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The Role of the Similarity Between Suppliers' and Buyers' Sustainability Practices in Improving Suppliers' Performance: An Empirical Investigation

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THE ROLE OF THE SIMILARITY BETWEEN SUPPLIERS' AND BUYERS'

SUSTAINABILITY PRACTICES IN IMPROVING SUPPLIERS'

PERFORMANCE: AN EMPIRICAL INVESTIGATION

A Dissertation

by

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ABSTRACT

Kwanheui Cheon, <u>The Role of the Similarity between Suppliers' and Buyers' Sustainability Practices in Improving Suppliers' Performance: An Empirical Investigation</u>. Doctor of Philosophy (Ph.D.), May, 2023, 142 pp., 18 tables, 9 figures, references, 328 titles.

Sustainability has become an essential component of corporate survival and prosperity. As a result, companies are eager to introduce sustainability to every part of their businesses. In addition, because stakeholders' interest has spread from companies to their entire supply chain, companies must manage their relationships with other supply chain members regarding sustainability. Consequently, there has been an interest in investigating the implementation and management of sustainability along supply chains. However, there are still voids in sustainable supply chain management research. For example, scholars have pointed out the need for research on sustainability from a supplier perspective as opposed to the traditional viewpoint – buyer perspective.

To fill the voids mentioned above, drawing from studies in the literature on sustainability, supply chain management, innovativeness, and risk tolerance and employing stakeholder and embeddedness theories, I investigate the role of similarities between suppliers' and buyers' sustainability practices in improving suppliers' performance. I suggest that relational embeddedness and supplier innovativeness are positively related to the similarity of the supplier's and buyer's sustainability practices. I also assess the moderating role of risk tolerance of the supplier. Furthermore, I discuss the research methodology used to test the hypotheses as depicted in the research model.

DEDICATION

I dedicate this dissertation to my God and my family. Finishing my doctoral studies would be impossible without the enormous support and love of my wife, Hyunjin Cho, and two boys, Sirhan and Sirjun. I also would like to thank my parents: Songyong Cheon and Soonhee Lim, and my parents-in-law: Heonchang Cho and Junghwa Lee. Thank you for your love and patience.

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CHAPTER I

INTRODUCTION

The 21st century represents the "Century of Sustainable Development" (Kreibich, 2011, p.47).

In the modern age, sustainability has evolved in interacting with corporate activities and social interests. For example, the 1962 book, Silent Spring by Rachel Carson, made the public realize the risks of the indiscriminate production and usage of pesticides (Dichloro-Diphenyl-Trichloroethane), resulting in paying attention to sustainability in terms of the environment. Since then, the reduction of the ozone layer caused by manufactured chemicals such as halocarbon refrigerants in the 1970s, the acid rain due to sulfur oxides emitted by manufacturers in the 1980s, and the climate change caused by greenhouse gas emissions in the 1990s have continuously increased public attention to environmental sustainability (Spindler, 2013). Ultimately, various regulatory and voluntary actions such as the Acid Deposition Act in 1980, the Montreal Protocol in 1987, and the UN annual climate change conference appeared to protect the environment and maintain environmental sustainability.

These cases have made local communities, consumers, governments, and NGOs (Non-Government Organizations) directly or indirectly monitor and evaluate companies or

regulate their business activities (Campbell, 2007; Neville, Bell, & Mengüç, 2005). It is not easy for companies to strive for sustainability because of the cost and risk related to sustainability implementation and changes in corporate priorities (Epstein, 2008). However, companies implementing appropriate sustainable activities increase their overall performance by reducing waste and costs and improving their reputation (Vachon & Klassen, 2008; Zhu, Sarkis & Lai, 2008). The implementation of appropriate sustainable activities has become a source of competitive advantage. Therefore, many executives have recognized that sustainability is critical to the survival of their companies as a strategy (Bonini & Gorner, 2011).

Furthermore, public attention grew from individual companies to their suppliers over time. For example, people blamed Nike for hiring factories that relied on sweatshop labor, including child labor, to produce its goods in developing countries: China, Vietnam, Thailand, Indonesia, Sri Lanka, Pakistan, and Malaysia (Bouchery, Corbett, Fransoo, & Tan, 2017) in the 1990s. Thus, the issue has negatively affected Nike's image for two decades. Also, the Dhaka garment factory collapse in India in 2012 and the fire in Lara Plaza in Bangladesh in 2013 have made the public more concerned about suppliers. In Hong Kong, anti-sweatshop protesters marched against Uniqlo, the Japanese fast-fashion brand, in 2015 because the suppliers of Uniqlo employed deliberate and systemic sweatshop labor in China and Vietnam. Finally, people have begun to regard the actions of the suppliers as those of the companies hiring the suppliers.

As public attention has expanded from individual companies to their suppliers since the 1990s, the integration of sustainability and supply chains has become a critical issue for traditional supply chain management (Gualandris, Klassen, Vachon & Kalchschmidt, 2015; Ahi & Searcy, 2013; Linton, Klassen & Jayaraman, 2007; Kleindorfer, Singhal, & Wassenhove, 2005). In this context, the academic world, as well as business fields, recognize

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the strategic importance of planning, sourcing, production, and distribution logistics (Supply-Chain Council, 2008) in both achieving long-term performance and addressing sustainability issues within operations of the companies and their supply chains (Koberg & Longoni, 2019; Yun, Yalcin, Hales, & Kwon, 2019; Touboulic & Walker, 2015; Ahi & Searcy, 2013; Hall & Matos, 2010). As a result, sustainable supply chain management (SSCM) has attracted much more attention from researchers and practitioners simultaneously.

Research in SSCM has rapidly increased since the early 2000s (Martins & Pato, 2019; Khalid, Seuring, Beske, Land, Yawar, & Wagner, 2015; Eskandarpour, Dejax, Miemczyk & Peton, 2015; Beske-Janssen, Johnson & Schaltegger, 2015; Winter & Knemeyer, 2013; Ashby, Leat & Hudson-Smith, 2012). For example, I found 2,630,000 search results for SSCM under the supply chain and sustainability terms from Google Scholar. However, studies show many issues to be examined by pointing out the biases and limitations: research design, methodology, theory, analysis unit, and research topic of SSCM research (Khan, Yu, Golpira, Sharif, & Mardani, 2021; Carter, Hatton, Wu & Chen, 2020; Jabbour, Jabbour & Sarkis, 2019; Patel & Desai, 2019).

Statement of Research Problem and Conceptual Background

With public interest, sustainability has become an essential factor for the survival and prosperity of business organizations (Bonini & Gorner, 2011). As a result, companies have become desperate to transplant sustainability into every part of their business. Also, since the interests of stakeholders have expanded from an individual company to the whole supply chain to which the company belongs (Bouchery et al., 2017; Gualandris et al., 2013), the company should manage the relationship with other supply chain members, such as suppliers, buyers, or even third-party service providers (Koberg & Longoni, 2019; Tseng et al., 2015;

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Seuring & Muller, 2008). So, much research has examined the introduction, implementation, and management of sustainability in the supply chain and its organization. However, many topics in SSCM research are still awaiting further investigation.

Meanwhile, scholars have warned that the weakest link in supply chains determines the overall performance of the supply chains and individual members of the supply chains, calling for attention and efforts to develop/improve the weakest part (Zhao & Hou, 2021; Hausman, 2004; Finch, 2004). Kause, Vachon, and Klassen (2009) said that "companies are only as sustainable as the suppliers that compose their supply chains" (P 21), suppliers are regarded as the weakest link in supply chains. However, studies have also confirmed that suppliers play an essential role in supply chains and even sustainable ones (Raj, Biswas, & Srivastava, 2018; Gualandris & Kalchschmidt, 2016; Song & Thieme, 2009). Therefore, research on suppliers' sustainability from the supplier side is significant not only for suppliers themselves but also for the survival and prosperity of all members in the supply chain, and active and extensive research activities on this are essential.

However, there have been fewer studies from a supplier-centered or supplier perspective in sustainable supply chain research (Qiao, Li, & Capaldo, 2022; Pereira, Silva, & Hendry, 2021; Gelderman, Semeijn, & Mertschuweit, 2016; Acosta, Acquier, & Delbard, 2015; Ayuso, Roca, & Colomé, 2013; Brammer, Hoejmose, & Millington, 2011). For example, searching for research papers with "Sustainable Supply Chain" as a search term in Google Scholar resulted in 63,400 hits in January 2023. Next, adding "Supplier Perspective" to this search result narrowed down to only 529 hits. Therefore, only 0.83% of the total search results for sustainable supply chain research on Google Scholar indicate that sustainable supply chain research from the supplier perspective is very scarce. Table 1 summarizes several studies conducted after scholars in the mid-2010s pointed out that sustainable supply chain studies from a supplier perspective were rare.

Table 1.1: Sustainable Supply Chain Research from Supplier Perspective

Study	Purpose	Findings	Research Type	Limitations
Acosta et al. (2014)	Exploring supplier response (acquiescence, compromise, avoidance/concealment) to the request to adopt sustainability from a buyer and the transfer of sustainability adoption from primary suppliers to secondary suppliers	Suppliers adopt and diffuse SSCM programs selectively and partially rather than exhaustively. Formal coercive demands from buyers do not guarantee their actual adoption	Case study	Limitations in generalizing the research results because it used a case study as a methodology and focused on a single industry, even a single buyer and their suppliers
Roloff et al. (2015)	Identifying the cause of the failure to establish the ideal partnership between suppliers and buyers using supplier interviews	Confirming that the unfair practices of buyers were the cause of the failure to establish the ideal business relationship with their suppliers	Case study	It failed to overcome the limitation of the case study or explicitly include sustainability as a research agenda. Also, it neglected the effort of suppliers in building partnerships and the process of introducing sustainability.
Lion et al. (2016)	Identify suppliers' approaches to adopting sustainability based on internal and external sustainability practices from the supplier perspective	Naming four types of sustainability adoption approaches: under-exploited, not-interested, collaborative, and developing	Case study	Restriction on the generalization of research results due to the characteristics of a case study focusing on a single industry / Omitting the economic aspect of sustainability
Raj et al. (2018)	Building and testing an analytical model regarding greening and corporate social responsibility (CSR) efforts of suppliers and buyers at the same time to explore the different results from five different contracts	Identifying how different contract types*1 affect the optimal greening level, CSR level, retail price, and profits of suppliers and buyers	Modeling	The analytic model assumes the linear relationship among demand, retail price, greening, and CSR level, and the supplier acts as a Stackelberg leader. (Stackelberg: a strategic game in which the leader firm moves first, and then the follower firms move sequentially.)

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Table 1.1, cont.

Study	Purpose	Findings	Research Type	Limitations
Lund-Thomsen (2020)	Answering the reason suppliers in developing countries are skeptical of corporate social responsibility (CSR) in global supply chains	Identifying CSR definition may differ between suppliers and buyers depending on economic situations or social contexts in global supply chains because suppliers can regard a request to comply with CSR defined by buyers as financial or cultural imperialism	Literature review	It overlooked environmental sustainability because it focused only on CSR. Also, no empirical evidence supports a subject.
Belhadi et al. (2021)	Exploring how behavioral motivators (behavioral uncertainty, interpersonal trust, and relational experience) affect sustainable supply chain governance (SSCG) decision-making in buyer-supplier dyads amid the complexities and uncertainty of the sustainable performance of partners	Behavioral uncertainty in sustainable performance could lead to contractual and relational sustainable SSCG. Significantly, the interaction of interpersonal trust and relational experience is critical to making SSCG decision	Experimental Vignette Methodology	Limitations in not being able to fully reflect on the actual situation due to the usage of the scenario method Fails to verify whether decision-making has changed in response to changes in sustainability performance

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It shows the purpose and results of recent sustainable supply chain studies from a supplier perspective, the significance of the study, the research methodology, and its limitations. For example, Acosta and his colleagues (2014) have contributed to sustainable supply chain research by showing how suppliers respond to buyers' demands for sustainability adoption due to the dependence on their buyers, resource constraints, and firm size.

On the other hand, among the existing sustainable supply chain studies, supplier-related studies are mainly about 1) the buyer's supplier management, such as supplier selection (e.g., Thomas, Darby, Dobrzykowski, & Hoek, 2021; Chen, Wang, Yao, Li, & Yang, 2018; Faisal, Al-Esmael, & Sharif, 2017; Grover, Grover, Rao, & Kejriwal, 2016) or supplier development (e.g., Pedroso, Tate, da Silva, & Carpinetti, 2021; Jia, Stevenson, & Hendry, 2021; Yawar & Seuring, 2018), 2) the relationship between the sustainability performance of the supplier and the sustainability performance of the buyer (e.g., Ahmed & Shafiq, 2022; Shafiq, Johnson, Klassen, & Awaysheh, 2017; Lee & Klassen, 2008), 3) and the similarity of the sustainability between the buyer and the supplier (e.g., Ahmed & Shafiq, 2022). Therefore, I examine whether introducing and implementing supplier sustainability is not a process to satisfy the buyer's request to ensure the buyer's sustainability performance but is directly beneficial to the supplier's business performance. So, this research will answer the following questions:

- Does the similarity between suppliers' and buyers' sustainability practices directly improve the supplier's profitability and increase sales to their buyers?
- Does the supplier's relational embeddedness relate to the similarity between suppliers' and buyers' sustainability practices?
- Does the supplier's innovativeness mediate relational embeddedness and the similarity between suppliers' and buyers' sustainability practices?

- Does the supplier's risk tolerance moderate the relationship between suppliers' relational embeddedness and the similarity between suppliers' and buyers' sustainability practices? Also, Does the supplier's risk tolerance moderate the relationship between suppliers' relational embeddedness and innovativeness?

To answer the questions about the impact of the similarity in sustainability on suppliers' profitability and sales to the focal buyers, I propose a research model based on theories: stakeholder theory (Freeman, 1984) and embeddedness (e.g., social network theory, Granovetter (1973), widely used in sustainable supply chain research (e.g., Do, Mishra, Colicchia, Creazza, & Ramudhin, 2022; Rentizelas, de Sousa Jabbour, Al Balushi, & Tuni, 2020; Sauer & Seuring, 2018; Sayed, Hendry, & Bell, 2017 for institutional theory, Morais, & Barbieri, 2022; Siems, & Seuring, 2021; Rebs, T., Brandenburg, Seuring, & Stohler, 2018; Meixell, & Luoma, 2015; Chacón Vargas, & Moreno Mantilla, 2014; Hofmann, Busse, Bode, & Henke, 2013 for stakeholder theory, & Yang, Zheng, Xie, & Tian, 2022; Lu, Potter, Rodrigues, & Walker, 2018 for Social network theory). Then, hypotheses based on the research model are offered and tested using available data.

Freeman & Reed (1983) described a stakeholder as anyone who can influence or be affected by the achievement of organizational goals. In supply chain management research, stakeholder theory clarifies the interrelationships between different participants in the supply chain (Tseng, Ha, Lim, Wu, & Iranmanesh, 2022). It also highlights that stakeholders can play an important role in seeking a more sustainable supply chain because participants need to secure legitimacy to run a successful business by meeting the requirement or demands of stakeholders (Siems & Seuring, 2021; Meixell & Luoma, 2015). Embeddedness (e.g., social network theory) describes how people engage in social networks for various benefits, including social, economic, and psychological (Grannovetter, 1973) or how social

interactions occur (Sebaka & Zhao, 2022). In addition, it well explains organizational networks because human interactions and relationships form an interconnected cooperation network (Horak et al., 2019). Finally, it also postulates that network relationships can be pathways to obtaining the information and resources needed (Bai, Xu, & Jiao, 2022; Radziwon & Bogers, 2019; Leenders & Dolfsma, 2016). Therefore, these theoretical lenses provide appropriate guidance in answering the first two research questions.

Next, by reviewing sustainable supply chain literature (e.g., Espino-Rodríguez & Taha, 2022; Tseng et al., 2022; Tipu & Fantazy, 2021; Gualandris, & Kalchschmidt, 2014, 2013), risk management literature in the sustainable supply chain (e.g., Yang, & Wang, 2022; Fagundes, Teles, de Melo, & Freires, 2020; Abdel-Basset, Gunasekaran, Mohamed, & Chilamkurti, 2019; Park, Kremer, & Ma, 2018; Chereau & Schellhorn, 2014; Auyong, 2013), this research will answer the last question about the role of supplier attitude to risk in the relationship between suppliers' efforts and the similarity of sustainability. According to previous studies, sustainability is closely related to innovativeness (Tipu & Fantazy, 2021; Gualandris & Kalchschmidt, 2014, 2013) and involves a new investment (Espino-Rodríguez & Taha, 2022; Detre, Johnson,& Gray, 2011). Therefore, based on innovativeness-related sustainability research, this research presents the mediating effects of supplier characteristics (innovativeness) on the relationship between suppliers' efforts and the similarity of sustainability. It then tests the hypotheses using the data for the previous two questions.

Significance of the Research

This research fills a gap in the sustainable supply chain literature by exploring the relationship among relational embeddedness, innovativeness, risk tolerance, and similar

sustainability between supply chain members from a supplier perspective. The contribution of this research consists of two sessions: contribution to research and contribution to practice.

Contribution to Research

Researchers have actively examined the implementation and management of sustainability in the supply chain. Still, many topics are awaiting further investigation to improve the understanding of sustainable supply chains and to help practitioners implement sustainability in supply chains. This research contributes to the growing literature positioned at the dyadic relationship analysis of SSCM fields from a supplier perspective in the following ways.

First, this research offers a different perspective on SSCM research by changing viewpoints from buyers to suppliers in implementing sustainability in supply chains. There are many callings for research on the supplier from supplier-centered views (Qiao, Li, & Capaldo, 2022, Pereira, Silva, & Hendry, 2021; Gelderman, Semeijn, & Mertschuweit, 2016; Acosta, Acquier, & Delbard, 2014; Ayuso, Roca, & Colomé, 2013). But, most of the previous research has rarely paid attention to supplier activities to improve their performance. Like supplier relationship management, supplier involvement in new product/service development, supplier selection, and supplier development, most of the existing supply chain research has tested their research models or hypotheses from buyer perspectives. However, this research will contribute to forming a balanced view of suppliers and buyers in SSCM research through the role of similar sustainability between suppliers and buyers, reviving the research needs: changing viewpoints (Nematollahi & Tajbakhsh, 2020; Cloutier et al., 2020; Jabbour et al., 2019; Xiao et al., 2019).

Second, despite growing calls to focus on social sustainability or integrate social and environmental sustainability (Nematollahi & Tajbakhsh, 2020; Cloutier et al., 2020; Bubicz

et al., 2019), few studies explore the interaction of environmental and social sustainability (Yun et al., 2019). Therefore, this research adds knowledge to this under-studied field in SSCM by simultaneously examining environmental and social sustainability. Furthermore, existing studies from the buyer perspective identified the impact of specific activities such as SSCM or supplier management on the environment and social sustainability of the company (Gualandris et al., 2014) or explained the interaction between environmental and social sustainability in the inter-organizational relationship such as the relationship between the buyer and the supplier or between the government and the supplier (Wu et al., 2014). This study explains the relationship between environmental and social sustainability within suppliers through innovativeness.

Third, as recommended by many scholars (Stekelorum, 2020; Carter et al., 2019; Touboulic & Walker, 2015; Carter & Easton, 2011), this research designs a research model to develop hypotheses and tests them by introducing multiple theories such as embeddedness (social network theory) and stakeholder theory. Based on various theoretical lenses, this study conforms to the latest trends in sustainable supply chain research (Touboulic & Walker, 2015; Carter & Easton, 2011). It also confirms the applicability of embeddedness (social network theory) and stakeholder theory in the environment of the sustainable supply chain. Therefore, this research adds empirical evidence supporting the theories that this research uses and extends each theory's research field into sustainable supply chains.

Last, existing research has limitations in generalizing research results due to bias caused by the industrial characteristics: the different degrees of the importance of sustainability according to industry types (Brandenburg et al., 2014; Hassini, Surti, & Searcy, 2012) and the various degree of the convenience of obtaining data across industries (Patel & Desai, 2018; Brandenburg et al., 2014). On the other hand, by including as many companies and industries as possible, this research will reduce the bias arising from the industrial

characteristics to a broader extent. In other words, the number of industries included in the data to test the research model increases compared to previous studies, increasing the generalizability of test results. Therefore, this study may contribute to SSCM research by providing results that have increased the possibility of generalization using more comprehensive data.

Contribution to Practice

This research provides several implications for managers and practitioners of suppliers in supply chains. First, the results of this study suggest that introducing, implementing, and maintaining sustainability similar to that of buyers can improve suppliers' profitability and sales performance. Therefore, the relationship between the similarity of sustainability and the profitability or sales performance of suppliers can provide helpful information about the type and direction of sustainability when introduced or transplanted and managed by managers of the suppliers.

Second, the relationship between relational embeddedness and the similarity of sustainability among suppliers and buyers implies that maintaining or developing close relationships with the buyers helps introduce, implement, and manage sustainability similar to that of buyers. In other words, the results of this research mean that relational embeddedness is an antecedent for introducing, implementing, and managing similar sustainability. Furthermore, it shows suppliers' managers that maintaining a close relationship with their buyers is the starting point for increasing their profitability and sales to the buyers through similar sustainability.

Third, the research results show that social and environmental sustainability are not separate issues that must be managed independently based on the relationship between innovativeness and each sustainability relationship. Therefore, it suggests that suppliers'

managers simultaneously consider social and environmental sustainability when introducing, implementing, and managing sustainability.

In brief, this research contributes to SSCM research by 1) changing viewpoints from buyers to suppliers, 2) exploring social and environmental sustainability through innovativeness, 3) employing multiple theories for better hypotheses and a more in-depth interpretation of the findings, and 4) taking comprehensive samples that complement extant exploratory research. In addition, it contributes to the operations management practice field by 1) finding the similar sustainability between buyers and suppliers that increases operations performance and the sale to the focal buyers, 2) identifying the role of the close relationship with the focal buyers to get similar sustainability or increase similarity, and 3) presenting the role of innovativeness in social sustainability and environmental sustainability.

Definition of Key Terms

This session explains key terms and related concepts necessary to understand the research, although they are not constructs of the research model. In other words, in the case of terms for which existing studies have not established precise concepts, related terms, and concepts are introduced together to help readers understand. For example, the similarity of sustainability between suppliers and buyers is a term that explains the similarity of sustainability between suppliers and buyers by utilizing institutional theories. Therefore, understanding both sustainability and similarity is necessary to understand this term, presenting both here.

The following key terms come from SSCM literature to explain the connections or relationships among embeddedness, sustainability, innovativeness, risk tolerance, and performance. Therefore, this dissertation defines the following terms as follows:

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- Relational embeddedness: Granovetter (1992) defines relational embeddedness as personal relationships people have developed through a history of interactions, and it has characteristics of trust, obligation, and identification (Nahapiet & Ghoshal, 1998). It emphasizes the share of emotion, time, and information among members (Uzzi & Lancaster, 2003), utilized as a learning channel and social capital for members (Andersson, Forsgren, & Holm, 2002). Therefore, relational embeddedness in supply chains refers to the degree of reciprocity and closeness in the relationship between supply chain members (Blonska, Rozemijer, & Wetzels, 2008).

- Sustainable supply chain management (SSCM): Management seeking to achieve goals in all three dimensions: economic, environmental, and socially sustainable development derived from customer and stakeholder requirements, management of material, information, and capital flows, and cooperation between businesses along the supply chain (Seuring & Müller, 2008)

- Sustainable supply chain practices: Practices aiming to reduce or eliminate waste, increase the efficiency of resource use, and improve the well-being of employees and communities in SSCM (Erkul, Kaynak, & Montiel, 2015; Golicic & Smith, 2013)

- Sustainable performance: There is no clear definition and consensus on sustainability performance, but some researchers define sustainable performance as the performance achieved by the company from a social, environmental, and economic point of view (Espino-Rodriguez & Taha, 2020; Gualandris, Golini, & Kalchschmidt, 2014). I define it as follows based on sustainability practices in three aspects:
  o Environmental sustainability performance includes effective waste management to reduce or eliminate waste, improve product quality, and use materials efficiently.
  o Social sustainability performance includes the well-being and safety of the employee and the interest in stakeholder relationships, such as customers, employees, labor

unions, community, government, and other interesting groups.

  o Economic sustainability performance includes improving financial performance by
    reducing waste, reducing costs, efficiently using resources, increasing brand
    awareness through enhanced quality, strengthening the relationship with suppliers and
    customers, and implementing efficient purchasing and pricing strategies.

- Similarity: Resemblance of a focal organization to other organizations in its environment
  and the result of imitation or independent development under similar constraints

  o The similarity in environmental sustainability between buyers and suppliers: The
    processes or status that cause an organization to resemble other organizations in terms
    of environmental sustainability based on what makes organizations similar.

  o The similarity in social sustainability between buyers and suppliers: The processes or
    status that cause an organization to resemble other organizations in terms of social
    sustainability based on what makes organizations similar.

- Innovativeness: The collective openness of companies to new ideas embedded in
  corporate culture (Lintukangas, Kähkönen, & Hallikas, 2019; Hurley & Hult, 1998) and
  the ability to develop new products or processes with a greater willingness to face new
  changes (Espino-Rodriguez & Taha, 2020; Azadegan and Dooley, 2010)

- Risk tolerance: Willingness or adherence to the potential loss on account of certain
  benefits that the risk is worth taking and is being under control (Rafiq, Akbar, Maqbool,
  Sokolová, Haider, Naz, & Danish, 2022; Haridasan & Kumar, 2014)

- Profitability: The positive results of suppliers' operations activities

- Sale to the focal buyer: Goods or services sold by suppliers to their focal buyers, literally

Organization of the Dissertation

This chapter introduces the overview of sustainability research and the research problems with a brief discussion of the research methodology. The study's significance then follows, consisting of research and practice sessions. Finally, this chapter shows the definitions of key constructs.

This dissertation organizes the remainder of the dissertation as follows. Chapter II reviews theories and literature such as SSCM research, embeddedness, stakeholder theory, innovativeness, and performance. Then, an integrative framework for exploring the relationship among key constructs from supplier perspectives is offered along with a detailed linkage to each construct. The research hypotheses, all based on theory and literature, are discussed next. The third chapter (Chapter III) elaborates on research methodology. In this chapter, I enumerate the procedures for the study, the data collection, and the analysis techniques used to test the hypotheses. The fourth chapter (Chapter IV) presents all the study results. Finally, in the last chapter (Chapter V), I discuss the study's results, effects, and limitations. The dissertation concludes with future research directions.

CHAPTER II

LITERATURE REVIEW & RESEARCH FRAMEWORK

This chapter consists of four sections. The first section briefly reviews the current status of sustainable supply chain research. This review indicates that the study of sustainable supply chains from a supplier perspective is less studied. The second section introduces two theories (embeddedness and stakeholder theory) and two review results of related literature (innovativeness and risk tolerance) in the sustainable supply chain. The third section draws on the previous theories and literature, presents a research framework, and develops specific hypotheses among the research variables. I present tables and figures to help build and describe hypotheses and the research model. Finally, the last section closes this chapter by summarizing what this chapter mentions.

Overview of Sustainable Supply Chain Research

Initial studies for SSCM have described supply chain issues and environmental issues or the impacts of environmental matters on supply chains as separate topics (Touboulic & Walker, 2015). However, current studies have identified SSCM from the more distinct and multifaceted aspects. For example, companies have integrated their environmental, social, and economic performance or do their business at the intersection of the triple bottom line

in sustainable development (Ansari & Kant, 2017). In addition, the public has expanded their concerns about sustainability from individual companies to their suppliers (Gualandris et al., 2013), and stakeholders have held companies accountable for their suppliers (Bouchery, Corbett, Fransoo, & Tan, 2017). As a result, SSCM has become one of the top priorities for companies to improve sustainable outcomes or performance in their operations and supply chains (Koberg & Longoni, 2019; Tseng, Lim & Wong, 2015; Seuring & Muller, 2008).

Along with the change in the perception of sustainability, research on SSCM has also increased rapidly since the early 2010s. (Alinaghian, Qiu, & Razmdoost, 2021; Khan et al., 2021; Saeed & Kersten, 2020; Nematollahi & Tajbakhsh, 2020; Cloutier, Oktaei & Lehoux, 2020; Carter et al, 2020; Jabbour et al., 2019; Patel & Desai, 2019; Martin & Pato, 2019). Thanks to abundant research activities, SSCM researchers can access innumerable research results (e.g., over four million research results from Google Scholar as of January 2023). Still, it is not easy to catch the status of SSCM research because of the large number of research results. In other words, for researchers who start SSCM research, SSCM literature review has become arduous to organize a tremendous amount of existing research results. Many review articles attest to this difficulty (e.g., Alinaghian et al., 2021; Khan et al., 2020; Saeed et al., 2020). Nevertheless, I identified the following seven characteristics of recent sustainable supply chain studies through an extensive and intensive literature review.

First, from the research design aspect, Patel and Desai (2018) and Ansari and Kant (2017) classified types of research designs in SSCM research into empirical qualitative (e.g., case study and interview), empirical quantitative (e.g., survey), desk qualitative (e.g., conceptual models), desk quantitative (e.g., mathematical modeling and simulation), and empirical triangulation (e.g., using more than one method). Their studies showed that qualitative research accounted for about 60% of the reviewed studies. In comparison,

approximately 30% employed quantitative research designs, and less than 7% of the reviewed papers used empirical triangulation as a research design. Therefore, the findings in research design features conclude that the research on SSCM stays at the preliminary stage and needs support from more quantitative results. Also, researchers need to employ a triangulation research design more actively to strengthen the SSCM research (Thurmond, 2001).

