

Improving the Environmental Sustainability Performance of Key Suppliers: A Mixed-method Case Study in the Semiconductor Industry

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ABSTRACT

In response to rising pressures, manufacturing industries are increasingly adopting environmental sustainability as a corporate goal. The rise in globalization and outsourcing magnifies the reliance on suppliers to achieve such sustainability objectives. Therefore, the PSM function is tasked with influencing suppliers to become more environmentally sustainable. However, research in the field of PSM tends to focus on the consequences of influencing suppliers rather than the underlying motives guiding suppliers to improve their sustainability performance. That is while an understanding of the relationship between buyer influence and supplier motives can help predict the effectiveness of buyer influence. To bridge this gap, a mixed-methods case study was conducted in the semiconductor industry, providing qualitative and quantitative insights on environmental sustainability in buyer-supplier relationships. The findings show that instrumental, moral, and relational supplier motives for environmental sustainability positively impact the effectiveness of mediated and non-mediated buyer influence. Additionally, it was found that supplier dependence and environmental impact can predict the effectiveness of buyer influence. These findings enrich, nuance, and support current sustainable PSM research, and provide practical implications for advancing environmental sustainability through PSM.

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation/Acronym	Meaning
AI	artificial intelligence
AMER	Americas
APAC	Asia-Pacific
A&T	assembly & test
AVE	average variance extracted
CH ₄	methane
CO ₂	carbon dioxide
CSDD	Corporate Sustainability Due Diligence
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
EMEA	Europe, Middle East & Africa
ESG	Environmental, Social, Governance
FE	front end
GHG(s)	greenhouse gas(es)
HFCs	hydrofluorocarbons
HTMT	heterotrait-monotrait
ISO	International Organization for Standardization
LM	linear (regression) model
MANOVA	multivariate analysis of variance
MCAR	missing completely at random
N ₂ O	nitrous oxide
NDCs	nationally determined contributions
NGOs	non-government organizations
OEMs	original equipment manufacturers
OSAT	outsourced assembly & test
PFCs	perfluorocarbons
PLS	partial least squares
PSM	Purchasing and Supply Management
RBV	resource-based view
RDT	Resource Dependence Theory
RMSE	root mean squared error
SBTi	Science Based Targets initiative
SDGs	Sustainable Development Goals
SEM	structural equation modeling
SET	Social Exchange Theory
SF ₆	sulfur hexafluoride
Subcon	subcontractor
TBL	triple bottom line
UN	United Nations
VIF	variance inflation factor
VRIN	valuable, rare, inimitable, and non-substitutable

1. INTRODUCTION

Supply Chain Collaboration is the Key to Making the Chip Industry More Sustainable

— Main Takeaway from SEMICON Europa 2022 ([Melvin, 2023, p. 1](#))

In recent decades, manufacturing industries have experienced increasing external pressures to reduce their environmental footprints, including greenhouse gas emissions, energy- and water consumption, and waste generation ([Giannakis et al., 2020, p. 5](#); [Grimm et al., 2014, p. 159](#); [Jia et al., 2021, p. 1633](#)). In response, more and more firms acknowledge their impact on the environment and the broader consequences of climate change if action is not taken. Respectively, these firms have adopted environmental sustainability in their corporate strategy ([Difrancesco et al., 2022, p. 604](#); [Monczka & Petersen, 2012, pp. 16, 17](#); [T. Wu et al., 2014, pp. 220, 221](#)). Extant literature widely agrees that commitments must be operationalized within companies and along the supply chain to significantly improve environmental sustainability performance ([Difrancesco et al., 2022, p. 604](#); [Govindan et al., 2016, p. 1813](#); [Koberg & Longoni, 2019, p. 1085](#); [Villena & Gioia, 2018, p. 65](#); [Wohlgezogen et al., 2021, p. 435](#)). This consensus stems from recognizing that upstream and downstream environmental impacts transcend beyond organizational boundaries ([Arora et al., 2020, p. 712](#)). So, more recently there has been further recognition of the reliance on suppliers to achieve strategic sustainability objectives ([Difrancesco et al., 2022, p. 604](#); [Krause et al., 2009, p. 18](#); [Miemczyk et al., 2012, p. 478](#)). The dependence on suppliers for sustainability is magnified by the upward trend of (1) globalization of supply bases and (2) outsourcing (parts of) production ([Foerstl et al., 2010, pp. 118, 119](#); [Kitsis & Chen, 2020, p. 326](#)). Consequently, the Purchasing and Supply Management (PSM) function faces the challenge of influencing suppliers to improve their environmental sustainability performance in alignment with corporate objectives ([Gimenez & Tachizawa, 2012, p. 537](#); [Murfield & Tate, 2017, p. 1319](#)).

However, sustainable PSM research tends to focus on the consequences of influencing suppliers rather than the underlying motives guiding suppliers to improve their sustainability performance ([Paulraj et al., 2017, p. 239](#)). As a result, little is known about the relationship between buyer influence and the motives that drive suppliers to become more environmentally sustainable. That is while an understanding of the relationship between buyer influence and supplier motives can help predict the effectiveness of buyer influence ([Kitsis & Chen, 2020, p. 326](#); [Vanpoucke et al., 2016, p. 733](#)). Within PSM literature, scholars commonly distinguish between mediated and non-mediated buyer influence ([Vos et al., 2021, p. 3](#)), and instrumental, moral, and relational supplier motives for environmental sustainability ([Baliga et al., 2020, p. 351](#)). Prior research has separately investigated how mediated and non-mediated buyer influence affect consequences such as supplier satisfaction, collaboration, adaptation, integration, and performance ([Benton & Maloni, 2005, p. 6](#); [Maloni & Benton, 2000, p. 57](#); [Nyaga et al., 2013, p. 45](#); [Terpend & Ashenbaum, 2012, p. 58](#); [Zhao et al., 2008, p. 375](#)), and how instrumental, moral, and relational supplier motives affect environmental sustainability performance and the adoption of sustainable practices ([Kitsis & Chen, 2020, p. 327](#); [Paulraj et al., 2017, p. 243](#)). What is missing in PSM literature is a holistic study that examines the impact of instrumental, moral, and relational supplier motives on the effectiveness of mediated and non-mediated buyer influence. Therefore, this study aims to bridge this gap by investigating the following research question:

How do supplier motives for environmental sustainability impact the effectiveness of buyer influence?

To explore this research question, a mixed-methods case study is conducted, integrating quantitative insights from a supplier survey with qualitative insights from expert interviews on the buyer's side. By combining empirical insights from both ends of the dyad this study provides a more holistic perspective on environmental sustainability in buyer-supplier relationships ([Brennan & Turnbull, 1999, p. 482](#); [Murfield & Tate, 2017, p. 1341](#); [Wilson, 1996, p. 9](#)). A case study approach was chosen because (1) it is well-suited for investigating complex phenomena through multiple sources and methods of data collection ([Crane, 1999, p. 240](#); [Eisenhardt, 1989, pp. 534, 535](#); [Foerstl et al., 2010, p. 121](#)), and (2) academic research in the field of PSM has not kept pace with industry practice regarding environmental sustainability ([Arora et al., 2020, p. 720](#); [Panigrahi et al., 2019, p. 27](#); [Schoenherr et al., 2012, p. 4565](#); [Stange et al., 2022, p. 1](#)). The case study is conducted in the semiconductor industry due to its (1) substantial contributions to global environmental impacts ([Villard et al., 2015, p. 108](#)), and (2) complexity, illustrating how outsourcing and offshoring trends increase the dependence on suppliers for environmental sustainability ([Gopal et al., 2022, p. 310](#)). Specifically, a globally operating and sourcing semiconductor manufacturer and its key suppliers are chosen because of their pivotal role in achieving environmental sustainability along the supply chain ([Bartos et al., 2022, p. 3](#); [Lee et al., 2014, p. 49](#)).

The findings of this study enrich current sustainable PSM research by showing how instrumental, moral, and relational supplier motives positively predict the effectiveness of both mediated and non-mediated buyer influence. Additionally, the findings support resource-dependency research, indicating that supplier dependence positively impacts the effectiveness of buyer influence up to the point that it negatively impacts the supplier's ability to improve its environmental sustainability performance ([Z. Zhang et al., 2021, p. 4](#)). Furthermore, this study provides a more nuanced understanding of supplier environmental sustainability performance by demonstrating that it is not only an outcome of buyer influence but that it can also inform buyer influence in the context of sustainable PSM. In addition, this study aligns with prior research by affirming the practical distinction between mediated and non-mediated buyer influence through expert validation ([Maloni & Benton, 2000, p. 54](#)). While previous research argues that buyer influence is mainly mediated and, therefore, tends to focus on mediated buyer influence, the findings of this study highlight the significance of non-mediated buyer influence in the context of sustainable PSM. Finally, this study broadens the theoretical frame within sustainable PSM research by introducing constructs for buyer influence strategy effectiveness that may inform future empirical investigation ([Panigrahi et al., 2019, p. 27](#)).

Furthermore, this study aims to contribute to the advancement of environmental sustainability through the PSM function. First, by considering financial, relational, and environmental facets within buyer-supplier relationships, this study guides PSM professionals to strategically focus efforts. Second, the findings inform PSM professionals on how supplier-specific traits – instrumental, moral, and relational supplier motives, supplier dependence, and supplier environmental impact – can affect the effectiveness of mediated and non-mediated buyer influence strategies. Regarding the use of mediated influence, PSM professionals are not only recommended to consider its expected effectiveness based on supplier-specific traits but also to weigh their implications for other sourcing objectives. Moreover, it is recommended to integrate multiple sources of non-mediated influence and leverage the complementary competences of PSM and sustainability professionals to increase the effectiveness of a supplier engagement strategy for environmental sustainability.

The following section presents an integrative review of extant literature to examine to what extent the current stream of research can provide resolutions to the research question. Based on the literature review, a conceptual framework with hypotheses is retrieved that guides this study. In the subsequent chapter, the methodology and results of this study are outlined. Next, the results are discussed, providing an answer to the research question and implications for research and practice. Finally, the study concludes with recommendations for future research based on the limitations.

2. THEORETICAL BACKGROUND: ADVANCING SUSTAINABILITY THROUGH PURCHASING AND SUPPLY MANAGEMENT

Performing a comprehensive literature review is crucial as it forms the cornerstone of a solid theoretical framework. This study employs an integrative literature review approach to develop a common conceptual understanding of the study's constructs by synthesizing existing research ([Torraco, 2005, p. 363](#)). Besides establishing a common understanding of the constructs, this synthesis contributes to the knowledge in the field of sustainable PSM through the emergence of new theoretical frameworks ([Snyder, 2019, p. 335](#); [Torraco, 2005, p. 362](#)). The review starts with a general introduction to environmental sustainability and the role of PSM in achieving it. Next, the importance and practice of supplier prioritization are discussed. Then, the main constructs, i.e. buyer influence and supplier motives are defined. Subsequently, possible contingency factors to become more environmentally sustainable are discussed from both the buyer's and suppliers' perspectives. Finally, a conceptual model with hypotheses is presented that guides the rest of this study.

2.1. Purchasing and supply management as the gatekeeper for achieving sustainability: Concepts and practice

2.1.1. Defining sustainability: Triple bottom line in purchasing and supply management

On a macro-level, the United Nations (UN) broadly defined sustainability as meeting “the needs of the present without compromising the ability of future generations to meet their own needs.” ([World Commission on Environment & Development, 1987, p. 8](#)). However, around the mid-1990s, this definition was commonly criticized for being “sufficiently vague”, i.e. ambiguous enough to allow consensus but lacking much substance ([Daly, 1996, p. 3](#); [Purvis et al., 2019, p. 685](#)). To make sustainability more specific, [Elkington \(1998, p. 20\)](#) introduced the “triple bottom line” (TBL) concept, which considers that the environment, society, and the economy should be sustained for future generations. [Purvis et al. \(2019, p. 692\)](#) highlight that early literature considered the three elements as distinct perspectives. Since then, sustainability has evolved towards more systematic approaches. For example, [Raworth \(2017, pp. 43-45\)](#) presents a visual 21st-century compass for humans to thrive (see [Figure 1](#)). It suggests that a sustainable world provides for people's needs (e.g. food, education, and housing) without going beyond the planet's boundaries (e.g. climate change, ocean acidification, and chemical pollution). So, built on the social foundation and below the environmental ceiling lies the safe space for the economy to thrive.

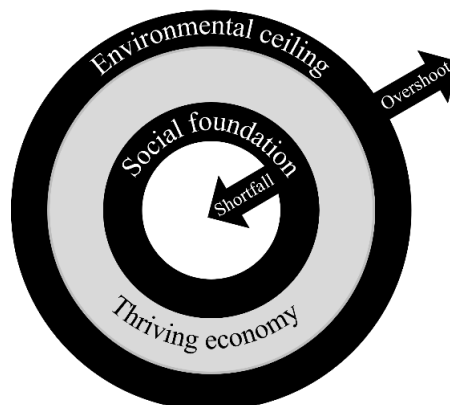


Figure 1. The Doughnut Economy
Adapted from: [Raworth \(2017, p. 44\)](#)

On a micro-level, the TBL allows for economic, environmental, and social impacts and objectives to be considered by individual actors ([Carter & Rogers, 2008, p. 364](#)). This enabled sustainability to increasingly be adopted as a corporate goal by businesses and as a research topic by scholars since around the beginning of the 21st century. Often, the elements are depicted as three intersecting circles ([e.g. Carter & Rogers, 2008, p. 365](#); [Purvis et al., 2019, p. 682](#)). This representation of the TBL suggests that organizational activities can be sustainable for one, two, or three elements (see [Figure 2](#)). So, it implies that organizations can achieve sustainability by balancing their performance at the intersection of all three elements ([Carter & Rogers, 2008, pp. 364, 365](#)). The responsibility of organizations to balance performance between the elements is referred to as Corporate Social Responsibility (CSR), which is often evaluated by quantitative Environmental, Social, and Governance (ESG) performance metrics ([Clément et al., 2023, p. 2](#)).

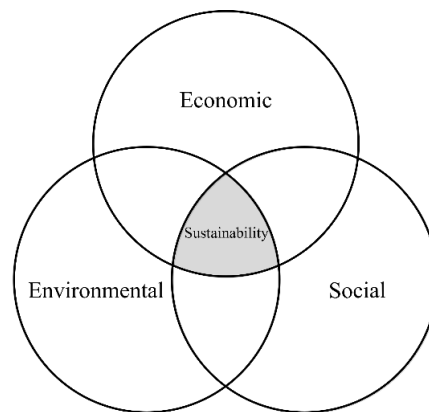


Figure 2. The Sustainable Plectrum

Adapted from: [Carter and Rogers \(2008, p. 365\)](#)

Firms have heterogeneous strategies for CSR and ESG because they have different impacts along the elements, face different external pressures, and hold different internal motivations to become more sustainable ([Adesanya et al., 2020, p. 325](#); [Hyatt & Berente, 2017, p. 1212](#)). Given the heterogeneity of sustainability strategies, sustainability management is divided into two dimensions: substantive and symbolic ([Ashforth & Gibbs, 1990, p. 178](#); [Hyatt & Berente, 2017, p. 1213](#); [Ma et al., 2022, p. 2](#)). Substantive sustainability management includes the commitment to proactively improve the organization’s sustainability performance and requires integral changes in the firm ([Hyatt & Berente, 2017, p. 1213](#); [Ma et al., 2022, p. 2](#); [Sharma & Henriques, 2005, p. 169](#)). Conversely, symbolic sustainability management is characterized by reactive compliance to convey sustainability-related information to stakeholders aimed at protecting the organization’s reputation ([Boiral, 2007, p. 127](#); [Hyatt & Berente, 2017, p. 1213](#); [Lim & Tsutsui, 2012, p. 74](#); [Rodrigue et al., 2013, p. 111](#)). As the aim of this research is the improvement, instead of only the reporting, of sustainability performance, the focus is on substantive sustainability.

