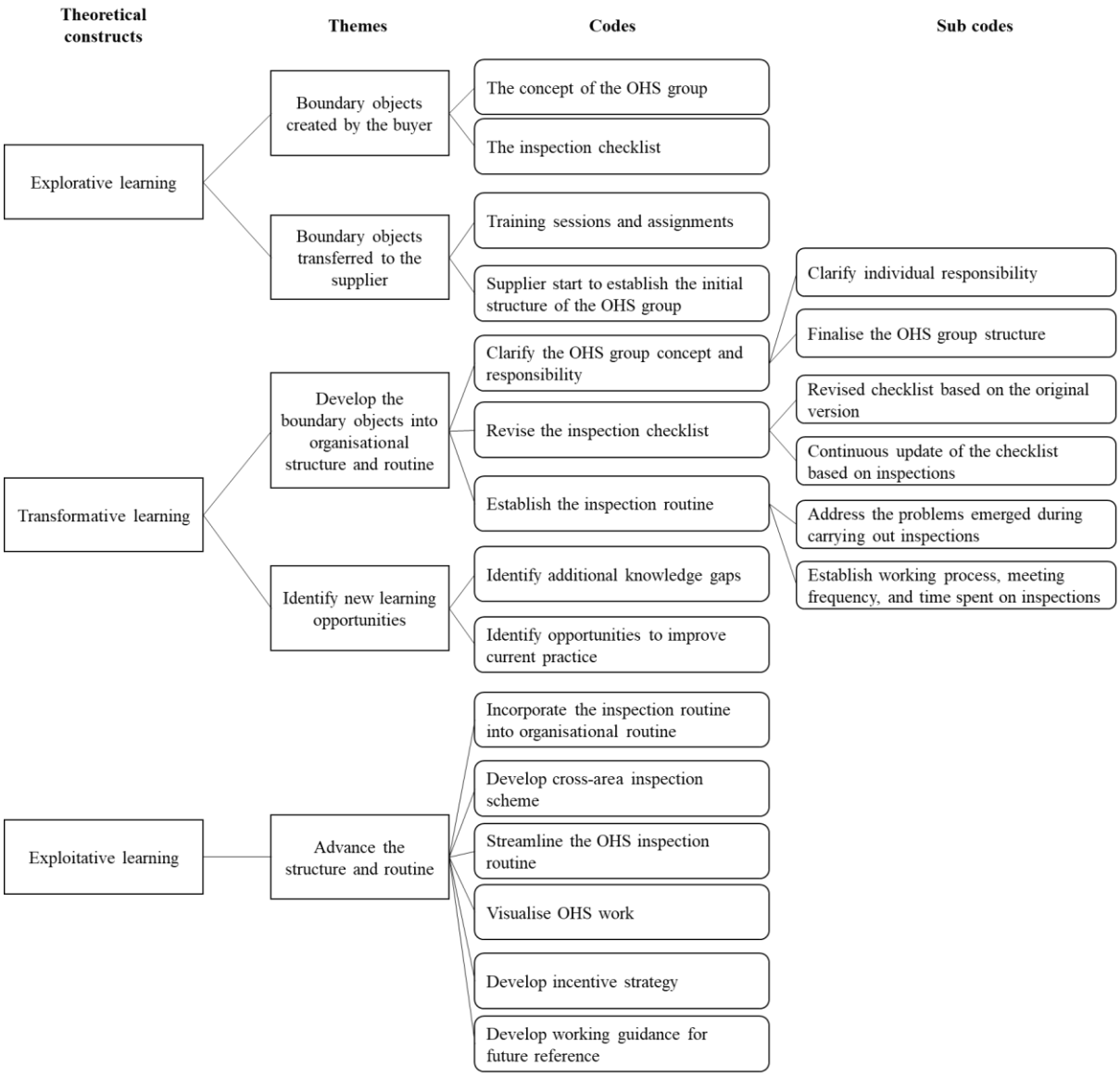


Figure 7. Coding structure of Paper III

4.6 Findings

This section outlines how sustainability knowledge is disseminated from the buyer to the supplier organisations and how that knowledge is managed and developed at the suppliers. More specifically, it summarises the conveyance of boundary objects from the buyer to the suppliers via SSD projects, during which suppliers use their absorptive capacity to develop the boundary objects, contextualising and configuring them to meet their local needs, resulting in the internalisation of the knowledge transferred from the buyer. The findings show that all four suppliers went through a learning loop that consists of explorative, transformative, and

exploitative learning. It is shown that, during this process, transformative learning can also trigger new rounds of explorative learning before moving on to exploitative learning. Meanwhile, although explorative learning was similarly triggered and led by the buyer and the external knowledge provider in all four cases, the propensity and content of transformative and exploitative learning differed across the suppliers according to factors such as the size of the firm, the attitude of the group leaders, and the knowledge-senders' approach to supervision. Table 20 provides example evidence of suppliers' use of absorptive capacity and the changes to the boundary objects during the SSD project.

4.6.1 Explorative learning – accepting the boundary objects

Before implementing the SSD project at each supplier, the two key boundary objects – the concept of an OHS group and the OHS inspection checklist – were created by the buyer. The concept of an OHS group was generated by the buyer based on the idea that "only shop floor workers really care about their health and safety condition because it is of vital interest to them, while it is only a responsibility to the management team" (FF2). In terms of the inspection checklist, this was designed by the buyer based on past auditing of the firm's supply base. By providing them with this checklist, the suppliers were expected to get an overview of the scope and depth of the knowledge the buyer intended to transfer via the project. Both the concept of an OHS group and the initial inspection checklist were identical for the four suppliers included in this project since the buyer wanted to control the outputs of this project to some degree by having exactly the same inputs, i.e. the same boundary objects for S1-S4.

Table 20. Sample empirical evidence of suppliers' use of absorptive capacity

Learning stages	The status of the boundary objects		Sample of key quotes	Characteristics of this learning process
Explorative learning	Boundary objects created by the buyer	The concept of the OHS group	Our aim is to help the factory to establish an effective OHS group which is consisting of staff from each responsibility area (FF1). For the factories, it is actually to select a group of people to construct the group that will be in charge of the OHS management for the entire factory (KP2).	The suppliers passively started the project to receive knowledge from the buyer and the KP. The learning is focused on the two boundary objects; the learning content and the way to learn is similar across the four suppliers.
		The inspection checklist	In terms of the knowledge we would like to deliver to our suppliers, this project will focus on the 50 items listed in the inspection list (FF1). The scope of this project is defined by the inspection checklist developed by the brand. This checklist is developed based on the common issues identified from past audits for its supply base (KP1).	
	Boundary objects transferred to the supplier	Training sessions and assignments	He [KP1] came to deliver training to the selected members. The training is very professional and very informative (S1-2). We had a whole day training, during which the teacher told us what we are expected to do and how to use the inspection checklist (S2-1). I covered topics such as the requirements of the OHS group. I got to know the actual situation of the factory and also alleviated their concerns for this project (KP3). We were not sure about some certain items of the checklist and the teacher explained them in more detail in terms of the what we should do and aim to achieve (S4-2).	
		Suppliers start to establish the initial structure of the OHS group	The group member list is still waiting for further amendment because I misunderstood the required structure of the OHS group (S1-2). He [KP2] helped us to establish an original version of the OHS group structure and also provided some instructions and suggestions to us regarding what is OHS (S2-2). She [KP3] helped us to select the group members and had a look at the actual situation of our factory (S3-1). This time the teacher [KP4] came to help us establish the group and I then called a meeting for us all to emphasise the importance of this project and encourage our group members to actively engage (S4-1).	
Transformative learning	Develop the boundary objects into organisational structure and procedure	Clarify the OHS group concept and responsibility	My duty includes three main aspects: to facilitate, to monitor and to provide support and resources for the entire group (S1-1). I now realise that I am also a part of the group and the factory. I have the responsibility to spot and report issues in my responsibility area (S2-3). We also had a discussion around the individual responsibility of each group member and the group leaders (KP3). We divided our factory into several responsibility areas based on the number of floors. Each of the group members is responsible for one floor (S4-2).	Suppliers adapted the OHS group concept into their factories according to their organisational structures and revised the inspection checklist based on their situation and capacity. All suppliers developed an inspection routine that is under continuous adjustment to fit their actual situation.
		Revise the inspection checklist	The original checklist does not fit the actual situation of the factory, the group members didn't know how to use it. So I asked them to first revise the checklist (KP1). The checklist has been revised to fit our packaging floor, the teacher [KP2] asked us to remove irrelevant items (S2-3).	

			My leader provided an updated checklist for each of our group members and asked us to use it (S3-3). I have helped the factory to divide the items into different categories according to the required inspection frequency. The checklist is now simplified and easier to use (KP4).	During this process, the content to learn and the way to learn start to be different and not limited to the two boundary objects. All suppliers showed some level of proactive learning, which indicates a shift from passively receiving knowledge from the buyer and KPs to proactively searching for knowledge relevant to OHS management.
		Establish the inspection routine	All the factories now have a pretty much settled inspection routine (FF1). We have an inspection within my floor every week. Issues found will be reported to the group leader immediately and follow-up corrections will start (S1-3). I'm collecting the inspection results for last month. I'll plan regarding how to address the issues detected and delegate the responsibility to relevant group members (S2-2). We now have established a routine to do inspections. The group members now carry out OHS inspections twice every month. In addition, I do unannounced double checks (S3-2). I will report to my leader once I spot any issues and start to find solutions (S4-4).	
	Identify new learning opportunities	Identify additional knowledge gaps	Our group is now also thinking of the question that: which aspect would we like the teacher to focus on for the next factory visit? We'll discuss this with the teacher before he comes to visit us (S1-1). I'm still not very clear about what the teacher [KP2] said about chemical classification and would like the teacher to give more details next time (S2-6). As a female worker, I'd like to know more about the knowledge relevant to female worker protection (S3-3). I feel like I want to know more about the laws & regulations and procedural documents for OHS work because I'm still a bit confused about this stuff (S4-2).	
		Identify opportunities to improve current practice	I've got an idea that I can also engage the staff in my floor to carry out the OHS work together (S1-4). By doing the inspections, we can also identify opportunities to improve our production routine and facilities (S2-2). I think the key to this OHS group is to engage the group members, and I'd like the teacher to give us more advice on that (S3-1). I'll cover some of the key points into the daily meeting within my floor to let more people know about this [OHS]work (S4-3).	
Exploitative learning	Advance the structure and procedure	Incorporate the inspection procedure into organisational routine	My goal is to develop a solid and operationalised procedure for the OHS group and to make it a formal structure that can operate effectively and sustainably in the factory (S1-1). I'm planning to divide my responsibility area into some sub-areas and ask those staff who report to me to be aware of respective sub-areas, I believe this will work better as we have both a day shift and night shift (S2-6). What we are planning to do is to make the OHS work a part of their job responsibility rather than extra or additional workload (S3-1). It is just about being aware of OHS issues, to report in a timely way, and to sort it as soon as possible. OHS is of great importance to us all, anyway (S4-4).	Improve learning efficiency or improve action efficiency; diversified learning; own routine, own procedure, and efficiency focused actions.
		Develop cross-inspection scheme	We have come up with an idea of cross-inspection to make the inspections not so boring and also more effective (S1-1). I think it is more effective to do cross-inspections as we may overlook issues within our own areas (S1-4).	

	Visualise OHS work	We had the experience of visualisation a few years ago to meet the requirements of some clients and, this time, we would like to make the visualisation more systematic (S4-1). One of the measures we would take is to make the issues we found from inspections visible within the shop floors to let people be aware of those issues and then try to avoid them (S4-2).
	Develop incentive strategy	We developed a points redemption scheme. Basically, we will give points to a group member upon addressing the issue he or she identified during inspections. They can redeem the points for daily necessities every two months (S1-2). We developed an incentive strategy specifically for the OHS group to encourage group members to carry out inspections (S4-2).
	Develop working guidance for wider diffusion	We developed a document which records key steps of this project and also the design of the incentive strategy. It works as a guidance for us to carry on with OHS work in this factory and to copy the same pattern to other factories (S1-2). A working guidance has been finalised during the last factory visit; this document can work as a guideline for the future work of the OHS group (KP2). We'll apply the established procedure to our new factory to manage the OHS issues (S3-1). They [S4] have developed a working guidance and all the group members are actively carrying out their work based on the guidance (KP4).

The receipt and acceptance of the two boundary objects and the initialisation of explorative learning were similar across the four cases. Each of the consultants conducted a kick-off meeting and classroom training session, as required by the buyer. More specifically, the suppliers were informed about the details of the required structure and the expected responsibility of the OHS group, and given general knowledge relevant to OHS management, such as how to identify hazards on the shop floor. Following the requirements from the buyer, all four suppliers (S1-S4) adopted the same structure for the OHS group, where the group was made up of staff from both the management team and the shop floor. More specifically, two leaders for each group were established: one from the top management team, who would make key decisions, and one who had been in charge of OHS management within the factory for some time.

Meanwhile, the original OHS inspection checklist was also unpacked during classroom training to familiarise the group with the items included in it and the scope of the project. In doing so, the suppliers explored and were aware of the knowledge they needed to gain and the responsibilities they were expected to take on for this project. Therefore, explorative learning at the supplier side was characterised by the successful acceptance of the two boundary objects and preparatory work undertaken to contextualise them to the particular supplier. However, at this stage, the suppliers were passively receiving information from the consultants and the buyer. The concept of an OHS group became somewhat clearer to the group leaders, but the inspection checklist was still superficial to them. In particular, the general shop floor workers included in the group did not really absorb anything at this point.

4.6.2 Transformative learning – developing the boundary objects into contextualised organisational structures and procedures

Transformative learning at suppliers was characterised by the contextualisation and

configuration of the two boundary objects. This process naturally differed across the four cases. First, in terms of finalising the OHS group, unlike the remaining three suppliers (S2-S4), which are much smaller in size, S1 went through an additional round of adjustments in terms of the structure of their OHS group. More specifically, following the requirements from the buyer, S1's initial OHS group had over 30 people, which was too large to work effectively. After a factory visit by the FF and a meeting between FF, KP1, and S1, the OHS group was streamlined to a group of 18 people. For example, S1-2 mentioned that "we were a bit out of track in the first version of our OHS group when we mechanically applied the requirements…we had problems such as the group was too large, and not everyone could attend the all-day training because of their normal work duty. Then FF1 came and called a meeting with KP1 and me to configure and then finalise the structure of our OHS group". The final structure was still somewhat different to what was requested by the brand, especially in terms of including shop floor workers. This particular adaptation however was a common feature across all four cases, as explained by KP4: "it is crucial that the group is stable…the turnover rate at the shop floor level is really high, while the shop floor managers are relatively stable… the group [of S4] includes only one shop floor worker". Therefore, the OHS group structure was adapted to better fit the actual situation of the suppliers in order for them to carry on with the OHS work. Furthermore, the individual responsibilities and specific work content of every group leader/member were also specified according to their own situation.