Second, from a theoretical viewpoint, although the proportion of atheoretical studies has decreased over time, there are still studies not guided by any theories at a high proportion: 33 percent (Touboulic & Walker, 2015; Carter & Easton, 2011). Further, theories adopted by research on SSCM came from other fields such as economics and social science (Touboulic & Walker, 2015; Colquitt & Zapata-Phelan, 2007). As a result, researchers hired various theories to explore sustainable activities, performances, and outcomes in supply chain management. The most frequently used theories are Resource-Based-View, Stakeholder Theory, Institutional Theory, and Transaction Cost Theory (Carter, Hatton, Wu, & Chen, 2019; Touboulic & Walker, 2015; Carter & Easton, 2011). Besides these four theories, SSCM research used Resource Dependence Theory, Dynamic Capability, Agency Theory, Social Network Theory, and Contingency Theory to explain sustainable supply chains (Carter et al., 2019). In addition, simultaneous usage of various theoretical lenses is encouraged (Stekelorum, 2020) because multiple theories complement each other, provide better hypotheses, and enable a more in-depth interpretation of the findings (Carter & Easton, 2011). Therefore, the trend of simultaneously employing multiple theories is increasing (Touboulic & Walker, 2015; Carter & Easton, 2011).

Third, in terms of research methods, researchers have used various ways such as case studies, conceptual and theoretical models, surveys, interviews, literature reviews, and mathematical models (Martins & Pato, 2019; Patel & Desai, 2018; Ansari & Kant, 2017; Carter & Easton, 2011). The direct observation methods such as a case study, interview, and

survey, accounted for 60% to 70% of the studies which the literature review included (Patel & Desai, 2018; Ansari & Kant, 2017; Touboulic & Walker, 2015; Seuring & Muller, 2008). The case study has been the most prominent research method among direct observation methods (Kobrg & Longoni, 2019; Patel & Desai, 2018; Ansari & Kant, 2017). Because of limitations in collecting empirical or secondary data (Ansari & Kant, 2017), the case study became the most frequently used research method in SSCM. Therefore, SSCM research needs to hire other research methods, such as surveys and archival data, to support its findings firmly and overcome the shortcomings of case studies.

Fourth, the unit of analysis in the SSCM studies shows that most studies analyzed individual companies, functional units in companies, small business units, or even individuals. Still, few studies use buyer-supplier pairs (e.g., Brandenburg, Govindan, Sarkis, & Seuring, 2014) or supply chain networks (e.g., Alinaghian et al., 2021) as units of analysis to explore sustainable supply chains. Moreover, the characteristics of existing research methodologies such as case studies and survey studies make it challenging to collect data on dyadic or triad relations: buyer-supplier or supplier-supplier-buyer relations (Carter & Easton, 2011; Calantone & Vickery, 2010). However, researchers like Calantone and Vickery (2010) showed a way to collect data exploring dyadic relations by combining various archival data (e.g., Compustat in Wharton Research Data Service, MSCI KLD Index, Dow Jones Sustainability Indexes, and Global Reporting Initiative). Therefore, researchers can expect to complement and extend the understanding of SSCM by analyzing dyadic, triad relations or supply chain networks among supply chain members.

Fifth, the most frequently studied industry is different from researcher to researcher or from study to study. For example, Carter and Easton (2011) described consumer products and transportation as the most chosen by researchers, while Ansari and Kant (2017) pointed out manufacturing and food. In short, I realized that industry bias exists through analyzing the

industries selected for the current SSCM studies (Patel & Desai, 2018; Brandenburg et al., 2014; Carter & Easton, 2011). The bias from industry is due to the degree of the importance of sustainability according to the types of industries (Brandenburg et al., 2014; Hassini, Surti, & Searcy, 2012; Carter & Carter, 1998) and the degree of the convenience of obtaining relevant data across the industries (Patel & Desai, 2018; Brandenburg et al., 2014; Carter & Easton, 2011). Therefore, when studying SSCM, researchers should control the industry type to avoid bias related to the industry types or reduce the bias by including as many industries as possible.

Sixth, SSCM research has mainly focused on the antecedent such as drivers and barriers to implement SSCM practices (e.g., Panda, Kumar, Jakhar, Luthra, Garza-Reyes, Kazancoglu, Nayak, 2020; Touboulic & Walker, 2015; Carter & Easton, 2011; Seuring & Muller, 2008;), the measurement for the results of sustainability practices or the performance of SSCM (e.g., Saeed & Kersten, 2020; Beske-Janssen, Janssen, & Schaltegger, 2015), the mechanisms for SSCM initiatives (e.g., Alinaghian et al., 2021; Cloutier et al., 2020; Bloom, 2015; Turker & Atlantus, 2014 Lund-Thomsen & Nadvi, 2010; Jeppesen & Hansen 2004; Blowfield, 2000), the relationship between SSCM practices and sustainable, operational, or financial performance (e.g., Vanalle, Ganga, Godinho Filho, & Lucato, 2017; Younis & Sundarakani 2016; Tan, Zailani, Tan, &Shaharudin, 2016; Gualandries Golini, & Kalchschmidt, 2014; Sen, 2009; Zhu & Sarkts, 2004), and the effects of specific industries or regions/countries on SSCM (e.g., Nematollahi & Tajbakhsh, 2020; Cai & Choi, 2020; Santos, Carvalho, Barbosa-Povoa, Marques & Amorim, 2019; Ketprapakorn, 2019; Jia Zuluaga-Cardona, Bailey & Rueda, 2018). And then there is still active research on these topics.

Last, despite the active SSCM research since the 2010s (Alinaghian et al., 2021; Saeed & Kersten, 2020; Nematollahi & Tajbakhsh, 2020; Jabbour et al., 2019) despite active research since the 2010s, many of the following issues are still waiting for research. As far as

suppliers and third-party logistics providers (Nematollahi & Tajbakhsh, 2020; Cloutier et al., 2020; Jabbour et al, 2019; Xiao, Wihelm,van der Vaart, & Van Donk, 2019), diversifying units of analysis from individual firms to pairs/triangles or supply chain network units (Alinaghian et al, 2021), broadening perspective from a single company to holistic supply chains (Bubicz, Ferreira, Barbosa-Povoa, & Carvalho, 2019; Jabbour et al., 2019):, activating quantitative research testing the sustainability in supply chains (Bubicz et al., 2019; Ciccullo et al, 2018), detailing processes or mechanism of sustainability implementation in supply chains (Cloutier et al., 2020; Jabbour et al., 2019), exploring decision-making processes regarding the implementation of sustainable activities & countermeasures to trade-off situations among three sustainable dimensions or within each dimension (Nematollahi & Tajbakhsh, 2020; Carter et al, 2020; Ciccullo et al, 2018), building theories through integrating middle-scale theory establishment using proposition, taxonomy, and typology (Carter et al., 2020), focusing and integrating social sustainability (Nematollahi & Tajbakhsh, 2020; Cloutier et al., 2020; Bubicz et al., 2019; Dubey et al., 2017), establishing consensus and standard measurement for social sustainability (Bubicz et al., 2019; Jabbour et al., 2019), exploring the effect of diversity considering the size (capacity) of the company and the characteristics of the region such as national characteristics and developing or developed countries (Bubicz et al., 2019; Dubey et al., 2017).

In conclusion, SSCM research started as a study on the impact of environmental issues of individual companies on the supply chain. Still, the public's interest has increased, and the area of their interest has expanded by including social and environmental issues at the same time. However, many SSCM studies are still conducted in qualitative research with an exploratory nature without proper theoretical guidance. Although various topics have been studied using various research techniques and data, many issues remain for future research.

Theories and Literature Relevant to This Research

This part introduces the two theories (embeddedness and stakeholder theory) and the literature review summary related to the other variables (innovativeness and risk tolerance). They are the logical basis of this research and constitute the research model. Each theory is an interdisciplinary theory based on different disciplines such as sociology or organizational behavior, not a theory inherent in operation management or supply chain management. Therefore, a sub-part explaining each theory consists of its origin and how operations management, supply chain management, or SSCM research has used it. In addition, the literature review results related to the other variables used in the research model are organized within the category of the sustainable supply chain. Finally, each sub-part contains a table summarizing the primary papers involved.

Embeddedness

Embeddedness is a central construct in social network theory and social capital theory (Tate, Ellram, & Golgeci, 2013; Lin & Qin, 2011; Choi & Kim, 2008; Autry & Griffis, 2008; Moran, 2005; Dacin, Ventresca, & Beal, 1999). Moreover, embeddedness leads to social networks, where resources that can be used and benefited constitute social capital (Lin & Qin, 2011). Therefore, it is essential to improve the understanding of embeddedness in SSCM by clarifying its origin to its current use in operations management and supply chain research.

Embeddedness refers to the degree to which non-economic institutions constrain economic activity (Polanyi, 1944). First, Karl Polanyi (1944) introduced the concept of embeddedness. And then, Mark Granovetter (1985) developed it as "an ongoing contextualization of economic activity in social relations" (Dacin et al., 1999, p. 319). These two researchers: Karl Polanyi and Mark Granovetter, are generally acknowledged as the

originators of embeddedness (Choi & Kim, 2008; Dacin et al., 1999) and the founders of

modern embeddedness (Lin & Qin, 2011; Choi & Kim, 2008) separately. Polanyi (1944)

argued that embeddedness is a necessary and fundamental condition of the economy in his

book: The Great Transformation. Granovetter (1985) insisted that personal motives and non-

economic factors such as structural status, social power, and sociability can rationalize

economic behaviors. Granovetter's (1985) research became the impetus for contemporary

research on embeddedness (Choi & Kim, 2008; Dacin et al., 1999).

According to Granovetter (1985), old-established social ties influence rational

economic exchanges, and there are two types of embeddedness: structural and relational.

Structural embeddedness is "the impersonal configuration of linkages between people or

units" (Nahapiet & Ghoshal, 1998, p. 244). In other words, structural embeddedness has

related to the presence or the absence of network ties between people or units and is featured

by cohesion, centrality, and hierarchy (Moran, 2005). Structural embeddedness is generated

in a triple or more complex structure that includes multiple dyadic relationships (Kim, 2014;

Uzi, 1996). Therefore, structural embeddedness means a configuration or a structural position

in a triadic or more complex network that involves informational and reputational benefits

influenced by monitoring and controlling (Kim, 2014).

On the other hand, relational embeddedness refers to "personal relationships people

have developed with each other through a history of interactions" (Nahapiet & Ghoshal,

1998, p. 244), and trust, obligation, and identification characterize it (Moran, 2005). Because

relational embeddedness is related to personal relationships, it emphasizes sharing emotion,

time, and information among members (Uzzi & Lancaster, 2003) and mutual dependence and

commitment (Rowley, Behrens, & Krackhardt, 2000). Relational embeddedness is created in

a direct and dyadic relation between two persons or units (Kim, 2014). Also, it becomes a

channel of learning and social capital for members (Andersson, Forsgren, & Holm, 2002).

Therefore, relational embeddedness refers to a direct relationship measured by the strength of the ongoing interactions that produce trust, reciprocity, and obligation between participants (Kim, 2014).

In structural embeddedness, the presence or absence of a network explains the connection patterns that make the network density: dense and sparse (Nahapiet & Ghoshal, 1998). Dense networks represent effective governance mechanisms with high interconnectivity and shared routines (Burt, 2000, 1992; Rowley, Behrens, & Krackhardt, 2000). People or units in dense networks are closely connected, have many standard contacts, develop intensive communication, and share redundant information from multiple sources (Kim, 2014; Uzi, 1996).On the other hand, the sparse network, namely a structural hole, means no direct contact among people or units (Burt, 2000). People or units in the sparse network have few standard connections, trying to increase the efficiency of the information flow (Burt, 2000, 1992). Therefore, the large, sparse network provides non-redundant and unique information and increases entrepreneurial opportunities, even though it does not provide a strong governance mechanism (Burt, 2000).

Relational embeddedness also consists of two types: strong and weak ties (Kim, 2014; Tiwana, 2008; Dhanaraj, Lyles, Streensma, & Tihanyi, 2004; Granovetter, 1973). A strong tie refers to how often a member interacts with the other member and how efficiently they spread information, knowledge, and resources between them. On the other hand, a weak tie refers to loosely-coupled relationships or relatively rare interactions between a focal unit and an external one out of the group that the focal unit belongs to (Kim, 2014; Kim & Choi, 2008; McEvily & Zaheer, 1999; Granovetter, 1973). Therefore, relational embeddedness promotes close observations and interactions, enabling firms to access specific information, tactical knowledge, and know-how (Kim, 2014; Khoja, Adams, & Kauffman, 2010; Tiwana, 2008; Granovetter, 1973) through strong ties. Also, it plays a crucial role in conducting new,

innovation-oriented tasks such as product and process innovation through weak ties (Moran, 2005; Granovetter, 1973).

Among the operational management studies hiring the concept of embeddedness, the research by Nahapiet and Ghoshal (1998) is one of the earliest and most cited studies (Dias & Silva, 2022). However, they used the dimensions of embeddedness to define social capital: structural, cognitive, and relational, not directly using embeddedness to construct a research framework. For example, they mentioned that networks represent structural capital, shared codes, language, and narratives represent cognitive capital; relational capital is formed through trust, social norms, and commitment. Like Nahapiet and Ghoshal's (1998) research, many operations management or supply chain management studies use embeddedness with the concept of social capital (e.g., Chen, Wang, Chen, Lo, & Chen, 2019; Swierczek, 2019; Peng, Tu, & Wei, 2018) or social network (e.g., Long, & Chen 2021; Stolze, Mollenkopf, Thornton, Brusco, & Flint, 2018). So, relatively few studies use embeddedness as a separate, standalone concept to test their research model (e.g., Song, Yang, & Yu, 2020). Therefore, reviewing operation management and supply chain management studies using social network theory or social capital theory help to understand the current status of embeddedness in operation management or supply chain management research.

SSCM research on social capital theory has scrutinized mainly sustainable performance in supply chains, buyer-supplier relationships, sustainable performance factors, and practices (Dias & Sliva, 2022). Therefore, embeddedness research primarily focuses on clarifying the role of practice formation and the buyer-supplier relationship. The following table summarizes representative studies using embeddedness to construct and test a research model. It can provide a basic grasp of the research status of embeddedness in operation management and SSCM. Table 2-1 summarizes representative SCM studies using embeddedness to test their research models. It focuses on research purposes and results.

Table 2.1. Main studies based on embeddedness in SCM research

Author(s) & Year	Purposes	Types	Findings
Choi & Kim, 2008	It intends to expand the understanding of the inter-organizational relationship, such as the buyer-supplier relationship, by using structural embeddedness in the social network theory.	Conceptual	A better understanding of structural embeddedness is positively related to improving buyers' operational, financial, and supplier management performance.
Autry & Griffis, 2008	Relying on social capital theory, it shows how a firm's investments in supply chain structures and relationships drive differentiated performance.	Conceptual	
Bernardes, 2010	Drawing on the social network theory, it explores factors related to relational embeddedness and the role of supply management.	Empirical (survey)	The relational embeddedness of social capital affects firm performance, and the supply management function may contribute to sustainable competitive advantage.
Kim, 2014	It examines whether understanding structural embeddedness enhances a buyer's operational and financial performance. Also, it tests the mediating role of the understanding of relational embeddedness.	Empirical (survey)	Understanding the structural embeddedness enhances the buyer's operational performance, not financial performance. Relational embeddedness mediates the influence of the enhanced understanding of the structural configuration on operational performance.
Wu & Pullman, 2015	Using the role of cultural embeddedness, it identifies why individuals and firms behave as they do and how their behavior affects network configuration.	Empirical (interview)	Cultural interactions at the node and network levels explain the network's functioning and change.

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Table 2.1, cont.

Author(s) & Year	Purposes	Types	Findings
Kim, Choi, & Skilton, 2015	It examines how different configurations of buyer-supplier embeddedness change the choices related to the level of involvement buyers and suppliers exhibit in inter-firm innovation activities.	Conceptual	Diverse configurations of buyer-supplier embeddedness are likely to create unique selection patterns for inter-firm innovation activities.
Tukamuhabwa, Stevenson, & Busby, 2017	It empirically examines supply chain resilience in the context of developing countries, providing theoretical insight into what resilience means in the supply chain.	Empirical (case study)	Threats of disruption, resilience strategies, and outcomes are interrelated in complex and non-linear ways. Supply networks' political, cultural, and territorial embeddedness explain these interrelationships.
Song, Yang, & Yu, 2020	Using network analysis, it explores the network structure of supply chain finance by identifying firms' operational capabilities and attributes of supply chain networks regarding supply chain finance. Also, it examines how supply chain networks and operational capabilities reduce information asymmetry and enhance the availability of working capital.	Empirical (case study)	Firms with specific operational capabilities and the necessary level of network embeddedness will overcome the difficulties of information asymmetry by initially showing uncontrolled signals to financial service providers to differentiate themselves from other ineligible firms.

Stakeholder Theory

Stakeholder theory emerged as an alternative to shareholder theory (Freeman, 1994). The underlying argument of stakeholder theory is that a business organization should consider the interests of its constituents, not its simple members, as well as the interests of shareholders (Laplume, Sonpar, & Litz, 2008; Freeman, 1994).

The term stakeholder became initially known from an internal memorandum at the Standford Research Institute in which managers needed to understand the concerns of stakeholders such as employees, lenders, suppliers, and shareholders when developing goals they could support (Sinclair, 2011). Later, it was introduced into strategic management and became popular by Freeman (1984, 2010). Freeman (1984) detailed the stakeholder theory of organizational management and business ethics that deals with morals and values in managing an organization, identified groups of stakeholders in a company, and described how management could adequately consider the interests of these groups in his book, Strategic Management: A Stakeholder Approach.

Stakeholder means "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman, 1984: 46). Freeman (1984) classified stakeholders into two primary types: internal and external. Internal stakeholders, including employees, managers, owners, and shareholders, operate within a company. On the other hand, external stakeholders are not part of the company but are affected by the company's actions or affect the company (Laplume et al., 2008) such as customers (buyers), suppliers, financiers, local communities, trade associations, competitors, the government, and society.

Furthermore, Grunig and Hunt (1984) identify four types of stakeholders by categorizing linkages between stakeholders and an organization: regulatory, normative, functional, and diffused stakeholders. Regulatory stakeholders, namely enabling stakeholders,

allow an organization to have the resources and autonomy to operate. Shareholders, legislatures, regulators, and boards of directors are good examples of regulatory stakeholders. Functional stakeholders affect the input function that suppliers, employees, and unions conduct and the output function that customers, distributors, and retailers are related to. Normative stakeholders, such as competitors and peers from the same industrial or professional associations, share similar values, goals, and problems affecting the norms or informal rules. Finally, diffused stakeholders include other organizations such as media, the community, activists, and other special interest groups like non-governmental organizations (NGOs) which do not have frequent interaction with the organization but have the potential for meaningful impacts on the organization. Figure 2-1 shows these four types of stakeholders based on an organization's relationship (Rawlins, 2006; Gruing & Hunt, 1984).

Stakeholder theory states that a company's management strategy must consider all stakeholders involved for the company to succeed. Stakeholder theory also emphasizes interconnected relationships between organizations and stakeholders to conduct successful business (Kayikci, Kazancoglu, Gozacan-Chase, & Lafci, 2022; Freeman, 1994). Meanwhile, companies use the stakeholder theory in three ways (descriptive, instrumental, and normative) to achieve their goals (Donaldson & Lee, 1995). First, the descriptive approach considers the company as a combination of various stakeholders, developing and implementing the most accurate ways to manage their interests as fairly as possible. Second, the instrumental approach determines the appropriate stakeholder management method to achieve the company's financial goal. Third, the normative approach considers stakeholders as ends in themselves rather than simply as means, establishing companies' ethical guidelines and achieving financial goals. Therefore, the stakeholder theory benefits the company in various ways, such as expanding business and social value sharing, increasing financial performance in the long run, and increasing social performance (Laplume et al., 2008).

Stakeholder theory, introduced and developed in strategic management by Freeman (1984), has extended its field to organization theory (e.g., Donaldson & Preston, 1995), business ethics (e.g., Starik, 1995), and sustainability (e.g., Steurer, Langer, Konrad, & Martinuzzi, 2005). Finally, from 2007 to 2008, stakeholder theory began to be used in operations and supply chain management (Lavassani & Movahedi, 2010). As a result, it has become one of the most widely used theories that explore the interrelationships of participants in supply chains and the sustainability in supply chains (Tseng, Ha, Lim, Wu, & Iranmanesh, 2022; Haleem, Farooq, Cheng, & Waehrens, 2022; Carter, Hatton, Wu, & Chen, 2019; Carter & Washispack, 2018).

Therefore, in supply chain management research, stakeholder theory clarifies the interrelationships between stakeholders in the supply chain (Tseng et al., 2022). and highlights that stakeholders can play an essential role in establishing sustainable supply chains because stakeholders need to secure legitimacy to run a successful business by meeting the requirement or demands of each stakeholder mentioned that SSCM research on stakeholder theory had scrutinized mainly three subjects. The first object is to identify whether or not stakeholders can affect SSCM and, if they can, how stakeholders' impact on SSCM differs depending on the type of stakeholder. Research results identified stakeholders pressures play a critical role in enhancing or hindering the adoption of sustainable management practices (e.g., Awan, Kraslawski, & Huiskonen, 2017; Gualandris & Kalchschmidt, 2013; Wolf, 2011; Kirchoff, Koch, & Nichols, 2011; Mollenkopf, Stolze, Tate, & Ueltschy, 2010). The second topic is to explore the effect of supply chains context variables such as supplier capability and buyer initiative on the influence of stakeholders in SSCM. As in the first topic results, researchers found the positive, negative, or even neutral moderate effect of context variables on the relationship between stakeholder pressure and sustainability practice in supply chains (e.g., Bouguerra, Hughes, Cakir, & Tatoglu, 2022;

Pohlmann, Scavarda, Alves, & Korzenowski, 2020; Ehrgott, Reimann, Kaufmann, & Carter, 2011; Wang, Zhang, & Zhang, 2020; Awaysheh & Klassen, 2010). The last subject is to investigate what differences the type of stakeholder makes regarding the kind of sustainability. For example, research results reported that external stakeholders could prefer to be involved in social sustainability because they could regulate or mobilize public opinion (Haleem et al., 2022; Zhu & Sarkis, 2006). On the other hand, internal stakeholders favor environmental sustainability because they could lead to proactive environmental strategies (Haleem et al., 2022; Sarkis, Gonzalez-Torre, & Adenso-Diaz, 2010). Table 2-2 summarizes representative SSCM studies based on stakeholder theory. It focuses on research purposes and results.
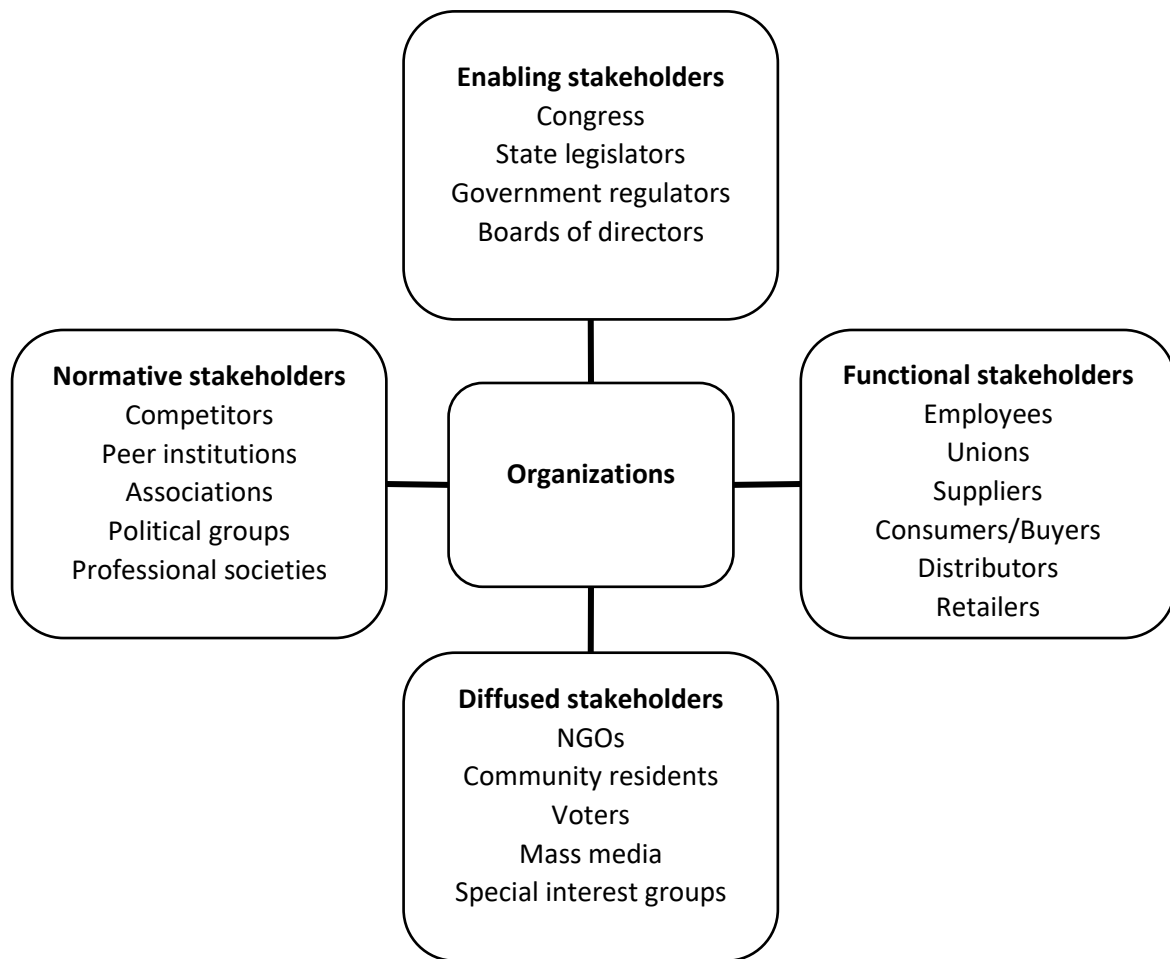
Figure 2.1. Four types of stakeholders regarding linkages between stakeholders and an organization (modified from Rawlins, 2006, p. 5)

Table 2.2. Main studies based on stakeholder theory in SSCM research

Author(s) & Year	Purposes	Types	Findings
Walker & Bourne (2007)	To explore the stakeholders' role in the procurement process drawing on stakeholder theory	Conceptual	Identifying one of the often-neglected stakeholder groups, the downstream supply chain, and showing how stakeholders' contribution to added value can be embedded into the procurement process.
Gualandris, Klassen, Vachon, & Kalchschmidt, 2015	Building a model to explore how firms address accountability for sustainability issues in supply chains	Conceptual	Monitoring systems must be recognized as more complex and diverse, sustainable evaluation and verification systems with multiple processes and dimensions.
Awan, Kraslawski, & Huiskonen, 2017	Examining the relationship between stakeholder pressure and adoption of sustainable supply chain practices and the impact of the pressure on sustainability performance.	Empirical (survey)	Sustainable supply chain practices from various stakeholder pressures can play in achieving manufacturing firms' social and environmental performance.
Busse, Regelmann, Chithambaram, & Wagner, 2017	To explore the perceptions of energy that managers in logistics organizations portray	Empirical (interview)	Describing which energy-related perceptions exist, how they can be categorized into attitudes, subjective norms, and perceived behavioral controls, and how different stakeholders affect them.
Camilleri, 2017	To provide a comprehensive review of contributions to responsible supply chain management and to explain how firms use responsible procurement and supply chain management to protect and enhance their reputation	Conceptual	Differentiated strategies and proactive engagement in responsible supply chain management give firms a competitive advantage in the long run.

Table 2.2, cont.

Author(s) & Year	Purposes	Types	Findings
Quiroga-Calderón, Mejía-Salazar, Moreno-Mantilla, & Loaiza-Ramírez, 2018	To investigate whether green supply chain management practices and more disruptive innovations involving the redefinition of the supply chain's strategy are influenced by firms' integration with this type of stakeholders	Empirical (survey)	the integration between small and medium-sized enterprises and the community affects green supply chain management and disruptive practices.
Morais & Barbieri, 2020	To examine how stakeholder salience and contingency factors influence the extent to which focal firms implement governance mechanisms to address social issues in supply chains	Empirical (case study)	Classifying the social issues, proposing three types: central social issues, peripheral social issues, and remote social issues, and describing three archetypes of supply chain social sustainability: elementary, selective, and extensive.
Haleem, Farooq, Cheng, & Waehrens, 2022	To scrutinize the effect of stakeholder pressure on implementing sustainable management practices.	Conceptual	Stakeholder pressure often promotes sustainable practices, sometimes has little impact, and sometimes discourages sustainability practices.
Kayikci, Kazancoglu, Gozacan-Chase, & Lafci, 2022	Discovering the drivers of sustainable circular supply chains in achieving the sustainable development goals in low- and middle-income countries through stakeholder theory.	Conceptual (Best-Worst Method)	Economic sustainability is the best key driver among the eight drivers in achieving sustainable development goals.

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Innovativeness

In research topics about something innovative, innovation and innovativeness have been the core concepts. Although many studies use the two as separate concepts, it is also true that the distinction is not clear. Therefore, a comparison of innovativeness with innovation helps to understand innovativeness clearly.