Nevertheless, research has come to agree that substantive sustainability (macro-level) can only be achieved by improving sustainability performance within firms (micro-level) as well as along the supply chains (meso-level) ([Difrancesco et al., 2022, p. 604](#); [Villena & Gioia, 2018, p. 65](#)). This is because it is evident that environmental, social, and economic impacts transcend organizational boundaries and extend across entire supply chains, both upstream and downstream ([Arora et al., 2020, pp. 711, 712](#)). Therefore, firms rely on their suppliers for their products and services to be sustainably sourced and produced upstream, and firms rely on their

customers for their products and services to be sustainably sold and used downstream. However, the dependence on suppliers is greater than the dependence on customers, which can be explained by (1) supply chain position differences, and (2) outsourcing and offshoring trends.

First, so-called “chain liability” – i.e. stakeholders attributing responsibility for unsustainable practices to the focal firm ([Hartmann & Moeller, 2014, p. 282](#)) – is higher downstream than upstream. That is because downstream firms (brand companies) are relatively more visible to stakeholders than upstream firms (raw material suppliers) due to their perceived closeness to individual end-consumers, brand recognition, and the general presence of their products ([Brammer & Millington, 2006, pp. 8, 9](#); [Chiu & Sharfman, 2011, p. 1564](#); [M. Lo, 2014, p. 93](#); [Schmidt et al., 2017, p. 8](#)). In addition, downstream firms tend to face greater demand uncertainty due to their increased risk of reputational damage, which is a consequence of their relatively greater visibility ([M. Lo, 2014, p. 109](#)). On the other hand, upstream firms face lower reputational risk owing to their lower visibility. Additionally, upstream firms’ demand uncertainty is generally lower as their revenue streams are usually diversified among multiple corporate customers from various industries ([Schmidt et al., 2017, p. 8](#)). As a result of the greater reputational risk, downstream firms are more internally driven to operationalize sustainability along their supply chain, which in that case is upstream ([M. Lo, 2014, p. 93](#); [Schmidt et al., 2017, p. 20](#)). The idea that sustainability is pulled through supply chains by customer demand instead of pushed through by suppliers seems to be widely supported (see [Elkington, 1998, p. 106](#); [Giunipero et al., 2012, p. 261](#); [Hariyani et al., 2023, p. 8](#); [Lee et al., 2014, p. 39](#); [Min & Choi, 2020, pp. 9, 10](#); [Murfield & Tate, 2017, p. 1329](#)).

Second, supplier dependency on sustainability is further magnified by the transfer of environmental and social impacts to suppliers as a consequence of the rise in outsourcing and offshoring ([Foerstl et al., 2010, pp. 118, 119](#); [Kitsis & Chen, 2020, p. 326](#)). Global outsourcing, i.e. sourcing goods that traditionally were provided in-house from a global supply base, has shifted manufacturing jobs and emissions to emerging countries ([Eggert & Hartmann, 2021, p. 2](#); [Hsu et al., 2016, p. 86](#); [O'Rourke, 2005, pp. 121, 122](#)). As a result, companies have become more sensitive to the sustainability performance of their suppliers from developing countries ([Hwang et al., 2016, p. 9](#)). That is while suppliers from emerging countries can impose a higher risk of non-compliance with Western sustainability standards (e.g. in terms of human rights and environmental hazards) ([Coşkun et al., 2022, p. 4](#); [Reuter et al., 2010, p. 57](#)). On the other hand, global sourcing has the potential to promote sustainable activities in emerging countries through the supply chain ([Gualandris et al., 2014, p. 268](#); [Jiang et al., 2020, p. 36](#)). So, to prevent environmental and social sustainability risks and costs from being externalized to suppliers and creating a weak link in the chain, firms should strive for active supply base management ([Foerstl et al., 2010, pp. 118, 119](#); [Villena & Gioia, 2018](#)). In turn, the responsibility to manage the external supply base per sustainability objectives is introduced to PSM professionals ([Schulze & Bals, 2020, p. 2](#)). Sustainable PSM is therefore defined in this study as:

The consideration of economic, environmental, and social elements in the supply of external resources – products, services, capabilities, and knowledge – that are essential for running, maintaining, and managing the primary processes of a firm, in such a way that it contributes to people, profit and the planet.

Adapted from: [Lintukangas et al. \(2019, p. 3\)](#); [Miemczyk et al. \(2012, p. 489\)](#); [Schulze and Bals \(2020, p. 3\)](#); [Weele \(2010, p. 8\)](#)

It is challenging to span the boundaries of the firm and enforce sustainability to suppliers in the upstream of the supply chain ([Lintukangas et al., 2019, p. 4](#)). In that regard, [Hoffman and Bazerman \(2005, p. 16\)](#) argue that it is key for firms to acknowledge that environmental sustainability practices are sometimes profit-compatible and sometimes not. It is suggested that with this recognition it becomes easier to convince suppliers to adopt environmental sustainability practices that are mutually beneficial. [Miemczyk and Luzzini \(2019, p. 252\)](#) found that firms have moved beyond this recognition and that both environmental and social sustainability performance can be improved without compromising on economic performance. That is because it suggested that environmental and social sustainability practices have a positive effect on firm performance when combined with risk assessment and mitigation practices. Failing to address environmental and social risks may lead to reputational damage or supply disruptions, which can negatively affect firm performance along all three elements of sustainability ([H. Hofmann et al., 2014, p. 169](#); [K. Roehrich et al., 2014, p. 712](#); [Miemczyk & Luzzini, 2019, p. 240](#)). In addition, [Hermundsdottir and Aspelund \(2022, p. 7\)](#) found and concluded that environmental sustainability practices offer an abundance of opportunities for manufacturers in terms of value creation, cost reduction, and risk reduction to the extent that it offsets the associated investment costs of innovation. So, where earlier literature disagreed on whether the three sustainability elements represent trade-offs or mutual reinforcements ([Purvis et al., 2019, p. 692](#)), more recent literature suggests that sustainable PSM can ultimately lead to better performance in all three aspects ([Geng et al., 2017, p. 245](#)).

Additionally, research highlights PSM professionals may not have a strategic understanding of how the three aspects interrelate to achieve overall sustainability as a consequence of handling sustainability projects in isolation ([Carter & Liane, 2011, p. 47](#)). However, sustainable PSM activities can lose power when handled in conjunction because environmental, social, and economic practices have a different influence on sustainability performance depending on which element is targeted ([Miemczyk & Luzzini, 2019, p. 252](#)). Therefore, research suggests that there is no “one solution fits all” and that specific sustainable PSM activities are needed depending on the desired outcome and the dynamics at the supply chain level ([Miemczyk & Luzzini, 2019, p. 241](#); [Z. Wu & Pagell, 2011, pp. 587, 588](#)). Here it is assumed that sustainable PSM activities aimed at economic sustainability represent more or less “business as usual” because firms exist on the basis of being financially sustainable. In contrast, environmental and social sustainability will not be achieved through business as usual ([Knight et al., 2022, p. 4](#)). Social objectives often present the elimination of forced labor, child labor, and workplace injuries to combat human rights violations ([Miemczyk et al., 2012, p. 482](#)). Therefore, social sustainability tends to be operationalized along supply chains through supplier codes of conduct, supplier audits, and certification ([Marshall et al., 2015, p. 5](#); [Miemczyk & Luzzini, 2019, p. 241](#); [Sancha et al., 2015, p. 398](#)). Conversely, environmental objectives usually present the minimization of emissions, energy consumption, waste generation, and resources use to combat climate change ([Geng et al., 2017, p. 249](#)). Therefore, environmental sustainability tends to be operationalized along supply chains through collaborating with suppliers to create innovations and enhance efficiency (e.g. product redesign, process optimization, and recycling) ([Blome et al., 2014, p. 39](#); [Miemczyk & Luzzini, 2019, p. 241](#); [Tachizawa & Wong, 2015, p. 24](#)). So, whereas socially sustainable PSM is more a matter of compliance through supplier adaptation, environmentally sustainable PSM is more a matter of innovation through supplier collaboration. This can be an explanation for the observation of many scholars that the environmental element has received significantly more

attention in PSM literature than the social element ([Hermundsdottir & Aspelund, 2022, p. 2](#); [Miemczyk et al., 2012, p. 479](#); [Negri et al., 2021, p. 2860](#)). In conclusion, this study concentrates on environmental sustainability as it requires unique policies and holds various practical implications for successful collaboration with suppliers ([Miemczyk & Luzzini, 2019, p. 241](#)).

2.1.2. Realizing sustainability: Essence and practice of supplier prioritization

In 2015, the UN agreed on 17 Sustainable Development Goals (SDGs) and 169 targets for 2030 that aim to balance the three dimensions of the triple bottom line ([United Nations, 2015b, p. 5](#)). The environmental goals entail protecting marine and land life by combating climate change and its impacts through promoting sustainable consumption and production, and sustainably managing natural resources ([United Nations, 2015b, p. 18](#)). Climate change is driven by greenhouse gas (GHG) emissions which blanket the Earth and trap the sun's heat, causing global warming, which imposes multiple risks for all forms of life on Earth ([United Nations, n.d.](#)). Therefore, the UN stipulated in the Paris Agreement that limiting the global temperature increase to 1.5°C above pre-industrial levels would significantly reduce the risks and impacts of climate change ([United Nations, 2015a, p. 3](#)). Anthropogenic GHGs are those that are emitted as a result of human activities, such as burning fossil fuels, deforestation, and industrial processes. GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases; hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) ([Fu & Su, 2020, p. 757](#); [United Nations, 1998, p. 19](#)). Around 80% of anthropogenic GHGs are emitted through fossil fuels, i.e. coal, oil, and gas ([United Nations, n.d.](#)), and CO₂ accounts for around 80% of the total anthropogenic GHG emissions ([Intergovernmental Panel on Climate Change, 2014, p. 46](#)). Thus, the priority in combating climate change is a significant reduction in the use of fossil fuels and CO₂ emissions before the estimated tipping point of 1.5°C global warming in 2030 ([Intergovernmental Panel on Climate Change, 2018, p. 4](#)).

Committed to contributing to lowering anthropogenic GHG emissions, most UN member states provide domestic economy-wide numerical targets for at least CO₂ emissions reduction ([United Nations, 2022, p. 4](#)). Such climate actions are known as nationally determined contributions (NDCs). In extension to the Paris Agreement, an increasing number of nations have committed to achieving carbon neutrality (net zero emissions) by 2050 ([OECD, 2022, p. 4](#)). However, projections indicate that the current climate targets are insufficient to meet the objectives outlined in the Paris Agreement ([OECD, 2022, p. 13](#); [United Nations, 2022, p. 6](#)). Hence, realizing environmental sustainability hinges on countries raising their aspirations and ensuring the implementation of decisive climate action ([OECD, 2022, p. 16](#)). On a global average, the energy sectors emit approximately 35% of GHG emissions, agriculture, forestry, and other land use account for 24% (net emissions), 21% were released by industry, 14% by transport, and 6.4% by the building sector ([Intergovernmental Panel on Climate Change, 2014, p. 46](#)). If emissions from electricity and heat production are attributed to the end-consumers of the energy, the industry and building sectors would account for 31% and 19%, respectively. Thus, NDCs and subsequent governmental regulations put pressure on domestic industries to become more environmentally sustainable ([Fleith de Medeiros et al., 2022, p. 4](#); [Giunipero et al., 2012, p. 261](#); [Hariyani et al., 2023, p. 6](#)).

However, legal risk imposed by current and future governmental regulations is not the only form of pressure exerted on organizations. Other stakeholders – such as societal organizations (e.g. non-government organizations (NGOs) and media), finance intermediaries

(e.g. shareholders, creditors, and insurance companies), and business partners (e.g. customers, suppliers, and employees) – can affect a firm’s attitude toward environmental sustainability ([Foerstl et al., 2010, pp. 118, 119](#); [Hariyani et al., 2023, p. 7](#); [Paulraj et al., 2017, pp. 239, 240](#)). So, in addition to legal risk, a firm’s management of environmental impacts is also affected by reputational, financial, and demand risk and uncertainty ([Adesanya et al., 2020, p. 422](#); [Lam, 2018, p. 2405](#); [M. Lo, 2014, p. 109](#)). Examples of these types of risk include the Corporate Sustainability Reporting Directive (CSRD) that obliges large firms in the EU to report their sustainability performance (["Corporate Sustainability Reporting Directive \(CSRD\)," 2022](#)), Volkswagen’s “defeat devices” that were used to falsify CO₂ emission levels which led to significant reputational damage ([BBC News, 2015](#)), the proposed climate-related disclosures for investors in American stock markets ([U.S. Securities and Exchange Commission, 2022](#)), and Apple’s global supply chain decarbonization plan for 2030 ([Apple Inc., 2022](#)).

As introduced, firms facing external pressures (e.g. Apple) may be held responsible for their supply chain and transmit their objective to lower environmental impacts upstream in the form of customer demand ([Giunipero et al., 2012, pp. 261, 262](#); [Hariyani et al., 2023, p. 8](#); [Murfield & Tate, 2017, p. 1329](#)). External pressures are often focused on GHG emissions, as these have the most commonality across firms and climate change has the most immediate global urgency ([Ellram & Tate, 2023, p. 11](#)). The Greenhouse Gas Protocol divides a firm’s environmental impact in terms of GHG emissions into three categories across its product or service lifecycles ([Greenhouse Gas Protocol, 2013, p. 6](#)). First, Scope 1 GHG emissions are a direct result of the production processes, facilities, and transportation controlled by the focal firm ([Ellram & Tate, 2023, p. 6](#)). Second, Scope 2 GHG emissions represent indirect emissions that stem from acquired electricity, steam, heating, and cooling consumed by the focal firm. Third, Scope 3 relates to the GHG emissions that occur beyond the focal firm’s direct control, encompassing both upstream and downstream activities ([Eggert & Hartmann, 2021, p. 3](#)). The division into three scopes provides a comprehensive framework for measuring and managing greenhouse gas emissions. That is because such categorization helps firms understand the different sources and areas of responsibility for these emissions. Based on that understanding a firm is better enabled to make targeted policies for reduction.

First of all, Scope 1 emissions are owned and controlled by the focal firm, and, therefore, provide the focal firm full authority to change its production processes and reduce Scope 1 GHG emissions. Furthermore, Scope 2 GHG emissions can be reduced by lowering energy consumption and by switching to renewable energy sources, such as solar, wind, or geothermal ([Ellram & Tate, 2023, p. 6](#)). Finally, reducing Scope 3 GHG emissions is less straightforward due to the indirect control held by the focal firm to reduce impacts. At the same time, it has been estimated that Scope 3 emissions can account for up to 70 percent of a firm’s carbon footprint ([Murfield & Tate, 2017, p. 1320](#)). However, despite Scope 3 encompassing both upstream and downstream GHG emissions, the majority of GHG emissions occur upstream ([Eggert & Hartmann, 2021, p. 1](#)). This, in conjunction with the observation that sustainability is being pulled upstream in supply chains, explains why Scope 3 GHG emissions are measured and managed at the supply side. However, given that the more impactful firms often have extensive supplier networks comprising thousands of suppliers, it is improbable for such firms to simultaneously engage all suppliers in actively reducing GHG emissions. Therefore, as in all areas of supplier management and sustainability, priorities have to be set ([Ellram & Tate, 2023, p. 13](#)).