Second, the original OHS inspection checklist was revised by all four suppliers to fit the structure of the OHS group and the individual responsibilities of each group member. More specifically, by applying the knowledge gained via the training sessions on how to identify hazards in their own factory, the group identified problems with the existing inspection checklist and thus made corresponding amendments. For example, S2-1 mentioned that: "As suggested by the teacher [KP2], we did a trial inspection right after the teacher fully explained

the checklist to see whether we needed to add or delete any items to make it work better in our case". This resulted in an updated, customised version of the checklist in which items relevant to the particular supplier were retained and those irrelevant were omitted.

Third, based on the finalised OHS group and the revised inspection checklist, the four suppliers started to develop the inspection routine to further contextualise and solidify the concept of an OHS group. The inspection procedure developed at the four suppliers were quite similar. More specifically, monthly inspections and meetings, closed-loop management of the detected OHS hazards, and reporting schemes were included in the inspection procedure. However, the inspection and reporting frequency was different across the four cases. For example, the scheduled frequency of formal inspections each month was as follows: 3 times for S1, once for S2, twice for S3 and a maximum of twice per month for S4. This was found to depend on the business workload of each supplier. S4-2, for example, explained, "we carry out the formal inspections according to our business workload, say once per month when we are pretty busy and twice when we are not as busy". Meanwhile, the group members in all four cases were found to have developed an inspection habit in addition to carrying out the responsibilities required by the formal inspection routine. They were aware of the need to consider OHS hazards within their area and conducted casual checks on a day-to-day basis, which was far more frequently than was required by the formal routine. Therefore, the habit of inspections was developed both at the group leader and group member levels in all four suppliers, and this was similar across the four cases.

In addition, all four groups made continuous adjustments to the formal inspection routine where necessary, with the assistance of the consultants during subsequent factory visits. The adjustments included changes to the checklist and the inspection routine based on the OHS hazards detected during inspections, and thus they differed across the four suppliers. For example, S3 focused on improving the efficiency of their inspection routine and S3-2

mentioned that “we are still in a stage of trial and error at the moment. We are doing configurations and adjustments to the way we carry out the inspections and how we run the OHS group. We are trying to figure out a way that suits our factory best.”

Further, the suppliers entered a learning loop where they identified opportunities to learn new knowledge and improved current practices by applying what they had learned. More specifically, the suppliers showed an intention to gain additional new knowledge and to learn more about any opportunities to improve their current practices. For example, the group leaders in S2 and S4 (S2-2 and S4-2) expressed a willingness to learn more about relevant laws and regulations and asked the corresponding lead consultant from KP to cover this topic in a classroom training session during their next factory visit. S2-2, in particular, highlighted his success in arguing with the local authority about firefighting equipment, drawing on the knowledge he had learned from the classroom training. Therefore, the group leaders started to realise the benefits brought about by the project and thus became more proactive in their approach to learning.

Moreover, it was found that the group leaders played an important role in whether or not the group proactively learned and applied the knowledge. More specifically, the general workload, the attitude of the group leaders, and the frequency of supervisory factory visits from KP and FF affected how far they pushed the group members to carry out the OHS work. For example, the group leader of S2 (S2-1) said: “this [OHS group work] is additional work for me, I don’t have a lot of time to put into it… we are running a monthly inspection where everyone is responsible for his/her area and a monthly meeting where they summarise and report the OHS hazards they have identified”. And thus, there is only one inspection every month for S2. In fact, in the case of S4, it was found that when there were no factory visits from KP4 within a three-month period, inspections were either postponed or cancelled by the supplier. Moreover, KP1 also emphasised, based on his experience with S1, the importance of pushing group

leaders to carry out inspections and to summarise the issues they identified at the end of each month. Thus, the factory visits from the KPs were not only important for transferring knowledge, they also represented an effective approach to supervision, providing support to the suppliers and ensuring progress remained on schedule.

Overall, during the transformative learning process, the boundary objects were developed into concrete structures and procedures in all four suppliers, i.e. the finalised OHS group and the OHS inspection routine, which were then also taken forward by the suppliers via exploitative learning. However, the four suppliers differed in terms of the specific learning content since they faced different OHS challenges and had different workload constraints.

4.6.3 Exploitative learning – embedding and enhancing structures and procedures

During this learning process, suppliers proactively developed some specific documents and supportive strategies to further enhance and embed the OHS group structure and OHS inspection routine into their organisations, and the actions they took to exploit the knowledge were found to vary across the four cases. For example, all four suppliers produced a guideline document that recorded the key steps, events and materials of the project for further reference. However, the way in which they intended to use this guideline differed. More specifically, the group leaders of S1 expressed their willingness to use this as a template for applying the same approach at some other factories belonging to the company. Meanwhile, the remaining (smaller) suppliers S2, S3 and S4 viewed the guideline as a user manual for themselves and the other group members when carrying out the current OHS work. They saw this manual as being especially useful to knowledge retention as group members change over time.

In addition, S1 moved a step further towards engaging group members and improving inspection efficiency. More specifically, S1 developed incentive strategies with the support of the top management team to further engage group members and showcase the benefits of being

involved in OHS management work to other workers that were not part of the OHS group. Moreover, a cross-area inspection strategy was developed by S1 to improve the efficacy of inspections. For example, S1-3 mentioned that “we also do cross-area inspections, say, to let someone else check my area. This is because others may have different perspectives and can identify hazards that I cannot find, so we do such cross-area inspections for each other”.

Meanwhile, S4 attempted to visualise the work of the OHS group in order to better integrate it with the way in which they manage the current production routine. This approach was influenced by their past experience of visualising OHS work. Although no additional strategies were developed at S2 and S3, the group leaders also worked to integrate the OHS group into their organisational routines and made some progress in terms of improving efficiency in responding to OHS audits. This was confirmed by KP3, who mentioned that “I’ve had a check of the way the group [S3] do inspections and also the meeting minutes of their monthly meetings, now I can say that the group is running smoothly and effectively”. This also illustrates a learning loop between transformative learning and exploitative learning, where suppliers move back and forth to incorporate past experiences into current practices for managing OHS.

Finally, additional benefits provided by the OHS group and the inspection routine have been identified. For example, S1-2 mentioned that “unlike in the past, I don’t need to do a lot of preparations now when we have audits. I just need to post a notification to the group members and go and have a check with them before the audit. This has reduced the workload for me and the entire factory to a very large extent compared to before”. In other words, this helped with readiness for future audits either by the supplier’s customers or by other third parties. Therefore, exploitative learning is characterised by improving efficiency and expanding the scope to further enhance and embed the established structures and procedures.

4.6.4 Improvements in managing OHS issues

Towards the end of the project, all four suppliers began reporting fewer OHS risks and issues from the regular OHS inspections. This was also confirmed by the KPs. For example, after the last factory visit, KP1 said "S1 went through a process in which they identified an increasing number of non-compliances in the first few OHS inspections and then a decreasing trend [of the number of non-compliances]. The focus now is to address the identified issues and prevent them from emerging again". Suppliers also reported an improved awareness in addition to inspection skills. For example, one of the shop floor workers (S2-3) had substantially improved both her awareness of identifying OHS risks and her ability to practice her duty as an OHS group member. She mentioned that "now I realise that I have the responsibility to report any risks I find during work…before [joining the group], I just felt that I was merely a worker to earn money from working here, these [OHS risks] were none of my business". Meanwhile, the OHS group and the OHS inspection routine have been successfully integrated into the supplier organisations. For example, KP3, who mentioned that "I've checked the way the group [S3] do inspections and also the meeting minutes of their monthly meetings, so now I can say that the group is running smoothly and effectively, and this structure is well embedded in this organisation". These claims were also echoed by S1-2 who referred to overall improvements in terms of both awareness and inspection skills throughout the entire OHS group and the factory, concluding that is now helping to reduce audit fatigue.

4.7 Discussion

This paper has drawn on the constructs of absorptive capacity and boundary objects to study the knowledge transfer and internalisation process at the supplier side in SSD projects, as summarised and conceptualised in Figure 8. Figure 8 illustrates how the transfer of the boundary objects triggers similar explorative learning processes in the OHS groups of the four

cases. The OHS group in each supplier then takes a different approach towards transforming and exploiting the knowledge gained to develop the boundary objects into consolidated organisational structures and procedures in recognition of their local needs and contexts.

The results show that, in deploying the SSD project, the buyer has created the key boundary objects and taken actions to facilitate knowledge transfer to and knowledge development at suppliers using these objects. This finding is consistent with prior literature by showing that sustainability initiatives, such as SSD projects, are key drivers of learning towards sustainability in supply chains (Silvestre et al., 2020), and that the source of learning is external to the suppliers (Kim et al, 2015; Huo et al, 2021; Pereira et al., 2021). More specifically, it is the buyer who initiated knowledge transfer and dissemination towards suppliers, and the passive explorative learning phase at the supplier side ends with the acceptance of the boundary objects.

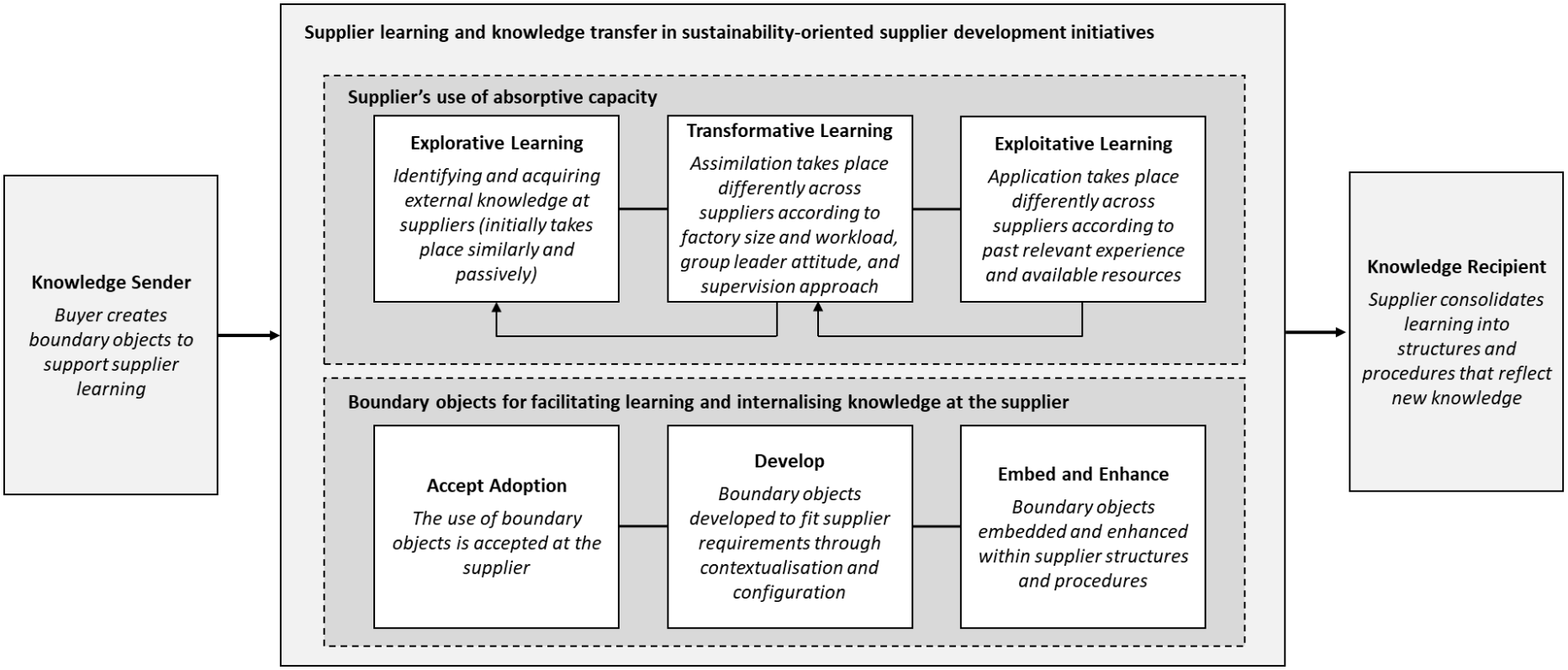


Figure 8. Suppliers' use of absorptive capacity and boundary objects to internalise sustainability knowledge

Literature has suggested that boundary objects play an agential role in facilitating learning towards sustainability in organisations (Hawkins et al., 2017), and that the creation and management of boundary objects is a key process in developing and maintaining effective links across different functions within organisations (Star and Griesemer, 1989). We extend the use of boundary objects to the transfer of sustainability knowledge across different organisations in a supply chain context. More specifically, our research suggests that the 'concept of an OHS group' and the 'OHS inspection checklist' are valuable boundary objects that carry standardised knowledge and work to support the knowledge transfer process from buyer to supplier. Therefore, our first proposition is:

- **Proposition 1.** Suppliers start the learning process towards sustainability in a passive manner. The explorative learning process is driven by the buyer and realised by the transfer of the boundary objects created by the buyer in SSD projects.

This research adds further insight into transformative learning at the supplier side. Previous research has shown that limited attention has been given to transformative learning, although it plays a vital role in connecting explorative and exploitative learning and in processing valuable external and existing internal knowledge (Lane et al., 2006; Knoppen et al., 2015; Huo et al., 2021). It has also been shown that boundary objects are important for enabling the transformation of knowledge (Carlile, 2002; Fabbe-Costes et al., 2020). Our research places an emphasis on transformative learning at the supplier side by examining how knowledge is assimilated by suppliers who configure and develop the boundary objects that were originally generated by the buyer. For example, S3 gradually finalised the OHS inspection checklist and developed the inspection routine by applying the knowledge gained from various knowledge transfer events, such as the training sessions and remote consultations, to their own situation. Therefore, the concept of an OHS group and the inspection checklist are now rooted

in and contextualised by established structures and procedures (Hawkins et al., 2017), i.e. the finalised OHS group and the inspection procedure.