Schumpeter (1934) argued that innovation goes through a new combination created by entrepreneurs, resulting in new products, new processes, the opening of new markets, new ways of doing business, and new sources of supply. The academic community has accepted his argument and used it widely. Innovation means the practical implementation of ideas that will lead to introducing new products or services or improving the delivery of goods or services (Gao, Xu, Ruan, & Lu, 2017; Arlbjørn, de Haas, & Munksgaard, 2011; Windrum & García-Goñi, 2008; Schumpeter, 1934). Drawing on this basic definition of innovation, researchers have defined the concept as a variety of focus points such as process, marketing, capability, and cultural and environmental perspectives (Gao et al., 2017). However, the central element of these various definitions of innovation is to put new ideas into action. The generally accepted definition of innovation is creating, taking, and implementing new ideas, processes, products, or services in organizations to generate economic value (Gualandris & Kalchschmidt, 2014).

On the other hand, innovativeness represents an enterprise's innovation orientation, the potential, and ability to deploy human, business, and technical resources to maintain existing innovations or significantly improve and produce ultimately new products or services for corporate performance (Paille & Halilem, 2019). Innovativeness refers to a willingness to change and improve existing processes, products, or management systems (Saeed & Kersten, 2019; Gualandris & Kalchschmidt, 2014). In a nutshell, innovativeness, a

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company's innovation orientation, includes its commitment to its will, its strategy for innovation, and its commitment to initiatives (Paille & Halilem, 2019).

Meanwhile, among various definitions of innovation, cultural and environmental perspective defines innovation as the concept of openness to new ideas as an aspect of corporate culture that assesses the organization's orientation toward innovation (Gao et al., 2017; Lee & Tsai, 2005; Hurley & Hult, 1998).

However, the meanings of the two terms: innovation and innovativeness, are in the same vein, willingness/ability to change (Gualandris & Kalchschmidt, 2014). Therefore, the SSCM study with innovation, which includes organizational orientation, was included in the current innovativeness study in SSCM. In addition, before Gao et al. (2017), supply chain research separately focused on SCM, innovation, and sustainability (Tebaldi, Bigliardi, & Bottani, 2018). So, literature studying SCM and innovation, innovation and sustainability, or all three topics, was reviewed to identify the current research status of innovation or innovativeness in SCM or SSCM (e.g., Tebaldi et al., 2018; Gao et al., 2017).

Therefore, systematic literature review (SLR) articles on SCM or SSCM research based on innovation or innovativeness (e.g., Tebaldi et al., 2018; Gao et al., 2017) can provide good snapshots to understand the current research trends. First, the results of SLR articles commonly reveal that manufacturing, agriculture, and mining are popular industries in research. Researchers estimated that these industries receive more attention because they are more likely to emit environmental pollutants (Tebaldi et al., 2018; Gao et al., 2017). Second, innovation types in sustainable supply chain research are biased toward the product, process, or technological innovations (Nilsson & Göransson, 2021; Tebaldi et al., 2018; Gao et al., 2017). On the other hand, research related to organization, marketing, or resource allocation innovations is limited. The bias of innovation types is presumed since innovation is

only associated with the sustainable supply chain's specific functions (Tebaldi et al., 2018; Gao et al., 2017) such as sourcing, delivery, and value position (e.g., Jensen & Govindan, 2014; Neubert, Dominguez, & Ageron, 2011; Silvestre, 2014). Third, studies about the integration of innovation and sustainability in social and environmental aspects are scarce, so studies on the economic aspects of sustainability account for around two-thirds of the total studies (Nilsson & Göransson, 2021; Tebaldi et al., 2018; Gao et al., 2017). Even Gao et al. (2017) reported that only one study considered sustainability's economic and social dimensions. It is consistent with the necessity of social sustainability research, one of the future research agendas presented in SLR on sustainable supply chain research (Nematollahi & Tajbakhsh, 2020; Cloutier et al., 2020; Bubicz et al., 2019; Dubey et al., 2017). Last, I could find only one study conducted from a supplier's point of view while reviewing the literature. For example, Kim and Chai (2017) investigated the impact of supplier innovativeness on supply chain collaboration and agility. Research from a supplier perspective is also one of the future research topics presented by SLR on sustainable supply chain research. The following table 2-4 summarizes representative studies using innovation or innovativeness in the context of SCM or SSCM. It can provide a basic grasp of the research status of innovativeness in SCM or SSCM by focusing on research purposes and results.

Table 2.3. Main studies based on innovativeness in SCM or SSCM research

Author(s) & Year	Purposes	Types	Findings
Gualandris & Kalchschmidt, 2014	To investigate how sustainable supply chain management develops and evolves from internal to external practices	Empirical (survey)	Customer pressure and innovativeness positively and significantly affect Sustainable process management.
Saeed & Kersten, 2019	To identify drivers of sustainable supply chain management that encourage organizations to undertake sustainability initiatives and implement sustainable solutions	Conceptual (literature review)	Regulatory and market pressures are the most prevailing drivers of sustainable supply chain management for implementing sustainability practices.
Gao, Xu, Ruan, & Lu, 2017	To explore the relationship between innovation, supply chain, and sustainability and to redefine supply chain innovation and sustainable supply chain innovation	Conceptual (literature review)	Integration of three research streams: innovation, supply chain management, and sustainability and definition of sustainable supply chain innovation regarding eight figures like systematic, complex, internal and external, and dynamic
Bag, Wood, Xu, Dhamija, & Kayikci, 2020	To evaluate the role of the Big data analytics capability as an operational approach in improving sustainable supply chain performance	Empirical (survey)	Big data analytics capability affects innovative green product development, employee development, and sustainable supply chain outcomes. Also, innovation and learning performance affect sustainable supply chain performance.
Kim & Chai, 2017	To investigate the impact of supplier innovativeness on supply chain collaboration and agility	Empirical (survey)	Supplier innovativeness positively affects information sharing and supply chain agility but has no relationship with strategic sourcing.
Mardani, Kannan, Hooker, Ozkul, Alrasheedi, & Tirkolaee, 2020	To present a comprehensive review of the application of the structural equation modeling in the assessment of sustainable and green supply chain management (SCM)	Conceptual (literature review)	Providing overview in eight different areas: green SCM, sustainable development and SCM, environmental SCM, supplier sustainability, green supplier, corporate social responsibility and SCM, SCM under the carbon emission policy

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Table 2.3, cont.

Author(s) & Year	Purposes	Types	Findings
Paillé & Halilem, 2019	To refine eco-innovativeness at the firm level and synthesize the literature to find their determinants from a knowledge-based resource view.	Conceptual (literature review)	The integrated conceptual model is proposed to illustrate how the factors, such as long-term-based eco-innovation orientation, dynamic eco-capacity, and green absorptive capacity, interact in eco-innovativeness prediction.
Hsu, Tan, & Zailani, 2016	To predict how sustainable supply chain initiatives might influence reverse logistics outcomes and identify the impact of eco-reputation and eco-innovation orientation strategies on deploying sustainable supply chain initiatives.	Empirical (survey)	Implementing sustainable supply chain initiatives can realize positive reverse logistics outcomes. Also, eco-innovation and eco-reputation are theoretically important antecedents of sustainable supply chain initiatives.
Wang & Sarkis, 2013	To investigate whether companies' environmental and social supply chain activities are associated with their financial performance	Empirical (archival data)	Integrated sustainable supply chain management is positively associated with corporate financial performance measured by return on assets and return on equity. However, the positive effects can have a time lag of at least two years.

Risk tolerance

Risk tolerance means acceptable risk. Each company and supply chain may have a unique level of risk tolerance. Also, this level may vary by product, service, or time. (Abdel-Basset, Gunasekaran, Mohamed, & Chilamkurti, 2019).

Risk tolerance originates from the opposite concept of risk aversion used to describe The St. Petersburg paradox cited in Daniel Bernoulli (1783)'s paper (Finke & Guillemette, 2016). After that, various disciplines such as economics, finance, management, and psychology, have studied risk tolerance (Fan & Xiao, 2005; Roszkowski, 1993). For example, in the supply chain discipline, Schweitzer and Cachon (2000) and Agrawal and Seshadri (2000) are among the first researchers to apply the concept of risk tolerance to supply chains (Hu & Meng, 2021). However, they investigated newsvendor decisions across different profit conditions or different types of risk preferences based on a mathematical model using risk aversion, not risk tolerance.

Meanwhile, there are various definitions of risk according to the purpose of research by academic discipline. For example, finance represents risk as the probability of expected outcomes such as profit volatility in an investment portfolio or default or bankruptcy risk. On the other hand, strategy defines risk as expected and actual profit volatility, risk of strategic behavior, and relational risk like opportunistic behavior (Mnauj & Mentzer, 2008). As each field uses its own definition of risk, supply chain research does not yet have a consensus about the definition of risk tolerance. For example, Olson and Wu (2010) mentioned that risk tolerance refers to the organization's ability to absorb risk. Trujillo-Barrera, Pennings, and Hofenk (2016) said that risk tolerance is the producer's general predisposition toward assuming financial risk. Abdel-Basset et al. (2019) define risk tolerance as an acceptable risk.

In addition, some researchers introduced the scope of risk tolerance, focusing on the perception and attitude of risk as a series of recognition from not feeling any risk to extreme risk aversion. For example, Zsidisin and Hartley (2012) noted that risk tolerance levels range from risk aversion through risk neutrality to risk seeking. Arcelus, Kumar, and Srinivasan (2012) classified retailers into risk-seeker, risk-neutral, or risk-averse to evaluate the relationship between a retailer's pricing and ordering policies. Trujillo-Barrera, Pennings, and Hofenk (2016) also classified risk tolerance from extreme risk seeking to risk aversion by citing Pennings and Wansink's (2004) risk perception range.

Since Schweitzer and Cachon (2000) and Agrawal and Seshadri (2000) introduced the concept of risk tolerance into supply chain research, risk tolerance belongs to the risk mitigation process among four processes of supply chain risk management: identification, assessment, mitigation, and monitoring (Ho, Zheng, Yildiz, & Talluri, 2015). However, compared with other risk research topics in SSRM such as risk identification (Kayis & Karningsih, 2012; Tsai, Liao, & Han, 2008), assessment (Wiengarten, Pagell, & Fynes, 2013; Samvedi, Jain, & Chan, 2013), and mitigation (Vedel & Ellegaard, 2013; Kang & Kim, 2012), the risk tolerance research has not attracted much attention. It is because SSRM focuses on identifying risk factors and studying how to deal with them (Ho, Zheng, Yildiz, & Talluri, 2015) and because risk tolerance is a context variable or has a moderate effect on the relationship between other variables. For example, Todaro et al. (2021) examined whether risk tolerance moderated the relationship between perceived climate risk exposure and supply chain or internally oriented climate action.

Reviewing risk tolerance literature related to the supply chain showed the following topics mainly studied and characteristics: decision-making related to order or price, coordination, mergers and acquisition, optimization, and the relationship with information. For example, early research mainly focused on decision-making related to orders (e.g., Wang

& Webster, 2007; Schweitzer & Cachon, 2000; Agrawal & Seshadri, 2000), investments (e.g., Xie, Yue, Wang, & Lai 2011), and prices (Chernonog, Avinadav, & Ben-Zvi, 2015; Chernonog & Avinadav, 2014; Xu, Dan, Zhang, & Liu, 2014) based on mathematical models. Afterward, studies on collaboration using contractual conditions among supply chain members (e.g., (Hu, Meng, Xu, & Son, 2016) and mergers and acquisitions in supply chains (e.g., Avinadav, Chernonog, & Perlman, 2017) were conducted. At the same time, the optimization of decision-making using various mathematical models (e.g., Hu & Meng, 2021; Todaro, Testa, Daddi, & Iraldo, 2021; Abdel-Basset, Gunasekaran, Mohamed, & Chilamkurti, 2019) has been another research subject. At the same time, the relationship between risk tolerance and other variables (e.g., information) and this relationship's effect on suppliers' efficiency has attracted attention as a current research topic (Hrazdil, Kim, & Li, 2022; Avinadav, Chernonog, & Ben-Zvi, 2019; Zhao & Zhu, 2018). Table 2-5 summarizes representative studies using risk tolerance in the context of SCM or SSCM. It can provide a brief understanding of the research status of risk tolerance in SCM or SSCM by focusing on research purposes and results.

Table 2.4. Main studies based on risk tolerance in SCM or SSCM research

Author(s) & Year	Purposes	Types	Findings
Hrazdil, Kim, & Li, 2022	To investigate whether risk-tolerant customers induce suppliers' investment inefficiency	Empirical (archival data)	The risk tolerance of CEOs in downstream firms induces volatility in the investment decisions of upstream firms. Customers' ex-ante risk tolerance levels have spillover effects along the supply chain, with suppliers' investment efficiency being negatively associated with customers' ex-ante risk tolerance levels
Todaro, Testa, Daddi, & Iraldo, 2021	To investigate perceived climate change and perceived exposure to climate risk as a precedent for corporate response to climate change & to test the moderation of risk tolerance on the relation between perceived climate risk exposure and climate action	Empirical (survey)	Risk attitudes are a significant factor in decision-making under climate uncertainty, and managers' risk tolerance plays a role as a moderator of the relation between perceived climate risk exposure and climate action
Hu & Meng, 2021	To investigate supply chain players' levels of risk tolerance to optimize product sale prices and supply chain efforts in supply chain collaboration	Modeling	Risk aversion may not always have negative effects on mobile game supply chain decisions, and risk-seeking may not always have positive effects. A change in decision-making also depends on the relative risk tolerance of supply chain partners.
Xie, Yue, Wang, & Lai 2011	To investigate the impact of various supply chain strategies and risk-averse behaviors of the players on quality investment and price decisions in a make-to-order supply chain with uncertain demand in international trade.	Modeling	Both supply chain strategy and risk-averse behavior significantly impact quality investment and pricing. Compared to a risk-neutral supply chain, a risk-averse supply chain has lower, same, and higher quality products in three supply chain strategies.

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Table 2.4, cont.

Author(s) & Year	Purposes	Types	Findings
Xu, Dan, Zhang, & Liu, 2014	To examine pricing decision between a manufacturer and a retailer in the presence of risk aversion using a mean-variance model	Modeling	Risk aversion is of great importance for both the manufacturer and the retailer. The price set by a risk-averse dual-channel supply chain is lower than the one set by a risk-neutral dual-channel supply chain

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<center>**Framework of Key Relationships and Hypotheses**</center>

Relational Embeddedness and the Degree of Similarity in Sustainability Practices

Embeddedness is a central construct in social network theory and social capital theory (Tate et al., 2013). Embeddedness has two dimensions: structural and relational embeddedness (Granovetter, 1985). Structural embeddedness regards the configuration of network relationships (Rowely et al., 2000; Nahapiet & Ghoshal, 1998) where network ties' connectivity, centrality, and hierarchy are analyzed (Moran, 2005). On the other hand, as a part of this study, relational embeddedness refers to the relationships members have developed through long and continuous interactions (Nahapiet & Ghoshal, 1998). Because the network members, like buyers and suppliers, establish their relationships through the accumulation of long-term interactions, they develop standard norms and trust and share value and mutual recognition (Moran, 2005). So, relational embeddedness is considered a source of organizational learning and social capital (Ferraris, Santoro, & Scutto, 2020; Kang & Hau, 2014; Li, Wang, Huang, & Bai, 2013; Tate et al., 2013; Andersson et al., 2002). In other words, the closer the relationship between members, the more advanced their relationship is (Evangelista & Hau, 2009). It results in strong ties between members that offer the advantage of exchanging quality information and knowledge (Li et al., 2013). Therefore, the relational embeddedness study focuses on how companies acquire strategic assets, such as information and resources, how they collaborate, and how learning occurs within the network (Ferraris et al.,2020; Rowley et al., 2000).

In this sense, it is desirable to use relational embeddedness to explain adopting new business practices like sustainable practices. For example, in sustainable supply chain management, financial constraints, lack of appropriate knowledge and skills, inadequate

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support from top management, inappropriate regulation, lack of measurement, and weak

demand are typical main obstacles to adopting and implementing sustainable practices

(Panigrahi & Rao, 2018; Sajjad, Eweje, & Tappin, 2015; Giunipero, Hooker, Denslow,

2012). Meanwhile, previous research findings support that relational embeddedness can be a

vital channel to overcome obstacles (e.g., lack of appropriate knowledge, skills, and

measurement). For example, Dhanaraj, Lyles, Steensma, and Tihanyi (2004) pointed out that

relational embeddedness influences tacit and explicit knowledge transfer among joint venture

companies. McEvily and Marcus (2005) found that relational embeddedness help members

get involved in resolving alliance issues by reducing mistrust and uncertainties. Tiwana

(2008) identified that shared values among members enable them to easily absorb their

counterparts' ideas and thoughts, contributing to the transmission and integration of tacit

knowledge. In addition, Luca, Ferraris, Papa, and Vrontis (2018) found relational

embeddedness reduced the cost of knowledge acquisition through the free exchange of

knowledge, facilitating learning. Therefore, we can infer that strong ties, such as long and

frequent interactions, offer the advantages of exchanging quality information and knowledge

and access to critical resources, helping adopt new sustainable practices from their

counterparts, such as buyers or suppliers. In a nutshell, if a company and its partners have a

closer relationship, they would be more willing to transfer their respective tacit or complex

knowledge to each other (Park & Glaister, 2009; Moran, 2005), helping adopt new

sustainable practices.

Sustainability issues emerged around 20 years ago and became mainstream in supply

chain management (Seuring, Aman, Hettiarachchi, de Lima, Schilling, & Sudusinghe, 2022).

Furthermore, sustainability researchers have demonstrated that embeddedness plays a critical

role in influencing the introduction and implementation of sustainable practices as network

context may promote or limit it under different collaborative constructions (Zhou, Govindan,

& Xie, 2020; Tate et al., 2013). Meanwhile, relational embeddedness can encourage the firm to implement and expand environmental practices in the sustainable supply chain (Stefano & Montes, 2018). However, adapting and implementing environmentally sustainable practices mean that some challenges and skills from alien technology lead to market uncertainties for a firm (Zhou et al., 2020). Moreover, widespread solutions, specific technical standards, or policies that stimulate sustainable environmental activities may not be available (Dangelico, Pujari, & Pontrandolfo, 2017; Ziegler, 2015). So, companies desperately seek environmental practices for sustainable supply chains; they recognize that relational embeddedness could help them implant or imitate leading companies' sustainability strategies and activities. Because relational embeddedness develops in the trust (Moran, 2005), the supplier closely observes its buyer and shares the buyer's specific information and strategies. Relational embeddedness efficiently spreads information, knowledge, and resources among members (Kim, 2014; Khoja et al., 2010; Tiwana, 2008; Granovetter, 1973), helping adopt or imitate sustainable practices of leading members in supply chains like buyers. Therefore, based on the above discussion and empirical evidence, I suggest the following hypotheses:

- H1a: *Relational embeddedness positively relates to the degree of similarity in environmental sustainability.*

Sancha, Gimenez, Sierra, & Kazeminia (2015) identified that collaboration facilitates more noticeable progress in social sustainability because buyers and suppliers develop specific capabilities and resources to solve social issues by working closely. By providing training and education sessions as supplier development programs, buyers enable suppliers to understand the goals of social sustainability and its positive implications on their operations, motivating them towards socially responsible actions in their factories (Alghababsheh& Gallear, 2021; Yadlapalli, Rahman, & Gunasekaran, 2018). In addition to collaboration and

supplier development programs, relational embeddedness serves as interaction routines that foster the exchange of information, knowledge, and resources toward effectively implementing socially sustainable practices (Gualandris & Kalchschmidt 2016; Kim, 2014; Khoja et al., 2010; Tiwana, 2008; Andersson et al., 2002). Relational embeddedness promotes mutual learning and knowledge exchange, enabling suppliers to develop the necessary capabilities to improve work infrastructure, health and safety procedures, and labor conditions (Alghababsheh& Gallear, 2021; Sancha et al., 2015). The closer and more frequent interaction based on trust between buyer and supplier is, the more norms and the more profound value and mutual recognition between them develop and share (Moran, 2005). Sharing goals and value between buyer and supplier facilitate the process for buyers to assess supplier activities (Wang et al. 2013) and monitor performance (Lioliou and Zimmermann 2015), making suppliers comply with buyers' code of conduct (Alghababsheh& Gallear, 2021; Lund-Thomsen, 2008). Therefore, based on the above discussion, I propose the following hypothesis:

- *H1b: Relational Embeddedness positively relates to the degree of similarity in social sustainability.*

Relational Embeddedness and Innovativeness

Drawing from the various definitions of innovativeness in the previous theories and literature review session, I define innovativeness as a firm's willingness and ability to deploy human, technical, and business resources to maintain existing innovations, produce new products or services, improve processes, or explore new markets (Paille & Halilem, 2019; Gao et al., 2017; Gualandris & Kalchschmidt, 2014; Wang & Ahmed, 2004) through the

proposal and implementation of new ideas (Crespell & Hansen, 2009; Leonard & Swap, 1999) for corporate performance.

This definition shows that innovativeness includes entrepreneurial (organizational), market, and learning (knowledge) issues. And these issues are also identified in many previous innovativeness studies (e.g., Mancha & Shankaranarayanan, 2020; Mkalama, Ndemo, & Maalu, 2018; Kyrgidou & Spyropoulou, 2013; Griese, Pick, & Kleinaltenkamp, 2012; Nybakk, Crespell, Hansen, & Lunnan, 2009; Hult, Hurley, & Knight, 2004). In addition, a common feature of research on these issues is studying antecedents of innovativeness. Therefore, they have identified the various antecedents: for example, entrepreneurial orientation (e.g., Damic, Naletina, & Buntic, 2020; Mancha & Shankaranarayanan, 2020; Mkalama et al., 2018; Kyrgidou & Spyropoulou, 2013; Hoq, 2009; Hoq & Ha, 2009; Nybakk et al., 2009; Hult et al., 2004), marketing orientation (e.g., Damic et al., 2020; Kyrgidou & Spyropoulou, 2013; Hoq, 2009; Hoq & Ha, 2009; Hult et al., 2004), learning orientation (e.g., Damic et al., 2020; Nybakk et al., 2009; Hult et al., 2004), knowledge (e.g., Griese et al., 2012), environmental dynamism (e.g., Mkalama et al., 2018), technology capability (e.g., Mkalama et al., 2018; Kyrgidou & Spyropoulou, 2013; Kamaruddeen, Yusof, & Said, 2010), & managerial capability (e.g., Kyrgidou & Spyropoulou, 2013). They then found positive relationships between these antecedents and innovativeness. Among these antecedents, learning orientation, market orientation, and entrepreneurial orientation are most commonly founded (Damic et al., 2020; Garcia & Calantone, 2002; Hult et al., 2004).

Learning orientation is a crucial determinant of innovativeness among these main antecedents (Damic et al., 2020). In addition, learning orientation refers to the development of new knowledge that can influence an organization's behaviors (Damic et al., 2020; Griese et al., 2012; Nybakk et al., 2009; Hult et al., 2004). Learning orientation also emphasizes

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gathering knowledge (Damic et al., 2020) and helps organizations anticipate market and environmental changes (Garcia & Calantone, 2002).

So the key to learning orientation, a significant determinant of innovativeness, is acquiring knowledge and recognizing changes in the surrounding environment. Meanwhile, relational embeddedness serves as a channel to access adequate information, knowledge, know-how, and resource and diffuse them among members (Kim, 2014; Khoja, Adams, & Kauffman, 2010; Tiwana, 2008; Granovetter, 1973). Furthermore, some studies have confirmed social capital (e.g., Griese et al., 2012; Nybakk et al., 2009) and social networks (e.g., Kyrgidou & Spyropoulou, 2013) based on the concept of relational embeddedness, have a positive relationship with innovativeness. Therefore, based on the above discussion and empirical evidence, I suggest the following hypothesis:

- *H1c: Relational embeddedness positively relates to innovativeness.*

Innovativeness and the Degree of Similarity in Sustainability

It is well known that innovativeness precedes sustainability (Bamgbade, Kamaruddeen, & Nawi, 2015). Also, much empirical evidence supports this relationship between innovativeness and sustainability. For example, Gundry, Kickul, Iakovleva, and Carsrud (2014) found that innovativeness is an antecedent to obtaining firm sustainability in women-owned family businesses in transitional economies. Jin, Navare, and Lynch (2019) identified that innovativeness positively affected the sustainability orientation of companies by exploring the effects of sustainability orientation and firm size. Sharma, Prakash, Kumar, Mussada, Antony, and Luthra (2021) also identified that innovativeness influenced environmental sustainability by analyzing the relationship between the adaption of green culture, innovation, and green performance for achieving sustainability in the textile industry.

Meanwhile, when suppliers adopt sustainable practices, they can use one of the four strategies: innovator, explorer, enforcer, and tinker (Liu, Zhang, & Ye, 2019) from the supplier perspective. But unfortunately, suppliers who use the enforcer or the thinker strategy do not have enough resources or willingness to adopt sustainable practices (Liu, Zhang, & Ye, 2019). In detail, buyers may force their suppliers to adopt sustainable practices according to their requirements. However, suppliers using the enforcer strategy may be reluctant to proactively address sustainability issues or develop innovative practices. In addition, suppliers using a thinker strategy passively respond to sustainability concerns and crises. It is also challenging for suppliers to promote sustainability practices. In other words, they are not proactive or innovative in adopting sustainability. Moreover, they are not ready to cooperate with their buyers either. Therefore, these enforcer and thinker strategies are not related to explaining the relationship between innovativeness and adopting similar sustainable practices.

On the other hand, suppliers using the innovator or explorer strategy proactively respond to adopting sustainability or actively collaborate with buyers to embrace sustainability. For example, suppliers hiring an innovator strategy allocate more resources to adopt sustainability and collaborate with buyers to meet the demand of their buyers. Also, buyers enable suppliers to develop process innovations during the adoption by transferring knowledge and know-how or engaging suppliers to participate in various programs like supplier development programs (Liu, Zhang, & Ye, 2019). In addition, suppliers employing the explorer strategy tend to develop sustainability practices based on their own needs and judgment. However, they find their needs by asking about buyers' requirements (Liu, Zhang, & Ye, 2019). And then they respond proactively to meet buyers' criteria in sustainability practices (Liu, Zhang, & Ye, 2019) because buyers are one of the most critical stakeholders (Awan et al., 2017; Gualandris & Kalchschmidt, 2013; Kirchoff et al., 2011; Mollenkopf et

al., 2010). Such programs or actions to meet the requirements lead suppliers to make substantial changes in their processes and ask them to adopt similar sustainability standards to those of their buyers (Villena & Gioia, 2020). Therefore, it concludes that innovativeness can lead suppliers to adopt similar sustainable practices.