After acknowledging that engaging all suppliers at once is unattainable, efforts can be channeled at the supply categories with the highest priority and then progress accordingly ([Handfield et al., 2005, p. 10](#)). Arguably, the Kraljic Matrix is the most widely adopted and adapted purchasing portfolio tool in theory and practice for categorizing supplies to arrive at prioritized and different sourcing strategies for different supply items ([Gelderman & Van Weele, 2003, p. 207](#); [2005, pp. 19, 20](#); [Kraljic, 1983, p. 112](#); [Schiele, 2019, p. 64](#)). Furthermore, adaptations of the Kraljic Matrix closely resemble the original as they employ virtually identical dimensions and categories, while also suggesting similar strategy recommendations ([Gelderman & Van Weele, 2005, p. 21](#)). In the Kraljic Matrix, supplies are categorized along two dimensions: (1) ‘profit impact’ and (2) ‘supply risk’ (high vs. low) ([Kraljic, 1983, p. 112](#)). Profit impact refers to the extent to which a particular supply item or category affects the overall profitability of the organization. Supply risk pertains to the probability and impact of an undesired event associated with a particular supply item or category ([Hoffmann et al., 2013, p. 201](#); [Schiele et al., 2021, p. 56](#)). The profit impact of an item can be defined by absolute purchasing volume, relative purchasing volume, the impact on the final product (e.g. indirect vs. direct materials), and the impact on business growth ([Kraljic, 1983, p. 112](#); [Luukkainen & Kähkönen, 2023, p. 180](#); [Schiele, 2019, p. 65](#)). The supply risk of an item, on the other hand, can be defined by its availability, substitutability, competitive demand, number of suppliers, geographical spread of suppliers, make-or-buy opportunities, and storing risk ([Kraljic, 1983, pp. 110, 112](#); [Luukkainen & Kähkönen, 2023, p. 180](#); [Schiele, 2019, p. 65](#)).

As a result, the product of both dimensions, a 2x2 matrix, allows PSM professionals to trade-off exploiting purchasing power and managing supply risk for four different supply categories: (1) *routine* (low, low), (2) *leverage* (high, low), (3) *bottleneck* (low, high), and (4) *strategic* (high, high) (see [Appendix A](#)) ([Kraljic, 1983, p. 110](#)). In turn, the recommended supply category strategies are (1) *efficient processing* for routine items, (2) *exploitation of full purchasing power* for leverage items, (3) *volume assurance* (at cost premium if necessary), *search for alternatives* for bottleneck items, and (4) *the development of long-term relationships* for strategic items ([Gelderman & Van Weele, 2005, p. 20](#); [Kraljic, 1983, p. 112](#); [Schiele, 2019, p. 65](#)). For each of the four categories, [Krause et al. \(2009, p. 21\)](#) suggest strategies to achieve sustainability on the supply side. First, they suggest that due to a low profit impact and supply risk, achieving sustainability is mostly a matter of supplier selection for routine items. Then, for leverage items, sustainability can be achieved through the balancing act of reducing costs and achieving sustainability. For bottleneck items, it is argued that the buyer is in “no position to pressure a supplier to operate sustainably” due to its relatively low importance to such suppliers ([Krause et al., 2009, p. 21](#)). Finally, for strategic items, they recommend an additional emphasis on innovation through collaboration, which holds the potential for competitive advantages ([Kumar & Rahman, 2015, p. 116](#); [Lintukangas et al., 2019, p. 2](#); [Murfield & Tate, 2017, p. 1325](#)). Thus, the Kraljic Matrix could be used to identify different strategies to achieve sustainability for different supply categories.

Nonetheless, it is important to note that the Kraljic Matrix has also been criticized by scholars. A common critique by scholars is that profit impact and supply risk lack a unified way of measuring, weighing, and determining the parameters of the elements that define the dimensions ([Cox, 2004, p. 412](#); [Gelderman & Van Weele, 2005, p. 21](#); [Luukkainen & Kähkönen, 2023, p. 182](#); [Olsen & Ellram, 1997, p. 105](#); [Ramsay, 1996, p. 15](#); [Schiele, 2019, p. 66](#)). In addition to such measurement issues, criticism also relates to more fundamental issues and objections ([Gelderman & Van Weele, 2005, p. 21](#)). One fundamental issue is the fact that

purchasing portfolio models, like the Kraljic Matrix, fail to capture all the fundamental aspects of dyadic buyer-supplier relationships ([Dubois & Pedersen, 2002, p. 40](#); [Gelderman & Van Weele, 2005, p. 22](#)). In a phase after supply categorization, [Kraljic \(1983, pp. 113, 114\)](#) proposes the “strategic positioning” phase to arrive at sourcing strategies for the dyads with suppliers of strategic items by plotting the focal company’s buying power against the strength of the supply base. Often both steps are merged into one matrix, which introduces confusion about the level of analysis (category or supplier) ([Schiele, 2019, p. 66](#)). This results in the omitting of the role of individual buyer-supplier relationships, and, therefore, a finer distinction among the products and suppliers in each category is lost ([Luukkainen & Kähkönen, 2023, p. 181](#); [Padhi et al., 2012, p. 3](#)). However, as companies heterogeneously adopt a stance to sustainability and subsequent practices, different actions may be required for different suppliers in the same supply category ([Krause et al., 2009, p. 22](#)). This aligns with PSM research suggesting that supplier strategies are developed after the formation of category strategies ([Hesping & Schiele, 2015, p. 139](#)).

In light of significant research suggesting that updates are justified when applied in different contexts (e.g. sustainable PSM) ([Chkanikova, 2015, p. 481](#); [Murfield & Tate, 2017, p. 1322](#); [Pagell et al., 2010, p. 60](#)), the Kraljic Matrix offers a path for refining the purchasing portfolio model from a category- to a supplier-level of analysis ([Schiele, 2019, p. 66](#); [Stange et al., 2022, p. 3](#)). [Kraljic \(1983, p. 109\)](#) introduced the purchasing portfolio matrix under the argument that “purchasing must become supply management”. With this statement, Kraljic advocated a shift from merely purchasing goods and services to a more holistic and strategic approach known as supply management. In turn, [Krause et al. \(2009, p. 20\)](#) argue that a similar transformation is required to actively incorporate environmental sustainability into a sourcing strategy, i.e. “purchasing must become *sustainable* supply management”. As introduced, it should be recognized that purchasing cannot become sustainable supply management by engaging all suppliers at once ([Handfield et al., 2005, p. 10](#)). As a start, the buying firm can assess the contribution in its Scope 3 environmental impacts for each supplier (of a certain category). A simple “spend” (i.e. purchasing volume) analysis enables a rough identification of the focal company’s contribution to the supplier’s environmental impacts ([Ellram & Tate, 2023, pp. 13, 14](#); [Greenhouse Gas Protocol, 2013, p. 12](#)). Simply put: the level of spending on a certain supplier broadly reflects a firm’s exposure to – and responsibility for – that supplier’s environmental impacts. In this context, solely using the original Kraljic Matrix for prioritizing categories would not make sense as a firm’s spend can vary significantly among suppliers of the same category. So, whereas the Kraljic Matrix uses profit impact (or profit contribution) to measure the extent to which a category affects the firm’s profits, the extent to which a supplier affects the firm’s environmental impact can likewise be measured by purchasing volume ([Foerstl et al., 2010, p. 124](#)).

Then, to prioritize supplier engagement for environmental sustainability, a spend analysis alone will likely be insufficient. Achieving environmental sustainability requires collaboration with suppliers, and such collaboration necessitates building closer buyer-supplier relationships ([Murfield & Tate, 2017, p. 1336](#)). Given those circumstances, it is important to recognize that each buyer-supplier relationship holds unique contextual dynamics ([Dyer & Singh, 1998, p. 661](#)). The unique dynamics between different buyer-supplier relationships can be explained by the unequal distribution of resources for inter-organizational collaborations among firms ([Mitsubishi & Greve, 2009, p. 975](#); [Pulles et al., 2022, p. 4](#)). Vice versa, the unequal distribution of resources for collaborations among firms can also be explained by

unique dynamics between different buyer-supplier relationships, such as the dependence on each other for continuing the business ([Caniëls et al., 2018, p. 343](#); [Pulles et al., 2022, p. 2](#)). From the buyer's perspective, a high dependence means that little to no substitutable suppliers are available ([Villena et al., 2019, p. 11](#)). In such a situation, the buying firm will establish closer and more collaborative relationships with suppliers for which only a few alternatives exist, e.g. the suppliers of strategic and bottleneck items ([Fawcett et al., 2015, p. 649](#); [Kembro & Selviaridis, 2015, p. 455](#); [Q. Zhang et al., 2020, p. 641](#)). Additionally, PSM professionals may perceive that suppliers are more responsive to their demands when there exists a cooperative relationship ([Carr & Pearson, 1999, p. 516](#)). Thus, for the buying firm, the suppliers on which it is most dependent may be prioritized for leveraging the relationships to improve its environmental sustainability performance. Furthermore, the age or length of the buyer-supplier relationship is associated with the distribution of resources for collaboration ([Griffith et al., 2006, p. 87](#)). That is because a buyer and supplier that have managed to effectively align their interests over time are more likely to expect a continuation of exchange in the future ([Ramsay, 1996, p. 15](#)). So, not only can buyers leverage their collaborative supplier relationships to reduce their environmental impacts, but research also appears to indicate that the potential benefits (e.g. competitive advantages) of such collaborations are more likely to be enjoyed over the long-term. In the end, sustainability is inherently linked to the long term.

At this point, purchasing volume is identified as a derivative of profit impact, and the closeness of the relationship is identified as a derivative of supply risk. To further understand which suppliers are to be prioritized, it is important to establish a baseline measure for suppliers' environmental impacts ([Ellram & Tate, 2023, p. 14](#)). Even if the buying firm's relative contribution to a supplier's environmental impact is low, the supplier can still have a significant negative effect through its absolute environmental impact. Under the argument that categories with a lower environmental impact require less attention than high-impact categories, [Handfield et al. \(2005, pp. 11, 12\)](#) introduced environmental impact as a third dimension to the Kraljic Matrix. In contrast, other scholars seem to oppose that environmental impacts should be treated as a separate dimension. Their argument revolves around the notion that environmental impacts can directly influence both profits and supply risks, making it more appropriate to incorporate them within the existing dimensions ([Luukkainen & Kähkönen, 2023, p. 182](#); [Olsen & Ellram, 1997, p. 104](#); [Pagell et al., 2010, p. 68](#)). However, given the potential for measurement issues and the supplier level of analysis, it would not make sense to aggregate supplier environmental impact with the two other dimensions ([Gelderman & Van Weele, 2005, p. 21](#); [Krause et al., 2009, p. 22](#)). So, for a buying firm to account for the environmental impacts on the supply side and prioritize its efforts, the "Supplier Prioritization Cube" is presented below (see [Figure 3](#)) ([I. J. Chen & Kitsis, 2017, p. 1468](#)). The three dimensions result in eight different segmentations and four prioritizations: (1) high priority (relatively high score on all dimensions), (2) moderately high priority (relatively high score on two dimensions), (3) moderately low priority (relatively high score on one dimension), and (4) low priority (relatively low score on all dimensions).

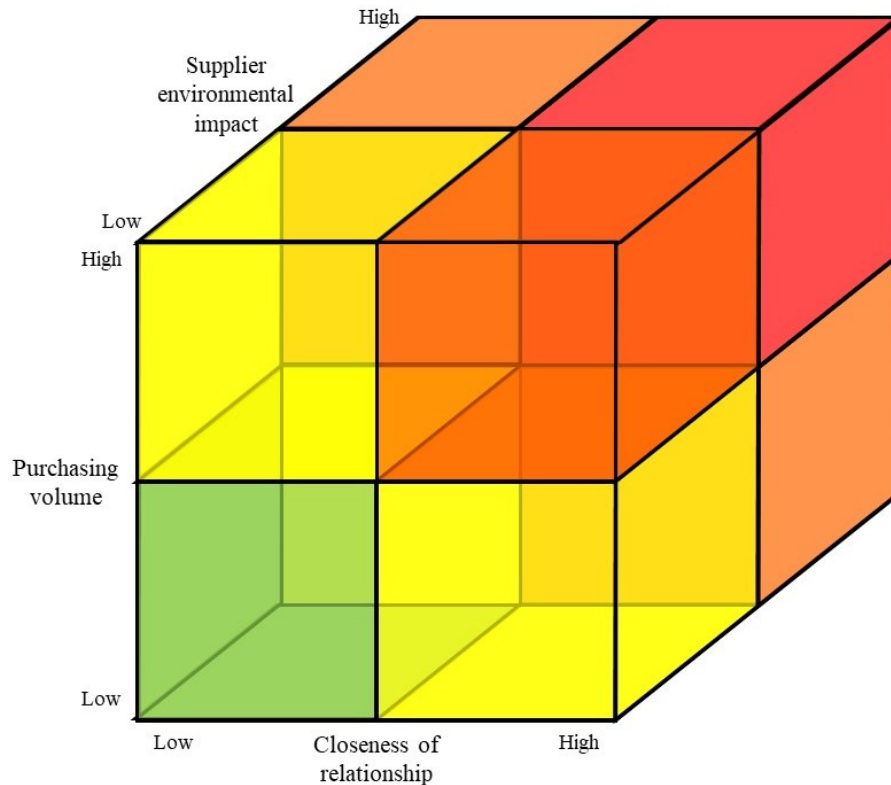


Figure 3. Supplier Prioritization Cube

Adapted from: [Handfield et al. \(2005, p. 11\)](#); [Kraljic \(1983, p. 112\)](#)

2.2. Motivating suppliers to improve their environmental sustainability performance: Constructs, contingency factors, and hypotheses

2.2.1. Buyer influence and supplier motives for environmental sustainability — an Institutional Theory and Social Exchange Theory perspective

In this section, two prominent theories are explored to build a complementary theoretical framework of buyer influence strategies to improve suppliers' environmental sustainability performance: Institutional Theory and Social Exchange Theory. Why firms adopt environmental sustainability practices has predominantly been explained from an Institutional Theory perspective ([Geng et al., 2017, p. 248](#)). Institutional Theory provides a framework for understanding how firms are influenced by pressures that originate from their external environment ([Villena & Dhanorkar, 2020, p. 701](#); [Wijethilake & Ekanayake, 2018, p. 135](#)). According to Institutional Theory, firms strive to conform to coercive, normative, and mimetic institutional pressures to gain legitimacy within their external environment ([DiMaggio & Powell, 1983, p. 150](#)). While there exists no one-way definition of institutional pressures in literature, there are enough commonalities to arrive at a general understanding. Coercive pressures are exerted by stakeholders on which a firm depends – e.g. the government or a key customer – leading to repercussions in events of non-compliance ([Fayezi et al., 2020, p. 482](#); [Vos et al., 2021, p. 2](#)). Normative pressures represent the expectations from stakeholders on which a firm does not directly depend – e.g. NGOs, media, or the broader society – that can lead to bad publicity and reputational harm when these are not met ([Hariyani et al., 2023, p. 7](#); [Saeed et al., 2018, p. 4](#)). Mimetic pressures originate from competitors as a means to mitigate uncertainty, as firms face a competitive disadvantage if they fail to imitate their industry peers

([Ahmed et al., 2020, p. 4](#); [DiMaggio & Powell, 1983, p. 150](#); [Hariyani et al., 2023, p. 7](#)). These institutional pressures, in turn, influence a firm's strategies, and adopting environmental sustainability practices is a matter of strategy ([K. H. Hofmann et al., 2012, p. 542](#)).