Literature has suggested that a cross-functional team consisting of employees from different departments is critical to effective transformative learning and to establishing organisational buy-in towards change at buyer organisations (Meinlschmidt et al., 2016; Fabbe-Costes et al., 2020). We expand this line of work by showing how suppliers use the cross-functional team, i.e. the OHS group in the context of this research, to transform knowledge and facilitate organisational and individual buy-in to change. For example, some group members, especially shop floor workers, gradually developed an awareness of OHS issues and started to carry out informal inspections in addition to the formal inspection routine. This illustrates the need to include multiple hierarchical levels of staff in the cross-functional team in order to actually embed the structure and procedure within the organisation. More importantly, by including shop floor workers in the knowledge transformation process, the knowledge transferred from the buyer was able to raise awareness levels throughout the entire supplier organisation. Our findings thus reinforce those from previous literature (e.g. Liu et al., 2019) and further unpack how the sustainability group within a supplier organisation can take effect to facilitate changes in terms of OHS management.

Moreover, we find that transformative learning manifested in a process whereby suppliers, as knowledge-recipients, started to take the initiative to learn proactively. Meanwhile, the use of absorptive capacity at the supplier side centres on transformative learning, which generates either new rounds of explorative learning or progresses to exploitative learning, as depicted in Figure 8. For example, some group members have identified new knowledge gaps and expressed their willingness to learn more. This complements recent findings (e.g. Pereira et al., 2021) on the combined use of explorative and exploitative learning at the supplier side by focusing on the transformation of the sustainability knowledge acquired via boundary

objects. Meanwhile, our findings identify several factors, such as the size and workload of the supplier, the attitude of the OHS group leaders, and the frequency of factory visits by the knowledge-senders, that affect the approach and attitude of suppliers towards transformative learning, i.e. how boundary objects are developed into organisational structures and procedures.

Thus, we develop the following propositions:

- **Proposition 2a.** Suppliers transform knowledge by contextualising and configuring the boundary objects according to their own situation to establish structures and procedures for managing sustainability issues, creating improved awareness throughout the organisation.
- **Proposition 2b.** During transformative learning, suppliers start to learn more proactively by initiating either exploitative learning, to take the transformed knowledge forward, or another round of explorative learning, to acquire additional valuable external knowledge.
- **Proposition 2c.** A supplier's approach to transformative learning is influenced by the organisation's size and workload, the OHS group leaders' attitude, and the knowledge-senders' approach to supervision.

Exploitative learning focuses on making improvements to current practices, and it is often used in combination with explorative learning by organisations when learning about sustainability (Silvestre et al., 2020; Pereira et al., 2021). This point is also supported by our findings, where learning loops consisting of the three learning processes were evident. More specifically, the established OHS group and inspection procedure worked to sustain the learning loops. For example, group members in S2 identified new knowledge gaps as they applied the knowledge transferred to conduct OHS inspections. Moreover, our findings further reveal that exploitative learning content varies across different suppliers as each has a different

knowledge base, different set of resources and prior experience in OHS work (Liu et al., 2019). For example, S4 further improved the efficiency of the established OHS group and inspection routine based on its past experience with visualisation techniques.

Literature suggests that supply chain learning towards sustainability undergoes multiple stages, where the buyer adopts different approaches and leverages various resources to disseminate the knowledge (Gong et al., 2018). We add to this by showing how supply chain learning content that is disseminated by the buyer is internalised at supplier organisations from the supplier's perspective. More specifically, upon receiving the boundary objects, the suppliers were pushed into entering a learning process. The OHS group and inspection routine then worked as supporting and facilitating structures and routines that enabled learning to be sustained within the supplier organisations. Therefore, by receiving the boundary objects and by developing them into concrete organisational structures and procedures, barriers to maintaining learning momentum, such as an inability to enter the learning cycle or lack of supporting structures (Yang et al., 2019), can be addressed.

Therefore, we propose the final set of propositions:

- **Proposition 3a.** In exploitative learning, suppliers combine knowledge gained from SSD with their past experiences and existing resources to further enhance established structures and procedures for managing sustainability issues.
- **Proposition 3b.** Developing boundary objects received from the buyer into embedded structures and procedures during exploitative learning can help to maintain learning momentum towards sustainability at supplier organisations.

4.8 Conclusions

This paper has adopted the absorptive capacity and boundary object lenses to examine knowledge internalisation at the supplier side in SSD projects. Focusing on suppliers' use of

absorptive capacity and the role of boundary objects has enabled an analysis of the dynamic and evolving nature of sustainability-related learning in supply chains. In doing so, the paper has responded to calls to investigate the processes and mechanisms behind sustainability-related supply chain learning and knowledge internalisation (Yang et al., 2019), especially by suppliers in SSD projects within the supply chain (Silvestre et al., 2020; Jia et al., 2021b).

More specifically, this paper has contributed to the literature in three ways. First, we have unpacked suppliers' use of absorptive capacity by providing a holistic and dynamic perspective of how suppliers internalise sustainability knowledge transferred from the focal buying firm that covers the explorative, transformative and exploitative learning process and leading to an improved understanding of the entire learning process for suppliers in SSD projects. Our results provide further insight and empirical evidence into the learning loops that occur at the supplier side and into the particular importance of transformative learning, which was largely omitted by previous literature.

Second, the paper has examined the three learning processes whilst also drawing on the construct of boundary objects. Specifically, this contribution stems from investigating suppliers' use of absorptive capacity by analysing the changes that occurred to two boundary objects. The different stages – the acceptance, development, and enhancement of boundary objects – represent the different foci of the three learning processes (i.e. exploration, transformation, and exploitation). To the authors' knowledge, this is the first paper to introduce the construct of boundary objects into the study of suppliers' learning processes to understand how knowledge transferred from the buyer to the supplier is internalised. In doing so, it opens up important avenues for further investigation of the knowledge flows between supply chain members using boundary theories and concepts.

Third, the paper has improved our understanding of the processes and outputs of supply chain learning in SSD projects from a supplier perspective. More specifically, our findings have

shown that the learning process is driven by the buyer – by creating and transferring boundary objects – and realised at the supplier side by developing these objects into concrete organisational structures and procedures. Importantly, this research showcases how knowledge transfer and diffusion can reach the shop floor level, generating a wider and stronger impact on the entire supplier organisation by developing the boundary objects into consolidated structures and procedures. In doing so, the study has also contributed to revealing the role of boundary objects in addressing the barriers to supply chain learning, as called for by previous research (e.g. Yang et al., 2019).

4.8.1 Managerial implications

Our research has important managerial implications for both buyers and suppliers. Buyers should consider developing tools, policies, or procedures when implementing SSD projects in order to generate a strong and sustained impact on suppliers during and after a project. This is in addition to general training sessions or workshops. Moreover, differences across suppliers, such as their size, knowledge base, and workload, need to be taken into consideration by the buyer when designing and deploying a project. For example, the OHS group established in the SSD project under study became a concrete structure within the supplier organisations to help maintain learning momentum towards sustainability and diffuse the knowledge to a wider audience, particularly the shop floor level. While templates and tools are valuable, there is no one-size-fits-all approach. Differences across suppliers, such as their size, need to be taken into consideration as this can affect whether suppliers are able to continue with the learning and new practices for sustainability. Thus, there is a need to provide scope for sufficient flexibility in the design of rules and requirements associated with any boundary objects, to keep track of how boundary objects are actually used by suppliers, and to provide support and assistance when needed. Finally, for suppliers, SSD projects provide the opportunity to access

sustainability knowledge, practices, and tools that they would not otherwise be able to access. Actively engaging in SSD to make the most use of the assistance provided can be beneficial for their sustainability performance in both the short-term and long-term. For example, the established OHS inspection routine and OHS group related to sustainability can help to reduce the burden of preparing for future audits, thereby contributing to overcoming the phenomenon of audit fatigue.

4.8.2 Limitations and future research

This research was limited to examining two particular boundary objects. Future research could be extended to other types of boundary objects and how they affect the knowledge transfer and learning processes in SSD projects. We have looked at suppliers' absorptive capacity from an organisational level perspective only; hence, learning and the use of absorptive capacity at multiple levels, including at the individual, organisational, and supply chain levels is an interesting direction for future study. Meanwhile, future research could also extend our study to include a broader range of supplier characteristics. This would enable a deeper understanding of factors that explain variation in how suppliers internalise sustainability knowledge. Finally, while our research has adopted a supplier's perspective, focusing on knowledge flows to and within supplier organisations, further analysis could be undertaken from a triadic perspective by examining the roles of the buyer, external knowledge provider, and supplier to evaluate how the interactions between all three players impact supply chain learning towards sustainability.

Chapter 5 – Conclusions

In this concluding section, the overall contribution of this PhD project and the contribution of each individual paper will first be discussed in Section 5.1. Section 5.2 will summarise the managerial insights derived from this research. Lastly, the limitations and future research directions will be provided in Section 5.3.

5.1 Contribution to Knowledge

As discussed in the Introduction Chapter, there is a gap in existing knowledge in terms of how SSD projects can be cascaded or disseminated to suppliers across multiple tiers in global supply chains. This research contributes to filling this gap and furthering our understanding in this area. Through conducting three pieces of inter-related research, this thesis answers the overarching research question of "*How do suppliers of multi-tier supply chains participate in and learn from sustainability-oriented supplier development initiatives deployed by the focal firm?*". In doing so, the thesis presents both an overview of the literature in the field of SSD, and empirical evidence on how SSD initiatives are extended further up the supply chain and internalised within supplier organisations.

Essentially, the thesis makes novel contributions to the field from the following five aspects (as shown in Figure 9). First, the research in this thesis provides insights into the use of SSD projects to develop multi-tier suppliers based in China supplying to leading fast-fashion brands in terms of social sustainability. By furthering the understanding of the SSD process and the implementation of social SSD projects in global supply chains, it contributes to filling the gap of limited SSD research on the social dimension of sustainability in multi-tier supply chains, as emphasised by prior literature (e.g. Subramaniam et al., 2019). More specifically, the findings show that it is becoming common for some Western brands to implement SSD projects with their suppliers based in emerging economies such as China to cascade sustainability-related practices up the supply chain. A variety of SSD projects have been developed by those brands, including knowledge-intensive training sessions, on-site tutorials, or a combination of different activities. Though there are still many challenges such as the lack of power from the focal firm over lower-tier suppliers and the institutional differences as identified by previous literature (Villena and Gioia, 2020), it is worth noting that there are indeed some good practices that are used to tackle those challenges, leading to the increase of effectiveness and scalability of SSD projects in the emerging economy context. For example, one common feature of the SSD projects studied in this research is the involvement of a local external knowledge provider. This not only helps with the localisation of SSD projects for the brands but also creates connection with external technical support for the suppliers. With both formal audits and the support provided by SSD projects in place, it appears to be able to facilitate the smooth flow of sustainability-related practices throughout the supply chain. Therefore, this research showcases the progress that has been made so far and the potential scalability in the future in developing suppliers from emerging economies using SSD projects. For example, in the context of China where the laws and regulations regarding sustainability have been improving and changing rapidly in recent years, involving a local third-party

consultancy helps to make sure the most up-to-date local and national requirements are integrated into the SSD projects. As a result, this research can be seen as a starting point for future research that intends to either dig deeper into the specific characteristics of specific emerging economy contexts and social and/or environmental issue contexts or carry out comparative studies to identify differences across different country contexts related to SSD. In addition, as occupational health and safety issues discussed in this thesis are closely linked to other labour issues such as labour conditions, gender equality, grievances, and vulnerable workers (Yawar and Seuring, 2017), it is argued that the conclusions derived from this research also have the potential to be applicable to other social issues. For example, resolving grievances requires established rules and mechanisms that allow frequent and efficient communications (Zhu and Lai, 2019) for both the management level and shop floor level workers. More specifically, the OHS inspection routine could include a check of grievance cases. The established OHS group in this study could be extended to include responsibilities relevant to grievances and also work as a channel for shop floor workers to report grievances.

Second, this research focuses on suppliers' involvement in the process of SSD, responding to the call from prior research (e.g. Sancha et al., 2019; Pereira et al., 2021) to incorporate the supplier perspective in studying the implementation and output of sustainability initiatives. It explores the diffusion of SSD initiatives throughout the supply chains via a novel framework that integrates the theory of boundary-spanning and boundary objects. In doing so, supplier's engagement in both extending SSD further up the supply chain and internalising SSD within its own organisation has been examined, reinforcing the important role played by suppliers in reaping the benefits of SSD projects. In addition, this research highlights the impact of relation-specific assets between suppliers and the focal firm, i.e. social capital, and suppliers' ability in absorbing knowledge, i.e. absorptive capacity, on how suppliers engage in SSD projects. Therefore, this research complements prior research by incorporating a supplier

perspective and revealing the challenges and the opportunities associated with suppliers' engagement in SSD projects. This research, at the same time, suggests the need for focal firms to pay more attention to suppliers' needs and organisational characteristics, and their relationship with suppliers when implementing SSD projects in multi-tier supply chains. For example, OHS issues discussed in this study require the use of on-site inspections and tailored tutorials as the OHS condition is largely dependent on the location, facilities, and infrastructure on the supplier site and thus varies across suppliers. Meanwhile, gender equality issues may require more training programmes that could help supplier factories and female workers in these factories to raise the awareness of gender equality issues as suggested by prior literature (Soundararajan et al., 2018).

Third, this research focuses on the knowledge-intensive feature of SSD projects. It studies the implementation of such projects by investigating knowledge and information transfer across the involved organisations. More specifically, it looks into both knowledge diffusion further up the chain via first-tier suppliers (Paper II) and knowledge internalisation within supplier organisations (Paper III) during SSD projects. The results show that a variety of entities and tools, such as an OHS inspection checklist, have been used to cross the boundaries of the involved organisations to transfer sustainability-related knowledge. For example, the first-tier supplier is found to work as the boundary-spanner who crosses the boundaries of the downstream and upstream dyads to diffuse the knowledge up to the second-tier suppliers; while tools such as the concept of the OHS group developed by the focal firm are used to cross the boundaries of the suppliers to facilitate knowledge application. In this way, the research is applicable for addressing other sustainability issues in supply chains as suppliers often lack sustainability expertise and resources (Subramaniam et al., 2019).