Also, stakeholder theory helps explain suppliers' decisions about adopting various similar environmental practices (Zuraidah Raja Mohd Rasi, Abdekhodaee, & Nagarajah, 2014; Hart, 1995). Organizations continuously adopt environmental initiatives in response to demands from stakeholders like buyers (Shrivastava, 1995). Buyers and suppliers plan together to reduce the environmental impact of production processes and products by sharing information, exchanging techniques, or facilitating specific and complex systems (Zuraidah Raja Mohd Rasi et al., 2014; Vachon & Klassen, 2007; Grewal & Dharwadkar, 2002; Geffen & Rothenberg, 2000). From active interaction and a closer bond with stakeholders, like buyers, suppliers gain a new opportunity to generate innovative products or processes (Zhu and Sarkis, 2004; Rao and Holt, 2005) to meet stakeholders' demands. At the same time, buyers seek novel inventions from their suppliers to fulfill the growing needs in terms of environmental sustainability (Chae, Yan, & Yang, 2020). Therefore, based on the above discussion, I suggest the following hypothesis:

- *H2a: Innovativeness positively relates to the degree of similarity in environmental sustainability.*

Firms' innovative technologies and products are essential to meet the increasing stakeholder demand for social well-being (Bamgbade, Kamaruddeen, & Nawi, 2017). Also, innovative firms leverage their ability to gather valid and valuable information about stakeholder needs to develop new sustainability strategies effectively (Pagell & Wu, 2009). Therefore, I also suggest the following hypothesis:

- *H2b: Innovativeness positively relates to the degree of similarity in social sustainability.*

The Degree of Similarity in Environmental Sustainability, Sales to the Focal Buyers, and Profitability

By using process innovation to meet buyers' requirements, suppliers can reduce greenhouse gas emissions, solid waste, water emissions, and effluent waste (Marin, Marzucchi, & Zoboli, 2015) and save raw material, energy, and production cost (Centobelli, Cerchione, & Singh, 2019; Klewitz & Hansen, 2014). Furthermore, process innovation encourages the production of products with technical specifications with a little negative impact on the environment (Günday et al., 2011). This environmental sustainability provides firms with economic benefits from cost savings based on reducing the usage of raw materials, energy, and water (Ekins & Zenghelis, 2021). Also, firms can earn non-operating profits by participating in Emission trading for carbon dioxide (CO_2) and other greenhouse gases (GHG) based on the reduction of greenhouse gas emissions (Oliver & Peters, 2020). Therefore, I suggest the following hypothesis:

- *H3a: the degree of similarity in environmental sustainability positively relates to profitability.*

The greater the perceived similarity between buyer and supplier relationships, the greater the level of trust (Nagel, Giunipero, Jung, Salas, & Hochstein, 2021). Trust-based transactions appear to be as concentrated as strategic purchases but with much more difficult-to-substitute items (Terpend, Krause, & Dooley, 2011). This difficulty in substituting may

cause a high level of buyer dependence on the supplier since buyers would find it difficult to identify alternative sources of supply. Therefore, I suggest the following hypothesis:

- *H3b: the degree of similarity in environmental sustainability positively relates to the sale to the focal buyers.*

The Degree of Similarity in Social Sustainability, Sales to the Focal Buyers, and Profitability

Social sustainability practices in supply chains focus on monitoring or auditing compliance with health and safety or sustainability (Huq, Stevenson, & Zorzini, 2014; MacCarthy & Jayarathne, 2012; Spence & Bourlakis, 2009), ensuring social accountability systems such as OSHAS 18001 or SA8000 certification (Ciliberti, de Groot, de Haan, & Pontrandolfo, 2009), developing balance systems among work and life and an ethical code of conduct (Awaysheh & Klassen, 2010), product or process redesign for benefiting workers (Klassen & Vereecke, 2012), reducing health risks (Pagell & Wu, 2009), and fair trade (Marshall et al., 2015). This social sustainability reduces non-operating expenses such as fines because they comply with buyers or socially required laws (Bouchery et al., 2017; Huq et al., 2014). In addition, improving the work environment through product and process innovation not only ensures the safety of workers (Klassen & Vereecke, 2012) but also contributes to productivity improvement by improving the efficiency of work. Therefore, I suggest the following hypothesis:

- *H4a: the degree of similarity in social sustainability positively relates to profitability.*

The greater the perceived similarity between buyer and supplier relationships, the greater the level of trust (Nagel, Giunipero, Jung, Salas, & Hochstein, 2021). Trust-based

transactions appear to be as concentrated as strategic purchases but with much more difficult-to-substitute items (Terpend, Krause, & Dooley, 2011). This difficulty in substituting may cause a high level of buyer dependence on the supplier since buyers would find it difficult to identify alternative sources of supply. Therefore, I suggest the following hypothesis:

- *H4b: the degree of similarity in social sustainability relates to the sale to the focal buyers.*

Moderate effects of Risk Tolerance

Risk tolerance refers to a person's willingness to take a risk (Ahmad 2020) or an attitude toward risk and is a reflection of personality (Wang, Zheng, Jiang, & Tao, 2021; Lusk & Coble, 2005). Risk tolerance ranges from extremely risk-averse: refusing any chance under any condition to extremely risk-seeking: a preference for carrying risk (Trujillo-Barrera, Pennings, & Hofenk, 2016). In addition, risk tolerance influences individuals' decisions in choosing investment alternatives (Pak & Mahmood, 2015; Snelbecker, Roszkowski, & Cutler, 1990). People with high-risk tolerance tend to embrace more uncertainty, try new things, and risk change. Conversely, people with low-risk tolerance tend to avoid uncertainty and instead want stability (Qiu, Colson, & Grebitus, 2014). Also, as for sustainability, risk tolerance is known to combine with risk perception to hinder or promote the adoption of sustainability practices (Trujillo-Barrera, Pennings, & Hofenk, 2016, 2014). This study attempts to explain the moderating effect of risk tolerance based on the results of these previous studies.

Risk Tolerance and the Relationship between Relational Embeddedness and the Degree of Similarity in Sustainability and the Relational Embeddedness and Innovativeness

Trujillo-Barrera et al. (2016, 2014) identified the moderating role of risk tolerance on the relationship between risk perception and the adoption of sustainable practices. In detail, they found that risk tolerance weakens the negative relationship between the perceived risk associated with adopting sustainable practices and the adoption of sustainable practices.

Meanwhile, risk perception means an individual's interpretation of the riskiness of the investment (Pennings & Wansink, 2004). Relational embeddedness can lower risk perception because relational embeddedness disseminates information, knowledge, and resources among members (Kim, 2014; Khoja et al., 2010), decreasing perceived risk (Liu, Huang, & Brown, 1998).

Therefore, relational embeddedness can replace low-risk perception in the above moderating role of risk tolerance, showing the moderating role of risk tolerance on the relationship between relational embeddedness and the adoption of sustainable practices. In addition, Todaro, Testa, Daddi, & Iraldo (2021) also identified that risk tolerance negatively moderates the relation between perceived exposure to climate risk and internally oriented climate action. Risk tolerance weakens the positive relationship between perceived necessity and taking action.

From these findings and the above discussion, relational embeddedness disseminates information, knowledge, and resources among members (Kim, 2014; Khoja et al., 2010; Tiwana, 2008; Granovetter, 1973), helping suppliers adopt or imitate sustainable practices of buyers with initiative in supply chains and resulting in the increase of the degree of the similarity of sustainable practices. And then, risk tolerance positively moderates the

relationship between relational embeddedness and the degree of similar sustainable practices. Therefore, I suggest the following hypotheses:

- *H5a: As risk tolerance increases, the relationship between relational embeddedness and the degree of similarity in environmental sustainability increases.*

- *H5b: As risk tolerance increases, the relationship between relational embeddedness and the degree of similarity in social sustainability increases.*

- *H5c: As risk tolerance increases, the relationship between relational embeddedness and innovativeness*

Chapter Summary

Through an extensive and intensive literature review, I identified the following characteristics of recent sustainable supply chain (SSCM) studies. The SSCM research began studying the impact of environmental issues in individual companies on supply chains. As public interest has increased, the area of interest has expanded by simultaneously covering social and environmental issues. However, many SSCM studies are still being conducted in qualitative studies with exploratory characteristics without adequate theoretical guidance. Various topics have been studied using multiple research techniques and data, but many future research tasks remain. The framework presented in this chapter attempts to offer a more comprehensive perspective by changing the viewpoint from buyers to suppliers. Specific hypotheses, supported by extant literature and multi-theories, are advanced for relationships among research variables. These hypotheses will be empirically tested, and their findings will be presented and discussed in the subsequent chapters.

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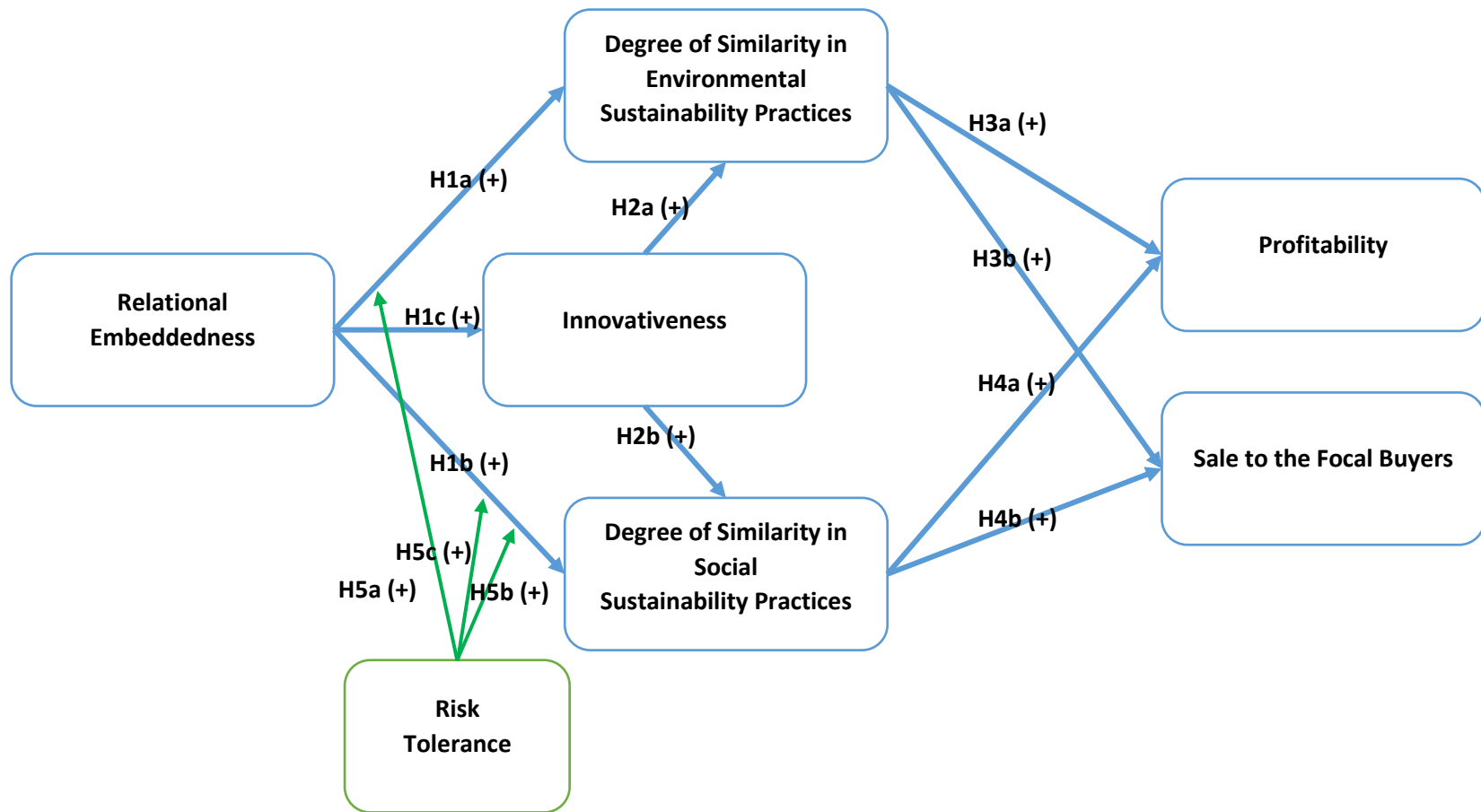
Figure 3.1: Research Model

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

This chapter describes the research design and methodology used for testing the

hypothesized framework. Specifically, this chapter addresses the following issues: (1) research

strategy and design, (2) target population and sample, (3) measurement of variables, (4)

reliability and validity issues, (5) data source and collection, and (6) analysis procedures

employed in this study. Last, a summary of this chapter will be presented at the end of this

chapter.

Research Strategy and Design

Research Strategy

Before designing research, one should clearly understand the research questions one

wants to investigate and then choose the right type of research

(McCombes, 2021). I decided to use quantitative research because quantitative research handles

numeric data and uses statistical tools to collect and analyze data (Streefkerk, 2023; Makrakis &

Kostoulas-Makrakis, 2016).

This study relies on embeddedness, stakeholder theory, and existing literature about

innovativeness, risk tolerance, and sustainability in supply chains to develop hypotheses that

explain the relationship among relational embeddedness, supplier innovativeness, the similarity

of sustainability practices between suppliers and buyers, and supplier performance. It then uses numeric data to analyze relationships and to test the hypotheses, trying to generalize the results. Therefore, I determined that quantitative research is the fittest for this study because it focuses on testing and confirming hypotheses based on theories and previous research results (Streefkerk, 2023; Kerlinger & Lee, 2000). Furthermore, quantitative research is better for this study because it plans to analyze panel datasets through mathematical and statistical analysis to test the research questions (Streefkerk, 2023; Makrakis & Kostoulas-Makrakis, 2016; Kerlinger & Lee, 2000).

Research design

Research designs are the plan and structure of research conceived to obtain answers to research questions (Kerlinger & Lee, 2000; Kaynak, 1997). Therefore, it is crucial to build a research plan and select a research type considering the research purpose, research question, and the method of collecting and analyzing available data (De Vaus, 2006; Kerlinger & Lee, 2000).

This study will use panel datasets, such as companies' sustainability practices and profitability over time based on public documents, to answer research questions. It means non-experimental research designs apply to this study because the researcher can not directly control independent variables and because their manifestations have already occurred or are inherently not manipulable (Mohajan, 2020; Swanson & Holton, 2005; Kerlinger & Lee, 2000). Although non-experimental research has several weaknesses, such as uncontrollable independent variables, lack of randomization, and risk of improper interpretation (Kerliner & Lee 2000), hypotheses and research models based on solid theories, large amounts of data, and time series analysis methods can compensate for these weaknesses. Therefore, this study follows a non-experimental research design using panel data set.

Target Population and Sample

Target Population

With empirical evidence, this study aims to investigate the role of the similarity of sustainability between suppliers and buyers in improving suppliers' performance. It is essential to identify supplier-buyer dyadic relations among as many companies as possible, pair them as suppliers and buyers, and secure data on the suppliers' sales to the buyers. Therefore, the population for this study consists of companies satisfying the following two conditions. First, companies report their buyers and their sales by complying with the Statement of Financial Accounting Standards (SFAS) No. 131 adopted by the Financial Accounting Standards Board (FASB) in 1998. This Statement requires a publicly-held business company to disclose each buyer (customer) and its sales to the buyer if 10 percent or more of the company's sales are derived from sales to any single buyer. Second, their sustainability practices can be identified through any database simultaneously. This study identifies buyers and the corresponding sales for suppliers through the Customer Segment file in Compustat. Many SSCM literature uses this data set to research the buyer-supplier relationship topics (e.g., Haw, Swink, & Zhang, 2022; Chen & Ho, 2019; Cohen & Frazzini, 2008). Also, this study targets sustainability practices after 2008 to rule out the impact of the financial crisis that occurred in 2007~2008 on companies' sustainability practices. In other words, the data collection period for the target population on sustainability practices of suppliers and buyers is from 2009 to 2020, the most recent available year.

Sample

Regarding sample size, panel data analysis using multivariate regression requires a minimum sample size of 50 and a preferred sample size of 100 to maintain statistical power of 0.80 in the most research situations (Hair, Black, Babin, & Anderson, 2010). Also, Hair

and his colleagues (2010) suggested a minimum ratio of observations to variables of 5:1 and a preferred ratio of 15:1 or more. The research model in this study has 19 variables, including two dependent variables (sales and profitability), one independent variable (relational embeddedness), three mediators (innovativeness, the degree of similarity of environmental sustainability practices between suppliers and buyers, and the degree of similarity of social sustainability practices between suppliers and buyers), one moderator (risk tolerance), two control variables (firm size and industry type), and ten dummy variables (years from 2010 to 2019) used for the year-fixed effect. The observation to variable ratio suggested guideline would result in a required minimum sample size of 95 and a preferred size of 285 or more. This study targeted a sizeable random sample of 190 (a median sample size between minimum sample size and preferred size) pairs of suppliers and buyers from the population described in this section.

Operational Definition and Measurement of Variables

Employing embeddedness and stakeholder theory and scrutinizing existent literature in sustainable supply chain literature, this study developed a research model and suggested hypotheses explaining the relationship among variables: relational embeddedness, the degree of similarity of environmental sustainability practices between suppliers and buyers, the degree of similarity of social sustainability practices between suppliers and buyers, innovativeness, risk tolerance, sales to the focal buyers, and profitability. Also, this study uses two control variables: firm size and industry type, and ten dummy variables (year) to limit their influence on the relationship among the above variables.

To measure the variables in the research hypotheses established through reviewing stakeholder theory, embeddedness, existing innovativeness, risk tolerance, and SSCM research, the following operational definitions of variables are intended. Table 3-1 shows a summary of operational definitions of variables.

Dependent Variables

This study uses two dependent variables: Profitability (PRO) and Sales to the focal buyers (SALE), to test the relationship between the similarity of sustainability practices between suppliers and buyers and suppliers' performance. Many previous studies (e.g., Jyoti & Khanna, 2021; Hussain, Rigoni, & Cavezzali, 2018; Lassala, Apetrei, & Sapena, 2017) have already tested the relationship between corporate sustainability practices and performance using financial indicators such as firm-level sales and profitability (e.g., ROA, ROE, and ROI). However, it is argued that the sales arising from transactions with a focal buyer who has a relationship with the supplier can more accurately measure the performance under the dyadic relationship between the supplier and the buyer (Chen & Ho, 2019).

Therefore, this study hires both a newly suggested performance measure (Suppliers' sale to the focal buyers) and a traditional performance measure (Profitability). Suppliers' sales to the focal buyers are directly measured by the supplier's sales data provided with the supplier-buyer pair in Compustat Customer Segment files. The supplier's sales were then measured by taking a natural logarithm of the supplier's sales to make moderately skewed data more normally distributed. Profitability is measured by suppliers' ROA (suppliers' net income/asset total), which previous studies have mostly used.

- Sale to the focal buyers: The natural logarithm of suppliers' sales were provided with a pair of suppliers and buyers (Chen & Ho, 2019)

- Profitability: ROA = Net Income / Asset Total (Jyoti & Khanna, 2021; Hussain, et al., 2018; Lassala et al., 2017)

Independent Variable

In this study, relational embeddedness (REMB) means a direct relationship measured by the strength of the ongoing interactions between suppliers and buyers (Kim, 2014; Gulati & Gargiulo, 1999). The relationship's frequency and strength can increase relational embeddedness (Fakharizadi, 2014; Greve, Baum, Mitsuhashi, & Rowley, 2010). Existing studies have used the number of interactions (repeated ties) to measure relational embeddedness (Fakharizadi, 2014; Meuleman, Lockett, Manigart, & Wright, 2010; Gulati & Gargiulo, 1999). The interaction will occur more frequently when suppliers and buyers are located closer together.

Therefore, the closer the distance between suppliers and buyers, the higher the interaction frequency; accordingly, a stronger relational embeddedness will be formed between suppliers and buyers. A good example is that automakers and their suppliers gathered closely together and actively interacted with each other. Therefore, the physical distance between suppliers and buyers can be a good proxy for measuring their relational embeddedness. Also, the distance between suppliers and buyers can be calculated using their zip codes.

- Relational embeddedness: The natural logarithm of the distance between suppliers and buyers (Habinek, Martin, & Zablocki, 2015)

Mediators

This study has three mediators: innovativeness (INNO), the degree of the similarity of environmental sustainability practices between suppliers and buyers (ENV), and the degree of the similarity of social sustainability practices between suppliers and buyers (SOC).

First, innovativeness in this study means companies' willingness and efforts to accept, apply, and improve new ideas and processes by investing resources to serve corporate performance (Paille & Halilem, 2019). Existing studies measure firms' innovativeness using the firms' R&D expenses or capital expenditure (Hirshleifer, David, Hsu, & Li, 2013) under the assumption that more innovative companies invest more resources in R&D and in new facilities and processes to develop new products and services and to improve existing products, processes, and even management systems (Saed & Kersten, 2019). Therefore, this study also uses R&D or capital expenditure to measure suppliers' innovativeness.

Second, the smaller the difference between suppliers' and buyers' sustainability scores evaluated by MSIC/KLD, the higher the similarity of sustainability practices between suppliers and buyers. Since the scores were given to buyers and suppliers according to the implementation of the same activities, the difference between the two scores means a gap between suppliers and buyers regarding sustainability practices. However, since only the absolute difference between scores means mutual similarity, the absolute value is applied to the difference between buyers' and suppliers' scores. Last, applying a natural logarithm to the absolute value of the gap mitigates the skewness of the similarity data of sustainable practices between suppliers and buyers, and a normal distribution is pursued.

- Innovativeness: Capital expenditure / Asset Total (Hirshleifer et al., 2013)

- The degree of the similarity of environmental sustainability practices between suppliers and buyers (ENV): The natural logarithm of the absolute value of buyers' environmental

sustainability practice scores minus suppliers' environmental sustainability practice scores (Chen & Ho, 2019)

- The degree of the similarity of social sustainability practices between suppliers and buyers (SOC): The natural logarithm of the absolute value of buyers' social sustainability practice scores minus suppliers' social sustainability practice scores (Chen & Ho, 2019)

Moderator

Risk tolerance originates from the opposite concept of risk aversion (Finke & Guillemette, 2016). Although supply chain research does not have a consensus about the definition of risk tolerance, I define it as the organization's ability to absorb risk (Olson & Wu, 2010). Therefore, I plan to measure risk tolerance using the firm's liability ratio.

- Risk tolerance: Liability Total / Asset Total (Elango, 2010)

Control Variables

Existing studies on the relationship between sustainability and corporate performance have used various control variables to enhance the internal validity of a study by including (controlling for) extraneous variables (Nielsen & Raswant, 2018). Sustainability and performance research has commonly used size, industry, risk, R&D, and advertising expenses as control variables (Younis & Balan, 2019; Andersen & Dejoy, 2011). This study uses firm size, industry type, and year as control variables.

Firm size has been used to proxy for constructs such as political costs, information production costs, and competitive advantages, to eliminate heteroscedasticity problems and to explain exporters' behavior (Al-Khazali & Zoubi, 2005). There are numerous measures of firm

size: enterprise value, the number of employees, total profits, net assets, and annual sales (Dang, Li, & Yang, 2017). This study uses the natural logarithm of the number of employees to make moderately skewed data more normally distributed. Next, the NAICS code measures the industry type to control the effects of industry types. Last, due to the nature of panel data, the year is used as another control variable regarding the year-fixed effect. However, 11 dummy variables will be generated from 2009 to 2019 and used for multiple regression analysis.

- Firm size: The natural logarithm of the number of suppliers' employees (Ahmed & Shafiq, 2022; Arocena, Orcos, & Zouaghi, 2021; Elango, 2010)

- Industry type: NAICS codes (Elking, Cantor, & Hofer, 2022; Elango, 2010)

- Year: Dummy variables generated by assigning 1 for the year and 0 for the remaining years (reference year is the first year in the sample.) (Song, Jung, Ki, & Feiock, 2020; Cheon & Ho, 2019)

Table 3.1 Operational Definitions of Variables

Feature of Variables	Acronym of variables	Name of Variables	Measuring	Sources
Independent Variable	**ReEMB**	Relational Embeddedness	the natural logarithm of the distance between suppliers and buyers	Habinek et al., 2015
Mediator	**ENV**	Degree of Similarity of Environmental Sustainability Practices between Suppliers and Buyers	the natural logarithm of the absolute value of buyers' environmental sustainability practice scores minus suppliers' environmental sustainability practice scores	Chen & Ho, 2019
Mediator	**SOC**	Degree of Similarity of Social Sustainability Practices between Suppliers and Buyers	the natural logarithm of the absolute value of buyers' social sustainability practice scores minus suppliers' environmental sustainability practice scores	Chen & Ho, 2019
Mediator	**INNOV**	Innovativeness	Capital expenditure / Asset Total	Hirshleifer et al., 2013
Dependant Variable	**Sale**	Suppliers' Sales to the Focal Buyers	the natural logarithm of suppliers' sales provided with a pair of suppliers and buyers	Chen & Ho, 2019
Dependant Variable	**ROA**	Suppliers' Profitability	Return On Asset = Net Income / Asset Total	Jyoti & Khanna, 2021; Hussain, et al., 2018; Lassala et al., 2017
Moderator	**RISK**	Risk of Tolerance	Liability Total / Asset Total	Elango, 2010
Control Variable	**FrmS**	Firm Size	the natural logarithm of the number of suppliers' employees	Ahmed & Shafiq, 2022; Arocena et al., 2021; Elango, 2010
Control Variable	**NAISC**	Industry Types	first two digits of NAICS codes	Elking, et al, 2022; Elango, 2010

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Table 3.1, cont.

Feature of Variables	Acronym of variables	Name of Variables	Measuring	Sources
Control Variable	**Year**	Year	Dummy variables generated by assigning 1 for the year and 0 for the remaining years (reference year is the first year in the sample.)	Song et al., 2020; Chen & Ho, 2019

Data Source and Collection

Data Source

This study collects data using multiple data sources such as MSCI/KLD database, Compustat, Compustat customer segment files, and FreeMapTools.

First, MSCI/KLD STATS is a data set with annual snap-shots of companies' environmental, social, and governance performance rated by KLD Research & Analytics, Inc (Chen & Ho, 2019; Chatterji, Levine, & Toffel, 2009). MSCI/KLD ratings for measuring firms' environmental, social, and governance performance were assigned based on the company's corporate social responsibility (CSR) reports and other relevant public information released yearly (MSCI/KLD 2018). MSCI/KLD ratings focused on the largest 650 publicly-traded companies in the S&P500 Index from 1991 to 2000. In 2001, MSC/KLD ratings extended the coverage to the top 1000 publicly traded US companies by market capitalization. Since 2003, the coverage of MSCI/KLD ratings expanded to include the top 3000 publicly traded US companies by market capitalization, and this coverage went on to include the top 4,000 later on.

Second, Compustat is one of the oldest and leading computerized sources of company and market information. Compustat has been produced by Standard & Poor's (S&P) since 1962. The registered name combines "computer" and "statistics." It provides financial information for more than 28,000 North American public companies. The database contains detailed income, balance sheets, cash flow, and additional data for 340 annual and 120 quarterly items with point-in-time snapshots from 1987 to the present. It edits raw financial reports all public companies submit annually and quarterly. It includes past reports of ordinary income, expenses, assets and liabilities, and the same data to facilitate trend analysis. Stock price records are also available.

The Compustat Customer Segment files are based on the customer lists and sales generated from the customers submitted by companies to comply with SFAS[1] No. 131 issued by the FASB. It provides data about pairing between buyers and suppliers as well as financial and accounting information, provides more specifically, the FASB[2] issued SFAS No. 131 on June 1, effective for fiscal years commencing after December 15, 1997. The statement requires a company to provide total assets and a measure of profit or loss with the list of customers if 10 percent or more of a company's sales from any single customer. The Compustat Customer Segment files include the historical customer records from Compustat Segment data, Center for Research in Security Prices (CRSP), and Compustat company fields through a fuzzy name-matching algorithm and verified manually (WRDS Compustat Segment, 2023). Therefore, this study can find information on the relationship between suppliers and buyers and suppliers' sales to the focal buyers from this data source. Also, the data in the files are further edited and supplemented with data publicly available by researchers. For example, Cohen and Frazzini (2008) and Cen, Maydew, Zhang, & Zuo (2017) contributed to creating and updating the files.

The distance calculation tool, such as FeeMapTools, gives data about the distance between suppliers and buyers based on Zip codes. There are lots of free distance calculation tools and application programs. This study uses two other free calculation tools and a ZIP code service program provided by the United States Postal Service (USPS) to calibrate further and cross-check available data and calculation results. This distance data represents suppliers' relational embeddedness to their buyers as a proxy.

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[1] Statement of Financial Accounting Standards (SFAS)
[2] Financial Accounting Standards Board (FASB)

Data Collection

When collecting data, understanding the characteristics of data sources and collecting data according to the variables to be measured is a very important process for the reliability and validity of data. Moreover, in the case of studies using proxies of secondary data, such as this study, more data are required to construct or calculate proxies. In addition, if you want to create a substitute or comparative proxy for validating a proxy, the types and numbers of data required increase. For example, a researcher can prepare data to represent the variable: suppliers' sales to the focal buyers, by extracting only one data: suppliers' sales, from Compustat customer segment files. However, data for suppliers' profitability is calculated when net income is divided by total assets after extracting suppliers' net income and total assets data from Compustat (assuming that ROA measures profitability). Additionally, if ROA is to be cross-validated with another proxy, such as Return On Equity (ROE), a researcher must extract total equity from Compustat in addition to net income and total assets. He/She is supposed to take additional steps to calculate ROE by dividing net income by total equity. Therefore, this data collection part explains the characteristics of the database's data and what data can be collected.

MSCI/KLD rated corporate behaviors across seven dimensions: governance, community, diversity, employee relations, environment, human rights, and product quality. For each dimension, MSCI/KLD ratings consist of paired items. Each such paired item has both a strength and concern indicator, which is binary, taking values 0 or 1. A score of 1 in a strength indicator indicates that the firm has positive behavior in complying with the social responsibility standards. In contrast, a score of 1 in a concerning indicator suggests the firm has a negative activity (i.e., illegal wastewater discharge) that can be considered a weakness in meeting social responsibility standards. However, this study uses the total strength score to measure environmental and social sustainability practices instead of a composite score: the strength score

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minus the concern score because the strength indicators are more reflective of companies'

substantial efforts to implement sustainability practices, while concerns are strongly related to

their negligence and violation (Chen & Ho, 2019; Chatterji et al., 2009). In addition, the

composite score has proven unreliable in prior research (e.g., Ahmed & Shafiq, 2022, Chen &

Ho, 2019; Jayachandran, Kalaignanam, & Eilert, 2013; Chen & Delmas, 2011). Last,

MSCI/KLD uses the Committee on Uniform Securities Identification Procedures (CUSIP)[3i]

number only as a company identifier. From the MSCI/KLD data source, this study obtains

sustainability practices data, making a proxy to measure the degree of the similarity of

sustainability practices between suppliers and buyers. This study procures 35,907 observations

from 2009 to 2019 from the MSCI/KLD data sources. The maximum number of observations is

4,980 in 2013, a minimum of 2,310 in 2016, and an average of 3,264. Table 3-2 shows the

number of sustainability practices observations by year.

The financial dataset from the Compustat database can provide data, creating proxies to

measure innovativeness, profitability, and risk tolerance and other data directly measuring three

control variables: firm size, industry type, and year. Also, It provides the zip code data needed to

calculate the distance between suppliers and buyers. The distance is used to measure the

supplier's relational embeddedness later. Like zip code data, capital expenditure and research and

development (R&D) expense data are extracted to measure suppliers' innovativeness. Debt in

current liabilities total, long-term debt total, liabilities total, asset total, net income total, and

shareholders' equity total data are also collected to create proxies to measure risk tolerance and

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[3] A CUSIP number identifies most financial instruments, including: stocks of all registered U.S. and Canadian companies, commercial paper, and U.S. government and municipal bonds (https://www.investor.gov/introduction-investing/investing-basics/glossary/cusip-number#:~:text=CUSIP%20stands%20for%20Committee%20on,U.S.%20government%20and%20municipal%20bonds).
).

profitability proxies. Last, the number of employees, North American Industry Classification

System (NAICS), and year data are obtained to measure the firm size and industry type and to

control the year effect respectively. Compuistat provides both the CUSIP number and The

Global Company Key (GVKEY)[4] as the companies' indicators. The data collection results show

the maximum number of observations is 12,934 zip code data in 2013, a minimum of 3,690

R&D expense data in 2009, and an average of 8,982. Table 3-2 shows the number of

observations for each item by related variables according to the year, the maximum and

minimum value of each item, and the average value.