Yet, while Institutional Theory provides insights into how organizations experience institutional pressures, it may not offer a comprehensive understanding of the specific influence strategies buying firms (could) employ to effectively improve their suppliers' environmental sustainability performance. This limitation of the Institutional Theory may be explained by the criticism that understanding the firm through an institutional lens has become relatively neglected compared to understanding the institutional pressures themselves ([Greenwood et al., 2014, p. 1209](#); [Munir, 2020, p. 1](#)). Therefore, scholars have called for future research in the field of sustainable PSM to advance the understanding of buyer influence and supplier environmental sustainability by supplementing Institutional Theory with other theories ([Fayezi et al., 2020, p. 494](#); [Kauppi & Hannibal, 2017, p. 459](#)).

Complementary to Institutional Theory, Social Exchange Theory (SET) postulates that seeking rewards and avoidance of punishment are fundamental motivations for inter-organizational relationships ([Blau, 1964](#); [Emerson, 1976, p. 352](#); [Nyaga et al., 2013, p. 44](#)). Whereas coercive pressure can explain the latter, reward pressure – the ability to offer rewards ([Nyaga et al., 2013, p. 47](#)) – can explain the former. That is because firms can gain synergistic rewards through collaboration ([Dyer & Singh, 1998, p. 667](#)), and may expect reciprocation of rewards in exchange for adaptation ([Nyaga et al., 2013, p. 46](#)). In addition to coercive and reward pressure, [French and Raven \(1959, pp. 153-156\)](#) identified three other sources of influence: legitimate pressure, referent pressure, and expert pressure. These five pressures are generally categorized into mediated (direct) and non-mediated (indirect) sources of influence ([Vos et al., 2021, p. 3](#)). The dichotomization of non-mediated and mediated sources of influence has been supported by empirical findings ([Maloni & Benton, 2000, p. 58](#)).

Coercive and reward pressure are mediated sources of influence, as a buyer can directly administer influence to bring about action from its supplier by leveraging reinforcements ([Benton & Maloni, 2005, p. 4](#); [French & Raven, 1959, p. 152](#); [Nyaga et al., 2013, p. 47](#)). On the other hand, legitimate, expert, and referent pressure are non-mediated sources of influence because they can occur as a natural part of buyer-supplier exchanges and their influence is more indirectly felt ([Benton & Maloni, 2005, p. 4](#); [Brown et al., 1995, p. 365](#); [Jean L. Johnson et al., 1993, p. 2](#); [Maloni & Benton, 2000, p. 55](#); [Terpend & Ashenbaum, 2012, p. 53](#)). Legitimate pressure exists when the buyer feels a legitimate right to influence the supplier based on (1) a legal right or (2) shared values and beliefs ([French & Raven, 1959, p. 154](#); [Gelderman et al., 2021, p. 4](#); [Nyaga et al., 2013, p. 47](#)). Since legitimate pressure can originate from two sources of influence, a further distinction can be made between traditional (non-mediated) and legal (mediated) legitimate pressure ([Gelderman et al., 2021, p. 4](#); [Ketilson, 1991, p. 529](#)). In the case of shared values and beliefs, traditional legitimate pressure occurs when the supplier believes that the buyer retains a natural right to influence ([Maloni & Benton, 2000, p. 54](#)). Therefore, traditional legitimate pressure depends on the perceptions of the supplier ([Gelderman et al., 2021, p. 4](#)). Conversely, legal legitimate pressure exists when the buyer exercises its judiciary right to influence a supplier based on contractual agreements ([Nyaga et al., 2013, p. 47](#)). Expert pressure emerges when the buyer holds specific expertise and knowledge that the supplier values and desires ([French & Raven, 1959, p. 155](#); [Gelderman et al., 2021, p. 4](#); [Nyaga et al., 2013, p. 47](#)). Referent pressure prevails when the supplier admires

the way its customer conducts business and therefore values being identified with them ([Nyaga et al., 2013, p. 47](#)).

Furthermore, with the same line of reasoning, normative and mimetic pressure also serve as non-mediated sources of influence. That is because the buying firm does not have direct control over the supplier's stakeholders and competitors from which these pressures arise ([Foerstl et al., 2015, p. 70](#)). Moreover, normative pressure can emerge from the expectations of stakeholders on which the supplier does not directly depend, but on whom the buyer does depend. For example, an EU-based firm may fall subject to the reporting or reduction of its Scope 3 environmental impacts whilst the overseas supplier that is responsible for part of those impacts operates under a different regulatory framework ("[Corporate Sustainability Due Diligence \(CSDD\) Directive](#)," 2022, pp. 2, 3; "[Corporate Sustainability Reporting Directive \(CSRD\)](#)," 2022, p. 16). When the buying firm would then use such legal obligation to legitimize reporting demands or to conduct due diligence, legal legitimate pressure is exerted in a non-mediated way. To avoid confusion, this distinct influence strategy is referred to as compliance pressure in this study.

To conclude, the complementary theoretical framework of Institutional Theory and SET establishes the list of influence strategies by categorizing them into mediated and non-mediated sources of influence (see [Table 1](#)). In sum, a buying firm may directly exert influence by rewarding the supplier by, for example, allocating more business or punishing the supplier with reduced purchasing volume ([Zhao et al., 2008, p. 370](#)). Additionally, a buying firm may impose contractual obligations, or refer to governmental regulations or shared values and beliefs. Moreover, the buying firm may indirectly exert influence by, for example, sharing best practices and providing technical guidance to the supplier, demonstrating exemplary environmental sustainability performance, publicly endorsing environmentally responsible suppliers, and notifying suppliers of their relative environmental sustainability performance.

Table 1. Influence Strategies.

Influence strategy	Description	Examples	Underlying principle
<i>Mediated</i>			
Coercive pressure	<i>Punishing or withholding punishment</i>	Loss of business	Loss aversion
Reward pressure	<i>Rewarding or withholding rewards</i>	Incentives: price premium, long-term contracts, profit-sharing	Reciprocity
Legal legitimate pressure	<i>Legitimizing demands with legal certainty or judiciary right</i>	Imposing contractual obligations	Legitimacy
<i>Non-mediated</i>			
Compliance pressure	<i>Legitimizing demands with an indirect legal obligation</i>	EU corporate sustainability due diligence directive EU corporate sustainability reporting directive	Legitimacy

Traditional legitimate pressure	<i>Legitimizing demands on the basis of shared values and beliefs</i>	Innovation, collaboration, sustainability, natural rights	Similarity
Expert pressure	<i>Sharing desired expertise and knowledge</i>	Training, deploying staff	Authority
Referent pressure	<i>Creating a positive reputation a supplier wants to identify with</i>	PR, certification, branding, success stories, exemplary performance	Sympathy
Normative pressure	<i>Engaging stakeholders and leveraging social influence</i>	Publicly endorsing environmentally responsible suppliers	Responsibility
Mimetic pressure	<i>Encouraging supplier competition</i>	Communication of relative performance	Scarcity

In addition, PSM research suggests that the motives driving a supplier's commitment to improving its environmental sustainability performance can help predict the effectiveness of buyer influence ([Baron, 2001, p. 9](#); [Kitsis & Chen, 2020, p. 326](#); [Vanpoucke et al., 2016, p. 733](#)). Thereby, it is also suggested that an understanding of the supplier's motives contributes to making a well-informed decision regarding influence strategies. Motives, despite their significance, have received limited attention in the field of PSM ([Kitsis & Chen, 2020, p. 326](#)). Within PSM literature, scholars commonly distinguish between three dimensions of motives: moral, instrumental, and relational ([Baliga et al., 2020, p. 351](#)). Moral motives are characterized by ethical standards and moral principles that stem from a feeling of responsibility and that sustainability is "the right thing to do" ([Aguilera et al., 2007, p. 839](#); [Baliga et al., 2020, p. 351](#)). Moral motives draw from a stewardship perspective, i.e. the theory that suggests that managers act as responsible stewards of the assets they control ([Baliga et al., 2020, p. 356](#)). Instrumental motives are reflected by the desire for economic reward or avoidance of punishment that originates from self-interest ([Kitsis & Chen, 2020, p. 327](#)). In other words, firms with instrumental motives adopt sustainable practices when they increase value from a shareholder perspective, i.e. the Friedman doctrine ([Baliga et al., 2020, p. 366](#); [Friedman, 1970, p. 126](#); [Paulraj et al., 2017, p. 240](#)). Relational motives derive from the supplier's will for positive relationships with its customers and other key stakeholders ([Kitsis & Chen, 2020, p. 327](#)). Contrary to instrumental motives, relational motives suggest that firms consider the interests of multiple stakeholders (e.g. the government, customers, employees).

Despite the differentiation between moral, instrumental, and relational motives, not all scholars agree that these are all different constructs. For instance, [Y. Chen and Chen \(2019, p. 624\)](#) approach relational motives as part of instrumental motives as they are essentially driven out of self-interest as well. [Paulraj et al. \(2017, p. 254\)](#) acknowledge that relational motives can be considered instrumental motives, providing the example of wanting to gain sustained competitive advantage. Nevertheless, a clear distinction can be made overall. As opposed to relational motives, instrumental motives are more transactional in nature. Therefore, instrumental motives represent the short-term gains or the prevention of losses perceived by the supplier ([Aguilera et al., 2007, p. 845](#)). On the other hand, the relational motives of a supplier represent the known or unknown long-term benefits of a closer relationship with the buyer and other stakeholders ([Aguilera et al., 2007, p. 837](#)). [Table 2](#) lists how the three motives

have been measured in prior research. Scholars encourage future researchers to refine their measurement scales to provide a more complete depiction of these important constructs ([Y. Chen & Chen, 2019, p. 632](#); [Kitsis & Chen, 2020, p. 336](#); [Paulraj et al., 2017, p. 254](#)).

Table 2. Measurement of Motives.

Measurement items*	Source
<i>Moral motives (stewardship perspective)</i>	
We engage in sustainable activities ... <ul style="list-style-type: none"> • because we feel the responsibility to the environment • because of genuine concern for the environment • as top management considers environmental responsiveness as a vital part of corporate strategy • because it is the right thing to do 	(Paulraj et al., 2017, p. 248)
We engage in sustainable practices: <ul style="list-style-type: none"> • because we feel responsible for sustainability • because of genuine concern for sustainability • because of top management belief • because it is the right thing to do 	(Y. Chen & Chen, 2019, p. 628)
Our firm engages in sustainable activities because of the ... <ul style="list-style-type: none"> • genuine concern for the environment (and people) • beliefs and values of senior management • belief that it is the right thing to do 	(Kitsis & Chen, 2020, p. 333)
<i>Instrumental motives (shareholder perspective)</i>	
We engage in sustainable activities ... <ul style="list-style-type: none"> • due to the shareholders' demand for sustainability improvements • to avoid poor publicity • to appease our shareholders 	(Paulraj et al., 2017, p. 248)
We engage in sustainable practices to: <ul style="list-style-type: none"> • avoid poor publicity • appease shareholders • differentiate from competitors • increase customer base • achieve profitability • avoid costly regulations 	(Y. Chen & Chen, 2019, p. 628)
Our firm engages in sustainability in order to ... <ul style="list-style-type: none"> • differentiate us from our competitors • sustain competitive advantage • achieve profitability 	(Kitsis & Chen, 2020, p. 333)
<i>Relational motives (stakeholder perspective)</i>	
We engage in sustainable activities ... <ul style="list-style-type: none"> • to increase our customer base • to differentiate us from our competitors • as it is a source of sustained competitive advantage 	(Paulraj et al., 2017, p. 248)

<p>Our firm engages in sustainability due to ...</p> <ul style="list-style-type: none"> • employee demand • community expectation • suppliers' sustainability initiatives 	<p>(Kitsis & Chen, 2020, p. 333)</p>
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**Note: Dropped items are not included*

With their introduction of the conceptual model of moral, instrumental, and relational motives, [Aguilera et al. \(2007, pp. 837, 852\)](#) address the interactions among the various motivations within organizations. They suggest that the motives are most often formed hierarchically and that organizations first need to see the economic benefits of environmental sustainability practices ([Aguilera et al., 2007, p. 848](#)). Therefore, they propose that organizations will first act from instrumental motives, then from relational, and finally from moral motives. In contrast, subsequent empirical research indicates that, overall, moral motives have the greatest effect on improvements in environmental sustainability performance out of the three ([Y. Chen & Chen, 2019, p. 631](#); [Kitsis & Chen, 2020, pp. 334, 335](#); [Paulraj et al., 2017, p. 253](#)). With moral motives followed by relational and instrumental motives, empirical research seems to suggest a reversed hierarchy of motives in relation to sustainability performance. To conclude, it is important to note that supplier motives are not mutually exclusive, regardless of the interaction between them.

2.2.2. Contingency factors in becoming more environmentally sustainable — a resource-based view and Resource Dependence Theory perspective

Prior research highlights the importance for scholars and practitioners to identify and understand the contingency factors that enable or inhibit a positive relationship between practice (i.e. buyer influence) and performance (i.e. supplier environmental sustainability) ([Aragón-Correa & Sharma, 2003, p. 83](#); [Eggert & Hartmann, 2021, p. 4](#); [Hart & Dowell, 2011, p. 1473](#); [Schmidt et al., 2017, p. 4](#)). Therefore, this section serves to examine the contingency factors in becoming more environmentally sustainable based on the resource-based view and the Resource Dependence Theory. For both theories, the contingency factors that could affect the effectiveness of the buyer's influence strategies are investigated. The resource-based view (RBV) of the firm suggests that resources within an industry may be heterogeneous and immobile across firms and that therefore a firm's assets and capabilities – when valuable, rare, inimitable, and non-substitutable (VRIN) – lead to a sustained competitive advantage ([Barney, 1991, pp. 104-106](#); [Carter & Rogers, 2008, p. 374](#); [Sarkis et al., 2011, p. 4](#)). According to the RBV, a firm's resources affect its strategies and responses to external pressures ([Barney, 1991, pp. 112, 113](#); [Bourgeois, 1981, p. 30](#); [X. Chen et al., 2018, p. 306](#); [Ma et al., 2022, p. 2](#)). Thus, the heterogeneity and immobility of resources implied by the RBV can explain why buying firms may employ various influence strategies and why suppliers react differently to such influence strategies.

From the buyer's perspective, both at the firm and individual level, certain preliminary capabilities are required to effectively influence a supplier. These capabilities consist of sufficient resources (human, financial, and physical), appropriate mandates (legal and authority), and adequate competences (skills, knowledge, and expertise) ([Barney, 1991, p. 101](#); [Carter & Rogers, 2008, p. 374](#); [Hariyani et al., 2023, p. 8](#); [Karim & Arif-Uz-Zaman, 2013, p. 179](#); [Pulles et al., 2016, p. 1466](#)). For instance, in the case of referent pressure, a buying firm may require sufficient human, financial, and physical resources to showcase exemplary

environmental sustainability performance. Additionally, a buying firm needs enough financial resources to exert coercive or reward pressure ([Wijethilake & Ekanayake, 2018, p. 143](#)). Hence, it is suggested that firms with more organizational slack and better financial performance are more likely to invest in innovation to lower environmental impacts ([Chiu & Sharfman, 2011, p. 1567](#); [Marquis & Qian, 2014, p. 133](#)). Organizational slack refers to the surplus resources, both actual and potential, that can be mobilized beyond the immediate requirements of an organization ([Bourgeois, 1981, p. 30](#); [X. Chen et al., 2018, p. 306](#)). It serves as a cushion that enables organizations to adapt to internal and external pressures, including the need for innovation to become more environmentally sustainable.