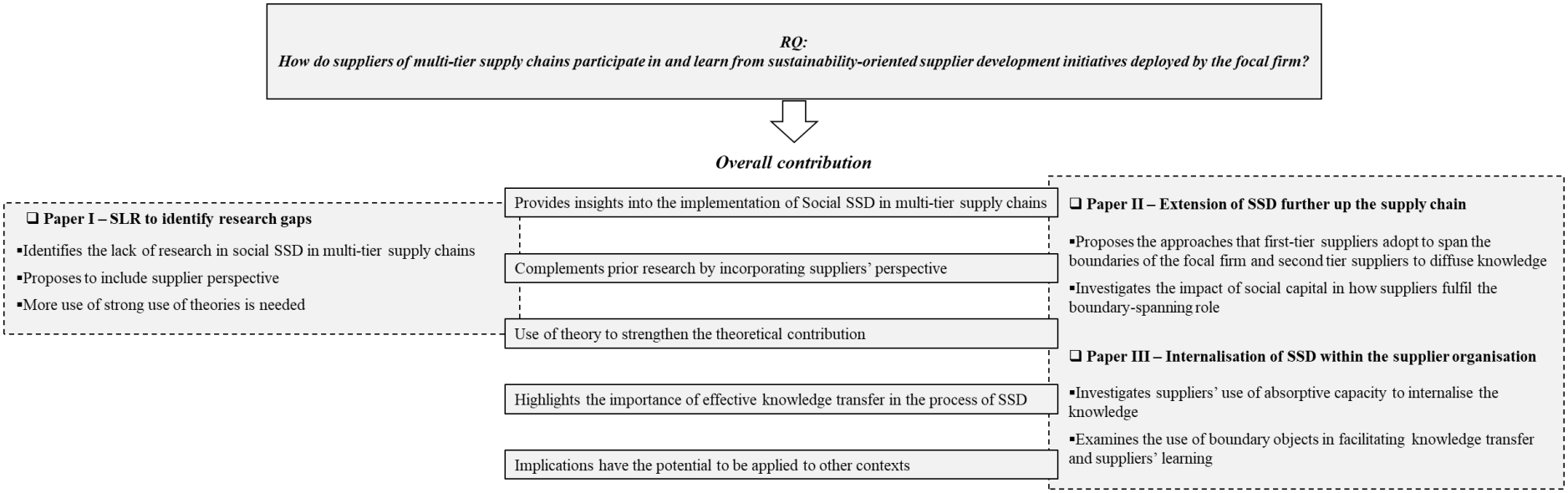


Figure 9. Overall contribution of this research

In addition, to provide a complete picture of the knowledge transfer and application during SSD, this research goes beyond the buyer-supplier dyad to collect and analyse data from all involved organisations, showing that both traditional supply chain members such as the focal firm and first-tier suppliers, and non-traditional supply chain members, such as the consultancies possessing sustainability-related knowledge, play a role in disseminating sustainability-related knowledge throughout the supply chain. Therefore, by revealing the complexity and importance of effective knowledge transfer and the combined use of different approaches in implementing multi-tier SSD projects, this research complements prior research that has proposed the four distinct approaches to managing sustainability in multi-tier supply chains (e.g. Tachizawa and Wong, 2014). This research can be a starting point for future SSD research that looks more deeply into knowledge exchange and transfer between involved parties and how this affects the output of SSD. Moreover, multiple sources of data such as observation notes can better capture the interactions between the involved organisations in addition to interviews. The residency in the consultancy firm enabled me to build trust and have longitudinal access to all involved organisations under study to collect rich data especially observation notes, which were collected over the course of the SSD projects. It is argued that longitudinal access to all organisations and rich observation data contributes greatly to study the relationships between organisations and the knowledge transfer processes. The observations allowed me to capture certain information that the participants may omit or would not like to share via interviews given the sensitive nature of social sustainability issues. It is also worth to note that given the nature of OHS issues, data collected via onsite residency and site visits greatly aided to both revealing concerns and showcasing progresses at supplier factories.

Fourth, this research makes strong use of theoretical lenses to enhance our understanding of the SSD phenomenon as well as providing managerial implications of interest

to practitioners. It thus responds to the call from prior research (e.g. Zorzini et al., 2015) advocating the powerful use of theoretical lenses and a clear justification for the choice of theory in doing sustainability-related research. More specifically, this research borrows two well-known theoretical lenses about knowledge management, i.e. boundary-spanning and boundary objects theory, from Organisation Studies literature and introduces them to SSD research. Neither of these theories have been used in this context before. The use of the two theoretical lenses helped to gain deeper insights into the phenomena of developing multi-tier suppliers in terms of sustainability. More specifically, by drawing on the boundary-spanning theory, Paper II highlights the important role played by first-tier suppliers in extending sustainability initiatives further up the supply chains, providing a refined and substantiated version of the actions first-tier suppliers take. The use of boundary objects concept in Paper III reveals the evolving nature of boundary objects in crossing organisational boundaries to transfer knowledge, thus contributing to explaining why certain tools can work to generate long-lasting effects in facilitate learning and knowledge application. Therefore, this research extends the use of these theoretical lenses to further explore and extend their power in investigating and theorizing the SSD phenomenon as well as utilising them to reinforce the unique viewpoint adopted by this research – to focus on knowledge management in the process of SSD. Meanwhile, by combining the two novel theoretical lenses with other more often used ones (e.g. social capital theory), this research brings novel perspectives and adds more explanatory power to the SSD phenomenon under study. Thus it is arguably able to contribute to generalising the findings from this research to broader SSD research that focuses on addressing other sustainability issues within multi-tier supply chains. Finally, it reinforces the feasibility and benefits of borrowing theoretical lenses from adjacent disciplines to enhance theoretical contributions of SSD and/or SSCM research as well as the generalisation potential of the findings to other fields of research.

Lastly, the findings derived from this research are believed to have the potential to be applied to other SSD contexts as no particular geographical or cultural issues associated with the social context of the China context emerged from this study. Instead, the results can be generalised beyond this context as it is found that the key to successful cascading of SSD projects are the relational specific factors and the implementation strategies. For example, paper III showed that successful knowledge transfer in SSD projects depends on the use of boundary objects along with appropriate supportive actions to assist suppliers when using the boundary objects in SSD.

As mentioned in the beginning of this chapter, the three papers included in this thesis – each with a distinct focus – jointly contribute to answering the overarching research question. Therefore, the next subsection will further explain the findings and contributions to knowledge of each individual paper.

5.1.1 Paper I – The SLR paper

There have been only two literature reviews covering the topic of SSD as a main theme of the research, i.e. Zimmer et al. (2016) and Yawar and Seuring (2017), where the former focused on analytical approaches to study SSD and the latter focused on SSD practices to address social issues. Even though they proposed that SSD initiative is an important tool to bring about sustainability performance improvements in supply chains, they failed to mention that there is still lacking a big picture of the SSD process, which covers components such as the factors that may influence the output of SSD and the implementation strategies. In addition, given that SSD is a fast-growing topic area, with over 30 new publications (from 2017 to 2019) focused exclusively on SSD since the above two literature reviews were published, there was a need to conduct a comprehensive review about SSD, primarily to identify key research themes, research gaps, and promising future research directions.

To this end, an SLR of 83 papers that discussed SSD was conducted in this paper. By categorising the papers according to their research context and topic area, the SLR have identified several gaps that need further research. The results have shown that whilst SSD has received increasing attention over time, there is still scope for further investigation into the various contextual factors, implementation strategies and performance measurement indicators. More specifically, the findings from the SLR have shown that there is a need to identify specific sustainability issues to be addressed instead of discussing sustainability in general as well as a need to study the diffusion of SSD initiatives further up the supply chain beyond first-tier suppliers. Moreover, a set of concrete performance measurement indicators is needed to better capture the output of SSD efforts. In particular, it was concluded that greater attention needs to be given to the supplier side in terms of how and whether they can benefit from SSD.

Further, the SLR have also revealed that the approach adopted to study the SSD process varies across different papers. Therefore, a contingency perspective was applied in reviewing the literature. With the use of the contingency theory lens, the SLR have suggested that future research should adopt a holistic perspective that takes all key components – contingency, response actions, and performance outcomes – into consideration via making more use of interaction and system approaches suggested by contingency theory to capture the complex, dynamic and evolving nature of SSD. Besides, the findings have indicated that there is also a need to give greater consideration to certain contingencies, response actions, and performance indicators, respectively. For example, factors relevant to interactions within the buyer-supplier dyad and those relevant to decision-makers, such as sustainability managers within the SSD process, require further investigation.

Overall, to the best of my knowledge, the paper is the only SLR to date that focuses specifically on SSD. By taking stock of the field using the contingency theory lens, it complements other prior SLRs to present the current state-of-the-art within SSD research,

identify gaps and the promising future research directions, and provide a holistic and comprehensive framework for future SSD research. Moreover, the research gaps identified in this paper were the building blocks of the subsequent empirical studies.

5.1.2 Paper II – Boundary-spanning role of first-tier suppliers in SSD

It was established from the SLR paper that there is a need to investigate the use of SSD projects to develop suppliers beyond the first tier in global supply chains. Prior empirical studies have identified the difficulties (e.g. Villena and Gioia, 2020) and approaches to reaching lower-tiers (e.g. Tachizawa and Wong, 2014), and highlighted the role of first-tier suppliers (FTs) in disseminating sustainability requirements and initiatives further upstream (e.g. Wilhelm et al., 2016). However, antecedents explaining how FTs take up and configure the role in the context of SSD have remained under-explored. By making use of social capital and boundary-spanning theory, this paper presented an in-depth study into how FTs span the boundaries of the focal firm and the second-tier suppliers (STs) in extending SSD initiatives up the supply chain.

The adoption of a supplier perspective in studying SSD in multi-tier supply chains has contributed to addressing a number of research gaps identified by the SLR. Most importantly, this paper goes beyond the buyer-FT dyad to examine the role played by the FT in the wider buyer-FT-ST relationship, drawing on the social capital lens to draw out the importance of relation-specific assets. It can be argued that this context has promising attributes to further our understanding of cascading SSD initiatives to lower-tier suppliers in global multi-tier supply chains. More specifically, the findings of this paper support prior research on the intermediary role played by first-tier suppliers in diffusing sustainability requirements further up the chain (Wilhelm et al., 2016; Soundararajan and Brammer, 2018). Further, by drawing on boundary-spanning theory, this paper has introduced the typology of "boundary-spanning" to describe the work undertaken by FTs and made a distinction between the two types of boundary-

spanning actions carried out by FTs, i.e. compliance-oriented and improvement-oriented actions. Compliance-oriented actions are actions taken by FTs aimed at achieving audit compliance only, whereas improvement-oriented actions go beyond pure audit compliance towards further improvements such as capability building. Therefore, by investigating the boundary-spanning role of FTs that sit on the boundary of the upstream FT-ST dyad and downstream buyer–FT dyad, this paper has extended prior literature by applying the boundary-spanning concept at the organisational and relationship network level.

In addition, the findings in this paper are consistent with prior research by showing that the existence of social capital is necessary for suppliers to adopt sustainability-related actions (Zhu and Lai, 2019). In terms of the distinct impact of the three social capital dimensions, it supports prior research in showing that structural capital establishes the foundation for network members to exchange knowledge and information, while relational capital has a more substantial impact (Villena et al., 2011). By moving a step forward to investigate the specific aspects under the three dimensions of social capital, this paper has also provided further insight into the distinct impact of different social capital aspects and highlighted the importance of cognitive and relational capital. The findings have shown that cognitive and relational capital that exists in the downstream dyad between the FT and the focal firm affects whether the FT adopts compliance- or improvement-oriented boundary-spanning actions in developing upstream STs. Further, a combination of moderate or advanced level of relational and cognitive capital facilitates improvement-oriented actions in SSD. Nonetheless, this paper has provided further empirical evidence as to the potential negative impact of relational capital identified by prior literature (e.g. Villena et al., 2011). In addition, in order to capture the impact of social capital, a large volume of observation data was collected in addition to the interview data. Based on the analysis, this paper has developed a conceptual framework that provides a platform for further advancement of SSD research and generated insights for practitioners

regarding how to make the best use of SSD efforts.

5.1.3 Paper III – Boundary objects in SSD

This paper investigated the process through which knowledge is transferred from knowledge-senders, i.e. the focal firm and the external knowledge provider, to knowledge-recipients, i.e. the suppliers, and the knowledge internalisation process. Together with Paper II, the two empirical papers have jointly filled one of the key gaps identified by the SLR paper – the lack of investigation of supplier engagement in SSD initiatives in multi-tier supply chains. More specifically, this paper focused on the internalisation of SSD whilst Paper II focused on the diffusion of SSD further up the supply chain.

Although the literature has suggested that the way in which suppliers acquire and apply the knowledge gained from SSD influences the effectiveness of SSD initiatives (Meinlschmidt et al., 2016; Pereira et al., 2021), research on how suppliers learn and internalise sustainability-related knowledge over time is still scarce. Drawing on the concept of supplier absorptive capacity and boundary objects, this paper studied the learning processes and mechanisms that suppliers use to internalise the knowledge gained via SSD. Most importantly, by investigating the role of boundary objects in transmitting knowledge across organisational boundaries, this paper has contributed to showcasing how boundary objects developed by the focal firms can be embedded within supplier organisations to generate a wide and strong impact on the entire organisation, especially in achieving adoption at the shop floor level. Therefore, boundary objects as knowledge transfer tools play an important role in addressing the barriers to supply chain learning towards sustainability. For example, the analysis has indicated that the established structure and procedure developed from the boundary objects at supplier factories contributes to overcoming the phenomenon of audit fatigue.

The findings of this paper support the conclusions from prior literature showing that

sustainability initiatives such as SSD are key drivers of suppliers' learning towards sustainability (Huo et al., 2021; Pereira et al., 2021). By unpacking the concept of absorptive capacity and investigating the three components of it, this paper has shown how learning driven by external sources are realised at the supplier side. Among the three learning processes that constitute absorptive capacity, this paper placed an emphasis on transformative learning, which has been given only limited attention in prior literature despite its vital role (Knoppen et al., 2015). The findings showed that suppliers' use of absorptive capacity centres on transformative learning, which either generates new rounds of explorative learning or progresses to exploitative learning. The analysis has also extended prior literature in identifying several factors such as the workload and the knowledge base of the suppliers that will affect how suppliers transform and exploit knowledge gained via SSD.

In addition, the introduction of the concept of boundary objects provided a novel lens for examining the entire learning process. More specifically, the analysis has shown that suppliers' use of absorptive capacity is triggered by the transfer of the two boundary objects, i.e. an OHS inspection checklist and the concept of an OHS group, created by the focal firm. The suppliers behaved similarly in exploring the knowledge but differently in transforming and exploiting the knowledge to configure and develop the boundary objects according to their own needs and contexts. In doing so, this paper has extended the use of the boundary objects lens to the transfer of sustainability knowledge across organisations in the context of SSD. In addition, this paper has provided new insights into how SSD projects could generate a long-lasting impact by suggesting that there is a need to develop concrete tools, policies or procedures that can be embedded in supplier organisations and take effect after the SSD project.