The buyer-supplier relationship, which is the fundamental data in creating the full dataset

to test hypotheses in this study, can be found in the Compustat Customer Segment files. This

data source also includes suppliers' sales to their buyers. In addition, it provides both CUSIP and

GVKEY as corporate indicators. The number of supplier-buyer pair observations is the

maximum at 3,771 in 2016 and the minimum at 3,236 in 2019. The average annual observation

is 3,463. Supplier sales are 2,535 in 2013, the largest, and 2,224 in 2015, the smallest. The

average annual observation number is 2,381. Table 3-2 details the observations for the pair of

supplier-buyer and suppliers' sales to the focal buyers.

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4 The Global Company Key or GVKEY is a unique six-digit number key assigned to each company (issue, currency, index) in the Capital IQ Compustat database (https://www.alacra.com/alacra/outside/lei/info/gvkey.html#:~:text=The%20Global%20Company%20Key%20or,the%20Capital%20IQ%20Compustat%20database).

Table 3.2 The Number of Observations by Year and Related Variables, Items, and Data Sources

Related Variables	Items	2009	2010	2011	2012	2013	2014	2015	2016
The Degree of the Similarity of Sustainability Practices Between Suppliers and Buyers	Governance, Community, Diversity, Employee relations, Environment, Human rights, and Product Quality	2,904	3,005	2,843	2,736	4,980	2,458	2,339	2,310
	Pair of suppliers and buyers	3,338	3,363	3,377	3,578	3,650	3,523	3,352	3,771
Relational Embeddedness	Zip Code	11,723	11,940	12,342	12,882	12,934	12,730	12,552	12,380
Innovativeness	Capital expenditure	8,602	8,571	8,545	9,099	9,173	8,888	8,570	8,297
	R&D expense	3,818	3,772	3,735	3,898	3,983	3,896	3,775	3,723
	Debt in current liabilities total	9,852	9,838	9,821	10,412	10,465	10,148	9,823	9,497
Risk Tolerance	Long-term debt total	9,905	9,887	9,850	10,433	10,498	10,171	9,846	9,524
	Liabilities total	9,910	9,887	9,856	10,445	10,514	10,192	9,864	9,544
Risk Tolerance /Profitability	Asset total	9,930	9,905	9,875	10,461	10,523	10,199	9,873	9,552
Profitability	Net income total	8,684	8,642	8,623	9,183	9,262	8,966	8,641	8,365
	Shareholders' equity total	9,930	9,902	9,873	10,460	10,522	10,199	9,873	9,552
Sales to the focal buyers	Sales	2,375	2,333	2,351	2,464	2,535	2,385	2,224	2,490
Firm Size	Employees	8,573	8,533	8,458	8,530	8,624	8,428	8,113	7,818
Industry Type	NAICS	9,243	9,042	9,118	9,642	9,760	9,412	9,100	8,459

Table 3.2, cont.

Related Variables	Items	2017	2018	2019	2020	Max.	Min.	Ave.	Data Sources
The Degree of the Similarity of Sustainability Practices Between Suppliers and Buyers	Governance, Community, Diversity, Employee relations, Environment, Human rights, and Product Quality	3,984	4,388	3,960	N/A	4,980	2,310	3,264	MSCI/KLD
	Pair of suppliers and buyers	3,548	3,353	3,236	N/A	3,771	3,236	3,463	Compustat Customer Segment
Relational Embeddedness	Zip Code	12,255	12,296	12,488	12,596	11,723	12,934	12,427	
Innovativeness	Capital expenditure	8,116	7,949	7,936	7,970	7,936	9,173	8,476	
	R&D expense	3,690	3,702	3,790	3,871	3,690	3,983	3,804	
Risk Tolerance	Debt in current liabilities total	9,293	9,083	8,973	9,036	8,973	10,465	9,687	
	Long-term debt total	9,300	9,086	9,043	9,106	9,043	10,498	9,721	Compustat
Risk Tolerance /Profitability	Liabilities total	9,321	9,105	9,051	9,114	9,051	10,514	9,734	
	Asset total	9,329	9,114	9,065	9,130	9,065	10,523	9,746	
Profitability	Net income total	8,174	8,000	7,982	8,013	7,982	9,262	8,545	
	Shareholders' equity total	9,329	9,111	9,065	9,130	9,065	10,522	9,746	
Sales to the focal buyers	Sales	2,381	2,273	2,227	N/A	2,535	2,224	2,381	Compustat Customer Segment
Firm Size	Employees	7,660	7,526	7,318	7,581	7,318	8,624	8,097	Compustat
Industry Type	NAICS	8,216	8,084	7,866	7,949	7,866	9,760	8,824	

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Reliability and Validity

Reliability

Reliability is the consistency or stability of the measuring instrument (Kerlinger & Lee, 2000). In other words, reliability refers to the consistency of a measuring instrument that produces the same result repeatedly when applied to the same object (Olabode, Olateju, & Bakare, 2019) regardless of the accuracy of the measuring instrument (Kerlinger & Lee, 2000). When researchers consider the reliability of measuring instruments, they consider four types of reliabilities: stability, parallel forms reliability, interrater consistency, and internal consistency (Olabode et al., 2019; Golafshani, 2003). Stability is test-retest reliability, the consistency or repeatability of measurement over time. Parallel forms reliability is the degree of the equivalent results from two tests designed the same way to test the same content. Interrater consistency means the degree to which different raters or observers give the same answers or estimates. Internal consistency is the correlation between different items in a test to measure the same construct. All four reliabilities show that reliability measures the level of consistency of the research instrument (Olabode et al., 2019).

Therefore, examining the characteristics of data sources or the process of generating data used in this study can confirm the reliability of the measuring instrument for the data sources. This study relies on multiple data sources such as Compustat, Compustat Customer Segment files, MSCI/KLD database, and FreeMapTools. First, this study uses financial data from the Compustat Fundamental database to estimate innovativeness, risk tolerance, and profitability. The financial data in the Compustat were generated by complying with Generally Accepted Accounting Principles (GAAP) and Generally Accepted Auditing Standards (GAAS). GAAP refers to a common set of accounting rules, standards, and procedures issued by FASB. U.S. public companies must follow GAAP when their accountants compile their financial statements.

The use of GAAP is not mandatory for all businesses, but the Securities and Exchange Commission (SEC) requires publicly traded and regulated companies to follow GAAP for financial reporting. Therefore, since Compustat is based on such strong, transparent, and general regulations, researchers regard Compustat as a well-established data source and evaluate that Compustat has a high level of reliability (Ellram & Tate, 2016).

Like Compustat, Compustat Customer Segment files were generated by following SABF No. 131, which requires that a company provides for each reportable segment quantitative disclosure of two basic items - total assets and a measure of profit or loss if 10 percent or more of a company's sales are derived from sales to any single buyer. In the same logic, researchers regard Compustat Customer Segment files as a well-established data source and admit the high reliability of the segment files. Therefore, this study can identify the relations between suppliers and buyers, pair them as supplier-buyers dyadic relations, and acquire suppliers' sales to the focal buyers based on reliable data sources, Compustat Customer Segment files.

The MSIC/KLD indicator ratings are determined based on the assessment of a group of 140 experienced research analysts (MSCI, 2018). These experts examine company disclosures, public information, government databases, and media and stakeholder reports to assess how well companies manage their sustainability risks and opportunities (MSCI, 2015). Last, the companies included in the analysis are invited to verify the data before the official release. These processes show that the MSIC/KLD measuring instruments have secured an acceptable level of reliability through the confirmation of the investigated companies before the announcement of the results after examination by 140 experts (interrater consistency) based on various sources (internal consistency). Therefore, the MSIC/KLD data source can also provide reliable data for the

sustainability practice indices of companies to calculate the degree of similarity of sustainability practices between suppliers and buyers.

Last, FreeMapTools, a distance calculation tool based on zip codes, was used to calculate the distance between buyers and suppliers to measure the relational embeddedness of suppliers to their buyers. The zip codes of buyers and suppliers were obtained from the Compustat Fundamental database, and the values obtained from FreeMapTools were cross-validated using two other tools (Zip-Codes.com and Zipdistance.com) that could obtain the distance based on the zip codes of two points. It confirms the reliability of the distance measuring instrument, FreeMapTools.

Validity

Validity deals with accuracy (Kerlinger & Lee, 2000). It is impossible to study validity without inquiring about the nature and meaning of one's variables. Validity refers to the instrument measures and what they are supposed to measure (Olabode et al., 2019; Kerlinger & Lee, 2000). There are four main types of validity: construct, content, face, and criterion validity (Kerlinger & Lee, 2000). Construct validity consists of convergence and discriminability, referring to that a measuring result can measure the same things the same and different things differently. Content validity is about whether the measurement tool completely measures what it is intended to measure. Face validity is similar to content validity but is nonquantitative and involves merely a visual inspection of the test, meaning whether a measuring procedure appears to measure what it should measure. Criterion validity includes predictive validity and concurrent validity, evaluating how well one measure predicts an outcome for another measure and how well the results of a test approximate the results of another test. In a nutshell, validity is whether a test measures what it aims to measure.

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Meanwhile, this study employs secondary data to measure variables. Secondary data sets are often already validated, making researchers consider that established databases have a high level of validity, and the clear descriptions surrounding the datasets provide greater opportunities for replication (Ellram & Tate, 2016). However, secondary data may not exist for all variables. Since some variables do not directly correspond to the secondary data in the database, existing data are used to create data to measure the desired variable. For example, Sales in Compustat Customer Segment files are a direct measure of what the variables (sales to the focal buyers) want to measure, while no value for Profitability can be found in the database to be referenced.

In the latter case, a proxy can be a useful substitute for measuring variables. A proxy is an indirect measure of the desired outcome, which is strongly correlated to that outcome. It is commonly used when direct outcome measures are unobservable or unavailable (Houston, 2004). For example, although the Compustat dataset has no direct values measuring companies' profitability, this study can measure profitability by calculating Return on Assets (ROA), net income divided by total assets. ROA, along with return on equity (ROE), return on investment (ROI), and earnings per share (EPS), has been used as one of the proxies that best measure profits in many studies (De Mendonca & Zhou, 2019; Bernhardt, Donthu, & Kennett, 2000). These proxies avoid some validity concerns by using self-report data and key informant samples (Houston, 2004). In this way, this study measures the variables used to explain the research model with values that maintained a certain level of validity and uses them to test research hypotheses.

Chapter Summary

In this chapter, I explained the research strategy and design. I selected a quantitative methodology since I will confirm hypotheses based on theories and existing research results by using a large amount of panel data. Also, I will apply non-experimental research designs to this study because I can not directly control independent variables. The target population was defined as all US businesses that could obtain information on sustainability practices and supplier-buyer pairing. Sampling aimed at more than 190 observations using the ratio between the number of variables to be studied and observed values according to the suggestion of Hair et al. (2010). All variables were redefined in a measurable form with reference to previous studies for measurement. Data were collected from four data sources: Compustat, Compustat Customer Segemant files, MSCI/KLD, and FeeMapTools. Finally, I closed this chapter by discussing that the reliability of the data was confirmed by examining the characteristics of the data source and the process of data collection and that the validity of the secondary data was also confirmed from previous studies.

CHAPTER IV

RESULTS OF DATA ANALYSIS

This chapter presents the results of the empirical study. First, a single data set is created

by integrating the collected data of all variables, focusing on the data for the pair of suppliers and

buyers. In this process, I also conduct preliminary work on dealing with missing values, outliers,

and normality of the dataset. Second, I report the characteristics of the data and variables by

reporting the results of descriptive analysis of the data while explaining whether the conditions

for multiple regression analysis are met. Third, I report the results of the tests of the research

model using penal data multiple regression analysis considering the year-fixed effect. Finally,

the different types of validity of the findings are discussed.

Data Assembling and Cleaning

Data Assembling

Supplier-buyer pair data were used as a criterion for integrating measured data for all

variables. There are 12,442 supplier-buyer pair data from 2009 to 2020 (the most recent year of

data). Next, corporate financial information and distance information data for the same period

were integrated into the supplier-buyer pair data using GVKEY. No data loss occurred in this

process. Finally, from 2009 to 2019 (the most recent year of MSIC/KLD data), environmental

sustainability practice data and social sustainability practices data of suppliers and

buyers are merged using the CUSIP code. In this process, 937 observations without sustainability practice data were deleted. As a result, a total of 11,505 data were secured.

Data Cleaning

In the final data set obtained through the data integration process, missing values were removed in the order of dependent variables (sale and ROA), an independent variable (Relational embeddedness), mediators (innovativeness, environment sustainability, and social sustainability), moderator (risk tolerance), and control variables (firm size and industry type). Through this process, observations containing a total of 8,893 missing values were removed, resulting in the final 2,618 observations. A detailed process can be found in Table 4-1. Last, I applied log transformation to the variables measured with relatively large values in the final data set to reduce or remove possible skewness of the original data. Also, I winsorized all variables to limit extreme values in the data set to reduce the effect of possibly spurious outliers.

Table 4.1 The Process for Removing Missing Observations

Variables	# of observations before	# of missing observations	# of observations after
1. Sale	11,505	409	11,096
2. ROA (Profitability)	11,096	-	11,096
3. Relational Embeddedness	11,096	2,266	8,830
4. Innovativeness	8,830	210	8,620
5. Environment Sustainability	8,620	5,628	2,992
6. Social Sustainability	2,992	204	2,788
7. Risk Tolerance	2,788	138	2,650
8. Firm Size	2,650	9	2,641
9. Industry type (NACIS)	2,641	23	2,618

Descriptive Statistics

This study confirmed that it had equal observations from 2010 to 2020 through descriptive statistics. Table 4-2 shows the number of observations throughout the year. Each year has around 200 observations, meeting the target sample size of 190 that this study considered yearly. Since all missing values were removed during the data cleaning process, no missing values were reported.

However, the box-plot analysis of each variable shows that some variables contain a few outliers. The outliers identified even though they went through winsorization in the data-cleaning process can unexpectedly influence the analysis results. However, no further outliers were removed in this study for several reasons. First, the number of finally obtained observations exceeds the number of outliers. In addition, the number of observations is also greater than the number presented as a criterion ($N \geq 30$). Second, the normality tests for all variables were satisfied. Third, there must be a sound reason to remove outliers, and some outliers represent natural fluctuations in the population, so no further outliers have been removed. Moreover, the variable that reported the most outliers was ROA, and the outliers in the ROA variable were considered true outliers because ROA was measured by corporate financial information (Bhandari, 2021).

Table 4-3 shows basic descriptive statistics for all variables. It shows that the dataset has no missing value and all variables have normality. No skewness value exceeds ± 2. nor that of kurtosis exceeds ± 7.0. Hair et al. (2010) and Bryne (2010) argued that data is normal if skewness is between -2 to +2 and kurtosis is between -7 to +7. Table 4-4 presents correlations between all variables.

The Variance Inflation Factor (VIF) and tolerance were checked to confirm the existence of multicollinearity among the variables. Since this study has two dependent variables (sales and profitability), collinearity was diagnosed twice according to each dependent variable. Generally, a VIF above 4 or tolerance below 0.25 indicates that multicollinearity might exist (Simon, 2009). When VIF is higher than 10 or tolerance is lower than 0.1, significant multicollinearity happened (Hair et al., 2010). Tables 4-5 & 4-6 present VIFs and tolerances.

As for the demographic characteristics of the data, the ratio of suppliers to buyers is 2:1 (suppliers 728: buyers 324), and 83.2% of the data was obtained from the manufacturing, video production and distribution industries, and mining industries. Table 4-7 presents these compositions in detail.

Table 4.2. The Number of Observations by Year after Cleaning Data

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Min.	Max.	Ave.	Total
# of observations	207	215	244	251	249	223	211	205	211	192	216	194	192	251	218	2618

Table 4.3. Descriptive Statistics

	No	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
1. Sale	2618	2.645	10.630	6.818	1.564	-0.201	0.048	0.032	0.096
2. ROA	2618	-5.767	3.444	0.507	1.409	-1.825	0.048	5.439	0.096
3. ReEMB	2618	0.001	26.710	8.895	7.465	0.820	0.048	-0.248	0.096
4. NAICS	2618	11.000	99.000	35.861	9.466	1.110	0.048	1.929	0.096
5. ENV	2618	1.000	6.000	2.739	1.565	0.428	0.048	-1.014	0.096
6. SOC	2618	1.000	15.000	5.170	3.277	0.739	0.048	-0.115	0.096
7. RISK	2618	0.388	6.015	1.996	1.177	1.197	0.048	1.333	0.096
8. Firms	2618	-2.718	4.745	0.902	1.624	-0.089	0.048	-0.482	0.096
9. INNOV	2618	-22.000	35.409	9.973	10.466	-0.232	0.048	0.619	0.096
Valid N (listwise)	2618								

ROA: Profitability, ReEMB: Relational Embeddedness, NAICS: Industry Type, ENV: Environmental Sustainability, SOC: Social Sustainability, RISK: Risk Tolerance, Firms: Firm Size, INNOV: Innovativeness

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Table 4.4. Correlations among Research Variables

	1	2	3	4	5	6	7	8
1. Sale								
	1							
2. Profitability	0.452**	1						
	0.000							
3. Relational Embeddedness	-.099**	-.048*	1					
	0.000	0.013						
4. Innovativeness	-0.004	-0.017	-.060**	1				
	0.831	0.384	0.002					
5. Environmental Sustainability Practices	-0.004	-0.020	.058**	0.002	1			
	0.835	0.317	0.003	0.925				
6. Social Sustainability Practices	-.085**	-0.036	.063**	-.074**	.468**	1		
	0.000	0.066	0.001	0.000	0.000			
7. Risk Tolerance	.196**	0.026	-0.006	-.136**	-.062**	-0.015	1	
	0.000	0.184	0.775	0.000	0.002	0.458		
8. Firm Size	.883**	.396**	-.133**	-.084**	0.020	-.045*	.215**	1
	0.000	0.000	0.000	0.000	0.313	0.023	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

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Table 4.5. VIF & Tolerance Diagnostic (Sale)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5071.107	7	724.444	1425.367	.000[b]
	Residual	1326.535	2610	0.508		
	Total	6397.642	2617			

a. Dependent Variable: Sale

b. Predictors: (Constant), Relational Embeddedness, Innovativeness, Environmental Sustainability Practices, Social Sustainability practices, Risk tolerance, Firm Size, & Industry

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	6.342	0.079		80.728	0.000		
	Relational Embeddedness	0.018	0.007	0.024	2.709	0.007	0.972	1.028
	Innovativeness	1.660	0.250	0.061	6.638	0.000	0.947	1.056
	Environmental Sustainability	-0.005	0.025	-0.002	-0.212	0.832	0.772	1.295
	Social Sustainability	-0.084	0.022	-0.040	-3.915	0.000	0.770	1.298
	Risk Tolerance	0.340	0.124	0.026	2.742	0.006	0.915	1.093
	Firm Size	0.855	0.009	0.888	95.932	0.000	0.927	1.079
	Industry Type	-0.012	0.002	-0.072	-7.848	0.000	0.950	1.052

a. Dependent Variable: Sale

Table 4.6. VIF & Tolerance Diagnostic (Profitability (ROA))

ANOVAª

Model	Sum of Squares	df	**Mean Square**	F	Sig.
1 Regression	8.447	7	1.207	72.392	.000ᵇ
Residual	43.505	2610	0.017		
Total	51.952	2617			

a. Dependent Variable: Profitability
b. Predictors: (Constant), Relational Embeddedness, Innovativeness, Environmental Sustainability
Practices, Social Sustainability practices, Risk tolerance, Firm Size, & Industry

Coefficients a

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1 (Constant)	0.022	0.014		1.532	0.126		
Relational Embeddedness	0.001	0.001	0.009	0.495	0.621	0.972	1.028
Innovativeness	0.032	0.045	0.013	0.715	0.475	0.947	1.056
Environmental Sustainability	-0.007	0.005	-0.031	-1.497	0.134	0.772	1.295
Social Sustainability	-0.001	0.004	-0.005	-0.223	0.824	0.770	1.298
Risk Tolerance	-0.080	0.022	-0.067	-3.582	0.000	0.915	1.093
Firm Size	0.036	0.002	0.412	22.148	0.000	0.927	1.079
Industry Type	0.000	0.000	0.027	1.465	0.143	0.950	1.052

a. Dependent Variable: Profitability
b. Predictors: (Constant), Relational Embeddedness, Innovativeness, Environmental Sustainability
Practices, Social Sustainability practices, Risk tolerance, Firm Size, & Industry

Multivariate Regression Analysis

This study conducted a multivariate regression analysis with year-fixed effects to investigate if suppliers' relational embeddedness affects suppliers' sales to their focal buyers and profitability measured by ROA throughout their innovativeness and similarity of sustainability practices with their buyers. Allen (2017) defined multivariate statistics as the collection of methods for multivariate data. According to Allen (2017), data are considered multivariate when there is more than one criterion variable. A multivariate analysis is appropriate to perform when the research involves determining the relationship between one or more predictor variables and multiple criterion variables (Pituch & Stevens, 2015). This study involves multiple criterion variables, such as sales and ROA. The study adopted multivariate statistics to address research questions.

Assumptions of Multivariate Tests

Multivariate regression analysis assumes linearity, normality, homoscedasticity (equality of variance), and independence between variables. After establishing a research model and hypothesis, it should be preceded by checking whether the four assumptions are met before statistically analyzing the data collected to test the relationship between variables (Hair et al., 2010).

First, linearity means that the relationship between the dependent and independent variables is linear. In this study, the linearity between the variables was confirmed through the residual P-P plot. Figures 4-1 & 4-2 show that the data measuring the variables to be used in this study have a linear relationship.

Second, normality refers to the distribution of dependent variable values corresponding to the independent variable value has a normal distribution. This study confirmed that normality was established through kurtosis and skewness verification between dependent variables and other variables. Table 4-3 shows that the data prepared for testing hypotheses in this study satisfies normality. The skewness value of this study has a value between -1.825 (ROA) and 1.197 (Risk Tolerance), and the kurtosis value has values of -1.014 (Similarity of Environmental Sustainability Practices) and 5.439 (ROA). These values meet the criteria of skewness between -2 to +2 and kurtosis between -7 to +7 suggested by Hair et al. (2010).

Third, homoscedasticity (equality of variance) means that the distribution of the dependent variable values corresponding to the independent variable values has the same variance. This study created a scatterplot using the residuals of the dependent and independent variables. Then, by using the "Loess in fit Method" function in SPSS, the equality of variances was confirmed by drawing a line dividing the plates of the residuals into 50% to check whether the line was straight or not. Figures 4-3 & 4-4 confirm that the data measuring the variables in this study satisfy homoscedasticity (equality of variance).

Finally, independence (multicollinearity) means that all observations are independent of each other. One observation does not affect the different observations. This can be confirmed by checking no occurrence of multicollinearity between variables. Multicollinearity may check out if it happens by checking the VIF and tolerance values. From a conservative standpoint, the VIF value should be less than 4, and the tolerance value should be greater than 0.25 (Simon, 2009). The maximum value of VIF in this study is 1.298 (similarity of social sustainability practices), and the minimum value of tolerance is 0.70. Therefore, multicollinearity did not occur in this

study. Generally, a VIF value less than 10 and a tolerance value greater than 0.1 are applied

(Hair et al.,2010).

As a result, this study satisfies all conditions for multivariate regression analysis, and it

was confirmed that it is appropriate to analyze data and test hypotheses using multivariate
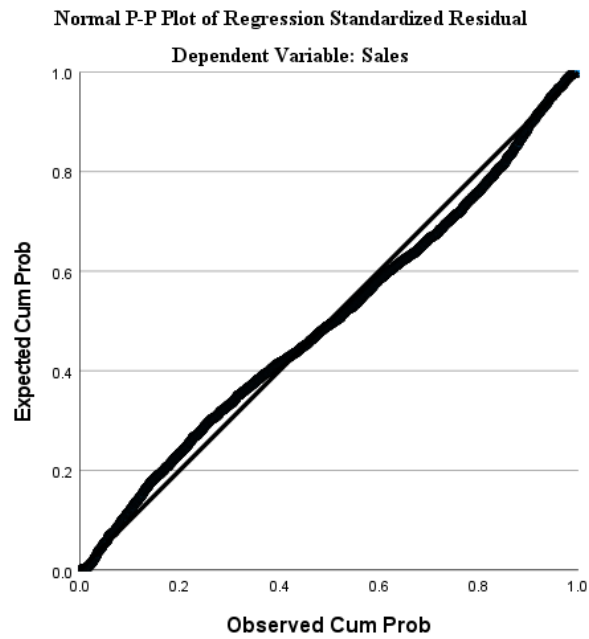
regression analysis.