Furthermore, at the individual level, buyers require authorization from their superordinate to apply any influence strategy. For expert pressure, a buyer necessitates the expertise and knowledge a supplier desires, such as know-how on environmental sustainability ([Schulze et al., 2019, p. 292](#)). Finally, individual buyers must possess the right competences to effectively influence suppliers ([Hariyani et al., 2023, p. 8](#); [Hsu et al., 2016, p. 95](#); [Karim & Arif-Uz-Zaman, 2013, p. 179](#)). While resources and mandates are relatively straightforward in literature, a recurring point of discussion revolves around the competences PSM professionals should possess ([Fleith de Medeiros et al., 2022, p. 9](#)). Ultimately, the individual buyers serve as the designated actors responsible for influencing the suppliers, which asks for individual sustainability competences ([Delke, 2022, p. 49](#)). In their Delphi study, [Schulze and Bals \(2020, pp. 8, 9\)](#) identified essential competences needed by PSM professionals to effectively implement sustainability. They categorize the competences according to the typology of [Delamare Le Deist and Winterton \(2005, p. 39\)](#), which includes: cognitive, functional, social, and meta competences (see [Appendix B](#)). Cognitive competences concern knowledge and understanding, functional competences represent skills, social competences reflect behavior and attitude, and meta competences regard the acquisition of the other types of competences ([Delamare Le Deist & Winterton, 2005, p. 39](#); [Schulze & Bals, 2020, p. 2](#)). The main individual sustainability competences and their description in the context of influencing suppliers to become more environmentally sustainable are listed in [Table 3](#).

Table 3. Sustainable PSM Competences.

Competence	Description
<i>Cognition-oriented</i>	
Systems Thinking Competence	<ul style="list-style-type: none"> • <i>Understands the business case for sustainability</i> • <i>Thinks beyond one's own nose</i> • <i>Applies the strategic context of the company</i> • <i>Understands the supply network</i> • <i>Understands circular economy models</i>
Critical Thinking	<ul style="list-style-type: none"> • <i>Gathers information to get a better understanding of an issue</i> • <i>Asks for background information</i> • <i>Critically reviews processes and approaches</i>
<i>Functional-oriented</i>	
Basic Sustainability Knowledge	<ul style="list-style-type: none"> • <i>Knows sustainability strategies & procedures of the institution</i> • <i>Understands the different policy implications for environmental & social sustainability</i> • <i>Knows frameworks & law</i>

	<ul style="list-style-type: none"> • <i>Understands that sustainability does not mean “doing good”, but preventing risk and following a business case</i>
Supplier Relationship Management (application of tools)	<ul style="list-style-type: none"> • <i>Applies monitoring tools</i> • <i>Conducts a risk assessment/prioritization</i>
<i>Social-oriented</i>	
Communication Skills	<ul style="list-style-type: none"> • <i>Presents & sells facts</i> • <i>Conducts an open conversation</i> • <i>Interacts with others</i> • <i>Adapts to a target group, including influence strategies</i> • <i>Uses appropriate communication channels</i> • <i>Moderates</i>
Cross-functional Teamworking	<ul style="list-style-type: none"> • <i>Cooperates with others to find mutual solutions</i> • <i>Knows relevant internal departments to cooperate with</i>
Thoughtfulness towards others	<ul style="list-style-type: none"> • <i>Shows understanding of the other position</i> • <i>Acts in a discreet manner</i> • <i>Is understanding</i> • <i>De-escalates</i> • <i>Is aware of how to avoid conflicts</i>
Supplier Relationship Management (communication)	<ul style="list-style-type: none"> • <i>Explains requirements and issues to the supplier</i> • <i>Shows the benefits of sustainability to the supplier</i> • <i>Convinces based on the appropriate influence strategies</i> • <i>Explains the business risk to the supplier</i>
<i>Meta-oriented</i>	
Commitment to Change	<ul style="list-style-type: none"> • <i>Is passionate and believes in the benefit of sustainability</i> • <i>Does commit personally to the next steps</i> • <i>Takes on leadership to bring in new sustainability initiatives</i> • <i>Is willing to participate</i>
Supplier Relationship Management (cooperative attitude)	<ul style="list-style-type: none"> • <i>Coaches the supplier in the implementation of sustainability standards</i> • <i>Shares experiences</i> • <i>Offers training to the supplier</i> • <i>Works together with the supplier</i>

Adapted from: [Schulze and Bals \(2020, pp. 8, 9\)](#)

When a firm lacks these competences they may be purchased, but are typically developed through higher education and professional training efforts ([Sarkis et al., 2010, p. 165](#); [Schulze & Bals, 2020, p. 9](#)). So, a firm’s top management should encourage and support PSM professionals to develop the competences needed to find and create innovative means and strategies to nurture the supply base ([Blome et al., 2014, p. 44](#); [Lintukangas et al., 2019, p. 8](#)). Cognition-oriented competences enable buyers to understand the interconnectedness of environmental sustainability and the strategic context of the buying firm through conceptual and systematic ways of thinking ([Schulze & Bals, 2020, p. 7](#)). Functional-oriented competences

provide buyers with the necessary expertise to integrate sustainability criteria into their category management, i.e. demand planning, category strategy, supplier identification and selection, negotiation and contracting, executing, and supplier evaluation ([Hsu et al., 2016, p. 95](#); [Schiele, 2019, pp. 55-58](#)). Social-oriented competences are crucial for buyers to effectively engage suppliers and avoid conflicts by applying the most appropriate influence strategies and using deliberately chosen expression and framing ([Pulles & Loohuis, 2020, p. 76](#)). Specifically, “thoughtfulness towards others” implies that buyers need to show an understanding of the supplier’s motives to improve its environmental sustainability performance. Meta-oriented competences play a key role in driving sustainable practices. Buyers who are committed to change and willing to lead sustainability initiatives can influence external suppliers and internal colleagues and foster a commitment to sustainability throughout the supply chain ([Beske-Janssen et al., 2023, p. 12](#)). In sum, from an RBV perspective, the contingencies for influencing suppliers to become more environmentally sustainable primarily arise from the buyer’s organizational slack and individual sustainability competences of the buyer.

Even when faced with rigid institutional pressures, certain firms may be reluctant to adopt environmental sustainability practices due to their high investments and uncertain long-term benefits ([X. Chen et al., 2018, p. 306](#)). Therefore, similar to the buyer, yet with more significance, the presence or development of organizational slack enables a supplier to effectively respond to the buyer’s influence ([Blome et al., 2014, p. 33](#); [X. Chen et al., 2018, p. 310](#); [Sarkis et al., 2010, p. 165](#)). Thus, the supplier’s organizational slack affects whether the buyer’s sustainable PSM practices will result in improved supplier sustainability performance. Accordingly, it is proposed that firm size influences sustainability performance, given that larger firms may possess greater access to slack resources to invest in sustainability ([Ni & Sun, 2018, p. 162](#)). However, findings suggest that not only resource-rich firms engage in sustainability practices and that top management commitment acts as a stronger determinant ([Blome et al., 2014, p. 44](#)). This implies that the level of top management commitment to deploy or develop sufficient human, financial, and physical resources plays a more crucial role in facilitating environmental sustainability than the mere presence of organizational slack ([Blome et al., 2014, p. 36](#); [Fleith de Medeiros et al., 2022, p. 4](#); [Giunipero et al., 2012, pp. 260, 261](#); [Hariyani et al., 2023, p. 8](#); [Kumar & Rahman, 2015, p. 118](#)). Complementary to this notion, it was found that moral motives have a greater effect on firms’ commitment to sustainability than instrumental motives ([Y. Chen & Chen, 2019, p. 631](#)). Instrumental and moral motives did have comparable positive effects on compliance ([Y. Chen & Chen, 2019, p. 632](#)). This implies that for a supplier to adopt environmental sustainability practices, as opposed to social sustainability practices, moral motives can be of great importance. That is because moral motives are associated with top management commitment ([I. J. Chen & Kitsis, 2017, p. 1457](#)) and because environmental sustainability practices are less compliance-driven ([Miemezyk & Luzzini, 2019, p. 241](#)).

Furthermore, it is argued that environmental impact moderates the effect of sustainable PSM practices on improved environmental sustainability performance because bigger firms with higher impacts should face superior stakeholder pressures and should have better-developed industry infrastructures to report performance ([Eggert & Hartmann, 2021, pp. 5, 9](#)). However, conducting a baseline measurement can be challenging for PSM professionals due to low supply chain visibility ([Hariyani et al., 2023, p. 13](#)). Similar to firm size, ownership structure may play a role in the willingness of firms to report and lower their environmental impacts ([Hahn & Kühnen, 2013, p. 13](#)). Compared to smaller privately-held companies, larger

publicly-traded firms are subject to greater regulatory scrutiny and experience more external pressure to be transparent and disclose environmental impacts and commitments ([Eggert & Hartmann, 2021, p. 5](#)). In addition, research suggests that publicly-traded firms have more slack resources and competences to support environmental sustainability initiatives ([Darnall & Edwards Jr., 2006, p. 317](#); [K. H. Hofmann et al., 2012, p. 532](#)). So, in line with the RBV, firm size and ownership structure are two possible contingency factors for suppliers to become more environmentally sustainable.

Additionally, research emphasizes the importance of considering the contingencies that arise from national cultures and regulatory frameworks concerning the environment ([Genç, 2013, p. 530](#); [González et al., 2008, p. 1034](#)). From an RBV perspective, it could be argued that resources and capabilities are shaped by cultural values ([Maurer et al., 2011, p. 434](#)). In that vein of argument, a firm's cultural context can either facilitate or impede environmental sustainability action ([Daily & Huang, 2001, p. 1543](#); [Sarkis et al., 2010, p. 165](#)). Research also shows that cultural values are positively related to environmental sustainability reporting and performance ([Dkhili & Ben Dhiab, 2021, p. 309](#); [Vitolla et al., 2019, p. 1566](#)). Here, culture is defined as “the collective programming of the mind which distinguishes the members of one category of people from another” ([Hofstede, 1994, p. 1](#)). “Categories of people” often represent nations on a macro-level and organizations on a micro-level ([Hofstede, 1994, p. 1](#); [Maurer et al., 2011, p. 441](#); [Minkov & Hofstede, 2012, p. 153](#)). Whereas national cultures can be distinguished by fundamental values, organizational cultures primarily differ in terms of superficial practices such as symbols, heroes, and rituals ([Hofstede, 1994, p. 9](#)). This difference illustrates how national cultures shape and evolve organizational cultures, as well as the broader market environment, regulatory frameworks, and societal expectations universally ([Minkov & Hofstede, 2012, p. 134](#); [Parker, 1997, p. 1](#)).

So, from an RBV perspective, the level of resources and capabilities available for environmental sustainability in supplier organizations can be understood through the lens of national culture ([Maurer et al., 2011, p. 434](#)). For example, nations that value stability may be more hesitant to adopt environmentally sustainable (enabling) practices due to the uncertainty and potential risks associated with change. Due to a higher appraisal for avoiding uncertainty, suppliers from such countries may be more receptive to a form of mimetic pressure ([DiMaggio & Powell, 1983, p. 150](#)). On the other hand, suppliers from countries that value hierarchy and authority may be more receptive to mediated influence strategies ([Hofstede & Bond, 1988, p. 10](#)). That is because members of high power distance national cultures are more willing to accept the use of coercion and rewards to influence their behavior ([Yuan Wang & Clegg, 2002, p. 39](#); [Zhao et al., 2008, p. 370](#)). These examples highlight how cultural factors could have a meaningful influence on the supplier's motives and the effectiveness of the buyer's influence strategies. To summarize, the contingency factors that could affect the effectiveness of environmental sustainability practices from an RBV perspective include organizational slack, individual competences, firm size, top management commitment, ownership structure, and cultural values.

Whereas the RBV concerns how internal resources and capabilities contribute to competitive advantages, the Resource Dependence Theory (RDT) focuses on how external resource dependencies affect the strategic behavior and decision-making of organizations ([Sarkis et al., 2011, p. 4](#)). So, RBV and RDT are often used in conjunction because they provide complementary perspectives into a firm's internal and external resource management ([e.g. Gelderman, 2003, pp. 113-115](#)). In the context of environmental sustainability, the RBV can

explain the absolute ability of the buyer to exert influence and the absolute ability of the supplier to react to this influence, and the RDT can explain the relative importance of the buyer to exert influence and the relative importance of the supplier to react to this influence. Having discussed the significance of buyer dependence in preceding sections (see [2.1.2.](#)), the focus in this section is on the examination of supplier dependence.

Supplier dependence presents the degree to which a supplier is dependent on a certain buyer for its turnover, i.e. the buyer's portion in the supplier's revenue stream ([Elking et al., 2017, p. 24](#); [Kim & Zhu, 2018, p. 7](#); [Pulles et al., 2022, p. 6](#)). Greater dependence typically involves greater uncertainty, making the supplier more motivated to take action and/or more vulnerable to the buyer's influence ([Gelderman, 2003, p. 118](#); [Hillman et al., 2009, p. 1405](#); [Pulles et al., 2022, p. 6](#)). Thus, RDT can help predict a supplier's response to the influence of the buying firm related to the interdependence and relative power positions in the supply chain ([Sarkis et al., 2011, p. 9](#)). For example, it has been found that relatively large and independent organizations may leverage their power and put more pressure on their suppliers to reduce their Scope 3 environmental impacts ([Eggert & Hartmann, 2021, p. 9](#); [Foerstl et al., 2015, p. 70](#); [González et al., 2008, p. 1033](#)).

Nonetheless, the synthesis of RBV and RDT seems to unveil a noteworthy paradox. Where the RDT proposes that smaller more dependent firms are more easily moved to become more environmentally sustainable, RBV stipulates that the required capabilities may not be readily available to such firms ([González et al., 2008, p. 1033](#); [Z. Zhang et al., 2021, p. 4](#)). Vice versa, large independent firms may be more capable from an RBV perspective, they may be less easily moved from an RDT perspective. Arguably, the most significant implications arise when there is a high level of buyer dependence on a supplier, while the supplier has comparatively lower dependence on the buyer ([Gelderman, 2003, p. 115](#)). Such a situation in which the buyer accounts for a relatively small portion of the supplier's turnover and the supplier holds a significant share in the buyer's spend and environmental impacts, exposes the buyer to high strategic supply risk ([Reichenbachs et al., 2017, p. 359](#)). Strategic supply risk is "the unwillingness of a supplier to live up to the buyer's requirements, even though, in principle, it could" ([Schiele et al., 2021, p. 57](#)). To conclude, RDT complements RBV by providing an external and provisional view of resources. A consideration of both perspectives contributes to understanding the possible contingencies in the effectiveness of buyer influence for improving suppliers' environmental sustainability performance.