Further, the adoption of a longitudinal case study enabled an analysis of the dynamic and evolving nature of sustainability-related knowledge transfer and learning in the context of SSD. By collecting and analysing data over the entire preparation and implementation period

of the SSD project, the study showed how suppliers transform the knowledge by configuring the two boundary objects and developing them into concrete structures and procedures within their organisations. Moreover, data collected from multiple levels of staff within the supplier organisations enabled an investigation of how both organisational and individual level buy-in, in terms of OHS work management, takes place.

5.2 Managerial Implications

As illustrated in the Introduction Chapter, this study sought to further the understanding of the SSD process for both researchers and practitioners. This section thus summarises the managerial implications of this thesis and each individual paper. Overall, this thesis highlights the important role of suppliers in reaping the full benefits of SSD initiatives for focal firms of multi-tier supply chains. By taking a supplier's perspective, our results show that it is necessary to maintain a good relationship and align the long-term sustainable development goal with suppliers, especially direct first-tier suppliers. To reduce the tension between labour standards and cost efficiency (Govindan et al., 2021), it is also important to showcase the benefits of SSD initiatives such as reducing audit fatigue for suppliers to facilitate active engagement and investment.

Meanwhile, focal firms need to take a holistic view and develop appropriate tools and supervision schemes when deploying SSD initiatives. Essentially, when designing SSD initiatives, there is a need to consider suppliers' characteristics and sustainability capability gap in order to improve the fit between SSD initiatives and suppliers' needs. For example, if developing lower-tier suppliers, the focal firm needs to be aware of the power and relationship strength between all parties, especially between different tiers of suppliers to constrain opportunistic behaviours. Meanwhile, apart from tailoring SSD to suppliers' needs, the scalability of SSD projects needs to be taken into consideration as there are usually hundreds

of suppliers within a fast-fashion supply chain (e.g. Inditex, 2020). In addition, local professional bodies can be a good source of sustainability-related knowledge and a good partner to work with in localising SSD projects. When it comes to implementation, the findings of this research suggest that it is beneficial to have a set of tools to choose from depending on the specific sustainability challenges to address. Such tools can be training sessions, on-site consultations, assignments, sustainability checklists, and the establishment of dedicated sustainability team. Supervision schemes such as monthly review meetings also need to be put in place to make sure that everything is on track. In addition, a proper post-project monitoring scheme may need to be developed in order to sustain the impacts of the SSD projects on suppliers. Such a scheme can be a combination of audits and/or review meetings.

Although the first paper, the SLR paper, primarily focused on presenting the state-of-the-art in research and identifying future research opportunities in the field of SSD, the results from reviewing academic papers also enable practitioners to think through the entire SSD process and the various factors that will influence the final output. The key research findings relevant to practitioners highlight the following three aspects. Firstly, a set of appropriate performance metrics that reflect the overall and specific improvements brought about by SSD initiatives need to be developed. In addition to indicators such as labour rights that have been widely used in audit checklists, indicators such as worker participation in sustainability practices and the presence and operation of internal sustainability-related procedures at supplier organisations can be incorporated to reflect the ongoing progress. Secondly, a portfolio of implementation strategies needs to be in place to fit supplier needs. For example, in order to address the issues of low wages and excessive working time, one of the key aspects of the SSD project can be the digitalisation of the records and the establishment of the system to record and monitor these two issues. In contrast, health and safety issues may rely more on frequent on-site tutorials to assist supplier factories in establishing a procedure to identify risk, take

actions to address it, and close the risk. Thirdly, a holistic and adaptive approach is needed in designing and implementing SSD initiatives. In addition to a thorough project plan, proper supervision and monitoring scheme needs to be put in place to make sure the project progresses as planned. For example, review meetings on a regular basis can provide a chance for all involved parties to take stock and identify potential risks, and make adjustments accordingly.

Paper II provided an in-depth analysis of the role of FTs in diffusing SSD initiatives up the supply chain. The analysis first summarised the two different approaches taken by first-tier suppliers in fulfilling the boundary-spanning role. This contributes to raising the awareness of focal firms as to the engagement of first-tier suppliers in SSD and take actions accordingly. In addition, the analysis highlights to practitioners the importance of relation-specific assets between the organisations involved in SSD initiatives. More specifically, focal firms need to pay attention to the level of social capital both between them and their first-tier suppliers, and within the FT-ST dyad. The level of relational capital requires special attention as excessive relational capital may reinforce compliance-oriented thinking in FTs and thus negatively affect the effectiveness of SSD initiatives. Involving independent third parties such as consultancy firms on a long-term basis may help with building connections between the focal firm and STs and monitoring the relationship between supply chain members. This can also reduce the reliance of STs on FTs in terms of gaining sustainability-related knowledge and dealing with sustainability challenges. Further, there is a need to build adequate cognitive and relational capital with both FTs and STs in order to facilitate improvement-oriented boundary-spanning actions from FTs. To do so, it is important to share the long-term sustainable development agenda with both FTs and STs to make them aware of the fact that they play an important part in realising the long-term sustainable development goal with both responsibilities and rights. This is also applicable to occasions where SSD projects are used to address broader sustainability issues as shared vision for sustainability between supply chain members are

necessary to strive for further improvement goals that exceed basic compliance requirements (H&M, 2021). In addition, social capital at the individual level can also be used to produce organisational benefits. For example, informal chats may contribute to further clarifying the goals and benefits and encouraging active participation.

Paper III provided insights into the acceptance, configuration and embedding of the tools developed by the focal firm at the supplier side. This can enhance practitioners' understanding of the knowledge transfer between involved organisations and knowledge application at suppliers during SSD projects. Moreover, the analysis using the concept of absorptive capacity highlights the need for buyers to pay attention to suppliers' learning ability and knowledge internalisation process. The findings also suggest the need to have careful planning and a proper supervision scheme in place. In addition, the analysis suggests that managers of SSD projects may need to be aware of supplier characteristics such as the size and stability of the workforce. This could inform the design and implementation of tools, policies and procedures when deploying SSD projects. Besides, the analysis also showcases the benefits to managers and dedicated staff at suppliers. More specifically, by developing the tools delivered from the focal firm into concrete organisational structures and procedures related to sustainability, suppliers may experience less audit fatigue for the entire organisation in terms of a reduced burden when it comes to preparing for future audits. Besides, established organisational structures such as OHS groups could also help with improving broader social conditions such as the empowerment of women, gender equality and grievance systems by providing female workers with the opportunity to join the group and facilitating a safe environment to report workplace issues.

5.3 Implications on the Role of External Knowledge Providers

Another novel aspect of this study is that it has some implications as to the role of the

consultancy firm and the consultants. The study reinforces the finding (Gong et al., 2018) that it is common for Western brands to collaborate with local consultancy firms to deploy SSD projects. Results show that when the focal firm works with both FTs and external knowledge providers, the external knowledge provider can use its in-house expertise to complement the role of FTs in knowledge and information transfer in the context of SSD. However, the presence of the external knowledge provider does not affect how FTs fulfil their boundary-spanning role to span the boundaries of STs to diffuse SSD initiatives. This is because the fact that the relationships established between the external knowledge provider and other organisations involved in the SSD project are short-term in nature and do not provide enough opportunities for sustained interactions that would build deeper and various types of social capital (Alghababsheh and Gallear, 2020). This then constrains the external knowledge provider from being able to exert a more significant influence on embedding SSD initiatives in the supply chain, especially regarding knowledge application at the STs level. Therefore, it is suggested that external knowledge providers need to be involved on a regular and long-term basis as cognitive and relational capital can only be developed via continuous and direct interactions among organisations participating in SSD. For example, training sessions plus on-site consultations involving all organisations provide the opportunity for focal firms and external knowledge providers to directly interact with relevant staff from FTs and STs. This enables more practical and context-specific instructions to be offered on a case-by-case basis whilst also constraining exclusively compliance oriented actions, such as information filtering from the FTs. The involvement of an external knowledge provider in this way can also make more effective use of their expertise to assist suppliers at lower tiers in going beyond audit-oriented compliance and in facilitating the establishment of shared values and goals.

In addition, this study identifies an issue associated with the governance of the collaboration between the focal firm and the consultancy firm. During the residency at the

consultancy firm, it was found that complaints and negotiations between the two organisations exist before, during and even after the SSD projects. This is due to the fact that they each had a different approach and focus for the projects and expectations for each other. For example, in the case of Paper III, the focal firm complained that there were not any innovative ideas brought by the consultants during the project. While on the other hand, the consultants complained that there was too little autonomy given to them by the focal firm. Moreover, the scope and timeframe of the project have changed significantly due to the disruption caused by the pandemic, leading to more workload from the consultants. These issues cannot be reflected in the contract or the budget, which constrained the time and effort the consultants could and would like to put into this project. This thus highlights the issue of sustainability-related contracts and governance mechanisms in SSD. Besides, differences in terms of the proactivity and ability across different individual consultants were also identified which also needs further investigation. For example, in order to generate long-term contractual relationships with the focal firm, most of the consultants chose to try their best to deliver what they knew to the suppliers as open and frankly as possible under the contracted scope and frame. However one of them held a different opinion which was to not share all of the key things as he thought this would be more likely to generate follow-up contracts.

5.4 Limitations and Future Research

In addition to the specific limitations and future research opportunities that have been discussed in the three papers respectively, this section will discuss the limitations and research agenda that can be concluded out of this thesis as a whole. It is nonetheless acknowledged that one of the concerns is the extent to which the conclusions derived from the two pieces of empirical research can be broadly generalised to the wider research and practical context. More specifically, this thesis has focused on one of several major concerns in the social dimension

of sustainability, i.e. the OHS issue, in the supply chains of Western fast-fashion brands. Although multiple organisations have been examined, including focal firms, suppliers of multi-tiers and external knowledge providers, and multiple sources of data including primary interview data and observation notes, and secondary data were collected, the results are believed to be fairly indicative of the SSD projects implemented in fast-fashion supply chains by Western brands for their suppliers based in emerging economies such as China. It, however, would still be interesting to see to what degree the findings can be extended to other industries, country contexts, and sustainability concerns. Meanwhile, the generalisability of the findings of this research to the wider SD research field is also worth investigating.

In addition, this research has taken the manufacturing supply chain of Western fast-fashion brands in China as the empirical research context because the China context provided a rich and appropriate setting to study the phenomenon of SSD, with a focus on social sustainability issues. However, due to time and resources limitations, it stopped at two fast-fashion supply chains. Including more supply chains in the China context may contribute to revealing the unique characteristics of this context while including similar supply chains from other country contexts may contribute to a cross-context comparative study of the phenomenon. Additionally, the thesis can provide a building block for future quantitative studies. For example, quantitative indicators and hypotheses could be developed based on the propositions from Paper II to examine the impact of different levels of social capital on the boundary-spanning role of first-tier suppliers in addressing different sustainability challenges in multi-tier supply chains.

Another limitation of this research is the fact that it has focused on supply chain members and the interactions among them. For sure there is an important role played by the external knowledge provider who greatly contributes to bringing expertise and knowledge into the supply chains in the context of SSD. However, this research did not go into much depth to

investigate the role played by non-traditional supply chain members and their interactions with all other organisations. Rather, the external knowledge provider was a gatekeeper into the other organisations that became the focus of this study. Therefore, it is suggested that future research may go further than the relationship networks consisting of supply chain members to include more centrally the roles of non-traditional supply chain members such as consultancy firms. For example, the coordination mechanisms between the focal firm, the suppliers, and the external knowledge providers in deploying multi-tier SSD projects can be investigated. This will also contribute to substantiating the governance approaches of multi-tier SSCM proposed by prior literature (e.g. Tachizawa and Wong, 2014).

Lastly, this research has taken a supplier perspective particularly in Paper II and Paper III by including the perspectives of different tiers of suppliers in the data collection and analysis processes. However, the majority of the data were still collected from first-tier suppliers. Including more data from second-tier suppliers and/or lower-tiers may enhance the contribution to the multi-tier SSD and multi-tier SSCM field. Therefore, it is suggested that future research could go further by approaching more lower-tier suppliers when studying SSD initiatives in multi-tier supply chains.

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Appendix 1: Case Study Protocol of Paper II

1. Overview of the case study

1.1 Aim of this study

This study aims to explore how suppliers can be effectively developed in terms of sustainability in a multi-tier supply chain. In particular, it examines how this is achieved through sustainability-oriented supplier development (SSD) initiatives. SSD is defined as any supplier development initiatives that aim at improving supplier sustainability performance or capability. Meanwhile, this study will investigate the development of lower-tier suppliers in addition to first-tier suppliers. Besides, the role of third-parties that involve in will also be explored.

1.2 Case strategy and rationale

This research is aiming to address the new phenomenon of sustainability-oriented supplier development through elaborating existing results and refining theories. It thus follows an abduction structure (Voss et al., 2016). This structure is suitable for the following reasons: (1) research on how buying firms develop their suppliers in terms of sustainability is still in early-stage with several inconsistency conclusions observed by reviewing relevant literature; (2) themes and patterns identified from relevant literature constructed the initial conceptual framework of this research, which will be further investigated through subsequent data collection (Saunders et al., 2016); (3) the focus of this research is to develop the understanding of the observations and the applied literature, neither to test existing theory nor developing new theory (Voss et al., 2016). Meanwhile, the research design allows necessary modifications as the research goes on, but only on the premise of retaining the rigor (Yin, 2018).

Besides, this research is both descriptive and explanatory in nature because it first seeks to obtain a thorough description of the sustainability-oriented supplier development (SSD)

process, including each party involved in, the relationship between them, and the context setting. Then, it also intends to explain the interactions among the above factors (Saunders et al., 2016).

Case study approach appears to be adequate in real-life settings because it allows researchers to investigate the subject of the case and the interaction between the subject and its context (Saunders et al., 2016). Multiple cases strategy is adopted based on the logic of replication, which allows the strengthening of the findings through either literal replication (individual cases report similar results) or theoretical replication (individual cases report contrasting results for anticipated reasons) (Yin, 2018).

In terms of literal replication, this research intends to employ at least one buying firm from industries such as apparel industry, consumer electronics industry, and automotive industry. Firms within the same industry are believed to present similar patterns in achieving sustainability along the supply chain (Meqdadi et al., 2018). Following the logic of theoretical replication, this research will include multiple suppliers, which are predicted to show different patterns in terms of SSD process. Moreover, the above three industry settings have been adopted in exemplars of other case study research in the field of sustainable multi-tier supply chain research (e.g., Dou et al., 2018; Wilhelm et al., 2016).