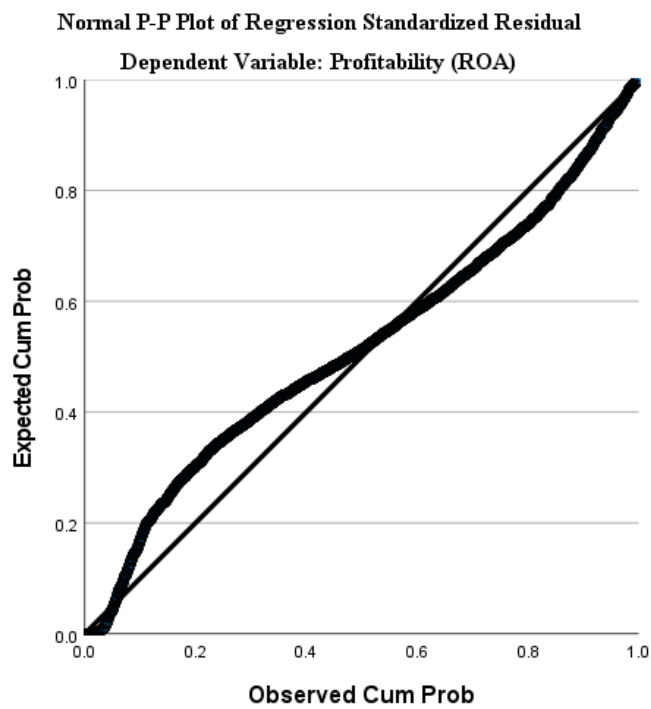Figure 4.1. Linearity test, Dependent variable: Sales

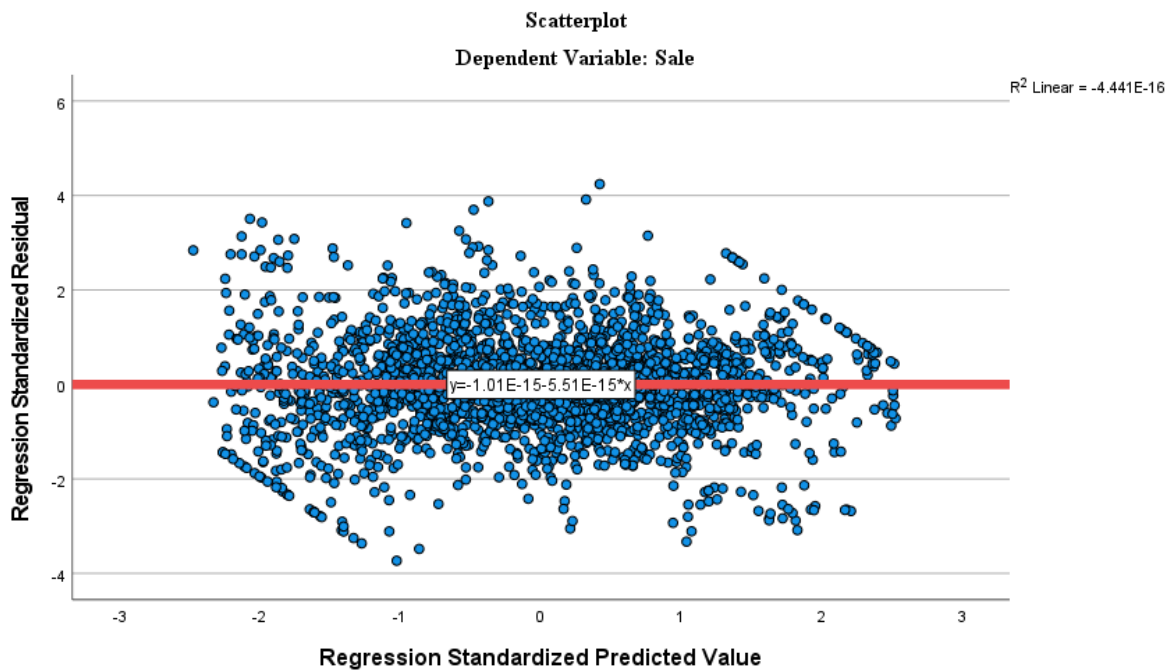Figure 4.2. Linearity test, Dependent variable: Profitability (ROA)

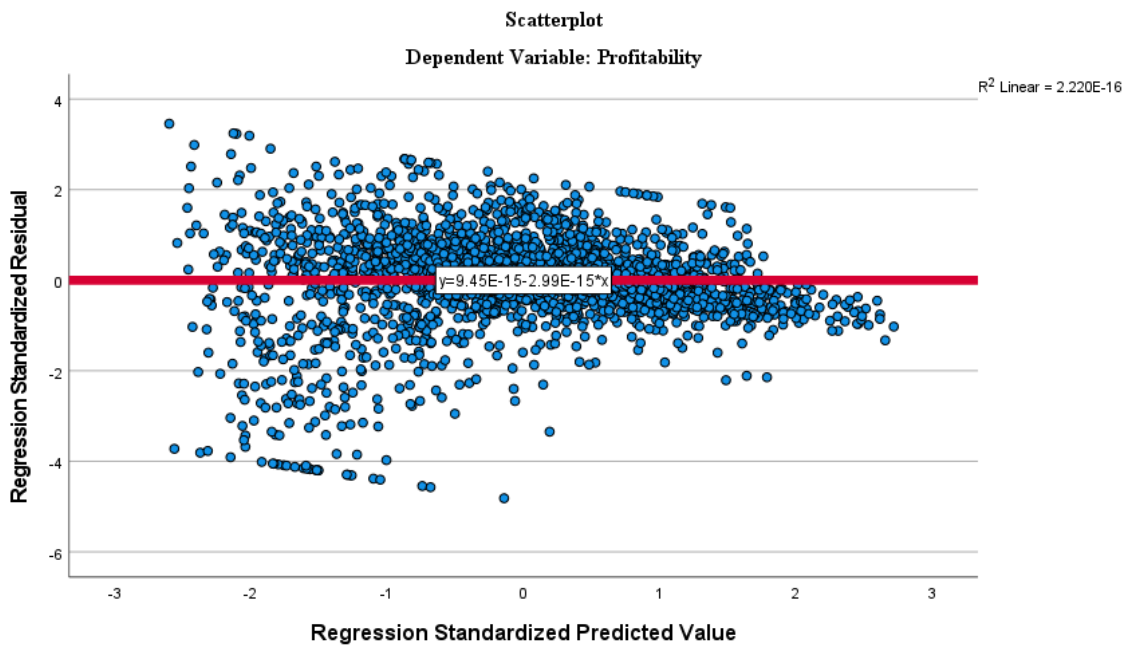Figure 4.3. Homoscedasticity test, Dependent variable: Sale

Figure 4.4. Homoscedasticity test, Dependent variable: Profitability (ROA)

Test for the research model using a multivariate regression

Multivariate regression can explain that suppliers' relational embeddedness influences suppliers' sales to their focal buyers and profitability (ROA) through the mediation effects of their innovativeness and similarity of sustainability practices with their buyers which are moderated by suppliers' risk tolerance. This study employs a year-fixed effect regression to control time-invariable unobserved characteristics that can be correlated with the observed independent variables for a panel data set analysis. In addition, this study assumes that sustainability practices in the previous year affected this year's performance based on previous research (e.g., Ilyas & Osiyevskyy, 2022; Chen & Ho, 2019). Figure 4-5. presents the research model with the time lag between sustainability practices and firm performance.
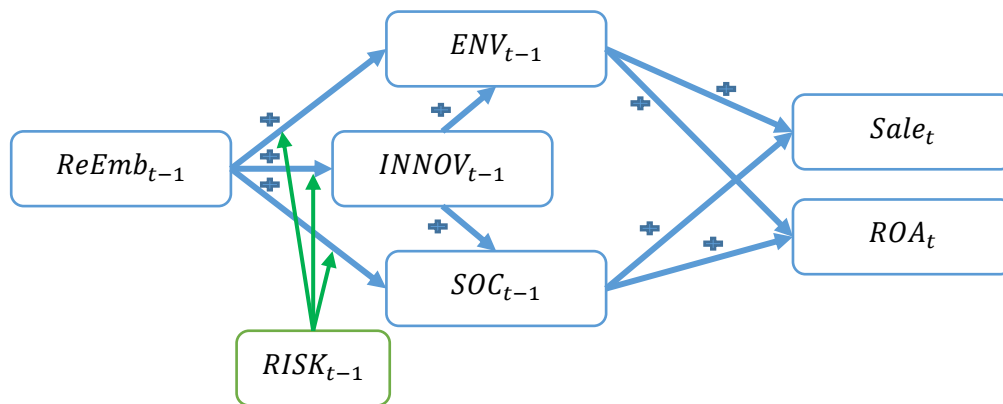
Figure 4.5 Research Model with a Time Lag between Sustainability Practices and Performance

This study uses PROCESS Macro (4.2 version, 2022) in SPSS (e.g., Han, 2022; Abu-Bader & Jones, 2021; Zadawa, Hussin, & Osmadi, 2018) to test the research model by considering time lag, year-fixed effects, and the complexity of the model. PROCESS, written by Andrew F. Hayes, is an observed variable Ordinary Least Squares (OLS) and logistic regression path analysis modeling tool. Social, business, and health sciences widely use this tool to estimate

direct and indirect effects in single and multiple mediator models, two and three-way interactions in moderation models, and conditional indirect effects in moderated mediation models with single or multiple mediators or moderators.

The research model of this study is a moderated mediation model with two dependent variables (suppliers' sales to their focal buyers and their profitability measured by ROA) and three serial mediators. Therefore, I subdivided the research model into four technical models that can apply PROCESS Macro, focusing on the dependent variables and the mediators that do not affect each other. Figure 4-4. shows these processes and subdivision results. The technical subdivision models 1 to 4 are consistent with the PROCESS Marco model No. 84 (Hayes, 2018) with two serial mediators and one moderator.

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Figure 4.6. A Technical Research Model for Running PRCESS Macro

Results of the Statistical Test
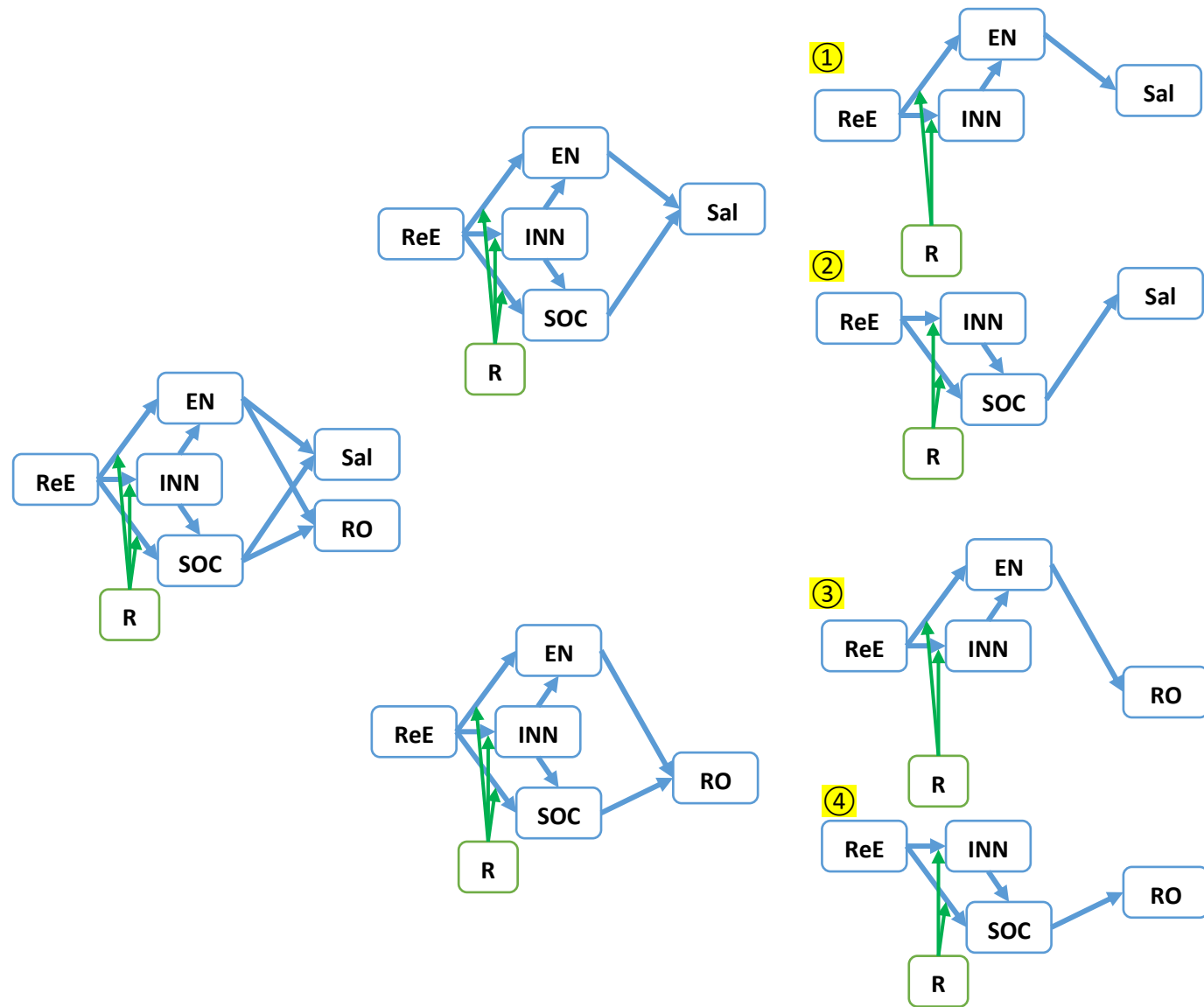
The regression results are shown in Table 4.8. The PROCESS Macro results of the relationship between the research variables are also depicted in Figure 4-7. Each path in the figure represents the associated hypotheses and the estimated path coefficients with Standard errors in parentheses. 10 out of 13 coefficients of all hypotheses in the model are significant and positive (i.e., the results are in the direction hypothesized); hence 10 hypotheses are supported, and three are not. A summary of the results of all hypotheses is presented in Table 4 9.

PROESS Macro implements Baron and Kenny (1986)'s method of verifying the mediation and moderation effect using complexity of ordinary least squares (OLS) regression equations. Therefore, a total of 12 regression equations were obtained from four sub-models that were subdivided to test this research model using PROCESS Macro. However, the results excluding overlapping regression equations are summarized in Table 4-8.

For example, the first sub-model identifies the relationship between suppliers' relational embeddedness with their buyers (ReEmb) and suppliers' sales to their focal buyers (Sale) by considering the continuous mediation effects from the similarity of environmental sustainability practices between suppliers and buyers (ENV) and supplier intention for innovation (INNO) and the moderation effect from supplier risk tolerance (RISK) on the relationship between ENV and INNO. Related hypotheses are H1a, H1c, H2a, H3b, H5a, & H5c. The first sub-model tests these hypotheses with regression equations 1, 2, and 3. The third sub-model identifies the relationship between ReEmb and ROA in consideration of the same mediation effect and moderation effect as the first sub-model. The related hypotheses are H1a, H1c, H2a, H3a, H5a, & H5c. The third sub-model tests these hypotheses with regression equations 1, 2, and 4. Therefore, overlapping hypotheses H1a, H1c, H2a, H5a, & H5c and regression equations 1 & 2 were reported only once.

Hypotheses explaining the sub-model and regression equations to verify them are summarized in Table 4-11.

In interpreting the results of this study, it is necessary to understand the characteristics of variables and explain them carefully. Among the variables in this study, ReEmb, ENV, and SOC assume a negative change from the definition of a variable, so very careful interpretation is required when explaining the relationship with other variables.

For example, ReEeb, ENV, & SOC were defined and measured as having a positive effect as the smaller the distance gap between suppliers and buyers, the smaller the difference between environmental or social sustainability practices scores. In other words, the ReEmb variable assumed that the closer the supplier is to the buyer, the more likely it will gain trust, collect information, and collaborate through frequent ongoing interactions with the supplier.

In the case of ENV, the similarity of sustainability practices between suppliers and buyers was measured by the difference in the values measured through environmental sustainability practices, meaning that the smaller the value of ENV, the greater the similarity between them. Therefore, since both the directions of the measured values of ReEmb and ENV have a negative direction, hypothesis H1a was supported by the verification result of the relationship between ReEmb and ENV being expressed as a positive relationship. Hypotheses that require attention to interpreting the results are H2a, H2b, H3a, H3b, H4a, H4b, H5a, & H5b, which consist of variables measured in the negative direction and variables that are not. Their negative coefficient values mean that there is a positive relationship between variables. Figure 4.6 shows all results.

Finally, 13 regression analyses were conducted for each individual hypothesis to verify the relationship between variables. There was no significant difference between the results of the

individual regression analysis for each hypothesis and the results of the PROCESS Macro

analysis conducted in this study. Only minor differences in the number of coefficients and

standard errors were found. However, hypothesis H4a (SCO→ROA), supported at the

significance level p<0.1 in this study, was not statistically supported in individual regression.
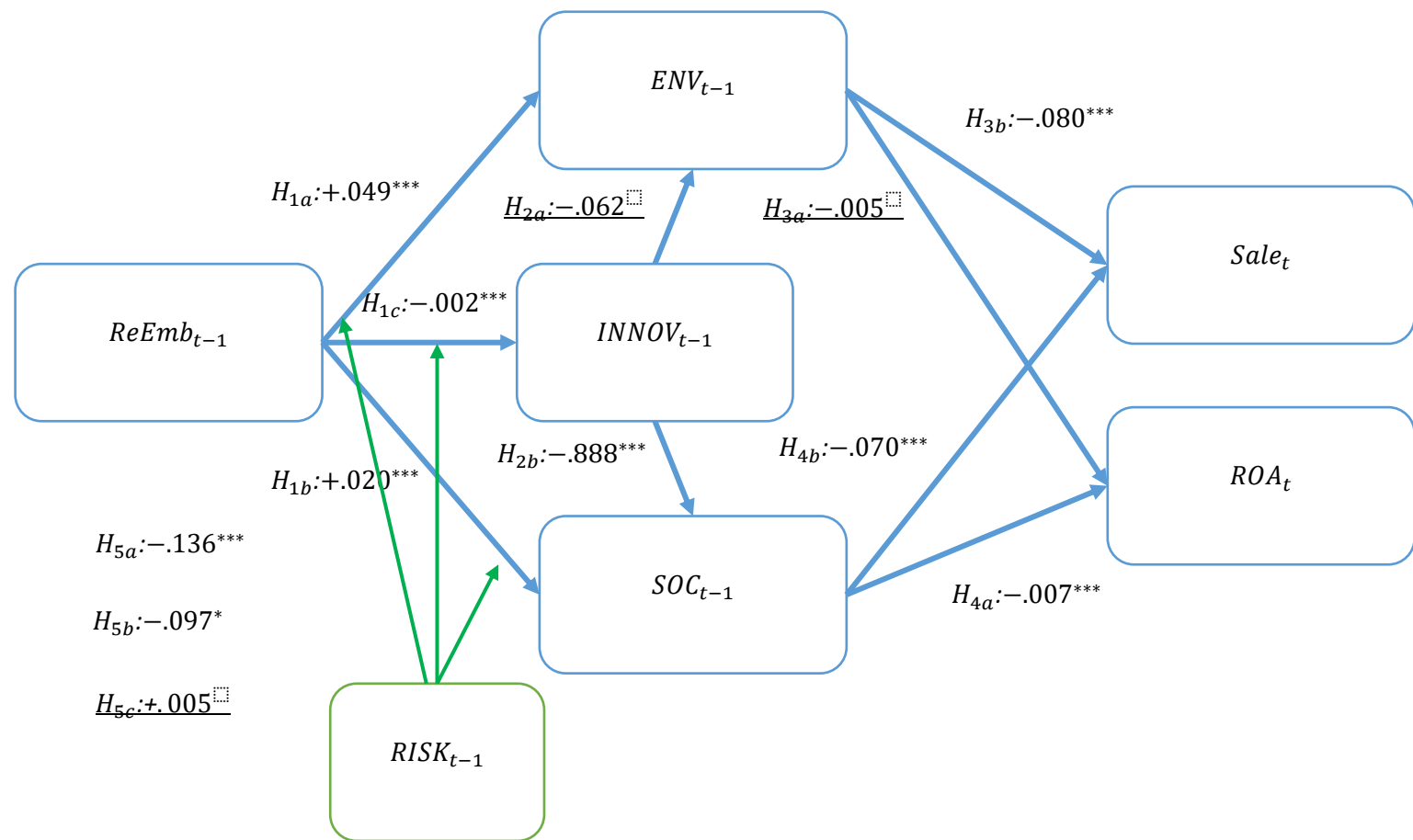
Figure 4.7 Research Model with a Time Lag between Sustainability Practices and Performance with Results

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Table 4.7 Supplier Industry Type

Sector	Description	Frequency	Percent
11	Agriculture, Forestry, Fishing and Hunting	12	0.5
21	Mining, Quarrying, and Oil and Gas Extraction	147	5.6
22	Utilities	18	0.7
23	Construction	33	1.3
31-33	Manufacturing	1783	68.1
42	Wholesale Trade	81	3.1
44-45	Retail Trade	18	0.7
48-49	Transportation and Warehousing	60	2.3
51	Information	249	9.5
52	Finance and Insurance	25	1.0
53	Real Estate and Rental and Leasing	45	1.7
54	Professional, Scientific, and Technical Services	92	3.5
56	Administrative and Support and Waste Management and Remediation Services	26	1.0
61	Educational Services	3	0.1
62	Health Care and Social Assistance	15	0.6
72	Accommodation and Food Services	9	0.3
99	Non-classifiable Establishments	2	0.1
Total		2618	100.0

Table 4.8. Regression Results

	(1) INNOV	(2) ENV	(3) SALE	(4) ROA	(5) SOC	(6) SALE	(7) ROA
ReEmb	-0.002***	0.020***	0.018***	0.001	0.020***	0.018***	0.001**
	(0.001)	(0.006)	(0.007)	(0.001)	(0.007)	(0.007)	(0.001)
INNOV		-0.062	1.5694***	0.056	-0.888***	1.510***	0.007*
		-0.211	(0.248)	(0.045)	(0.244)	(0.249)	(0.003)
RISK	-0.047***	-0.3594***			-0.221*		
	(0.010)	(0.104)			(0.121)		
ReEmb*INNOV	0.005	-0.1362***			-0.097*		
	(0.004)	(0.045)			(0.052)		
EMP	-0.002***	0.010	0.8559	0.035***	-0.006	0.855***	0.352***
	(0.001)	0.008		(0.002)	(0.009)	(0.009)	(0.002)
NAICS	-0.001***	0.000	-0.0119	0.000	0.002	-0.112	0.000
	(0.001)	(0.001)		(0.000)	(0.002)	(0.002)	(0.000)
fyear	considered	considered	considered	considered	considered	considered	considered
ENV			-0.080***	-0.005			
			(0.023)	(0.004)			
SOC						-0.070***	-0.007*
						(0.020)	(0.004)
Constant	.083***	0.598***	6.413***	-0.003**	1.404***	6.463***	0.001
	(0.005)	(0.057)	(0.068)	(0.012)	(0.066)	(0.072)	(0.001)
Observations	2,618	2,618	2,618	2,618	2,618	2,618	2,618
R-squared	0.055	0.111	0.795	0.167	0.0117	0.795	0.167
Adj. R-Squared	0.0005	0.0032			0.0012		

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Table 4.9. A Summary of the Results of All Hypotheses

	Hypothesis	Results	Relationships
H1a	Relational embeddedness positively relates to the degree of similarity	Supported	ReEmb→ENV
H1b	Relational embeddedness positively relates to the degree of similarity in social sustainability between suppliers and buyers.	Supported	ReEmb→SOC
H1c	Relational embeddedness positively relates to innovativeness.	Supported	ReEmb→INNOV
H2a	Innovativeness positively relates to the degree of similarity in environmental sustainability between suppliers and buyers.	Not supported	INNOV→ENV
H2b	Innovativeness positively relates to the degree of similarity in social sustainability between suppliers and buyers.	Supported	INNOV→SOC
H3a	the degree of similarity in environmental sustainability between suppliers and buyers positively relates to profitability.	Supported	ENV→ROA
H3b	the degree of similarity in environmental sustainability between suppliers and buyers positively relates to the sale to the focal buyers.	Supported	ENV→Sale
H4a	the degree of similarity in social sustainability between suppliers and buyers positively relates to profitability.	Not supported	SOC→ROA
H4b	the degree of similarity in social sustainability between suppliers and buyers relates to the sale to the focal buyers.	Supported	SOC→Sale
H5a	Risk tolerance strengthens the relationship between relational embeddedness and the degree of similarity in environmental sustainability between suppliers and buyers.	Supported	RISK→ENV (Moderate)
H5b	Risk tolerance strengthens the relationship between relational embeddedness and the degree of similarity in social sustainability between suppliers and buyers.	Supported	RISK→SOC (Moderate)
H5c	Risk tolerance strengthens the relationship between relational embeddedness and innovativeness.	Not supported	RISK→INNOV (Moderate)

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Table 4.10. Results of Analysis

	H1a ENV	H1b SOC	H1c INNOV	H2a ENV	H2b SOC	H3a ROA	H3b Sale	H4a ROA	H4b Sale	H5a ENV	H5b SOC	H5c INNOV
ReEmb	0.020***	0.020***	-0.002***									
	(0.006)	(0.007)	(0.001)									
INNOV				-0.062	-0.888***							
				(0.211)	(0.244)							
ENV						-0.005	-0.080***					
						(0.023)	(0.244)					
SOC								-0.007*	-0.070***			
								(0.004)	(0.02)			
Moderation										-0.136***	-0.097*	0.005
										(0.045)	(0.052)	(0.004)
Significance	O	O	O	**X**	O	**X**	O	O	O	O	O	**X**
Direction	O	O	O	**O**	O	**O**	O	O	O	O	O	**X**
Support	O	O	O	**X**	O	**X**	O	O	O	O	O	**X**

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.11. Hypotheses and Regression Equations for Sub-models

Sub-model	Hypothesis	Equations	variables
1	H1a, H1c, H2a, H3b, H5a, & H5c	1, 2, & 3	ReEmb, INNOV, ENV, Sale, RISK
2	H1b, H1c, H2b, H4a, H5b, & H5c	1, 2, & 4	ReEmb, INNOV, SOC, Sale, RISK
3	H1a, H1c, H2a, H3a, H5a, & H5c	1, 5, & 6	ReEmb, INNOV, ENV, ROA, RISK
4	H1b, H1c, H2b, H4b, H5b, & H5c	1, 5, & 7	ReEmb, INNOV, SOC, ROA, RISK

Chapter Summary

The results of the data analyses are elaborated in this chapter.

First, I explained the process of organizing data collected from various data sources in the form necessary for panel data analysis. This process involved processing missing values and outliers. Second, the correlation between descriptive statistics and all research variables was presented. In this process, the issue of the processing normality and independence of variables and outliers in the data was discussed. Third, whether linearity, normality, homoscedasticity, and independence assumptions for multivariate regression analysis were met was discussed, and the data prepared for this study were confirmed to be suitable for multivariate regression analysis. Fourth, this chapter explained PROCESS Macro, which was selected as a tool to test hypotheses with the prepared data and discussed the transition process from an initial research model to technical models to implement the research model in a statistical application program and four implemented technical models. Fifth, I briefly introduced the research results and discussed matters to be careful when interpreting the research results. In addition, it was briefly mentioned that there was no significant difference between the results of a separate regression analysis by hypothesis and the results of this study.

CHAPTER V

DISCUSSION AND IMPLICATION OF FINDING

This chapter discusses the results of the research hypotheses proposed and empirically tested in this study. The results of the hypotheses tested will be interpreted in detail, and the implications of the results and findings will be discussed. Next, this chapter closes by discussing the limitations of this research and the issues to be addressed in future research.

Implications for Researchers and Practitioners

This study aims to contribute to the SSCM discipline through empirical data analysis of research hypotheses related to the similarity of sustainability practices between suppliers and buyers based on in-depth investigations of embeddedness, stakeholder theory, and the evidence of existing studies. The first purpose of this study is to empirically identify that suppliers' close relationship with their buyers forms the similarity of sustainability practices between suppliers and buyers. Next, the similarity of the sustainability practices increases the suppliers' sales to the focal buyers and the profitability measured at the suppliers' overall level. Finally, this study aims to show that supplier characteristics, such as innovativeness and risk tolerance, can mediate or moderate these relationships and outcomes. Therefore, considering these research purposes, the

implications of research results and findings are discussed in depth according to the sequences in establishing the hypotheses in Chapter II. A summary of all results of the hypotheses is available in Chapter IV (Table 4-?).

Hypothesis H1a & H1b

Hypothesis H1a postulated a positive relationship between suppliers' relational embeddedness and the degree of similarity in environmental sustainability practices between suppliers and their buyers. The relationship is based on stakeholder theory (Freeman, 2010, 1984; Laplume et al., 2008), embeddedness (Uzzi & Lancaster, 2003; Rowley et al., 2000; Nahapiet & Ghoshal, 1998; Granovetter, 1985), and existent sustainability literature (Seuring et al., 2022; Zhou et al., 2020).

Hypothesis H1b proposed a positive relationship between suppliers' relational embeddedness and the degree of similarity in social sustainability practices between suppliers and their buyers. This hypothesis used the same logic in which Hypothesis H1a was generated. Because social sustainability practices, resulting from relational embeddedness gaps between suppliers and buyers, belong to a different dimension, the degree of similarity in social sustainability practices between suppliers and buyers coined individual Hypothesis H1b and was measured respectively.

The test results of H1a and H1b were statistically significant, with a positive relationship between the variables ($\beta=0.02$, $p<0.001$). In other words, the degree of similarity in environmental or social sustainability practices between suppliers and buyers increases as they have stronger ties based on frequent and ongoing interactions. These results are consistent with

the previous research results that relational embeddedness could help companies implant or benchmark leading companies' sustainability strategies and practices (Moran, 2005).

For reference, relational embeddedness and the degree of similarity in both environmental and social sustainability practices between suppliers and buyers have negative meanings due to the variables' measurement method characteristics. Therefore, hypotheses H1a and H1b should be interpreted as that the smaller the distance difference between suppliers and buyers is, the smaller the difference in the similarity of sustainability practices between suppliers and buyers is.

Also, these positive results of both Hypothesis H1a and Hypothesis H1b suggest the possibility of economic agglomeration effects. These results are consistent with the fact that auto manufacturers' suppliers are located close to auto manufacturers. Therefore, in terms of sustainable activities, it means that suppliers can obtain tangible or intangible benefits by being located near buyers.

Hypothesis H1c

Hypothesis H1c presupposed a positive relationship between suppliers' relational embeddedness and suppliers' innovativeness. I used stakeholder theory (Freeman, 2010, 1984; Laplume et al., 2008), embeddedness (Uzzi & Lancaster, 2003; Rowley et al., 2000; Nahapiet & Ghoshal, 1998; Granovetter, 1985), and existent innovativeness literature (Seuring et al., 2022; Zhou et al., 2020) to build Hypothesis H1c.

The result of Hypothesis H1c showed a statistically significant, negative coefficient value between suppliers' relational embeddedness and supplier innovativeness (β=-0.002, p<0.001). As

mentioned above, due to the nature of the measurement of relational embeddedness, the supplier's innovativeness increases as the distances between suppliers and buyers decrease in terms of measurement (as the relational embeddedness increases), so the coefficient value between them shows a negative relationship, but the interpretation means a positive relationship.

In this study, I defined innovativeness as the willingness and ability of companies to deploy human, technical, and business resources for implementing new ideas to maintain existing innovations, produce new products or services, improve processes, or open new markets (Paille & Halilem, 2019; Gao et al., 2017; Gualandris & Kalchschmidt, 2014). Therefore, frequent, ongoing interactions, such as strong ties, between suppliers and buyers provide channels for suppliers to be aware of and accept new ideas and technologies that buyers have (Siems et al., 2022). The result of hypothesis H1c shows that suppliers consider interactions or requests of buyers as opportunities to learn and develop new capabilities, as can be seen from suppliers' general responses to their buyers' demands or requests (Soundararajan et al., 2018).

Hypothesis H2a & H2b

Hypothesis H2a presumed a positive relationship between suppliers' innovativeness and the degree of the similarity of environmental sustainability practices between suppliers and buyers. Hypothesis H2b proposed a positive relationship between suppliers' innovativeness and the degree of the similarity of social sustainability practices between suppliers and buyers.

Both results of the hypotheses showed negative coefficient values (β of H2a = -0.062, β of H2b = -0.888) because of the nature of the measurement of the degree of similarity in sustainability practices. As mentioned above, these negative values mean a positive relationship

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between innovativeness and the degree of similarity in sustainability practices between suppliers and buyers. However, the result of hypothesis H2a was not supported (p>0.1) while that of hypothesis H2a was supported (p<0.001).

These results may mean the evolution of sustainability implementation in organizations (Zamanian & Kaynak, 2015). In other words, environmental sustainability activities may have already entered a mature stage, and the need for innovative methods may have decreased because the execution method or performance measurement method has been standardized. However, since social sustainability practices are still in the development stage, the implementation methods and performance measurement methods are not standardized so various ideas may be attempted and accepted.

Hypothesis H3a & H3b

Hypothesis H3a predicted a positive relationship between the degree of similarity of environmental sustainability practices between supplies and buyers and suppliers' profitability. Hypothesis H3a posited a positive relationship between the degree of the similarity of environmental sustainability practices between supplies and buyers and suppliers' sales to the focal buyers.