2.2.3. Conceptual model and hypotheses development

In this section, a conceptual model is presented that depicts the relationship between the motives of suppliers to engage in environmental sustainability and the effectiveness of influence strategies employed by the buyer to foster such engagement. By formulating hypotheses, this section aims to establish testable expectations for the study's outcome. The key rationale for the hypothesized relationships between supplier motives and buyer influence strategy effectiveness lies in the alignment of instrumental, moral, and relational motives with influence strategies that are mediated (i.e. coercive, reward, and legal legitimate pressure), non-mediated without relational gains (i.e. traditional legitimate and compliance pressure), or non-mediated with relational gains (i.e. expert, referent, normative, and mimetic pressure). The hypotheses are constructed based on underlying theories concerning the responsibility of business (i.e. shareholder, stewardship, stakeholder) and the distinct perspectives of business ethics that focus on motives for actions (i.e. ethical egoism, virtue ethics, and utilitarianism) ([Paulraj et al., 2017, p. 242](#)).

Firstly, instrumental motives for engaging in sustainability are derived from the shareholder theory. This perspective is founded on the notion that “there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game” ([Friedman, 1962, p. 133](#)). This implies that firms that mainly hold instrumental motives are primarily moved by the direct impact their course of action or inaction has on their profitability, i.e. improving or protecting current profit levels ([Brønn & Vidaver-Cohen, 2009, p. 94](#)). Therefore, instrumental motives align with ethical egoism and consequentialism, where the choice to engage in environmental sustainability is determined solely by weighing the potential consequences of action ([Anscombe, 1958, p. 12](#); [Paulraj et al., 2017, p. 242](#)). So, purely instrumentally motivated suppliers would only engage in environmental sustainability when there is a net positive effect on improving or protecting their profitability. Mediated sources of influence – reward, coercive, and legal legitimate pressure – can have a direct impact on a firm’s profitability in the form of positive and negative reinforcements ([Brown et al., 1995, p. 365](#); [Terpend & Ashenbaum, 2012, p. 53](#)). Additionally, in contrast to moral or relational motives, instrumental motives reflect a greater need to accurately predict the consequences of actions ([Aguilera et al., 2007, p. 841](#)). In the case of non-mediated influence strategies, the supplier determines whether and to what extent it is influenced by the buyer, whereas mediated sources of influence are intended to directly induce specific actions ([Benton & Maloni, 2005, p. 4](#); [Zhao et al., 2008, p. 370](#)). Based on these considerations, the following hypotheses are proposed:

H1. *Instrumental* supplier motives for environmental sustainability positively impact the effectiveness of *mediated* buyer influence strategies.

H1a. *Instrumental* supplier motives for environmental sustainability positively impact the effectiveness of buyer *reward pressure*.

H1b. *Instrumental* supplier motives for environmental sustainability positively impact the effectiveness of buyer *coercive pressure*.

H1c. *Instrumental* supplier motives for environmental sustainability positively impact the effectiveness of buyer *legal legitimate pressure*.

Secondly, moral motives for engaging in sustainability can be explained by the stewardship theory. Stewardship theory suggests that a firm’s course of action is shaped not solely by profitability or stakeholder pressures but also by ethical virtues ([Kaptein, 2008, p. 924](#)). Therefore, stewardship theory indicates that firms that are solely morally motivated are not concerned with the potential consequences of action but rather with the rightness of action as a matter of moral character ([Annas, 2007, p. 3](#); [Paulraj et al., 2017, p. 245](#)). This is how moral motives differ from instrumental and relational motives; they stem from intrinsic higher-order values or virtues instead of external property or attributes ([Aguilera et al., 2007, p. 847](#); [Arjoon, 2000, p. 163](#); [Paulraj et al., 2017, p. 244](#)). Empirical findings further suggest that moral motives are a much stronger driver for commitment to environmental sustainability than instrumental motives ([Y. Chen & Chen, 2019, p. 632](#); [Kitsis & Chen, 2020, p. 335](#); [Paulraj et al., 2017, p. 254](#)). This stands to reason that non-mediated sources of influence may be more effective than mediated influence strategies for primarily morally motivated firms. Specifically, non-mediated influence strategies that resonate with intrinsic values could potentially be effective

for these firms ([Arjoon, 2000, p. 163](#)). Notably, in the case of compliance pressure and traditional legitimate pressure, the firm believes that the buyer has a right to influence. This belief stems from environmental regulations imposed on the buyer or from the fact that the buyer is the supplier's customer, respectively. In contrast to other non-mediated influence strategies, these two sources of influence do not offer relational benefits to the supplier. This distinction is particularly significant when considering the interplay with moral motives, which are inherently related to ethical considerations of doing what is right. Therefore, the following is proposed:

H2. *Moral* supplier motives for environmental sustainability positively impact the effectiveness of *non-mediated* buyer influence strategies *without* relational gains.

H2a. *Moral* supplier motives for environmental sustainability positively impact the effectiveness of buyer *traditional legitimate pressure*.

H2b. *Moral* supplier motives for environmental sustainability positively impact the effectiveness of buyer *compliance pressure*.

Thirdly, relational motives for engaging in sustainability are rooted in the stakeholder theory. The stakeholder theory challenges the maximization of shareholders' wealth as the primary business objective as proposed by the shareholder theory ([Laplume et al., 2008, p. 1152](#)). Instead, it proposes that organizations should be managed in the interests of multiple stakeholders, not solely shareholders. While the shareholder theory finds its foundation in ethical egoism, the stakeholder theory follows the principle of total value maximization of utilitarianism ([Paulraj et al., 2017, p. 243](#)). According to utilitarianism, firms that are solely driven by relational motives make decisions based on actions that yield the most substantial consequences, taking into account the interests of the various entities engaged in a relationship with the firm. So, unlike moral motives, relational motives are driven by external property or attributes but they extend beyond self-interest, in contrast to instrumental motives.

Regarding mediated sources of influence, research findings suggest that coercive and legal legitimate pressure could harm the buyer-supplier relationship ([Maloni & Benton, 2000, p. 64](#); [Nyaga et al., 2013, p. 58](#); [Pulles et al., 2014, p. 31](#)). Research is less conclusive on the effect of reward pressure on the buyer-supplier relationship. On the one hand, rewards can serve as indicators of long-term commitment and tokens of relationship appreciation, thereby stimulating reciprocation ([Narasimhan et al., 2009, p. 383](#); [Nyaga et al., 2013, p. 58](#)). On the other hand, rewards can also signal a more transactional approach, potentially prioritizing immediate rewards over the long-term sustainability of the relationship. For example, that is when the allocation of rewards is not perceived as fair or when the withholding of rewards is perceived as a punishment ([Griffith et al., 2006, p. 94](#); [Ireland & Webb, 2007, p. 493](#); [Maloni & Benton, 2000, p. 64](#); [Nyaga et al., 2013, p. 48](#)).

Contrarily, non-mediated influence strategies focus more on the intrinsic factors of the buyer-supplier relationship than on extrinsic factors such as rewards and punishments ([Brown et al., 1995, p. 368](#)). Fundamentally, non-mediated sources of influence have the potential to strengthen the buyer-supplier relationship by enhancing the supplier's perception of the buyer's dedication to mutual success ([Chae et al., 2017, p. 45](#); [Dahlstrom & Boyle, 1994, p. 53](#); [Mohr & Nevin, 1990, p. 41](#); [Vos et al., 2021, p. 11](#)). Therefore, research suggests that non-mediated sources of influence may be more beneficial to meeting relational ends ([Maloni & Benton,](#)

2000, p. 64). Specifically, expert, referent, normative, and mimetic pressure hold the potential to effectively align with relational motives (Gulati, 2007, p. 100; Lado et al., 2011, p. 203; Paulraj et al., 2017, pp. 243, 244). For instance, relational motives such as collaboration and knowledge sharing align with expert pressure. Furthermore, the buyer-supplier relationship as a goal in itself aligns with referent pressure. Additionally, the relational goal of legitimacy among stakeholders aligns with normative pressure. Finally, the relational motive of wanting to gain a competitive advantage aligns with mimetic pressure. Hence, it is proposed that:

H3. *Relational* supplier motives for environmental sustainability positively impact the effectiveness of *non-mediated* buyer influence strategies *with* relational gains.

H3a. *Relational* supplier motives for environmental sustainability positively impact the effectiveness of buyer *expert* pressure.

H3b. *Relational* supplier motives for environmental sustainability positively impact the effectiveness of buyer *referent* pressure.

H3c. *Relational* supplier motives for environmental sustainability positively impact the effectiveness of buyer *normative* pressure.

H3d. *Relational* supplier motives for environmental sustainability positively impact the effectiveness of buyer *mimetic* pressure.

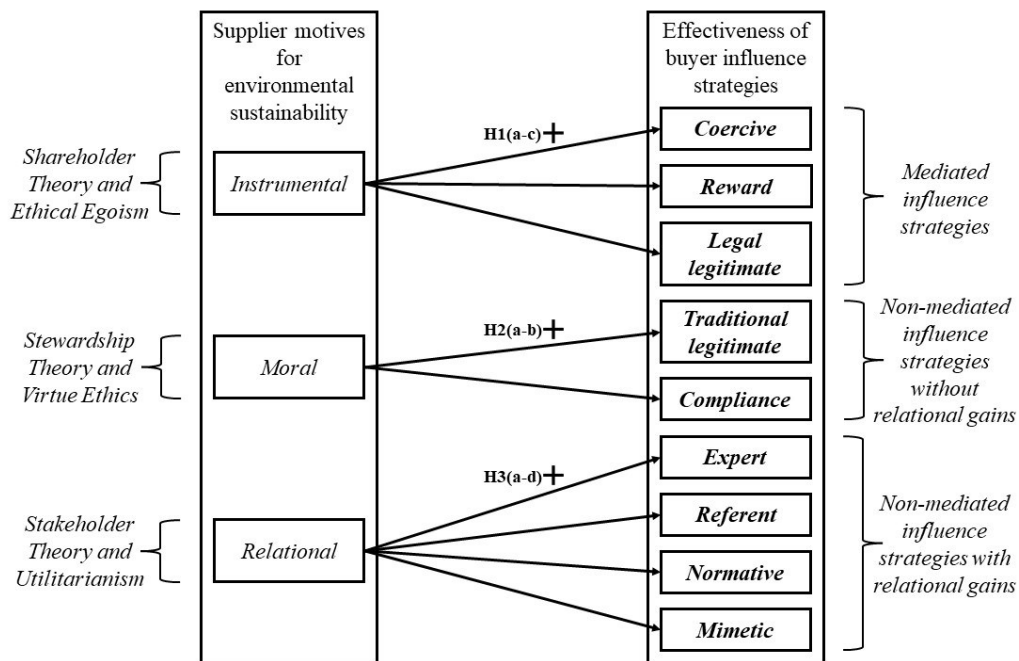


Figure 4. Conceptual Model

3. METHODOLOGY: A MIXED-METHOD CASE STUDY

3.1. Triangulation through a mixed-method research design

Two studies are conducted to explore how supplier motives impact the effectiveness of buyer influence. In the *quantitative* study, numerical data is collected from the key suppliers of a globally operating and sourcing semiconductor manufacturer to test the hypothesized relationships. In the *qualitative* study, textual data is collected from the semiconductor manufacturer's PSM and sustainability professionals to explore how the semiconductor manufacturer can influence its key suppliers to become more environmentally sustainable. The quantitative and qualitative studies reinforced each other in multiple ways, with the primary focus on the quantitative study that is complemented with qualitative insights. Through the mixed-methods research design, this study yields insights beyond those provided by solely the quantitative or qualitative study (Creswell & Creswell, 2017, p. 52). Furthermore, engaging both ends of the dyad in this study provides a more holistic perspective on environmental sustainability in buyer-supplier relationships (Brennan & Turnbull, 1999, p. 482; Murfield & Tate, 2017, p. 1341; Wilson, 1996, p. 9). That is because capturing both points of view enables a comparison between the buyer's and suppliers' perspectives on influence strategy effectiveness, i.e. data source triangulation (Patton, 1999, p. 1195). Where the quantitative study shows how supplier-specific traits impact influence strategy effectiveness, the qualitative study shows how influence strategies can be effectively employed in the context of PSM. Additionally, the complementary nature of quantitative and qualitative research increases the reliability and validity of this study, contributing to the rigor of the process and the trustworthiness of the findings (Roberts & Priest, 2006, p. 41). For instance, utilizing findings from the qualitative study to specify the constructs in the quantitative study enhances the construct validity of the quantitative study. Figure 5 provides a visual representation of the research design. It should be noted that while the figure below presents a sequential view, the interplay between both studies is not completely linear. In the following sections, the case company, the quantitative study, and the qualitative study are discussed, respectively. Subsequently, the chapter concludes with a synthesis of the results of both studies.

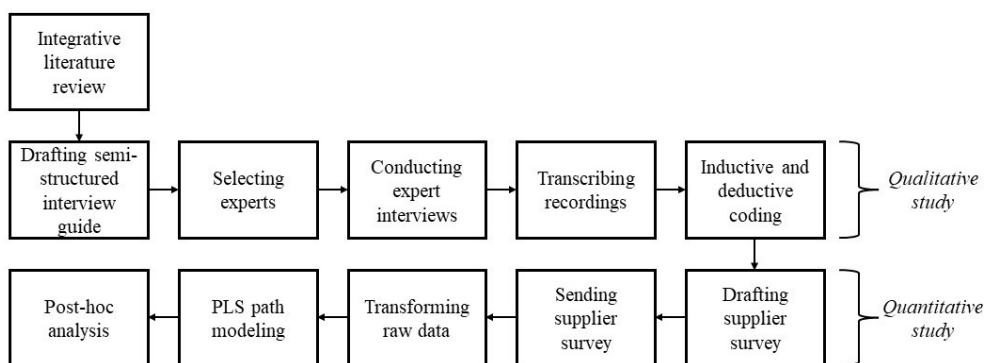


Figure 5. Research Design

3.2. A case study in the semiconductor industry

A case study approach is well-suited for investigating complex phenomena through multiple sources and methods of data collection (Crane, 1999, p. 240; Eisenhardt, 1989, pp. 534, 535; Foerstl et al., 2010, p. 121). Specifically, a single-company case study design ensures the

stability of buyer characteristics, and, thus, controls for any effects such characteristics could have ([Vos et al., 2021, p. 6](#)). Additionally, single-company case study design is reasonable when the single case company’s data is already challenging to acquire ([Ehrgott et al., 2013, p. 141](#); [Liu et al., 2018, p. 101](#)). The case company in this study is a globally operating and sourcing semiconductor manufacturer which is kept anonymous and is, therefore, referred to as “the semiconductor manufacturer”. The case company characteristics are presented in [Table 4](#) below.

Table 4. Case Company Characteristics.

Variable	Value
Industry	Semiconductors
Location	<i>*Data anonymized*</i>
Revenue	<i>*Data anonymized*</i>
Spend	<i>*Data anonymized*</i>
Number of employees	<i>*Data anonymized*</i>
Number of suppliers	<i>*Data anonymized*</i>

Discussions on environmental sustainability performance often focus on the semiconductor industry and supply chain (e.g. chemicals and mining) ([Handfield et al., 2005, p. 2](#)). On the one hand, the semiconductor industry serves as an enabler for environmental sustainability by contributing to global energy efficiency gains and through its role in sustainable technology breakthroughs (electric vehicles, solar panels, etc.) ([Harland et al., 2008, p. 3](#); [Lin et al., 2018, p. 2](#)). On the other hand, the semiconductor industry contributes majorly to global consumption and generation of (chemical) waste and GHG emissions ([Villard et al., 2015, p. 108](#)). Furthermore, the semiconductor industry is highly complex due to relatively long production cycles and short product life cycles ([Ehm et al., 2019, p. 2429](#); [Sun & Rose, 2015, p. 1210](#)). This, coupled with competitive globalization, results in semiconductor supply chains sourcing thousands of parts from dispersed geographic locations ([Gopal et al., 2022, p. 310](#)). Therefore, the semiconductor industry serves as an excellent example of how outsourcing and offshoring trends increase the dependence on suppliers for environmental sustainability.