1.3 The theoretical lens of this study

A literature review about SSD was first conducted to get an overview of the research relates to SSD. Existing literature shows that the implementation of SSD may benefit suppliers, buyers, and the entire chain. However, two main problems regarding existing literature emerged as follows: how does the deployment of SSD initiatives lead to performance improvement of suppliers and buyers? Why do performance outcomes vary? Thus, the above two observations guided the perspective of this research to investigate how buyers deploy SSD initiatives and

how suppliers involve to address the issue of effectively develop suppliers in terms of sustainability.

Social capital theory is widely used in studying the relationship between operational performance improvement of buyers and suppliers and supplier development practices aiming at improving operational performance (e.g., Preston et al., 2017; Krause et al., 2007). However, the application of social capital theory focuses on illustrating the relationship between social capital and performance outcome through quantitative approaches (e.g., survey), which rarely analyse how social capital is accumulated and how it works. Besides, the use of social capital theory lens in SSD research (e.g., Rodríguez et al., 2016b) is scarce and is called by some researcher as a future research opportunity (e.g., Zhang et al., 2017).

1.4 Case study question and theoretical framework

Based on the goal of this research, the two research questions of this study are as follows (Figure 1.):

- **RQ1:** How can first-tier suppliers be effectively developed in terms of sustainability?
- **RQ2:** How can lower-tier suppliers be effectively developed in terms of sustainability?

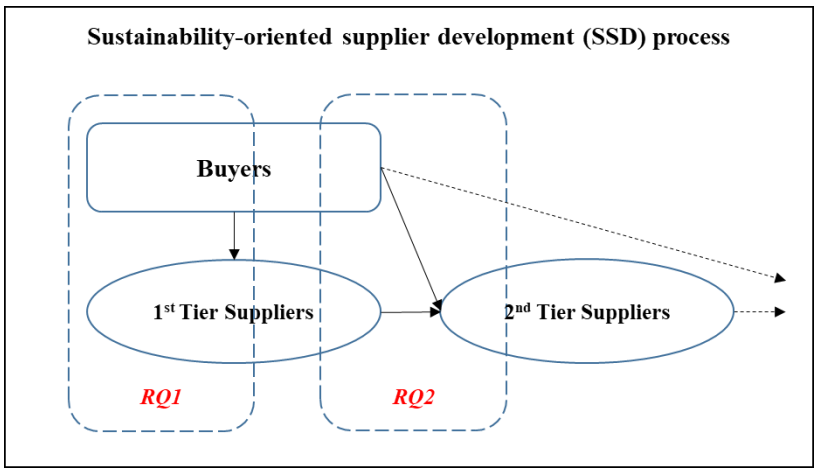

Figure 1. Research questions

Drawing on the theoretical lens, the two research questions will be explored through the following sub-questions: How can the three dimensions of social capital be accumulated and interacted during the process of SSD? How does the level of social capital affect the performance outcomes of SSD on both buyers and suppliers? What are the contingency factors that may affect the entire process?

Based on the elaboration of the research questions, the social capital theory, and the literature review on SSD, the initial conceptual framework of this research is constructed as follows in Figure 2:

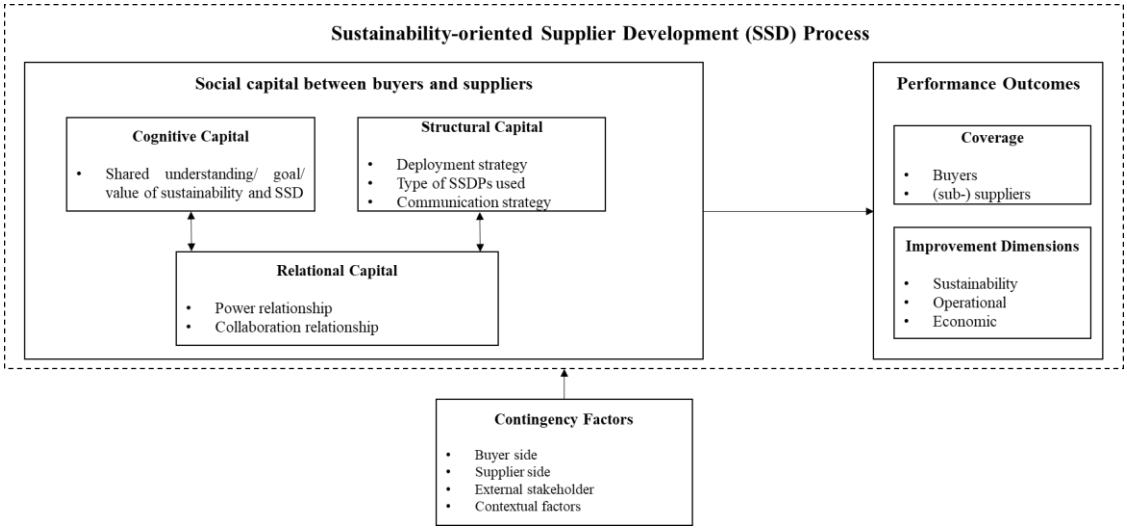

Figure 2. Initial conceptual framework

The conceptual framework focuses on the social capital existed and accumulated in the process of SSD and how does it affect the performance outcomes, and thus complements earlier conceptual frameworks that have either focused on examining the driving forces and enablers of SSD (e.g. Liu et al., 2019) or tested the link between SSD and performance outcomes (e.g. Yadlapalli et al., 2018).

The conceptual framework is comprised of three parts of concepts that will be investigated: the social capital between buyers and suppliers; the performance outcome aspects; the contingencies that might influence the decisions and results of entire SSD process. Each

part will be unpacked briefly in Table 1 and discussed below.

Table 1. Detailed explanation of the conceptual framework

	Elements	Categories	Specific examples	Source(s)
Social capital	Cognitive capital	Shared understanding, value, and goals	Sustainability and SSD	Busse et al., 2016
	Structural capital	Deployment strategy	Direct/co-organise with other parties	Liu et al., 2018
		Type of SSD strategies used	Direct/ indirect SSD strategies	Meqdadi et al., 2018
		Communication strategy	Content/ frequency/direction	Modi and Mabert, 2007
	Relational capital	Power relationship	Coercive power/ supplier autonomy	Meqdadi et al., 2018
		Collaboration relationship	Trust/ commitment/ reciprocity	Lo et al., 2018
Contingency factors	-	Buyer side	Management commitment/market strategy/ capability	Lo et al., 2018
		Supplier side	Management commitment/ knowledge base/capability	Kumar and Rahman, 2016
		External stakeholder	Support/ inspection from normative/coercive agency	Distelhorst et al., 2015
		Contextual factors	Geographical distance/ institutional difference	Busse et al., 2016
Performance outcome	Coverage	Buyers	-	Liu et al., 2018
		(Sub-) suppliers		
	Improvement dimensions	Sustainability	-	Ehrgott et al., 2013
		operational		
		economic		

1.4.1 Social capital dimensions

Referring to existing literature, three dimensions of social capital accumulate through interactions between buyers, suppliers, and other stakeholders and will, in turn, affect the results of SSD process (e.g., Rodríguez et al., 2016b). Cognitive capital provides "shared representations, interpretations, and systems of meaning" (Nahapiet and Ghoshal, 1998, p244) among all network members. Structural capital refers to the social capital that derives from the network ties and impersonal configuration between members within the network. Relational capital is related to the resources derived from personal relationships formed through past interactions (Nahapiet and Ghoshal, 1998).

Manifestations of social capital are discussed in the literature, but with less attention given to cognitive capital (Krause et al., 2007). However, a shared goal and understanding in

terms of sustainability and SSD are necessary to reduce conflicts and to achieve better results (Busse et al., 2016). Manifestations of structural capital include deployment strategy, type of SSD strategies used, and communication strategy. Deployment strategy refers to how a buyer carries out SSD, which is either direct unilateral actions by the buyer itself or co-organised projects with other institutions, such as NGOs and consulting firms. The type of SSD strategies used includes indirect and direct SSD strategies. Communication strategy refers to the communication activities during the SSD process. In terms of the relational capital, it will be investigated through both power relationship and collaboration relationship.

Apart from the respective impact of the three dimensions of social capital, the interrelationship among them will also be investigated. Generally, in supplier development literature, relational capital is found to play a more significant role (Villena et al., 2011). It is influenced by cognitive and structural capital (e.g., Preston et al., 2017) and meanwhile moderates the effect of those two in affecting performance outcome (e.g., Blonska et al., 2013). However, relational capital may also affect the accumulation of either cognitive capital or structural capital as well, especially in the context of sustainable development. This is because that relational capital might have been created through past interactions before SSD project. For example, before engaging suppliers in SSD, the buyer may choose to implement supplier development project to improve supplier operational performance first and then select some suppliers that will be involved in the following SSD project (e.g., Akman, 2015). The relational capital accumulated during this process is likely to influence the following SSD project to some extent. Thus, it is likely to be a two-way relationship between structural/ cognitive capital and relational capital.

1.4.2 Performance outcome and contingency factors

The performance outcome is measured by both specific improvement dimensions (operational,

sustainability, and economic dimensions), and the coverage of such practices on buyers and suppliers. Sustainability in this research refers to either social or environmental sustainability, which follows the same rule as Seuring and Müller (2008) in distinguishing the sustainability scope. Economic sustainability is assumed to be a pre-requisite before environmental and social sustainability can be pursued and thus not discussed as one separate sustainability dimension.

Regarding external stakeholders, it is found from the literature that due to the difficulties associated with managing sustainability issues in multi-tier supply base, some buying firms co-organise with other parties, such as NGOs (e.g. Rodríguez et al., 2016b), supply chain intermediaries (e.g. Cole and Aitken, 2019), third-party audit firm (Distelhorst et al., 2015), etc., to carry out supplier development in terms of sustainability in multi-tier supply base (Soundararajan and Brammer, 2018). Thus, in this research, the role of those external co-organisers will also be investigated to complement the primary buyer/supplier perspective.

1.5 Quality of the research design

An overview of the ways to address concerns regarding research quality throughout the entire research process is presented in Table 2. The four measures of research quality are construct validity, internal validity, external validity, and reliability (Yin 2018; Gibbert et al., 2008). This set of measurements has been adopted in exemplars of other case study research in the field of SSD (e.g., Rodríguez et al., 2016b; Reuter et al., 2010).

Table 2. Ways to establish research quality throughout the research process (Adapted from Yin 2018)

Criteria	Research phase			
	Design	Case selection	Data collection	Data analysis
Construct validity (*establishes suitable measures for the concepts being studied*)	- Adopt questions from previous research in the field of SSD	N/A	- Multiple sources of information: interviews, observations and secondary data	- Triangulate data from multiple sources - Interviewees review draft report
Internal validity (*establishes a causal relationship, whereby certain conditions are believed to be lead to other conditions, as distinguished from spurious relationships*)	- Develop a theoretical framework based on the literature review and a theoretical lens	- Record case selection criteria in case protocol	- Multiple respondents - Record factors that might be alternative explanations	- Discuss between authors to get interrater agreement - Pattern matching between the cases
External validity (*establishes the generalizability of the findings*)	- Adopt a multiple case strategy - Apply Social Capital Theory - Include third-party firm	- Theoretical sampling using replication logic - Clearly describe and record case context and situation	- Collect data on the case contexts - Compare available secondary data with interview results	- Pattern matching for analytical generalization in terms of Social Capital Theory
Reliability (*demonstrates the replicability of the research design and results*)	- Develop a case study protocol - Develop and use a case study database	- Select cases from suitable databases and indices	- Record semi-structured interview questions - Provide interviewees with the interview questions - Record the analysed secondary data	- Involve authors who do not participate in data collection - Rigorous coding process

2. Data collection procedures

2.1 Data sources and industry context

2.1.1 Data sources

Primary data will be collected through semi-structured interviews with buyers, (sub-) suppliers and third parties in the industries mentioned above – consumer electronics, apparel, and automotive industry. The interview protocols are given in the next section. The research team will try to approach qualified firms using own personal network and some national indices (e.g., The Corporate Information Transparency Index (CITI) by The Institute of Public & Environmental Affairs (IPE)).

To date, there is a potential centralized secondary data source from a consulting firm in Suzhou, who provides solutions as well as training projects for buying firms to assist them in developing suppliers in terms of sustainability. The SSD projects mainly focus on the occupational, health, and safety (OHS) topic in China context. The main content of data this

firm can provide now is archival and documentary data of the past consulting cases.

Secondary data from archives and documents are likely to be more objective since it is free from the influence of the research design and research questions at hand (Calantone and Vickery, 2010). Thus, it can strongly complement the use of primary data. The purpose of secondary data analysis in this research is as follows: (1) to complement with the results obtained from literature, including the perspective of third-party firm, the SSD strategies used, the measurement scales of performance outcome, etc.; (2) to understand the role of third-party firm and its relationship with the buyer and the suppliers; (3) to know relevant policies and legislations in China regarding the OHS issue in supply chain; (4) to inform of the interview protocol used to collect primary data.

2.1.2 Industry context

In addition to secondary data, the consulting firm also has some contacts with local manufacturing firms. Among the targeted industries of this research mentioned in previous section (Section 1.2), the consumer electronics industry would be easier to access to since Suzhou is one of the manufacturing centres of consumer electronics in China. Then, the apparel industry may be accessed as well since there are several manufacturing factories around Suzhou who are suppliers to large apparel brands,. Moreover, there is also some contacts with the industry associations and environmental NGOs in China. Moreover, it appears to be common for brands in apparel industry to transfer the responsibility to intermediaries in multi-tier supply chains to develop suppliers in terms of sustainability (Soundararajan and Brammer, 2018). Thus, it is reasonable to focus more on the above two industries. In terms of the automotive industry, it will be explored through secondary data first if there are past cases within this industry. The research team will be continually trying to get access to the automotive industry.

2.2 Data collection plan

The unit of analysis of this research is a firm, either a buyer, a (sub-) supplier, or a third-party firm. Access to suppliers may be gained through buying firms. Case selection criteria regarding the buyer and supplier are shown in Table 3.

Table 3. Case selection criteria

Unit of analysis	Criteria for main case selection	Rationale
Buyer	Must have at least two tiers of suppliers and have been deployed SSD initiatives to develop at least 1st tier suppliers	There is a potential need for them to develop suppliers in terms of sustainability beyond the 1st tier
	Relatively large buying firms that are based in China	Firm size affects the ability to develop suppliers in terms of sustainability
(sub-) supplier	Must have been committed to several SSD initiatives	Provide the context of studying the phenomenon from the perspective of (sub-) suppliers

Data will be collected through a multiple-method approach based on the data collection principle proposed by Yin (2018) for data triangulation. The primary data collection approach is semi-structured interview. The purposive and snowballing method will be employed to find suitable case firms and interviewees. Purposive sampling is also known as judgmental sampling, which allows researchers to select cases that depend on the research questions and objectives (Saunders et al., 2016). Once the initial contact is established, the snowballing method will be helpful to reach other potential cases and interviewees (Saunders et al., 2016). In terms of the interviewees from buyers and (sub-) suppliers, sustainability manager (or similar position) of each firm is the primary choice. However, in some firms, especially direct suppliers or lower-tier suppliers, there may not be a specialised position for managing sustainability issues, then general managers, purchasing managers, quality managers, etc. who are experienced in dealing with sustainability issues will be the preferable respondents. The project manager who is in charge of the SSD project will be the ideal interviewee from the third-party firm.