These results of hypotheses H3a and H3b also had negative coefficient values (β of H3a = -0.005, β of H2b = -0.080) because of the nature of the measurement of the degree of similarity in sustainability practices, resulting in the positive relationship between the degree of the similarity in environment sustainability practices between suppliers and buyers and suppliers'

profitability (H3a) or suppliers' sales to the focal buyers (H3b). Hypothesis H3a was not supported (P>0.1), and hypothesis H3b was supported (p<0.001).

By combining the results of the two hypotheses, I recognized that although sales increased from the supplier's point of view, their profitability did not improve. These results explain the contracting methods buyers typically use when entering contracts with their suppliers. Buyers usually request a discount on the unit price when they order a large quantity. Therefore, the results of the two hypotheses suggest the possibility that the buyer simply requested a price discount for a large quantity of orders. Alternatively, since there was no decrease in profitability, there is a possibility that the supplier offset the price discount effect with profits generated from environmental sustainability practices when the buyer requested a price discount.

Hypothesis H4a & H4b

Hypothesis H4a postulated a positive relationship between the degree of the similarity of social sustainability practices between supplies and buyers and suppliers' profitability. Hypothesis H4b proposed a positive relationship between the degree of the similarity of social sustainability practices between supplies and buyers and suppliers' sales to the focal buyers.

Hypotheses H4a and H4b identified negative coefficients (β of H4a = -0.007, p<0.001, β of H2b = -0.070, P<0.001), and both of them were statistically significant. As in the interpretation of Hypotheses H3a and H3b, these negative coefficients mean the positive relationship between the degree of the similarity in social sustainability practices between suppliers and buyers and suppliers' profitability (H4a) and sales to the focal buyers (H4b).

Unlike hypothesis H3a, hypothesis H4a showed a positive relationship. Social sustainability practices improve work infrastructure, health and safety procedure, and labor conditions (Alghabasheh & Gallear, 2021; Sancha et al., 2015). Therefore, since it is relatively difficult to measure the outcomes from social sustainability practices, it is presumed that the unit cost discount request due to the increase in order quantity was not applied.

Hypothesis H5a & H5b

Hypothesis H5a presupposed that as suppliers' risk tolerance increases, the relationship between suppliers' relational embeddedness and the degree of the similarity of environmental sustainability practices between suppliers and buyers increases. Hypothesis H5b presumed that as suppliers' risk tolerance increases, the relationship between suppliers' relational embeddedness and the degree of the similarity of social sustainability practices between suppliers and buyers increases.

The test results of H1a and H1b were statistically significant, with a positive relationship between the variables (H5a: β=-0.136, $p<0.001$; H5b: β=-0.097, $p<0.1$). Due to the variables' measurement method characteristics, the negative values mean the positive moderating effect of risk tolerance on the relationship between relational embeddedness and the degree of similarity in sustainability practices between suppliers and buyers.

In this study, risk tolerance can be interpreted as a willingness or confidence in the investment. Therefore, suppliers' introduction of new equipment or new processes can be facilitated by risk tolerance because it is presumed that the sustainability practices, which benchmark buyers or are introduced or implemented under the initiative of buyers, can give

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suppliers a certain level of confidence, compared to the sustainability practices that are introduced and implemented by suppliers alone.

Hypothesis H5c

Hypothesis H5c predicted that as suppliers' risk tolerance increases, the relationship between suppliers' relational embeddedness and suppliers' innovativeness increases.

This hypothesis H5c was not supported (β=0.005, p>0.1). From this result, I inferred that innovativeness differs from adventure's meaning. Entrepreneurs are not adventurers nor speculators. They might hate risks. They constantly try to control risk. For example, in the case of quality control, the process results are managed between the upper control line (UCL) and the lower line (LCL) of quality. Any processes should be within the scope of management. Investors differ from adventurers. Also, they differ from speculators. They are not risk seekers. Entrepreneurial investments tend to focus on things with higher returns but less risk. Therefore, it means that the concept of two variables (innovativeness and risk tolerance) implies the content of different categories, resulting in no statistically significant relationship observed between risk tolerance and innovativeness.

Limitations and Future Directions

Limitations

As in most studies, this study also had several limitations, highlighted below. Furthermore, based on the current study's findings, the challenging unanswered questions that future research can address are discussed in detail.

The target population for this study is all companies that could be paired with suppliers and buyers are implementing sustainable practices. However, because I relied on the information from SABF No. 131 to create supplier-buyer pairs, it is difficult to study small and medium-sized companies that do not need to comply with the code. In addition, it is impossible to study relationships with buyers who account for less than 10% of sales, so research is limited to relationships with buyers that can affect suppliers.

There is a large gap between the number of aggregate items of MSIC/KLD's environmental sustainability practices and social sustainability practices. It cannot be ruled out that the difference in the number of these aggregated items may have resulted in a difference in the analysis results of the relationship between innovativeness and the degree of similarity in environmental sustainability practices between suppliers (Hypothesis H2a) and buyers and the relationship between innovativeness and the degree of the similarity in social sustainability practices between suppliers and buyers (Hypothesis H2b). In future studies, it is necessary to make efforts to minimize the gap in the item number between the environment and social sustainability practices based on a more detailed analysis of sustainability data.

Although it was confirmed that the values measured using the proxy were statistically significant and satisfied the assumptions for multivariate regression analysis, doubts about the representativeness of the variables coming from the proxy itself remain a problem. It is necessary to cross-validate the results through repeated studies using different proxies. For example, I used capital expenditure to measure innovativeness. However, researchers can use patents or citations to measure innovativeness.

In this study data set, the supplier-buyer ratio is at 2:1. This was unintentional, but it is necessary to ascertain the contingency of the bias in the ratio of suppliers and buyers. In addition,

it is necessary to ascertain what effect this bias has. Furthermore, the industry types of suppliers were also concentrated in a specific industry, with three industries (manufacturing, information, and mining) accounting for 83.2%. Although the type of industry was used as a control variable to control the confounding effect of industry, this industry bias is also a limitation of this study.

Future Directions

Agglomeration economics effects can be inferred from Hypotheses H1a & Hypothesis H1b results. Therefore, various studies are needed on the relationship between sustainable practices and agglomeration economics. For example, determining whether agglomeration economics effects occur only in physical aggregation or virtual agglomeration (e.g., Zoom meetings) can be a meaningful topic linked to the efficiency of virtual or augmented reality in the future.

As part of the diversification of the supply chain research perspective, there is a need to study the supply chain from the perspective of the third parties who help the supply chain members like buyers and suppliers. For example, sustainability research from the perspective of service providers (e.g., logistics companies) assisting supply chain operations can be an interesting topic because logistics companies may have differences in transactions and relationship formation between suppliers and buyers.

Future research will be able to enrich the contents of the study by using various performance measurement (sustainable outcomes) indices. For example, in terms of measuring buyers' profit from sustainability practices, buyers' cost savings compared to purchasing from their suppliers (suppliers' sales to the focal buyers), rather than the profit measured in buyers' total sales may have more exact and valuable information. These studies will help to measure the effectiveness of supplier development programs accurately. In addition, the performance of

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sustainable practices can be measured by other indicators such as corporate reputation rather than financial indicators.

Although the MSIC/KLD is a widely used sustainability indicator, it is also worthwhile to conduct research using other sustainability indicators (e.g., ASSET4). Replication studies that repeat existing research models are also meaningful in that they accumulate evidence for generalization. In addition, research using data from other regions (Europe, Asia, or Africa) that MSIC/KLD does not include can expand the scope of SSCM research.

It has been a long time since both environmental sustainability practices and social sustainability practices have been necessary practices of companies that suppliers and buyers should introduce and implement to secure competitive advantages and survive. However, environmental sustainability practices have been introduced and implemented for a long time, and the processes and goals are standardized, so innovative introduction methods or management are not required. However, since social sustainability practices have not yet been introduced for a long time, it is inferred that innovative thinking and methods greatly influence the introduction and implementation of social sustainability practices. It corresponds to the research results of Zamanian & Kaynak (2015). It may also be the reason why many sustainability studies are focused on the environment. Therefore, more research on social sustainability practices is required in the future.

REFERENCES

Abdel-Basset, M., Gunasekaran, M., Mohamed, M., & Chilamkurti, N. (2019). A framework for risk assessment, management and evaluation: Economic tool for quantifying risks in supply chain. Future Generation Computer Systems, 90(1), 489-502.

Acosta, P., Acquier, A., & Delbard, O. (2014, January). Just do it? The adoption of sustainable supply chain management programs from a supplier perspective. In Supply Chain Forum: An International Journal (Vol. 15, No. 1, pp. 76-91). Taylor & Francis.

Agrawal, V., & Seshadri, S. (2000). Impact of uncertainty and risk aversion on price and order quantity in the newsvendor problem. Manufacturing & Service Operations Management, 2(4), 410-423.

Ahi, P., & Searcy, C. (2013). A comparative literature analysis of definitions for green and sustainable supply chain management. Journal of cleaner production, 52, 329-341.

Ahmad, G. N., Warokka, A., & Lestari, I. P. (2020). Financial risk tolerance analysis of Indonesian retail investor. Humanities & Social Sciences Reviews, 8(4), 852-875.

Ahmed, M. U., & Shafiq, A. (2022). Toward sustainable supply chains: impact of buyer's legitimacy, power and aligned focus on supplier sustainability performance. International Journal of Operations & Production Management, 42(3), 280-303.

Alghababsheh, M., & Gallear, D. (2021). Socially sustainable supply chain management and suppliers' social performance: The role of social capital. Journal of Business Ethics, 173, 855-875.

Alinaghian, L., Qiu, J., & Razmdoost, K. (2021). The role of network structural properties in supply chain sustainability: a systematic literature review and agenda for future research. Supply Chain Management: An International Journal, 26(2), 192-211.

Andersson, U., Forsgren, M., & Holm, U. (2002). The strategic impact of external networks: Subsidiary performance and competence development in the multinational corporation. Strategic management journal, 23(11), 979-996.

Ansari, Z. N., & Kant, R. (2017). A state-of-art literature review reflecting 15 years of focus on sustainable supply chain management. Journal of cleaner production, 142, 2524-2543.

Arcelus, F. J., Kumar, S., & Srinivasan, G. (2012). Risk tolerance and a retailer's pricing and ordering policies within a newsvendor framework. Omega, 40(2), 188-198.

Arlbjørn, J. S., de Haas, H., & Munksgaard, K. B. (2011). Exploring supply chain innovation. Logistics research, 3, 3-18.

Ashby, A., Leat, M., & Hudson-Smith, M. (2012). Making connections: a review of supply chain management and sustainability literature. Supply chain management: an international journal, 17(5), 497-516.

Autry, C. W., & Griffis, S. E. (2008). Supply chain capital: the impact of structural and relational linkages on firm execution and innovation. Journal of business logistics, 29(1), 157-173.

Auyong, H. (2013). Issues In A Sustainable Supply Chain Logistics. In Proceedings of the 2013 International Conference on Information, Operations Management and Statistics (ICIOMS2013).

Avinadav, T., Chernonog, T., & Ben-Zvi, T. (2019). The effect of information superiority on a supply chain of virtual products. International Journal of Production Economics, 216, 384-397.

Avinadav, T., Chernonog, T., & Perlman, Y. (2017). Mergers and acquisitions between risk-averse parties. European Journal of Operational Research, 259(3), 926-934.

Awan, U., Kraslawski, A., & Huiskonen, J. (2017). Understanding the relationship between stakeholder pressure and sustainability performance in manufacturing firms in Pakistan. Procedia Manufacturing, 11, 768-777.

Awaysheh, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. International Journal of Operations & Production Management.

Ayuso, S., Roca, M., & Colomé, R. (2013). SMEs as "transmitters" of CSR requirements in the supply chain. Supply Chain Management: An International Journal.

Azadegan, A., & Dooley, K. J. (2010). Supplier innovativeness, organizational learning styles and manufacturer performance: An empirical assessment. Journal of operations management, 28(6), 488-505.

Bag, S., Wood, L. C., Xu, L., Dhamija, P., & Kayikci, Y. (2020). Big data analytics as an operational excellence approach to enhance sustainable supply chain performance. Resources, Conservation and Recycling, 153, 104559.

Bai, Y., Xu, Y., & Jiao, J. (2022). Can corporate environmental management benefit from multirelationship social network? An improved maturity model and text mining based on the big data from Chinese enterprises. Environment, Development and Sustainability, 24(4), 5783-5810.

Bamgbade, J. A., Kamaruddeen, A. M., & Nawi, M. N. M. (2015). Innovativeness and Sustainability: Difference and Antecedent Relationship. ADVANCES IN GLOBAL BUSINESS RESEARCH Vol. 12, No. 1, ISSN: 1549-9332, 708.

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Bamgbade, J. A., Kamaruddeen, A. M., & Nawi, M. N. M. (2017). Malaysian construction firms' social sustainability via organizational innovativeness and government support: The mediating role of market culture. Journal of Cleaner Production, 154, 114-124.

Belhadi, A., Kamble, S. S., Mani, V., Venkatesh, V. G., & Shi, Y. (2021). Behavioral mechanisms influencing sustainable supply chain governance decision-making from a dyadic buyer-supplier perspective. International Journal of Production Economics, 236, 108136.

Bernardes, E. S. (2010). The effect of supply management on aspects of social capital and the impact on performance: A social network perspective. Journal of supply chain management, 46(1), 45-55.

Beske-Janssen, P., Johnson, M. P., & Schaltegger, S. (2015). 20 years of performance measurement in sustainable supply chain management–what has been achieved?. Supply chain management: An international Journal.

Blonska, A., Rozemeijer, F., & Wetzels, M. (2008, September). The influence of supplier development on gaining a preferential buyer status, supplier adaptation and supplier relational embeddedness. In Proceedings of the 24th IMP Conference (pp. 02-06). Sweden: Uppsala.

Bloom, J. D. (2015). Standards for Development: Food Safety and Sustainability in W al-M art's Honduran Produce Supply Chains. Rural Sociology, 80(2), 198-227.

Blowfield, M. (2000). Ethical sourcing: a contribution to sustainability or a diversion?. Sustainable Development, 8(4), 191-200.

Bonini, S., & Görner, S. (2011). The business of sustainability. McKinsey & Company.

Bouchery, Y., Corbett, C. J., Fransoo, J. C., & Tan, T. (2017). Sustainable supply chains: introduction. Sustainable Supply Chains: A Research-Based Textbook on Operations and Strategy, 1-12.

Bouguerra, A., Hughes, M., Cakir, M. S., & Tatoglu, E. (2023). Linking entrepreneurial orientation to environmental collaboration: a stakeholder theory and evidence from multinational companies in an emerging market. British journal of management, 34(1), 487-511.

Brammer, S., Hoejmose, S., & Millington, A. (2011). Managing sustainable global supply chain: Framework and best practices.

Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. European journal of operational research, 233(2), 299-312.

Bubicz, M. E., Barbosa-Póvoa, A. P. F. D., & Carvalho, A. (2019). Incorporating social aspects in sustainable supply chains: Trends and future directions. Journal of Cleaner Production, 237, 117500.

Burt, R. S. (2000). The network structure of social capital. Research in organizational behavior, 22, 345-423.

Burt, R. A. (1992). The constitution in conflict. Harvard University Press.

Busse, C., Regelmann, A., Chithambaram, H., & Wagner, S. M. (2017). Managerial perceptions of energy in logistics: an integration of the theory of planned behavior and stakeholder theory. International Journal of Physical Distribution & Logistics Management.

Cai, Y. J., & Choi, T. M. (2020). A United Nations' Sustainable Development Goals perspective for sustainable textile and apparel supply chain management. Transportation Research Part E: Logistics and Transportation Review, 141, 102010.

Calantone, R. J., & Vickery, S. K. (2010). Introduction to the special topic forum: Using archival and secondary data sources in supply chain management research. Journal of Supply Chain Management, 46(4), 3.

Camilleri, M. A. (2017). Corporate sustainability and responsibility: creating value for business, society and the environment. Asian Journal of Sustainability and Social Responsibility, 2(1), 59-74.

Campbell, J. L. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Academy of management Review, 32(3), 946-967.

Carter, C. R., & Carter, J. R. (1998). Interorganizational determinants of environmental purchasing: initial evidence from the consumer products industries. Decision Sciences, 29(3), 659-684.

Carter, C. R., & Liane Easton, P. (2011). Sustainable supply chain management: evolution and future directions. International journal of physical distribution & logistics management, 41(1), 46-62.

Carter, C. R., & Washispack, S. (2018). Mapping the path forward for sustainable supply chain management: A review of reviews. Journal of Business Logistics, 39(4), 242-247.

Carter, C. R., Hatton, M. R., Wu, C., & Chen, X. (2020). Sustainable supply chain management: continuing evolution and future directions. International Journal of Physical Distribution & Logistics Management, 50(1), 122-146.

Centobelli, P., Cerchione, R., & Singh, R. (2019). The impact of leanness and innovativeness on environmental and financial performance: Insights from Indian SMEs. International Journal of Production Economics, 212, 111-124.

Chacón Vargas, J. R., & Moreno Mantilla, C. E. (2014). Sustainable supply chain management capabilities: a review from the resource-based view, the dynamic capabilities and stakeholder theories. Latin American Journal of Management for Sustainable Development, 1(4), 323-343.

Chae, S., Yan, T., & Yang, Y. (2020). Supplier innovation value from a buyer–supplier structural equivalence view: Evidence from the PACE awards in the automotive industry. Journal of Operations Management, 66(7-8), 820-838.

Zhang, Y. B., Li, W., Jiang, L., Yang, L., Chen, N. H., Wu, Z. N., ... & Wang, G. C. (2018). Cytotoxic and anti-inflammatory active phloroglucinol derivatives from Rhodomyrtus tomentosa. Phytochemistry, 153, 111-119.

Chereau, C., & Schellhorn, C. (2014). Supply chain management and investment risk. Chereau, C., and Schellhorn, C."Supply Chain Management and Investment Risk," International Journal of Business and Social Science, 5(13), 45-52.

Chernonog, T., & Avinadav, T. (2014). Profit criteria involving risk in price setting of virtual products. European Journal of Operational Research, 236(1), 351-360.

Chernonog, T., Avinadav, T., & Ben-Zvi, T. (2015). Pricing and sales-effort investment under bi-criteria in a supply chain of virtual products involving risk. European Journal of Operational Research, 246(2), 471-475.

Choi, T. Y., & Kim, Y. (2008). Structural embeddedness and supplier management: a network perspective. Journal of supply chain management, 44(4), 5-13.

Ciccullo, F., Pero, M., Caridi, M., Gosling, J., & Purvis, L. (2018). Integrating the environmental and social sustainability pillars into the lean and agile supply chain management paradigms: A literature review and future research directions. Journal of cleaner production, 172, 2336-2350.

Ciliberti, F., de Groot, G., de Haan, J., & Pontrandolfo, P. (2009). Codes to coordinate supply chains: SMEs' experiences with SA8000. Supply Chain Management: An International Journal, 14(2), 117-127.

Cloutier, C., Oktaei, P., & Lehoux, N. (2020). Collaborative mechanisms for sustainability-oriented supply chain initiatives: state of the art, role assessment and research opportunities. International Journal of Production Research, 58(19), 5836-5850.

Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the Academy of Management Journal. Academy of management journal, 50(6), 1281-1303.

Crespell, P., & Hansen, E. (2009). Antecedents to innovativeness in the forest products industry. Journal of Forest Products Business Research, 6(1), 1-20.

Dacin, M. T., Ventresca, M. J., & Beal, B. D. (1999). The embeddedness of organizations: Dialogue & directions. Journal of management, 25(3), 317-356.

Damic, M., Naletina, D., & Buntic, L. (2020). CONCEPTUAL DEFINITIONS AND ANTECEDENTS OF ORGANIZATIONAL INNOVATIVENESS-A LITERATURE REVIEW. Economic and Social Development: Book of Proceedings, 565-574.

Dangelico, R. M., Pujari, D., & Pontrandolfo, P. (2017). Green product innovation in manufacturing firms: A sustainability-oriented dynamic capability perspective. Business strategy and the Environment, 26(4), 490-506.

Detre, J. D., Johnson, A. J., & Gray, A. W. (2011). Innovativeness and innovation: Implications for the renewable materials supply chain. International Food and Agribusiness Management Review, 14(2), 17-34.

Do, Q., Mishra, N., Colicchia, C., Creazza, A., & Ramudhin, A. (2022). An extended institutional theory perspective on the adoption of circular economy practices: Insights from the seafood industry. International Journal of Production Economics, 247, 108400.

Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. Academy of management Review, 20(1), 65-91.

Ehrgott, M., Reimann, F., Kaufmann, L., & Carter, C. R. (2011). Social sustainability in selecting emerging economy suppliers. Journal of business ethics, 98, 99-119.

Ekins, P., & Zenghelis, D. (2021). The costs and benefits of environmental sustainability. Sustainability Science, 16, 949-965.

Erkul, M., Kaynak, H., & Montiel, I. (2015). Supplier relations and sustainable operations: the roles of codes of conduct and human resource development. International Journal of Integrated Supply Management, 9(3), 225-249.

Eskandarpour, M., Dejax, P., Miemczyk, J., & Péton, O. (2015). Sustainable supply chain network design: An optimization-oriented review. Omega, 54, 11-32.

Gebril Taha, M., & Espino-Rodríguez, T. F. (2020). The impact of the organizational culture on hotel outsourcing and sustainable performance an empirical application in the egyptian hotel sector. Sustainability, 12(22), 9687.

Fagundes, M. V. C., Teles, E. O., de Melo, S. A. V., & Freires, F. G. M. (2020). Decision-making models and support systems for supply chain risk: literature mapping and future research agenda. European Research on Management and Business Economics, 26(2), 63-70.

Faisal, M. N., Al-Esmael, B., & Sharif, K. J. (2017). Supplier selection for a sustainable supply chain: Triple bottom line (3BL) and analytic network process approach. Benchmarking: An International Journal.

Fan, J. X., & Xiao, J. J. (2005). A cross-cultural study in risk tolerance: Comparing Chinese and Americans. Available at SSRN 939438.

Ferraris, A., Santoro, G., & Scuotto, V. (2020). Dual relational embeddedness and knowledge transfer in European multinational corporations and subsidiaries. Journal of Knowledge management, 24(3), 519-533.

Finch, P. (2004). Supply chain risk management. Supply chain management: an International Journal, 9(2), 183-196.

Finke, M. S., & Guillemette, M. A. (2016). Measuring Risk Tolerance: A Review of Literature. Journal of Personal Finance, 15(1).

Freeman, R. E., & Reed, D. L. (1983). Stockholders and stakeholders: A new perspective on corporate governance. California management review, 25(3), 88-106.

Freeman, R. E. (1984). Strategic Management: A Stakeholder Approach (Boston: Pitman, 1984). Jennings, in the article cited above, quotes Freeman and gives additional information concerning the influence of his work.

Freeman, R. E. (2010). Strategic management: A stakeholder approach. Cambridge university press.

Freeman, R. E. (1994). The politics of stakeholder theory: Some future directions. Business ethics quarterly, 409-421.

Gao, D., Xu, Z., Ruan, Y. Z., & Lu, H. (2017). From a systematic literature review to integrated definition for sustainable supply chain innovation (SSCI). Journal of Cleaner Production, 142, 1518-1538.

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. Journal of Product Innovation Management: An international publication of the product development & management association, 19(2), 110-132.

Geffen, C. A., & Rothenberg, S. (2000). Suppliers and environmental innovation: the automotive paint process. International Journal of Operations & Production Management, 20(2), 166-186.

Gelderman, C. J., Semeijn, J., & Mertschuweit, P. P. (2016). The impact of social capital and technological uncertainty on strategic performance: The supplier perspective. Journal of Purchasing and Supply Management, 22(3), 225-234.

Giunipero, L. C., Hooker, R. E., & Denslow, D. (2012). Purchasing and supply management sustainability: Drivers and barriers. Journal of purchasing and supply management, 18(4), 258-269.

Granovetter, M. (1992). Economic institutions as social constructions: a framework for analysis. Acta sociologica, 35(1), 3-11.

Granovetter, M. (1973). The Strength of Weak Ties." American Journal of Sociology 78: 1360-80. 1985. Economic Action and Social Structure: The Problem of Embeddedness." American Journal of Sociology, 91, 481-510.

Granovetter, M. (1985). 1985,"Economic Action and Social Structure: The Problem of Embeddedness.". American Journal of Sociology, 91(3), 4.

Grewal, R., & Dharwadkar, R. (2002). The role of the institutional environment in marketing channels. Journal of marketing, 66(3), 82-97.

Griese, I., Pick, D., & Kleinaltenkamp, M. (2012). Antecedents of knowledge generation competence and its impact on innovativeness. Journal of Business & Industrial Marketing, 27(6), 468-485.

Grover, R., Grover, R., Rao, V. B., & Kejriwal, K. (2016). Supplier selection using sustainable criteria in sustainable supply chain management. International Journal of Economics and Management Engineering, 10(5), 1775-1779.

Grunig, J. E., & Hunt, T. T. (1984). Managing public relations. Holt, Rinehart and Winston.

Gualandris, J., & Kalchschmidt, M. (2016). Developing environmental and social performance: the role of suppliers' sustainability and buyer–supplier trust. International Journal of Production Research, 54(8), 2470-2486.

Gualandris, J., & Kalchschmidt, M. (2014). Customer pressure and innovativeness: Their role in sustainable supply chain management. Journal of Purchasing and Supply Management, 20(2), 92-103.

Gualandris, J., & Kalchschmidt, M. (2013). Product and process modularity: improving flexibility and reducing supplier failure risk. International Journal of Production Research, 51(19), 5757-5770.

Gualandris, J., & Kalchschmidt, M. (2014). Customer pressure and innovativeness: Their role in sustainable supply chain management. Journal of Purchasing and Supply Management, 20(2), 92-103.

Gualandris, J., Golini, R., & Kalchschmidt, M. (2014). Do supply management and global sourcing matter for firm sustainability performance? An international study. Supply Chain Management: An International Journal.

Gualandris, J., Klassen, R. D., Vachon, S., & Kalchschmidt, M. (2015). Sustainable evaluation and verification in supply chains: Aligning and leveraging accountability to stakeholders. Journal of Operations Management, 38, 1-13.

Gundry, L. K., Kickul, J. R., Iakovleva, T., & Carsrud, A. L. (2014). Women-owned family businesses in transitional economies: key influences on firm innovativeness and sustainability. Journal of Innovation and Entrepreneurship, 3(1), 1-17.

Haleem, F., Farooq, S., Cheng, Y., & Waehrens, B. V. (2022). Sustainable Management Practices and Stakeholder Pressure: A Systematic Literature Review. Sustainability, 14(4), 1967.

Hall, J., & Matos, S. (2010). Incorporating impoverished communities in sustainable supply chains. International Journal of Physical Distribution & Logistics Management, 40(1/2), 124-147.

Hart, O. (1995). Corporate governance: some theory and implications. The economic journal, 105(430), 678-689.

Hassini, E., Surti, C., & Searcy, C. (2012). A literature review and a case study of sustainable supply chains with a focus on metrics. International journal of production economics, 140(1), 69-82.

Hausman, W. (2004). Supply chain performance metrics. The practice of supply chain management: Where theory and application converge, 61-73.

Ho, W., Zheng, T., Yildiz, H., & Talluri, S. (2015). Supply chain risk management: a literature review. International Journal of Production Research, 53(16), 5031-5069.

Hofmann, H., Busse, C., Bode, C., & Henke, M. (2013). A foundation of sustainability related supply chain risks in stakeholder theory. Efficiency and Logistics, 185-196.

Hoq, M. Z., & Ha, N. C. (2009). Innovativeness: its antecedents and relationship to SME business performance. Available at SSRN 1851423.

Hoq, M. Z. (2009). Innovativeness: Its antecedents and impact on SME business performance. Available at SSRN 1851425.

Hrazdil, K., Kim, J. B., & Li, X. (2022). Customers' Risk Tolerance and Suppliers' Investment Inefficiency. Journal of Risk and Financial Management, 15(2), 63.

Hsu, C. C., Tan, K. C., & Mohamad Zailani, S. H. (2016). Strategic orientations, sustainable supply chain initiatives, and reverse logistics: Empirical evidence from an emerging market. International journal of operations & production management, 36(1), 86-110.

Hu, B., & Meng, C. (2021). The effect of risk tolerance in mobile game supply chain pricing and effort decisions. Journal of the Operational Research Society, 72(10), 2301-2316.

Hu, B., Meng, C., Xu, D., & Son, Y. J. (2016). Three-echelon supply chain coordination with a loss-averse retailer and revenue sharing contracts. International Journal of Production Economics, 179, 192-202.

Hult, G. T. M., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. Industrial marketing management, 33(5), 429-438.

Anisul Huq, F., Stevenson, M., & Zorzini, M. (2014). Social sustainability in developing country suppliers: An exploratory study in the ready made garments industry of Bangladesh. International Journal of Operations & Production Management, 34(5), 610-638.

Hurley, R. F., & Hult, G. T. M. (1998). Innovation, market orientation, and organizational learning: an integration and empirical examination. Journal of marketing, 62(3), 42-54.

Jabbour, C. J. C., Sarkis, J., de Sousa Jabbour, A. B. L., Renwick, D. W. S., Singh, S. K., Grebinevych, O., ... & Godinho Filho, M. (2019). Who is in charge? A review and a research agenda on the 'human side'of the circular economy. Journal of cleaner production, 222, 793-801.

Jensen, J. K., & Govindan, K. (2014). Assessment of renewable bioenergy application: a case in the food supply chain industry. Journal of cleaner production, 66, 254-263.