Specifically, the semiconductor manufacturer (and its first-tier suppliers) are positioned between the downstream brand companies and the second-tier raw material suppliers (see [Figure 6](#)). This supply chain position underscores the pivotal role of the semiconductor manufacturer in driving sustainability throughout the entire supply chain ([Lee et al., 2014, p. 49](#)). As introduced (see [2.1.1.](#)), original equipment manufacturers (OEMs) hold high sustainability expectations for their manufacturing suppliers ([Bartos et al., 2022, p. 6](#)). This is because end consumers attribute responsibility for unsustainable supplier behavior to OEMs ([Hartmann & Moeller, 2014, p. 282](#)). Thus, the semiconductor manufacturer is a fitting example of how the requests of OEMs cascade further in their supply chains ([Bartos et al., 2022, p. 3](#)).

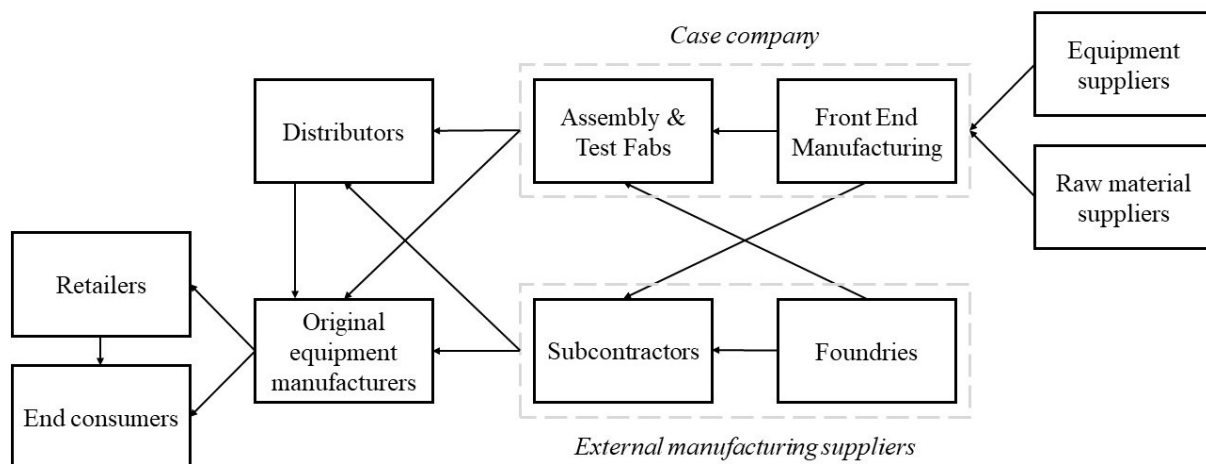


Figure 6. Simplified Overview of the Semiconductor Manufacturer’s Supply Chain

By recognizing the impact of climate change and its consequences on the quality of our planet, the semiconductor manufacturer has committed to the ambitions presented in [Table 5](#). As introduced in the literature review, a firm’s GHG emissions, which consist mostly of CO₂, also include the supplier’s emissions under Scope 3. So, to reach their carbon reduction goal, the semiconductor manufacturer also has to reduce CO₂ emissions on their supply side. As an initial step, the semiconductor manufacturer requested the suppliers of their biggest spend categories, External Manufacturing, Direct Materials, and Equipment, to report their Scope 1 and Scope 2 emissions. Then, based on the purchasing volumes per supplier, an estimation could be made of the semiconductor manufacturer’s portion of their suppliers’ emissions. However, as environmental impacts are not uniform across all business activities it is not an entirely accurate depiction of the semiconductor manufacturer’s contribution to those environmental impacts. Therefore, at the time of this study, supplier-specific Scope 3 reduction targets were not yet defined.

Table 5. Case Company Environmental Sustainability Goals.

Goals	Increments
<i>*Data anonymized*</i>	<i>*Data anonymized*</i>

3.3. A supplier survey as the quantitative study

3.3.1. Sample and data collection: Surveying 131 key suppliers

Naturally, quantitative studies are preferred for testing hypothesized relationships between variables. In addition, quantitative research presents an opportunity to substantiate the mostly qualitative studies in the field of sustainable PSM ([Panigrahi et al., 2019, p. 27](#)). The semiconductor manufacturer has a supply base that enables quantitative data collection on the

supply side. Since it is improbable for such a large buying firm to engage all suppliers at once a sample of 131 suppliers was chosen for the supplier survey. The same sample was used by the semiconductor manufacturer to request Scope 1 and 2 CO₂ emissions to determine their own Scope 3 emissions. The pre-collected data on the suppliers' Scope 1 and 2 CO₂ emissions was the starting point from which the data collected through the supplier survey could expand. Moreover, the 131 suppliers are from the External Manufacturing, Direct Materials, and Equipment categories as these categories have the highest economic and environmental impact on the semiconductor manufacturer. The sample represents ~59% of the semiconductor manufacturer's total annual spend. Excluding corporate services, the sample covers ~80% of the total annual spend, signifying the importance of these suppliers to the semiconductor manufacturer. Selecting the sample based on these three main supply categories ensures that there remains enough diversity among the sample in terms of spend and other characteristics. The sample characteristics are presented in [Table 6](#) below.

Table 6. Sample Characteristics Supplier Survey (N = 86).

Supplier category		Ownership structure		Geographical region*	
Foundry	6%	Public	57%	AMER	19%
Subcon	16%	Private	43%	APAC	72%
FE Materials	14%			EMEA	9%
A&T Materials	43%				
FE Equipment	9%				
A&T Equipment	12%				
Length of relationship with semiconductor manufacturer		Years of experience of respondent		Function of respondent	
0-10 years	31%	0-10	57%	Account/sales manager	41%
11-20 years	43%	11-20	26%	Sustainability manager	18%
21-30 years	21%	21-30	16%	Quality manager	20%
31-40 years	5%	30 >	1%	Other	21%

*Note: AMER = Americas, APAC = Asia-Pacific, EMEA = Europe, Middle East & Africa

The survey includes three variables for motives (i.e. moral, instrumental, relational), and ten variables for influence strategies (i.e. coercive pressure, reward pressure, legal legitimate pressure, traditional legitimate pressure, compliance pressure, expert pressure, referent pressure, normative pressure, mimetic pressure, and rational pressure). The variables, except rational pressure, were identified in the literature review. Rational pressure was identified as an additional influence strategy in the qualitative study. The measurement items for the variables are adopted from previously validated measurement items. For every construct, at least three measurement items were included to make sure that in case one measurement item was dropped, the construct would still be measured by multi-item scales. Multi-item scales consistently demonstrate superior predictive validity compared to single-item scales ([Diamantopoulos et al., 2012, p. 434](#)).

The measurement items were adjusted using track changes. Overall, all the measurement items for the influence strategies were transformed from an empirical focus to a hypothetical focus due to a low expected effect of an empirical focus. As this study aims to investigate the effectiveness of the influence strategies and not necessarily the usage of the influence strategies, a hypothetical focus was prioritized. However, an ideal scenario would

involve measuring both dimensions. Furthermore, the measurement items for the institutional pressures are transformed into the buyer-supplier dyadic relationship with the semiconductor manufacturer to fit the focus of the study and align with the focus of the other measurement items. Moreover, words such as requests, proposals, or change are replaced or adjusted to fit the specific context of environmental sustainability. The measurement items from the survey questionnaire can be found in [Appendix C](#). All the items were measured using a 5-point Likert scale ranging from “strongly disagree” to “strongly agree”.

The survey was transformed into MS Forms and was sent via e-mail to the suppliers’ account managers. The survey was open for two weeks and reminders were sent in two waves. The first reminder was sent by the researcher after one week. The second reminder was sent through the corresponding sourcing managers to the remaining suppliers a few days before the closing of the survey. After excluding all the cases that indicated the possession of insufficient knowledge to complete the survey, 86 usable responses were collected. This corresponds to a response rate of approximately 66%. After the data was collected the responses were matched with the semiconductor manufacturer’s internally available data, such as category and CO₂ emissions. Once all responses were matched, the data was anonymized.

3.3.2. Control variables: Supplier environmental impact, supplier dependence, and relationship length

The investigation regarding the possible contingency factors that could influence the effectiveness of the influence strategies in the literature review (see [2.2.2.](#)) highlights the significance of control variables in this study. Three control variables were included to account for the effects of characteristics specific to the supplier and the buyer-supplier relationship. First, supplier environmental impact was controlled for. Typically, supplier environmental impact is included in theoretical models as a dependent variable (e.g. [Arora et al., 2020, p. 714](#); [Eggert & Hartmann, 2021, p. 3](#); [Gelderman et al., 2021, p. 5](#)). However, due to the effectiveness of influence strategies being measured with hypothetical questions, the direction of causality is more logically established when controlling for environmental impact as an independent variable. Furthermore, it could be reasoned that the effectiveness of influence strategies can be affected by the supplier’s existing environmental impact. By definition, influence is exercised to achieve certain objectives by fostering behavioral change ([French & Raven, 1959, p. 151](#); [Frooman, 1999, p. 197](#)). In this context, the desired outcome is the adoption of sustainable practices that result in reduced environmental impacts. Environmental impacts are a direct reflection of organizational behavior ([Eggert & Hartmann, 2021, p. 7](#)). So, suppliers with higher environmental impacts may require bigger changes in organizational behavior to become more sustainable. This distinction in response could impact the perceived effectiveness of the influence strategies. Here, supplier environmental impact is measured by annual Scope 1 and Scope 2 CO₂ emissions as they reflect organizational behavior in terms of production and energy consumption. Specifically, CO₂ is the major anthropogenic GHG to be reduced to combat climate change ([Intergovernmental Panel on Climate Change, 2014, p. 46](#)) (see [2.1.2.](#)).

Next, the dependence of the supplier on the semiconductor manufacturer is included as a control variable. Supplier dependence can be used to explain how the influence of the buyer impacts the adoption of sustainable practices by the supplier ([Frooman, 1999, p. 196](#); [Saeed et al., 2018, p. 4](#); [Sarkis et al., 2011, p. 9](#); [Wolf, 2014, p. 319](#)). One perspective suggests that highly dependent suppliers are more receptive to fulfilling the buyer’s environmental performance requests, thus increasing the effectiveness of influence ([Brown et al., 1995, p. 384](#); [Eggert & Hartmann, 2021, pp. 4, 5](#); [Goodman & Dion, 2001, p. 296](#); [Zhao et al., 2008, p.](#)

369). Another perspective proposes that highly dependent suppliers make sacrifices in resource acquisition to maintain exchange relationships at the expense of environmental performance (Z. Zhang et al., 2021, p. 4). So, this adverse view suggests that supplier dependence can lower the effectiveness of buyer influence strategies. The contrasting views signify the importance of including supplier dependence as a control variable. Supplier dependence is measured through five measurement items using a 5-point Likert scale ranging from “strongly disagree” to “strongly agree” (see Appendix C).

Then, the length of the relationship is added as a control variable to account for its potential influence. Previous research shows how exchange relationships develop over time (Pulles et al., 2022, p. 12; Vanneste et al., 2014, p. 1898), and how relationship length can affect relational outcomes, such as perceived fairness, trust and influence (Griffith et al., 2006, p. 87; Nagati & Rebolledo, 2013, p. 185; Vos et al., 2021, p. 7; Zhao et al., 2008, p. 378). Specifically in this study, the recent shift to a more collaborative supplier relationship management approach by the semiconductor manufacturer makes relationship length a considerable control variable. Respondents to the supplier survey were asked to indicate the length of their firm’s relationship with the semiconductor manufacturer in years. In conclusion, controlling for tangible variables like supplier environmental impact and relationship length provides empirical support to the research model and strengthens the construct validity of the findings. Table 7 lists the control variables. The descriptive statistics and correlations among all the variables collected through the supplier survey are presented in Appendix D.

Table 7. Control Variables.

Variable	Value	Data collection
Supplier environmental impact	Metric tons CO ₂ (Scope 1 and 2)	Semiconductor manufacturer
Supplier dependence	5-point Likert scale (average of 5 measurement items)	Supplier survey
Relationship length	Years	Supplier survey

3.3.3. Measures against hypothetical bias, social desirability bias, common method bias, and non-response bias

Multiple measures were taken to reduce the effect of possible biases in the supplier survey. As introduced, the questions regarding the influence strategies were asked hypothetically. This introduces the key concern of hypothetical bias, i.e. whether or not – and to what extent – the answers of survey respondents and subsequent inferred estimates translate to real-world settings (Haghani et al., 2021, p. 1). Or simply put; hypothetical bias in surveys mirrors the age-old statement that “there is a difference between saying and doing” (Loomis, 2014, p. 35). *Ex-ante*, a so-called “honesty approach” was chosen to reduce hypothetical bias. The section on influence strategies started with a brief introduction, highlighting the hypothetical nature of the questions and emphasizing the importance of providing honest and genuine feedback, with no right or wrong answers (see Appendix E). Additionally, at the end of the survey, respondents were queried about their confidence in possessing sufficient knowledge to provide accurate responses to the questions. The cases indicating to have insufficient knowledge were deleted and were not included in the data analysis.

In general, survey participants tend to downplay activities considered socially undesirable while exaggerating those deemed socially desirable due to concerns about how

they are perceived by others ([Krumpal, 2013, p. 2025](#)). Especially when the survey questions regard potentially sensitive topics, such as influence and dependence ([Krumpal, 2013, p. 2026](#)). Thus, social desirability bias can potentially skew results if respondents feel pressured to provide responses that are socially acceptable or desirable rather than reflecting their actual views. This risk was found to be further amplified in research on hypothetical questions ([Kaderabek & Sinibaldi, 2022, p. 2](#); [Norwood & Lusk, 2011, p. 532](#)). Nonetheless, the social norms related to hypothetical questions can also be more ambiguous because of their hypothetical nature and the introduction of novel information, which could potentially limit the impact of social desirability bias ([Moore et al., 2012, p. 169](#)). In this study, social desirability bias is mitigated by carefully tailoring the survey design, thereby (1) assuring participants that responses were collected independently of the semiconductor manufacturer, (2) affirming that there are no right or wrong answers, and (3) increasing the perceived benefit for respondents in being truthful ([Krumpal, 2013, pp. 2041, 2042](#)). Regarding the last point, the invitation for the survey was presented as an opportunity for the respondents to share their perspectives on collaboration for environmental sustainability. Finally, the AI-powered language model ChatGPT-3.5 was used to determine the order of the questions regarding the influence strategies, aiming to minimize the impact of social desirability bias (see [Appendix F](#)). The descriptive statistics of the variables (see [Appendix D](#)) indicate an adequate level of variability, suggesting that respondents did not consistently provide socially desirable answers.