Documentation will be analysed as well. Documentations include organisational strategy documents (e.g., sustainable strategies, responsible procurement strategies, etc.), Code of Conduct, and sustainability reports (e.g., supplier responsibility report, etc.) (Cole and

Aitken, 2019). Relevant archival data of past events and development practices will be incorporated if possible. Table 4 gives the data collection schedule.

Table 4. Data collection schedule

	August	September	October	November
Finalize the data collection plan				
Secondary data collection				
Primary data collection				

3. Protocol questions and interview schedule

3.1 Protocol questions

3.1.1 For buyers (also include first-tier suppliers that develop their suppliers)

This set of protocol questions intend to address the research question by investigating how buyers commit to and leverage social capital to develop suppliers in terms of sustainability: (1) What is the general sustainability strategy and the sustainability-oriented supplier development strategy? (2) How do they commit to the accumulation of cognitive, structural, and relational capital? (3) What is the performance outcome of SSD initiatives from the perspective of the buyer, and how do they assess it? (4) How do they perceive the factors that would influence the SSD process?

3.1.2 For (sub-) suppliers

This set of protocol questions intend to address the research question by investigating how suppliers involve in SSD and how does this influence the development outcome of suppliers in terms of sustainability: (1) What is the overall experience in participating in the SSD project? (2) How do they commit to the accumulation of cognitive, structural, and relational capital? (3) What is the performance outcome of SSD initiatives from the perspective of the (sub-) supplier, and how do they assess it? (4) How do they perceive the factors that would influence the SSD process?

3.1.3 For the third-party consulting firm

This set of protocol questions intend to address the research question by investigating the role of the third-party consulting firm: (1) What is the role of the third-party consulting firm? (2) What is their role in developing cognitive capital, structural capital, and relational capital between buyer and suppliers?(3) How do they assess the results of the SSD project? (4) How do they perceive the factors that would influence the SSD process?

3.2 Interview schedule

3.2.1 Interview questions for the focal firm

1. Please briefly introduce the goal and objectives of this project. Are there any further work plans after this project?
2. Please explain why first-tier suppliers and second-tier suppliers were included in this project.
3. Please describe and evaluate the role played by the external knowledge provider in the SSD project.
4. How long have you been doing business with each of the chosen first-tier suppliers? How would you describe your dependence on them? How do you access your second-tier suppliers?
5. Please describe the level of engagement in the project by [one of the four chosen first-tier suppliers].
6. Please describe and evaluate the work undertaken by [one of the four chosen first-tier suppliers] in supporting the second tier.

3.2.2 Interview questions for first-tier suppliers

1. What do you usually do to communicate the requirements from the brand to the second tier?
2. What do you understand to be the goal of this SSD project?
3. How would you describe your relationship with the brand? Has it changed because of the SSD project?
4. How would you evaluate the role of the external knowledge provider? How would you describe your assimilation of the knowledge delivered?
5. Do you have any work plans after the training both for yourselves and for second tier?
6. How do you plan to further support or monitor the second tier?

3.2.3 Interview questions for second-tier suppliers

1. Please evaluate the training session. How would you describe your assimilation of the knowledge delivered? Is there anything you think should be improved?
2. What do you understand to be the goal of this SSD project?
3. How do you manage the sustainability issues in your firm? How do you work with the first tier?
4. Have you had any interactions with the first-tier supplier after the training session?
5. How do you find the mandated tasks? Have you been able to accomplish them?

3.2.4 Interview questions for the external knowledge provider

1. How would you describe your role in such projects? And in this project, in particular?
2. What do you understand to be the respective goal of the brand and the suppliers in this SSD project?
3. How would you evaluate this project?

4. How would you evaluate the level of engagement of the participants in the training and on-site consultations?
5. Please describe and evaluate the work done by [one of the four chosen first-tier suppliers] in supporting the second tier.

Appendix 2: Case Study Protocol of Paper III

1. Background and motivation

Supply chain learning (SCL), defined as "Multiple supply chain partners engaged in interactions where learning occurs and is focused on supply chain issues and solutions" (Flint et al., 2008, p. 274), and sustainability initiatives are mutually reinforcing in the process of realising sustainability (Silvestre et al., 2020). On the one hand, SCL incorporating environmental and social concerns between the buyer and its suppliers is difficult to replicate and can lead to competitive advantages (Carter and Rogers, 2008). It also facilitates knowledge acquisition and sharing among supply chain members, and thus provide chances for collaborative initiatives which would help to achieve sustainability (Silvestre, 2015; Yang et al., 2019). On the other hand, sustainability initiatives provide platforms for supply chain members to learn – acquire new knowledge and capabilities (Silvestre et al., 2020). Featuring in collaborative knowledge and experience sharing, sustainability-oriented supplier development (SSD) initiatives provide a platform for learning, which in turn, facilitates the reconfiguration and advancement of SSD initiatives (Meinlschmidt et al., 2016).

SCL is a desirable extension of organisational learning to learning in the supply chain context (Zhu et al., 2018). In organisational learning literature, learning could be categorised as exploitative learning and explorative learning. The former refers to the use and refinement of existing knowledge and routine, while the latter refers to the pursuit of new knowledge and practices (Holmqvist, 2004; Gupta et al., 2006; Im and Rai, 2008). Both types of learning are crucial to organisations, and transformations occur between these two interlaced types of learning (Holmqvist, 2004). From the dynamic capability view, the two forms of learning are linked by transformative learning, which combines new knowledge with existing knowledge, allowing the latter to be used in new ways (Lane et al., 2006). The three forms of learning

constitute the absorptive capacity (AC) of a firm (Lane et al., 2006; Meinschmit et al., 2016). AC is found to be important in performance improvement within buyer-supplier relationships (Sáenz et al., 2014; Meinlschmidt et al., 2016). AC allows firms to identify external knowledge and convert it into value for buyers (Lane et al., 2006) and suppliers (Sáenz et al., 2014).

Previous research has pointed out the impact of suppliers' AC or more general learning ability on the outcome of SSD initiatives (e.g. Bai et al., 2016; Liu et al., 2019). However, unlike studies that investigate the AC of the buyer from the different formats of learning that constitute AC (e.g. Meinlschmidt et al., 2016), research on suppliers' AC regarding sustainability knowledge and how it is linked with different formats of learning is quite limited. For example, Bai et al. (2016) and Roy et al. (2020) examined the learning ability of suppliers as a unified concept without considering what constitutes it. Liu et al. (2019) further split AC into access to external knowledge and prior relevant knowledge to represent the level of AC but did not relate it with the learning processes. Further, improvements in sustainability require supply chain members to go through sequential learning processes to explore new knowledge and incorporate the knowledge into daily business process; such a learning process, however, is still unclear and requires further investigation (Silvestre et al., 2020). Moreover, none of the above research has examined the learning processes that suppliers practice during the SSD process. Thus, the first research question of this research is:

- **RQ1:** How do suppliers use their AC to explore, transform, and exploit knowledge gained via SSD?

Apart from intra-organisational learning, effective knowledge transfer between firms within buyer-supplier relationships are also crucial to establish competitive advantage for the dyads or the broader supply chain (Roldán Bravo et al., 2018). Thus, desorptive capacity (DC), emphasising on the ability to identify external knowledge transfer opportunities and effectively facilitate outward knowledge transfer to recipients (Lichtenthaler and Lichtenthaler, 2009),

complements AC to better depict the establishment of competitive advantage of a buyer-supplier dyad or the broader supply chain based on different formats of learning (Meinlschmidt et al., 2016). Prior research has shown that buyers develop both their AC and DC through carrying out sustainability initiatives along the supply chain, leading to an improved capability in managing supplier sustainability (Meinlschmidt et al., 2016; Silvestre et al., 2020). For example, Meinlschmidt et al. (2016) found that in the process of deploying sustainability initiatives along the supply chain, the buyers not only iteratively practise explorative, transformative, and exploitative learning to configure the initiatives; they but also leverage their DC to transfer knowledge to suppliers by creating knowledge transfer opportunities (e.g. by engaging external knowledge providers) and facilitating knowledge application at suppliers (e.g. revisiting suppliers).

Moreover, it is common for the buyer to collaborate with external knowledge providers such as non-governmental organisations (NGOs) and consultancies who have expertise in deploying SSD initiatives to facilitate knowledge transfer and knowledge application (Meinlschmidt et al., 2016; Liu et al., 2019). For example, Rodríguez et al. (2016b) found that the buyer and the NGO each provides unique resources that complement each other in deploying SSD projects initiated by the NGO to achieve the goal of improving supplier social conditions. Thus, previous research has started to study the effectiveness of SSD initiatives deployed by the collaborative relationship between buyers and external knowledge provider and the resources each party brings to SSD. However, no prior research has systematically unpacked the capacity of each party and how they complement each other in facilitating knowledge transfer and application. Thus, the second research question is:

- **RQ2:** How do the buyer and the external knowledge provider collectively leverage their desorptive capacity during the SSD process?

In addition, the extant literature has suggested that there is a relationship between the

knowledge-sender's knowledge sharing process and the knowledge-recipient's learning process (Lichtenthaler and Lichtenthaler, 2010; Meinlschmidt et al., 2016; Roldán Bravo et al., 2020). More specifically, prior research has shown that the success of the knowledge-sender's DC and the performance outcome of sustainability initiatives depend on the AC of the recipients. Nevertheless, no prior research has considered the impact of the knowledge-senders' DC on knowledge-recipients' AC during the dynamic and evolving SSD process. Thus, the third research question is:

- **RQ3:** How do the desorptive capacity of the buyer and the external knowledge provider affect suppliers' use of absorptive capacity during the SSD process?

2. Theoretical background

2.1 SSD initiatives and learning

SSD incorporates a sustainability focus into supplier development (SD) initiatives. SD involves different formats of learning (e.g. explorative learning, exploitative learning) for supply chain members (Yang et al., 2019) as it provides a platform for direct interaction which facilitates the communication and transfer of tacit knowledge in the form of know-how between the buyer and its suppliers (Modi and Mabert, 2007). Effective knowledge transfer and application allow SD initiatives to achieve their potential (Giannakis, 2008). For example, Preston et al. (2017) found that suppliers with greater transformative learning regarding the knowledge transferred from SD initiatives could gain greater benefits.

SSD initiatives provide a platform for substantial learning relevant to sustainability for both buyer and supplier (Ehrgott et al., 2013), which in turn benefit SSD initiatives (Van Hoof, 2014). For example, through deploying SSD initiatives, buyers practice explorative, transformative, exploitative learning, which will lead to the development and reconfiguration of SSD initiatives (Meinlschimdt et al., 2016). However, whether the SSD initiatives could take effect as expected also depends on other parties involved in the SSD initiatives. For example,

both the level of explorative and exploitative learning of suppliers were found to determine whether the supplier will apply the knowledge gained from SSD initiatives (Liu et al., 2019). It is thus necessary to take into account the different learning processes of suppliers to investigate the performance outcome of SSD. To further unpack the learning process of suppliers, and how it is affected by the knowledge transfer process, we draw on the concept of absorptive capacity and desorptive capacity, which will be explained in the following subsection.

2.2 Absorptive capacity and desorptive capacity

Absorptive capacity (AC) is a firm's ability to utilise external knowledge through three sequential processes: explorative learning to identify and acquire valuable external knowledge; transformative learning to assimilate valuable external knowledge; and exploitative learning to apply assimilated knowledge to create new knowledge and value for the firm (Lane et al., 2006; Lichtenthaler and Lichtenthaler, 2009). Desorptive capacity (DC) represents an inverse process of AC in a firm to outwardly transfer knowledge (Roldán Bravo et al., 2018); it is defined as "a firm's ability to externally exploit knowledge" (Lichtenthaler and Lichtenthaler, 2009, p322). DC is constituted of two stages: the identification of knowledge transfer opportunities, and the subsequent knowledge transfer and facilitation of application at the recipients (Lichtenthaler and Lichtenthaler, 2010; Meinlschmidt et al., 2016; Roldán Bravo et al., 2018).

Both AC and DC have been applied to the supply chain management field. In terms of AC, Sáenz et al. (2014), for example, examined the impact of the AC of suppliers on the operational and innovation performance of the buyer-supplier dyad. In terms of DC, Roldán Bravo et al. (2018), for example, found that DC is the key factor that influences how a firm could contribute to building the competitiveness of the supply chain(s) in which it is embedded. Further, Roldán Bravo et al. (2020) suggested that both AC and DC should be considered when

evaluating the success of knowledge transfer. Their study showed an interlaced relationship between the buyer's DC and the supply-base's AC and the positive impact of the asymmetry between the two on building supply chain competence.

Few studies have taken an AC/DC perspective when studying the performance outcomes of SSD (e.g. Meinlschmidt et al., 2016; Tong et al., 2018; Liu et al., 2019). Meinlschmidt et al. (2016) found that buyer's AC and DC complement each other in advancing its sustainable supply management capability. In their study, they identified the learning cycle between explorative, transformative, and exploitative learning that constitute AC at the buyer, followed by the leverage of DC to share knowledge with suppliers. Recent studies have extended the analysis of AC to the supplier side. For example, Tong et al. (2018) used AC to represent the supplier's ability to implement sustainability initiatives after SSD without further unpacking what constitutes AC. Liu et al. (2019) divided AC into two elements – knowledge base and access to knowledge and studied how suppliers' AC affect the performance outcome of SSD. However, none of these studies has systematically unpacked the AC of suppliers and related it to different learning processes, i.e. explorative, transformative, exploitative learning, to further reveal how the AC of suppliers is developed during SSD. Moreover, no prior research has considered the interaction between the buyers' DC and the suppliers' AC. Besides, external knowledge provider is often involved in the SSD process by the buyer to facilitate knowledge transfer and application (Meinlschmidt et al., 2016). Thus, how external knowledge provider leverages its DC is also likely to affect the learning of suppliers. Thus, this research intends to fill the aforementioned gap by employing a triadic perspective that takes the buyer, the external knowledge provider and the supplier into consideration to further unpack how suppliers learn and how this is affected by the buyer and external knowledge provider. In doing so, this research also responds to a call from the recent literature to explore how firms leverage DC (Roldán Bravo et al., 2018) and the interplay between the knowledge-sender's (buyer's) DC

and the knowledge-recipient's (supplier's) AC (Szász et al., 2019).