Jeppesen, S., & Hansen, M. W. (2004). Environmental upgrading of third world enterprises through linkages to transnational corporations. Theoretical perspectives and preliminary evidence. Business Strategy and the Environment, 13(4), 261-274.

Jia, F., Zuluaga-Cardona, L., Bailey, A., & Rueda, X. (2018). Sustainable supply chain management in developing countries: An analysis of the literature. Journal of cleaner production, 189, 263-278.

Jia, M., Stevenson, M., & Hendry, L. (2021). A systematic literature review on sustainability-oriented supplier development. Production Planning & Control, 1-21.

Jin, Z., Navare, J., & Lynch, R. (2019). The relationship between innovation culture and innovation outcomes: exploring the effects of sustainability orientation and firm size. R&D Management, 49(4), 607-623.

Kamaruddeen, A. M., Yusof, N. A., & Said, I. (2010). Innovation and innovativeness: difference and antecedent relationship. The Icfai University Journal of Architecture, 2(1), 66-78.

Kang, M., & Hau, Y. S. (2014). Multi-level analysis of knowledge transfer: a knowledge recipient's perspective. Journal of Knowledge Management.

Kayikci, Y., Kazancoglu, Y., Gozacan-Chase, N., Lafci, C., & Batista, L. (2022). Assessing smart circular supply chain readiness and maturity level of small and medium-sized enterprises. Journal of Business Research, 149, 375-392.

Kayis, B., & Dana Karningsih, P. (2012). SCRIS: A knowledge-based system tool for assisting manufacturing organizations in identifying supply chain risks. Journal of Manufacturing Technology Management, 23(7), 834-852.

Ketprapakorn, N. (2019). Toward an Asian corporate sustainability model: An integrative review. Journal of Cleaner Production, 239, 117995.

Khalid, R. U., Seuring, S., Beske, P., Land, A., Yawar, S. A., & Wagner, R. (2015). Putting sustainable supply chain management into base of the pyramid research. Supply Chain Management: An International Journal.

Khan, S. A. R., Yu, Z., Belhadi, A., & Mardani, A. (2020). Investigating the effects of renewable energy on international trade and environmental quality. Journal of Environmental management, 272, 111089.

Khan, S. A. R., Yu, Z., Golpira, H., Sharif, A., & Mardani, A. (2021). A state-of-the-art review and meta-analysis on sustainable supply chain management: Future research directions. Journal of Cleaner Production, 278, 123357.

Khoja, F., Adams, J., & Kauffman, R. (2010). A temporal model of vertical relationships. Journal of Business-to-business Marketing, 17(3), 279-307.

Kim, M., & Chai, S. (2017). The impact of supplier innovativeness, information sharing and strategic sourcing on improving supply chain agility: Global supply chain perspective. International Journal of Production Economics, 187, 42-52.

Choi, T. Y., & Kim, Y. (2008). Structural embeddedness and supplier management: a network perspective. Journal of supply chain management, 44(4), 5-13.

Kim, D. Y. (2014). Understanding supplier structural embeddedness: A social network perspective. Journal of Operations Management, 32(5), 219-231.

Kim, Y., Choi, T. Y., & Skilton, P. F. (2015). Buyer-supplier embeddedness and patterns of innovation. International Journal of Operations & Production Management.

Kirchoff, J. F., Koch, C., & Satinover Nichols, B. (2011). Stakeholder perceptions of green marketing: the effect of demand and supply integration. International Journal of Physical Distribution & Logistics Management, 41(7), 684-696.

Klassen, R. D., & Vereecke, A. (2012). Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance. International Journal of production economics, 140(1), 103-115.

Kleindorfer, P. R., Singhal, K., & Van Wassenhove, L. N. (2005). Sustainable operations management. Production and operations management, 14(4), 482-492.

Klewitz, J., & Hansen, E. G. (2014). Sustainability-oriented innovation of SMEs: a systematic review. Journal of cleaner production, 65, 57-75.

Koberg, E., & Longoni, A. (2019). A systematic review of sustainable supply chain management in global supply chains. Journal of cleaner production, 207, 1084-1098.

Kyrgidou, L. P., & Spyropoulou, S. (2013). Drivers and performance outcomes of innovativeness: An empirical study. British Journal of Management, 24(3), 281-298.

Laplume, A. O., Sonpar, K., & Litz, R. A. (2008). Stakeholder theory: Reviewing a theory that moves us. Journal of management, 34(6), 1152-1189.

Lavassani, K. M., & Movahedi, B. (2010, May). Critical analysis of the supply chain management theories: toward the stakeholder theory. In POMS 21st Annual Conference, Vancouver.

Lee, S. Y., & Klassen, R. D. (2008). Drivers and enablers that foster environmental management capabilities in small-and medium-sized suppliers in supply chains. Production and Operations management, 17(6), 573-586.

Lee, T. S., & Tsai, H. J. (2005). The effects of business operation mode on market orientation, learning orientation and innovativeness. Industrial Management & Data Systems.

Leenders, R. T., & Dolfsma, W. A. (2016). Social networks for innovation and new product development. Journal of Product Innovation Management, 33(2), 123-131.

Leonard-Barton, D., & Swap, W. C. (1999). When sparks fly: Igniting creativity in groups. Harvard Business Press.

Linton, J. D., Klassen, R., & Jayaraman, V. (2007). Sustainable supply chains: An introduction. Journal of operations management, 25(6), 1075-1082.

Lintukangas, K., Kähkönen, A. K., & Hallikas, J. (2019). The role of supply management innovativeness and supplier orientation in firms' sustainability performance. Journal of Purchasing and Supply Management, 25(4), 100558.

Lioliou, E., & Zimmermann, A. (2015). Vendor opportunism in IT outsourcing: a TCE and social capital perspective. Journal of Information Technology, 30(4), 307-324.

Liu, S., Huang, J. C., & Brown, G. L. (1998). Information and risk perception: A dynamic adjustment process. Risk analysis, 18(6), 689-699.

Lu, H. E., Potter, A., Sanchez Rodrigues, V., & Walker, H. (2018). Exploring sustainable supply chain management: a social network perspective. Supply Chain Management: An International Journal, 23(4), 257-277.

Lund-Thomsen, P., & Nadvi, K. (2010). Global value chains, local collective action and corporate social responsibility: a review of empirical evidence. Business Strategy and the Environment, 19(1), 1-13.

Lund-Thomsen, P. (2020). Corporate social responsibility: A supplier-centered perspective. Environment and Planning A: Economy and Space, 52(8), 1700-1709.

Lund-Thomsen, P. (2008). The global sourcing and codes of conduct debate: Five myths and five recommendations. Development and Change, 39(6), 1005-1018.

Lusk, J. L., & Coble, K. H. (2005). Risk perceptions, risk preference, and acceptance of risky food. American Journal of Agricultural Economics, 87(2), 393-405.

MacCarthy, B. L., & Jayarathne, P. G. S. A. (2012). Sustainable collaborative supply networks in the international clothing industry: a comparative analysis of two retailers. Production Planning & Control, 23(4), 252-268.

Mancha, R., & Shankaranarayanan, G. (2021). Making a digital innovator: antecedents of innovativeness with digital technologies. Information Technology & People, 34(1), 318-335.

Mardani, A., Kannan, D., Hooker, R. E., Ozkul, S., Alrasheedi, M., & Tirkolaee, E. B. (2020). Evaluation of green and sustainable supply chain management using structural equation modelling: A systematic review of the state of the art literature and recommendations for future research. Journal of cleaner production, 249, 119383.

Marin, G., Marzucchi, A., & Zoboli, R. (2015). SMEs and barriers to Eco-innovation in the EU: exploring different firm profiles. Journal of Evolutionary Economics, 25, 671-705.

Martins, C. L., & Pato, M. V. (2019). Supply chain sustainability: A tertiary literature review. Journal of cleaner production, 225, 995-1016.

McEvily, B., & Zaheer, A. (1999). Bridging ties: A source of firm heterogeneity in competitive capabilities. Strategic management journal, 20(12), 1133-1156.

McEvily, B., & Marcus, A. (2005). Embedded ties and the acquisition of competitive capabilities. Strategic management journal, 26(11), 1033-1055.

Meixell, M. J., & Luoma, P. (2015). Stakeholder pressure in sustainable supply chain management: A systematic review. International Journal of Physical Distribution & Logistics Management.

Mkalama, B. W., Ndemo, B. E., & Maalu, J. K. (2018). The antecedents of innovativeness in small and medium manufacturing enterprises in Kenya: A critical review of literature.

Manuj, I., & Mentzer, J. T. (2008). Global supply chain risk management strategies. International Journal of Physical Distribution & Logistics Management.

Mollenkopf, D., Stolze, H., Tate, W. L., & Ueltschy, M. (2010). Green, lean, and global supply chains. International journal of physical distribution & logistics management.

Halim, M. F., Barbieri, C., Morais, D. B., Jakes, S., & Seekamp, E. (2020). Beyond economic earnings: The holistic meaning of success for women in agritourism. Sustainability, 12(12), 4907.

Moran, P. (2005). Structural vs. relational embeddedness: Social capital and managerial performance. Strategic management journal, 26(12), 1129-1151.

Sharma, S., Prakash, G., Kumar, A., Mussada, E. K., Antony, J., & Luthra, S. (2021). Analysing the relationship of adaption of green culture, innovation, green performance for achieving

sustainability: Mediating role of employee commitment. Journal of Cleaner Production, 303, 127039.

Nagel, D. M., Giunipero, L., Jung, H., Salas, J., & Hochstein, B. (2021). Purchaser perceptions of early phase supplier relationships: The role of similarity and likeability. Journal of Business Research, 128, 174-186.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. Academy of management review, 23(2), 242-266.

Nematollahi, M., & Tajbakhsh, A. (2020). Past, present, and prospective themes of sustainable agricultural supply chains: A content analysis. Journal of cleaner production, 271, 122201.

Neubert, G., Dominguez, C., & Ageron, B. (2011). Inter-organisational alignment to enhance information technology (IT) driven services innovation in a supply chain: the case of radio frequency identification (RFID). International Journal of Computer Integrated Manufacturing, 24(11), 1058-1073.

Neville, B. A., Bell, S. J., & Mengüç, B. (2005). Corporate reputation, stakeholders and the social performance-financial performance relationship. European Journal of Marketing, 39(9/10), 1184-1198.

Nilsson, F., & Göransson, M. (2021). Critical factors for the realization of sustainable supply chain innovations-Model development based on a systematic literature review. Journal of Cleaner Production, 296, 126471.

Nybakk, E., Crespell, P., Hansen, E., & Lunnan, A. (2009). Antecedents to forest owner innovativeness: An investigation of the non-timber forest products and services sector. Forest Ecology and Management, 257(2), 608-618.

Olson, D. L., & Wu, D. D. (2010). A review of enterprise risk management in supply chain. Kybernetes, 39(5), 694-706.

Pagell, M., & Wu, Z. (2009). Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. Journal of supply chain management, 45(2), 37-56.

Paillé, P., & Halilem, N. (2019). Systematic review on environmental innovativeness: A knowledge-based resource view. Journal of cleaner production, 211, 1088-1099.

Panda, T. K., Kumar, A., Jakhar, S., Luthra, S., Garza-Reyes, J. A., Kazancoglu, I., & Nayak, S. S. (2020). Social and environmental sustainability model on consumers' altruism, green purchase intention, green brand loyalty and evangelism. Journal of Cleaner production, 243, 118575.

Panigrahi, S. S., & Rao, N. S. (2018). A stakeholders' perspective on barriers to adopt sustainable practices in MSME supply chain: Issues and challenges in the textile sector. Research Journal of Textile and Apparel, 22(1), 59-76.

Park, B. I., & Glaister, K. W. (2009). Determinants of knowledge acquisition in Korean international joint ventures: A pre-and post-Asia crisis comparison. Journal of Korea Trade (JKT), 13, 51-74.

Park, K., Kremer, G. E. O., & Ma, J. (2018). A regional information-based multi-attribute and multi-objective decision-making approach for sustainable supplier selection and order allocation. Journal of cleaner production, 187, 590-604.

Pedroso, C. B., Tate, W. L., da Silva, A. L., & Carpinetti, L. C. R. (2021). Supplier development adoption: A conceptual model for triple bottom line (TBL) outcomes. Journal of Cleaner Production, 314, 127886.

Peng, B., Tu, Y., & Wei, G. (2018). Governance of electronic waste recycling based on social capital embeddedness theory. Journal of Cleaner Production, 187, 29-36.

Pennings, J. M., & Wansink, B. (2004). Channel contract behavior: The role of risk attitudes, risk perceptions, and channel members' market structures. The journal of business, 77(4), 697-724.

Pereira, M. M. O., Silva, M. E., & Hendry, L. C. (2021). Supply chain sustainability learning: the COVID-19 impact on emerging economy suppliers. Supply Chain Management: An International Journal, 26(6), 715-736.

Pohlmann, C. R., Scavarda, A. J., Alves, M. B., & Korzenowski, A. L. (2020). The role of the focal company in sustainable development goals: A Brazilian food poultry supply chain case study. Journal of Cleaner Production, 245, 118798.

Polanyi, K. (1944). 2001. The great transformation: The political and economic origins of our time, 2.

Qiao, J., Li, S., & Capaldo, A. (2022). Green supply chain management, supplier environmental commitment, and the roles of supplier perceived relationship attractiveness and justice. A moderated moderation analysis. Business Strategy and the Environment, 31(7), 3523-3541.

Qiu, Y., Colson, G., & Grebitus, C. (2014). Risk preferences and purchase of energy-efficient technologies in the residential sector. Ecological Economics, 107, 216-229.

Quiroga-Calderón, L. M., Mejía-Salazar, I. S., Moreno-Mantilla, C. E., & Loaiza-Ramírez, J. P. (2018). Integration with secondary stakeholders and its relationship with sustainable supply chain practices in Colombian SMES. European Journal of Sustainable Development, 7(4), 131-131.

Radziwon, A., & Bogers, M. (2019). Open innovation in SMEs: Exploring inter-organizational relationships in an ecosystem. Technological Forecasting and Social Change, 146, 573-587.

Rafiq, M., Akbar, A., Maqbool, S., Sokolová, M., Haider, S. A., Naz, S., & Danish, S. M. (2022). Corporate risk tolerance and acceptability towards sustainable energy transition. Energies, 15(2), 459.

Raj, A., Biswas, I., & Srivastava, S. K. (2018). Designing supply contracts for the sustainable supply chain using game theory. Journal of cleaner production, 185, 275-284.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance?. International journal of operations & production management.

Rawlins, B. L. (2006). Prioritizing stakeholders for public relations. Institute for public relations, 1, 14.

Rebs, T., Brandenburg, M., Seuring, S., & Stohler, M. (2018). Stakeholder influences and risks in sustainable supply chain management: a comparison of qualitative and quantitative studies. Business Research, 11, 197-237.

Rentizelas, A., de Sousa Jabbour, A. B. L., Al Balushi, A. D., & Tuni, A. (2020). Social sustainability in the oil and gas industry: institutional pressure and the management of sustainable supply chains. Annals of Operations Research, 290, 279-300.

Roszkowski, M. J., Snelbecker, G. E., & Leimberg, S. R. (1993). Risk tolerance and risk aversion. The tools and techniques of financial planning, 4(1), 213-225.

Rowley, T., Behrens, D., & Krackhardt, D. (2000). Redundant governance structures: An analysis of structural and relational embeddedness in the steel and semiconductor industries. Strategic management journal, 21(3), 369-386.

Saeed, M. A., & Kersten, W. (2019). Drivers of sustainable supply chain management: Identification and classification. Sustainability, 11(4), 1137.

Saeed, M. A., & Kersten, W. (2020). Sustainability performance assessment framework: a cross-industry multiple case study. International Journal of Sustainable Development & World Ecology, 27(6), 496-514.

Sajjad, A., Eweje, G., & Tappin, D. (2015). Sustainable supply chain management: motivators and barriers. Business Strategy and the Environment, 24(7), 643-655.

Samvedi, A., Jain, V., & Chan, F. T. (2013). Quantifying risks in a supply chain through integration of fuzzy AHP and fuzzy TOPSIS. International Journal of Production Research, 51(8), 2433-2442.

Sancha, C., Gimenez, C., Sierra, V., & Kazeminia, A. (2015). Does implementing social supplier development practices pay off?. Supply Chain Management: An International Journal, 20(4), 389-403.

Santos, A., Carvalho, A., Barbosa-Póvoa, A. P., Marques, A., & Amorim, P. (2019). Assessment and optimization of sustainable forest wood supply chains–A systematic literature review. Forest Policy and Economics, 105, 112-135.

Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B. (2010). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. Journal of operations Management, 28(2), 163-176.

Sauer, P. C., & Seuring, S. (2018). A three-dimensional framework for multi-tier sustainable supply chain management. Supply Chain Management: An International Journal, 23(6), 560-572.

Sayed, M., Hendry, L. C., & Zorzini Bell, M. (2017). Institutional complexity and sustainable supply chain management practices. Supply Chain Management: An International Journal, 22(6), 542-563.

Schumpeter, J. A. (1934). Change and the Entrepreneur. Essays of JA Schumpeter, 4(23), 45-91.

Schweitzer, M. E., & Cachon, G. P. (2000). Decision bias in the newsvendor problem with a known demand distribution: Experimental evidence. Management science, 46(3), 404-420.

Sebaka, L., & Zhao, S. (2022). Internal organizational networks and green innovation performance in Chinese new ventures: The roles of corporate proactive environmental strategy and the regulatory quality. European Journal of Innovation Management, (ahead-of-print).

Seuring, S., & Müller, M. (2008). Core issues in sustainable supply chain management–a Delphi study. Business strategy and the environment, 17(8), 455-466.

Seuring, S., Aman, S., Hettiarachchi, B. D., de Lima, F. A., Schilling, L., & Sudusinghe, J. I. (2022). Reflecting on theory development in sustainable supply chain management. Cleaner Logistics and Supply Chain, 3, 100016.

Shafiq, A., Johnson, P. F., Klassen, R. D., & Awaysheh, A. (2017). Exploring the implications of supply risk on sustainability performance. International Journal of Operations & Production Management.

Shrivastava, P. (1995). Environmental technologies and competitive advantage. Strategic management journal, 16(S1), 183-200.

Siems, E., & Seuring, S. (2021). Stakeholder management in sustainable supply chains: A case study of the bioenergy industry. Business Strategy and the Environment, 30(7), 3105-3119.

Song, M., & Thieme, J. (2009). The role of suppliers in market intelligence gathering for radical and incremental innovation. Journal of Product Innovation Management, 26(1), 43-57.

Spence, L., & Bourlakis, M. (2009). The evolution from corporate social responsibility to supply chain responsibility: the case of Waitrose. Supply Chain Management: An International Journal, 14(4), 291-302.

Starik, M. (1995). Should trees have managerial standing? Toward stakeholder status for non-human nature. Journal of business ethics, 14, 207-217.

De Stefano, M. C., & Montes-Sancho, M. J. (2018). Supply chain environmental R&D cooperation and product performance: Exploring the network dynamics of positional embeddedness. Journal of Purchasing and Supply Management, 24(4), 288-303.

Stekelorum, R. (2020). The roles of SMEs in implementing CSR in supply chains: a systematic literature review. International Journal of Logistics Research and Applications, 23(3), 228-253.

Steurer, R., Langer, M. E., Konrad, A., & Martinuzzi, A. (2005). Corporations, stakeholders and sustainable development I: a theoretical exploration of business–society relations. Journal of business ethics, 61, 263-281.

Stolze, H. J., Mollenkopf, D. A., Thornton, L., Brusco, M. J., & Flint, D. J. (2018). Supply chain and marketing integration: Tension in frontline social networks. Journal of Supply Chain Management, 54(3), 3-21.

Swierczek, A. (2019). Manufacturer structural embeddedness and the network rent: the intervening role of relational embeddedness in the triadic supply chains. Supply Chain Management: An International Journal.

Tan, C. L., Zailani, S. H. M., Tan, S. C., & Shaharudin, M. R. (2016). The impact of green supply chain management practices on firm competitiveness. International Journal of Business Innovation and Research, 11(4), 539-558.

Tate, W. L., Ellram, L. M., & Gölgeci, I. (2013). Diffusion of environmental business practices: A network approach. Journal of Purchasing and Supply Management, 19(4), 264-275.

Tsai, M. C., Liao, C. H., & Han, C. S. (2008). Risk perception on logistics outsourcing of retail chains: model development and empirical verification in Taiwan. Supply Chain Management: An International Journal, 13(6), 415-424.

Tebaldi, L., Bigliardi, B., & Bottani, E. (2018). Sustainable supply chain and innovation: A review of the recent literature. Sustainability, 10(11), 3946.

Terpend, R., Krause, D. R., & Dooley, K. J. (2011). Managing buyer–supplier relationships: empirical patterns of strategy formulation in industrial purchasing. Journal of Supply Chain Management, 47(1), 73-94.

Carson, R. (2009). Silent spring. 1962.

Thomas, R., Darby, J. L., Dobrzykowski, D., & van Hoek, R. (2021). Decomposing social sustainability: signaling theory insights into supplier selection decisions. Journal of Supply Chain Management, 57(4), 117-136.

Thurmond, V. A. (2001). The point of triangulation. Journal of nursing scholarship, 33(3), 253-258.

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Tipu, S. A. A., & Fantazy, K. (2021). Linking knowledge development with sustainable supply chain performance: mediating effects of innovativeness, proactiveness and risk taking. International Journal of Productivity and Performance Management, (ahead-of-print).

Tiwana, A. (2008). Do bridging ties complement strong ties? An empirical examination of alliance ambidexterity. Strategic management journal, 29(3), 251-272.

Todaro, N. M., Testa, F., Daddi, T., & Iraldo, F. (2021). The influence of managers' awareness of climate change, perceived climate risk exposure and risk tolerance on the adoption of corporate responses to climate change. Business Strategy and the Environment, 30(2), 1232-1248.

Touboulic, A., & Walker, H. (2015). Theories in sustainable supply chain management: a structured literature review. International journal of physical distribution & logistics management, 45(1/2), 16-42.

Phythian, J., Tucker, J., Comber, T., Armstrong, B., & Pervan, S. (2014). Retired Australian's use of information technology: a preliminary study. The International Technology Management Review, 4(1), 58-67.

Hofenk, D., Pennings, J. M., & Trujillo-Barrera, A. (2014). Understanding Producers' Motives for Adopting Sustainable Practices: The Role of Expected Rewards, Risk Perception, and Risk Tolerance (No. 329-2016-13241).

Trujillo-Barrera, A., Pennings, J. M., & Hofenk, D. (2016). Understanding producers' motives for adopting sustainable practices: the role of expected rewards, risk perception and risk tolerance. European Review of Agricultural Economics, 43(3), 359-382.

Tseng, M. L., Ha, H. M., Lim, M. K., Wu, K. J., & Iranmanesh, M. (2022). Sustainable supply chain management in stakeholders: supporting from sustainable supply and process management in the healthcare industry in Vietnam. International Journal of Logistics Research and Applications, 25(4-5), 364-383.

Tseng, M., Lim, M., & Wong, W. P. (2015). Sustainable supply chain management: A closed-loop network hierarchical approach. Industrial Management & Data Systems, 115(3), 436-461.

Tukamuhabwa, B., Stevenson, M., & Busby, J. (2017). Supply chain resilience in a developing country context: a case study on the interconnectedness of threats, strategies and outcomes. Supply Chain Management: An International Journal.

Uzzi, B. (1996). The sources and consequences of embeddedness for the economic performance of organizations: The network effect. American sociological review, 674-698.

Uzzi, B., & Lancaster, R. (2003). Relational embeddedness and learning: The case of bank loan managers and their clients. Management science, 49(4), 383-399.

Vachon, S., & Klassen, R. D. (2007). Supply chain management and environmental technologies: the role of integration. International journal of production research, 45(2), 401-423.

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. International journal of production economics, 111(2), 299-315.

Vanalle, R. M., Ganga, G. M. D., Godinho Filho, M., & Lucato, W. C. (2017). Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. Journal of cleaner production, 151, 250-259.

Vedel, M., & Ellegaard, C. (2013). Supply risk management functions of sourcing intermediaries: an investigation of the clothing industry. Supply chain management: An international journal, 18(5), 509-522.

Villena, V. H., & Gioia, D. A. (2020). A more sustainable supply chain. Harvard Business Review, 98(2), 84-93.

Walker, D. H., & Bourne, L. (2007). Stakeholders and the supply chain. In Procurement Systems (pp. 94-124). Routledge.

Wang, C. L., & Ahmed, P. K. (2004). The development and validation of the organisational innovativeness construct using confirmatory factor analysis. European journal of innovation management, 7(4), 303-313.

Wang, Z., & Sarkis, J. (2013). Investigating the relationship of sustainable supply chain management with corporate financial performance. International Journal of Productivity and Performance Management, 62(8), 871-888.

Wang, C. X., & Webster, S. (2007). Channel coordination for a supply chain with a risk-neutral manufacturer and a loss-averse retailer. Decision Sciences, 38(3), 361-389.

Wang, C., Zhang, Q., & Zhang, W. (2020). Corporate social responsibility, Green supply chain management and firm performance: The moderating role of big-data analytics capability. Research in Transportation Business & Management, 37, 100557.

Wang, X., Zheng, Y., Jiang, Z., & Tao, Z. (2021). Influence mechanism of subsidy policy on household photovoltaic purchase intention under an urban-rural divide in China. Energy, 220, 119750.

Wiengarten, F., Pagell, M., & Fynes, B. (2013). ISO 14000 certification and investments in environmental supply chain management practices: identifying differences in motivation and adoption levels between Western European and North American companies. Journal of Cleaner Production, 56, 18-28.

Windrum, P., & García-Goñi, M. (2008). A neo-Schumpeterian model of health services innovation. Research policy, 37(4), 649-672.

Winter, M., & Knemeyer, A. M. (2013). Exploring the integration of sustainability and supply chain management: Current state and opportunities for future inquiry. International journal of physical distribution & logistics management, 43(1), 18-38.

Wolf, J. (2011). Sustainable supply chain management integration: a qualitative analysis of the German manufacturing industry. Journal of business ethics, 102, 221-235.

Wu, Z., & Pullman, M. E. (2015). Cultural embeddedness in supply networks. Journal of Operations Management, 37, 45-58.

Xiao, C., Wilhelm, M., van der Vaart, T., & Van Donk, D. P. (2019). Inside the buying firm: Exploring responses to paradoxical tensions in sustainable supply chain management. Journal of Supply Chain Management, 55(1), 3-20.

Xie, G., Yue, W., Wang, S., & Lai, K. K. (2011). Quality investment and price decision in a risk-averse supply chain. European Journal of Operational Research, 214(2), 403-410.

Xu, G., Dan, B., Zhang, X., & Liu, C. (2014). Coordinating a dual-channel supply chain with risk-averse under a two-way revenue sharing contract. International Journal of Production Economics, 147, 171-179.

Yadlapalli, A., Rahman, S., & Gunasekaran, A. (2018). Socially responsible governance mechanisms for manufacturing firms in apparel supply chains. International Journal of Production Economics, 196, 135-149.

Jiang, R. M., Zheng, Y. J., Zhou, L., Feng, L. Z., Ma, L., Xu, B. P., ... & Shen, K. L. (2022). Diagnosis, treatment, and prevention of monkeypox in children: an experts' consensus statement. World Journal of Pediatrics, 1-12.

Yawar, S. A., & Seuring, S. (2018). The role of supplier development in managing social and societal issues in supply chains. Journal of cleaner production, 182, 227-237.

Younis, H., Sundarakani, B., & Vel, P. (2016). The impact of implementing green supply chain management practices on corporate performance. Competitiveness Review.

Yun, G., Yalcin, M. G., Hales, D. N., & Kwon, H. Y. (2019). Interactions in sustainable supply chain management: a framework review. The International Journal of Logistics Management, 30(1), 140-173.

Zhao, Y., & Hou, R. (2021). Should a supplier engage in the marketplace? an equilibrium analysis in a hybrid-format supply chain. RAIRO-Operations Research, 55(5), 2639-2655.

Zhou, M., Govindan, K., & Xie, X. (2020). How fairness perceptions, embeddedness, and knowledge sharing drive green innovation in sustainable supply chains: An equity theory and network perspective to achieve sustainable development goals. Journal of Cleaner Production, 260, 120950.

Zhu, Q., & Sarkis, J. (2006). An inter-sectoral comparison of green supply chain management in China: drivers and practices. Journal of cleaner production, 14(5), 472-486.

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. Journal of operations management, 22(3), 265-289.

Zhu, Q., Sarkis, J., & Lai, K. H. (2008). Green supply chain management implications for "closing the loop". Transportation Research Part E: Logistics and Transportation Review, 44(1), 1-18.

Ziegler, A. (2015). On the relevance of ideological identification and environmental values for beliefs and attitudes toward climate change: An empirical cross country analysis (No. 16-2015). MAGKS Joint Discussion Paper Series in Economics.

Zsidisin, G. A., & Hartley, J. L. (2012). A strategy for managing commodity price risk. Supply Chain Management Review, 16(2).

Zuraidah Raja Mohd Rasi, R., Abdekhodaee, A., & Nagarajah, R. (2014). Stakeholders' involvements in the implementation of proactive environmental practices: Linking environmental practices and environmental performances in SMEs. Management of Environmental Quality: An International Journal, 25(2), 132-149.

BIOGRAPHICAL SKETCH

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