2.3 The conceptual framework

To address RQ1, we applied the construct of AC which is comprised of three sequential learning processes (Lane et al., 2006) to study the development of AC on the supplier side. SSD initiatives provide suppliers with access to new knowledge (explorative learning for suppliers); however, it does not necessarily mean that suppliers will assimilate or further apply the knowledge to generate improvement actions (shown by the horizontal dotted arrows in Figure 1). To address RQ2, we first draw on Meinlschmidt et al.'s (2016) study to describe the buyer's AC as a learning cycle between the three formats of learning as deploying SSD initiatives is a 'learning-by-doing' process for the buyer (Liu et al., 2018). The buyer's DC then connects the AC of the buyer and the supplier as the buyer leverages DC to share knowledge with suppliers (Meinlschmidt et al., 2016) and thus establishes the link between the two parties in terms of knowledge transfer. Furthermore, involved external knowledge provider also leverages its DC to collaborate with the buyer to facilitate knowledge transfer and application (Meinlschmidt et al., 2016). RQ3 is built on the interlaced relationship between knowledge-senders' DC and knowledge-recipients' AC identified by prior research (e.g. Roldán Bravo et al., 2020). Based on the previous analysis, the conceptual framework of this research is developed (as shown in Figure 1). The three research questions this research intends to explore are represented using dotted lines, and the observations from previous research are in solid lines. More specifically, this research will first examine supply chain learning by focusing on the supplier side and unpacking the AC of suppliers to complement prior studies that primarily focus on the buyer side. Besides, this research will explore how the collaboration between the buyer and external knowledge provider works to provide a process view to study knowledge transfer during SSD. Moreover, by relating the DC of the buyer and external knowledge provider with the AC of the

supplier, this research provides a triadic perspective in exploring the knowledge transfer and learning processes during SSD.

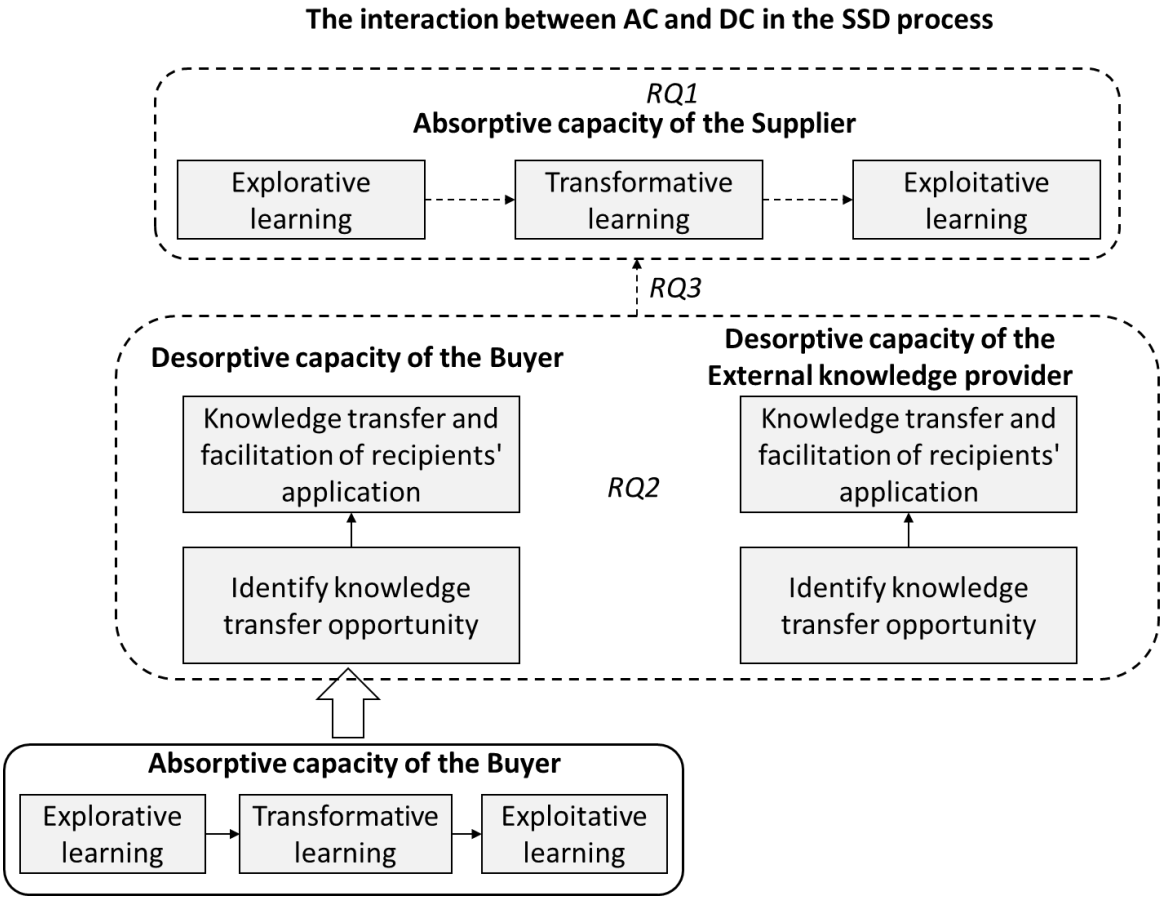

Figure 1. The interaction between AC and DC in the SSD process

3. Data collection plan

As illustrated above, this study intends to investigate SCL regarding sustainability from a multi-stakeholder perspective. Thus, every party involved in the SSD process will be approached before, during and after particular SSD initiatives to establish a multiple and dynamic perspective. In general, the focus will include understanding: 1) whether and how suppliers practice the three formats of learning throughout the SSD process; 2) how the way in which suppliers practice the learning processes is affected by the buyer and external knowledge providers; and 3) how external knowledge providers contribute to the learning and knowledge transfer process. Thus, a triad consisting of the buyer, the supplier and the external knowledge

provider is considered to be a case.

China will be the context of this research as non-adherence to sustainability requirements has been continuously detected in supplier premises in China (Villena and Gioia, 2020), prompting several Western buyers (e.g. Apple) to launch SSD initiatives across their supply chains in China. We will approach SSD initiatives focusing on social sustainability to respond to constant calls from the literature (e.g. Silvestre et al., 2020) to address a lack of understanding of the social dimension of sustainability. The inclusion criteria for case firms are: first, the buyer, suppliers and external knowledge providers are all involved in the SSD initiatives; second, suppliers included in the SSD initiatives are based in China; and third, the buyer has long-term plans in terms of SSD and intends to deploy SSD initiatives continuously in the near future.

The primary data collection method will be semi-structured interviews with staff from the buyer, its suppliers, and external knowledge providers. The detailed interview schedule is presented in Section 4. Secondary data (e.g. materials of the SSD initiatives, sustainability and audit reports of the firms) will also be collected to add to data triangulation.

4. Interview schedule

One project under study has finished, two interviews with the consultant and the project manager from the supplier side have been conducted regarding the process of the project and the outcomes. The SSD project was initiated in order to pass the BSCI audit required by the buyer. BSCI is a social auditing methodology proposed by amfori for firms to map their supply chain in terms of social performance and provide related services to facilitate improvements (amfori, 2020). The buyer-supplier-consultancy triad from this project is a case.

Another SSD project under study is currently ongoing, and the research team is keeping regular contact with the buyer and the external knowledge provider – a third-party consultancy.

This project aims to improve the capability of supplier factories in terms of OHS management. More specifically, the project aims to help the supplier factory establish an OHS committee that deals with all relevant issues and enable committee members to be able to integrate relevant management responsibility into their daily working routine. The committee will involve both staff management team and general workers. The project consists of a main training session and consultations and supports before and after the training session. The project started last September when the consultancy conducted a site visit to get an overview of the situation of the supplier factories and then provided supports accordingly. The main training, which includes all relevant theoretical knowledge, is being carried out in February and March. So far, a brief meeting with the buyer about the background and schedule of the project has been carried out. Further interviews with the project members from the buyer and the consultants from the consultancy will be carried out, both after the completion of the main training session and at the end of the entire project. Therefore, each interviewee from the buyer and the consultancy will be interviewed twice. The interviews after the completion of the main training session will focus on the collaborative deployment process between the buyer and the consultancy, their interactions with the suppliers, and the work plan for the next stage. The focus of the interviews at the end of the project will be: 1) gains from deploying this project, including the knowledge/skills learned and benefits brought about by the collaborative partnership; and 2) observed/expected benefits for the supplier factories, including the learning process, the improvements in terms of sustainability capability and performance, and the buyer-supplier relationship.

In terms of the interview with the staff from the supplier side, each interviewee will be interviewed three times – before and after the main training and at the end of the entire project. The first round of interviews intends to get an overview of the understanding and expectations of the staff at the supplier factories; The second round of interviews will focus on the learning

process and the outcome till then. More specifically, the questions will cover the following two points: 1) gains from the training, including the knowledge/skills learned and the changes in terms of awareness and understanding of the project; and, 2) the work plan for the next stage before the closure of the project. The focus of the third round will be on the learning outcome, where specific topics include the gains and experiences of this project, problems and actions taken during the project, and the work plan afterwards.

There will be four buyer-supplier-consultancy triads from this project. Detailed interview questions are presented in the following subsections.

4.1 Interview schedule – Round 1

4.1.1 Interview questions for supplier

1. Can you briefly introduce your firm?
2. Can you briefly introduce your job title and responsibility? And for how long have you been in this position or been dealing with sustainability issues?
3. How do you understand the goal of this project and your role in this project?
4. What are your goals for participating in the SSD project??
5. How do you communicate with the consultant from the beginning of the project?
6. Have you had any concerns or difficulties so far (e.g. about the project, the training, future work, etc.)?
7. Do you have any idea regarding the work relevant to sustainability after the completion of this project?
8. What's your goal and expectations for the upcoming training sessions and tutorials?
9. To be more specific, what would you like to get from the upcoming training sessions and tutorials (e.g. relevant knowledge, management skills, responsibility relate to sustainability issues, problems existed in daily work)?

4.1.2 Interview questions for the focal firm

1. Can you briefly introduce the main business of your firm, your supply chain, and your suppliers?
2. Can you briefly introduce your job title and responsibility? And for how long have you been in this position or been dealing with sustainability issues?
3. Can you briefly introduce the sustainability strategy and SSD strategy of your firm?
4. Can you please talk through the goal of this project and how did you decide which supplier to develop?
5. Why did you choose to collaborate with external knowledge providers? Have you had the experience of working with them before?
6. How do you see the role played by the consultancy so far? Have you encountered any difficulties in deploying the SSD projects together with the third-party consultancy?
7. How much progress has been made so far (e.g. the actions taken/any tangible or intangible outcomes)? Does the progress so far meet the goal or your expectations?
8. Do you see any changes or improvements that need to be made to the work at the next stage based on the experience so far?

4.1.3 Interview questions to the external knowledge provider

1. Can you briefly introduce the main business of your firm, the general features of the customers, and the role of your firm in SSD projects?
2. Can you briefly introduce your job title and responsibility? And for how long have you been in this position or been carrying out SSD projects?
3. Can you briefly summarise all the work you have done, including the remote support and the on-site consultations and training sessions so far?

4. Has anything changed compared to the initial proposal? How have you adapted to the changes?
5. How do you find the match between the information provided by the buyer and the actual situation at supplier sites?
6. Can you briefly introduce how you had prepared the training materials?
7. Have you got any feedback from the attendees of the training session or from the staff you have been in contact with?
8. How do you find the engagement of the staff from the supplier factory so far?
9. What do you think can effectively incentivise the staff from the supplier side to be more engaged in the training, to take on the responsibility and to embed the work into the daily working routine?
10. To what extent do you think they have absorbed the training content?
11. How's your interaction with the buyer going? How do find the support from the buyer?

4.2 Interview schedule – Round 2

4.2.1 Interview questions for supplier

1. How do you understand the goal/the purpose of this project and the working group now? How do you understand your role as a member of the working group now? How does that differ from your understanding previously?
2. What have you learned during the project? What are the takeaways from the project?
3. How do you describe your absorption of the content from the training/consultations throughout the project? How do you think those absorbed knowledge/takeaways can inform future work, as a group member/leader, in particular?
4. Do you have any ideas regarding your responsibility towards the EHS agenda in the long run, as a group member/leader, in particular?

5. [For workgroup leader only] How do you plan to use the working guidance developed by you and the external knowledge provider during the project?
6. Have you encountered any difficulties?
7. What support have you received from the buyer/external knowledge provider during the project? How do you understand their role during the project? How do you think about their joint work?
8. Overall, has anything changed since you joined the workgroup?

4.2.2 Interview questions for the focal firm

1. How do you feel about the entire project? Have you achieved your goals and expectations?
2. What are the main takeaways from deploying and participating in the SSD project? And from whom? How do you think those takeaways can inform future work relevant to SSD?
3. How do you describe your involvement in the project (e.g. interactions with the external knowledge provider/suppliers)?
4. How do you think the cooperation with the external knowledge provider worked? How effectively did you work together/complement each other?
5. How did you find your suppliers engaged in the project? how did you find their interaction with you and with the external knowledge provider, respectively?
6. Have you noticed any improvements/changes across different levels of staff at the supplier side?
7. What do you think they've learned from the project?
8. How do you think suppliers will carry on with the work after the completion of this project in the long term?
9. Overall, have you noticed any changes from the supplier side since the start of the project?

4.2.3 Interview questions to the external knowledge provider

1. How do you feel about the entire project? Do you think you have achieved the goals set by the buyer in the beginning? Why?
2. Can you briefly summarise all the work you have done? How effective has each of these approaches been?
3. How did you find the cooperation with the buyer worked? How did you find the support from the buyer was provided, if at all?
4. Have you got any ideas that you think could make the project more effective?
5. How did you find the engagement of the staff from the supplier factory? How did you find the interaction between the buyer and the supplier during the project?
6. Have you noticed any improvements/changes across different levels of staff at the supplier side?
7. Have you got any feedback from the group member/leader about their learning and absorption of relevant knowledge and their work?
8. What do you think they've learned from the project? To what extent do you think they have absorbed the knowledge you delivered, e.g. the training content?
9. How do you think suppliers will carry on with the work after the completion of this project in the long term? Do you anticipate any difficulties or issues for the suppliers who carry on with relevant work after the completion of this project in the long run?
10. Overall, have you noticed any changes from the supplier side since the start of the project?