In addition, common method bias can occur in this study as both the independent and dependent variables are measured with the same survey ([F. Kock et al., 2021, p. 3](#)). Common method bias can be problematic as it may affect both the reliability of the measurement items and the validity of the results ([F. Kock et al., 2021, p. 3](#); [MacKenzie & Podsakoff, 2012, p. 543](#); [Podsakoff et al., 2012, p. 565](#)). The risk of common method bias is raised when respondents cannot provide accurate responses ([MacKenzie & Podsakoff, 2012, p. 544](#)). As introduced, the cases indicating to have insufficient knowledge to provide accurate answers were deleted. Furthermore, to avoid respondents forming their own theories about cause-and-effect relationships, questions related to different constructs were intentionally placed in different sections in the survey questionnaire ([Miemczyk & Luzzini, 2019, p. 245](#)). To address this concern and to sustain the respondents' motivation, the length of the questionnaire was minimized by pre-collecting data on environmental impact and sample characteristics directly from the semiconductor manufacturer ([Casidy & Yan, 2022, p. 317](#)).

Lastly, non-response bias occurs when the non-responders are significantly different from the individuals who do respond. This bias can pose a problem because it may lead to results that are less representative of the entire target population. Firstly, Levene's test of homogeneity of variances and the independent samples t-test revealed a significant difference in environmental impact between non-responders and responders (see [Appendix G](#)). There are several potential reasons for why this bias is present. Non-responders may exhibit (1) reduced interest in sustainability-related activities, (2) concerns about potential negative consequences, (3) greater resource and time constraints to respond, or (4) a diminished perception of the benefits of participating, compared to responders. Controlling for supplier environmental impact can mitigate the influence of a potential non-response bias. Next, a comparison was made between the responses of early and late respondents to examine potential non-response bias. Here, it is assumed that late responders constitute the group that did not respond during the first wave of responses ([Armstrong & Overton, 1977, p. 399](#)). Early responses are those received before the reminder from sourcing managers ($N = 37$), while late responses are those

received after the reminder ($N = 49$). Levene's test of homogeneity of variances revealed a significant difference in the variance of moral motives between early and late responders (see [Appendix G](#)). However, the independent samples t-test showed no significant difference between the mean of moral motives between early and late responders. Additional robust tests for equality of means (Welch's and Brown-Forsythe) also did not show a significant difference between the mean moral motives of early and late responders. So, while the spread of the data (variance) is different between the two groups, the central tendency (mean) is not significantly different. Therefore, a non-response bias for moral motives cannot be assumed.

3.3.4. Data analysis: PLS path modeling

To test the statistical significance of the hypothesized paths, partial least squares (PLS) path modeling, also known as structural equation modeling (SEM), was employed. PLS path modeling is the most suitable statistical tool for evaluating various relationships among independent (exogenous) and dependent (endogenous) variables, allowing for the simultaneous consideration of aggregated dependence relationships within one comprehensive model ([Benton & Maloni, 2005, p. 11](#)). In fact, the adoption of PLS path modeling is on the rise in various social science disciplines, including PSM ([Hair, Risher, et al., 2019, p. 3](#); [Kaufmann & Gaeckler, 2015, p. 259](#)). This trend is significant because PLS path modeling uniquely overcomes the apparent dichotomy between academic and practical implications by combining explanation and prediction through a causal-predictive approach ([Gregor, 2006, p. 626](#); [Hair, Risher, et al., 2019, p. 3](#); [Hair, Sarstedt, et al., 2019, p. 572](#)). Thus, the adoption of PLS path modeling can contribute to bridging the academic-practitioner gap that persists in the field of PSM ([Stange et al., 2022, p. 1](#)).

Furthermore, PLS exhibits a greater degree of statistical power in comparison to composite-based SEM, increasing the likelihood of detecting a relationship significant when it exists in the population ([Hair et al., 2021, p. 11](#)). To ensure adequate statistical power, the sample should adhere to the recommended minimum size guidelines ([Hair et al., 2021, p. 15](#)). [Barclay et al. \(1995, p. 292\)](#) suggest that, as a rule of thumb, the sample size should be ten times the number of independent variables. In this study that means that the sample size should be larger than six (including control variables) times ten ($86 > 60$). While it offers a rough guideline, more accurate sample size requirements consider the statistical power of the estimates ([Hair et al., 2021, p. 16](#)). For example, when aiming at achieving a power level of 80%, the minimum required sample size is between 155 and 69 observations, assuming that the minimum path coefficient that is significant at 5% is between 0.11 and 0.30 ([Hair et al., 2021, p. 18](#)). While this guideline suggests a sample size at the lower end of the recommended range, the sample is considered appropriate for PLS path modeling, especially given the relatively high response rate of 66%. The statistical software SmartPLS 4 was used to conduct the PLS path modeling as it stands out as the most comprehensive option available ([Sarstedt & Cheah, 2019, p. 5](#)).

As a first step, the reflective measurement model was examined by following the evaluation procedure proposed by [Hair et al. \(2021, p. 76\)](#). This process began by evaluating item reliability through an analysis of the indicator loadings. All loadings exceed the recommended threshold of 0.708 (see [Appendix H](#)), indicating that the constructs explain more than 50 percent of the indicator's variance, thus demonstrating sufficient item reliability ([Hair, Risher, et al., 2019, p. 8](#)). Next, internal consistency reliability was assessed by reviewing composite reliability (ρ_a), an estimate that typically lies between the more conservative Cronbach's alpha and the more lenient composite reliability (ρ_c) ([Hair et al., 2021, p. 78](#)).

Higher values generally indicate higher levels of reliability. All constructs, except compliance pressure, demonstrate reliability levels above the threshold of 0.70 (see [Appendix I](#)) ([Hair, Risher, et al., 2019, p. 8](#)). After dropping Compliance_Pressure1, all constructs show sufficient internal consistency reliability. However, values of 0.95 and higher can be problematic because they indicate (1) that items are redundant, which adversely affects construct validity, and (2) the possibility of undesirable response behavior, such as straight lining ([Diamantopoulos et al., 2012, p. 436](#); [Drolet & Morrison, 2001, p. 198](#); [Hair, Risher, et al., 2019, p. 8](#)). This issue is addressed during the assessment of the structural model.

After evaluating the reliability, the convergent and discriminant validity of the reflective measurement model was examined. First, convergent validity assesses how well a construct aligns with and accounts for the variance of its items, and is measured by the average variance extracted (AVE) for all items within each construct ([Hair, Risher, et al., 2019, p. 9](#)). The AVE of each of the constructs is greater than 0.65, signifying that the construct explains a minimum of 65 percent of the variance among its items (see [Appendix I](#)). This surpasses the 50 percent threshold, demonstrating robust convergent validity. Second, discriminant validity refers to the degree to which a construct can be empirically distinguished from other constructs within the structural model ([Hair, Risher, et al., 2019, p. 9](#)). Heterotrait-monotrait (HTMT) ratio of correlations is used for evaluating discriminant validity because it offers greater sensitivity in detecting potential issues with discriminant validity than both the Fornell-Larcker criterion and the assessment of cross-loading ([Henseler et al., 2015, p. 128](#)). No value surpasses the more conservative threshold of 0.85, thus no discriminant validity problems seem to be present (see [Appendix J](#)).

After a satisfactory evaluation of the measurement model, the assessment of the structural model follows. Before evaluating the structural relationships, it is essential to examine whether collinearity does not introduce bias to the results of the regression equations. Collinearity is frequently assessed using the variance inflation factor (VIF), where values exceeding 5 indicate significant collinearity concerns among the indicators of formative measurement constructs ([Hair, Risher, et al., 2019, p. 10](#)). As a result, multiple highly-correlated measurement items were dropped to ensure VIF values below 5 for the remaining measurement items (see [Appendix K](#)). Collinearity is typically not a significant concern when VIF values fall between 3 and 5, and values below 3 generally indicate no collinearity problems ([Hair et al., 2021, p. 96](#)). In addition to the dropped items due to collinearity concerns, Coercive_Pressure5 was dropped to ensure construct validity and maintain composite reliability (ρ_a) values below 0.95.

Next, the model's explanatory (i.e. in-sample predictive) power and predictive (i.e. out-of-sample predictive) power were assessed. The model's explanatory power is evaluated with the metric R^2 , which represents the variance explained in each of the endogenous constructs ([Hair, Risher, et al., 2019, p. 11](#)). The structural model accounts for 12 to 44 percent of the variance in the endogenous constructs (see [Appendix L](#)). Thus, the R^2 values indicate a weak to moderate explanatory power of the model. The relatively modest explanatory power may not come as a surprise, considering the complexity of the model, the somewhat low sample size, and the context of social science research. Social science is inherently less predictable than, e.g. physical science because human behavior is influenced by a multitude of factors that are often challenging to measure accurately ([Hair, Risher, et al., 2019, p. 11](#)).

Finally, the structural model's predictive power is assessed. Especially when considering the risk of hypothetical bias, strong predictive power helps to ensure that the

model's results are not solely reliant on hypothetical responses but also match real-world outcomes, enhancing its ability to predict future observations. Firstly, Q^2_{predict} was evaluated to assess the predictive accuracy of the model. The Q^2_{predict} values provide limited insights as they depict a range of no to large predictive relevance (see [Appendix M](#)) ([Hair, Risher, et al., 2019, p. 12](#)). Therefore, the prediction statistics were subsequently examined. Here, predictive power is assessed by comparing the root mean squared error (RMSE) with a naïve benchmark produced through a linear regression model (LM) (see [Appendix M](#)). Since none of the RMSE values are greater than the values of the LM benchmark, high predictive power is declared for the indicators with $Q^2_{\text{predict}} > 0$, and medium predictive power is declared for the overall structural model ([Hair, Risher, et al., 2019, p. 13](#); [Shmueli et al., 2019, p. 2329](#)).

3.3.5. Results: Hypothesis testing

To test the hypothesized paths, the statistical significance of the path coefficients is assessed. A one-tailed bootstrapping procedure, utilizing 500 subsamples at a 5% significance level, is employed for computing the path coefficients. The choice for a one-tailed test is based on the relatively modest sample size and the fact that all hypotheses have specific directional paths ([N. Kock, 2017, p. 232](#)). Similar bootstrap samples of 250 and 1,000 were employed to check the stability of the estimates. The results show consistent levels of significance across the bootstrap samples.

Additionally, supplier environmental impact has 12 missing values due to a non-response to the semiconductor manufacturer's initial survey. Therefore, an appropriate missing value treatment should be chosen before the bootstrapping procedure. SmartPLS 4 offers mean replacement, casewise deletion, and pairwise deletion as options for treating missing values. Firstly, mean replacement is not generally accepted due to its potential to introduce inconsistent bias and increase sample size without adding new information ([Kang, 2013, p. 404](#)). Secondly, casewise deletion is the most commonly used approach, which is also the most conservative as it involves excluding all cases with missing data. However, when more than 5% of the values are missing and the values are not missing completely at random (MCAR), casewise deletion is not the preferred option ([Kang, 2013, p. 404](#)). With 12 missing values out of 86 observations, more than 5% of the values are missing (12/86 ~14%). Furthermore, the tests for non-response bias (see [Appendix G](#)) showed a significant difference in environmental impact between non-responders and responders, indicating that MCAR cannot be assumed. Thirdly, pairwise deletion maximizes the use of available data, which is especially beneficial given the relatively low sample size ([Little et al., 2014, p. 76](#)). Moreover, because it maximizes the use of available data, pairwise deletion can be more robust than casewise deletion when dealing with non-MCAR data. Thus, pairwise deletion is chosen because it seems to be the most appropriate missing value treatment.

The results of the model (see [Appendix N](#)) reveal multiple positive and significant relationships between the supplier motives for environmental sustainability and the effectiveness of buyer influence strategies. Firstly, instrumental motives have a positive effect on coercive pressure ($\beta = .305, p < .01$) and legal legitimate pressure ($\beta = .224, p < .05$), with an insignificant effect on reward pressure ($\beta = .229, p = \text{n.s.}$). Additionally, instrumental motives have a positive effect on two non-mediated influence strategies; traditional legitimate pressure ($\beta = .248, p < .05$) and rational pressure ($\beta = .263, p < .05$). Secondly, moral motives have an insignificant effect on traditional legitimate pressure ($\beta = .002, p = \text{n.s.}$), and a positive significant effect on compliance pressure ($\beta = .297, p < .05$). Furthermore, moral motives have a positive significant effect on reward pressure ($\beta = .244, p < .05$), legal legitimate pressure (β

= .230, $p < .05$), expert pressure ($\beta = .318$, $p < .05$), and rational pressure ($\beta = .179$, $p < .05$). Thirdly, relational motives have a positive significant effect on referent pressure ($\beta = .357$, $p < .01$), normative pressure ($\beta = .391$, $p < .001$), and mimetic pressure ($\beta = .294$, $p < .05$).

H1 is partially supported as instrumental motives exhibit influence on two out of three mediated influence strategies. The results offer support for *H1b* and *H1c*, indicating that suppliers with primarily instrumental motives are more likely to engage in environmental sustainability due to coercive and legal legitimate pressure. However, *H1a* did not receive support from the results. *H2* is partially supported because moral motives have a positive effect on the effectiveness of compliance pressure. So, while *H2b* finds support in the results, *H2a* lacks support. *H3* is partially supported because relational motives positively impact the effectiveness of three out of four non-mediated influence strategies with relational gains. Specifically, *H3a* finds no support in the results, while there is empirical support for *H3b*, *H3c*, and *H3d*. The results of the hypotheses are summarized in [Table 8](#) below.

Table 8. Hypotheses Testing.

	Hypothesis	Result
<i>H1.</i>	Instrumental motives → Mediated influence strategies	Partially supported
<i>H1a.</i>	Instrumental motives → Reward pressure	Not supported
<i>H1b.</i>	Instrumental motives → Coercive pressure	Supported
<i>H1c.</i>	Instrumental motives → Legal legitimate pressure	Supported
<i>H2.</i>	Moral motives → Non-mediated influence strategies without relational gains	Partially supported
<i>H2a.</i>	Moral motives → Traditional legitimate pressure	Not supported
<i>H2b.</i>	Moral motives → Compliance pressure	Supported
<i>H3.</i>	Relational motives → Non-mediated influence strategies with relational gains	Partially supported
<i>H3a.</i>	Relational motives → Expert pressure	Not supported
<i>H3b.</i>	Relational motives → Referent pressure	Supported
<i>H3c.</i>	Relational motives → Normative pressure	Supported
<i>H3d.</i>	Relational motives → Mimetic pressure	Supported

In addition to the hypothesized paths, several significant relationships involving the control variables were identified. The length of the relationship has no significant effect on any of the dependent variables. Notably, supplier dependence has a positive significant effect on reward pressure ($\beta = .244$, $p < .05$), legal legitimate pressure ($\beta = .352$, $p < .001$), traditional legitimate pressure ($\beta = .488$, $p < .001$), expert pressure ($\beta = .158$, $p < .05$), referent pressure ($\beta = .316$, $p < .01$), and rational pressure ($\beta = .224$, $p < .05$). Thus, demonstrating that supplier dependence has a significant impact on the effectiveness of these influence strategies. Lastly, the findings indicate a negative relationship between the environmental impact of the supplier and the effectiveness of expert pressure ($\beta = -0.203$, $p < .05$) and rational pressure ($\beta = -0.223$, $p < .01$). These results indicate that as the environmental impact of the supplier increases, the effectiveness of expert pressure and rational pressure decreases. The significant paths are shown in the empirical model below (see [Figure 7](#)).

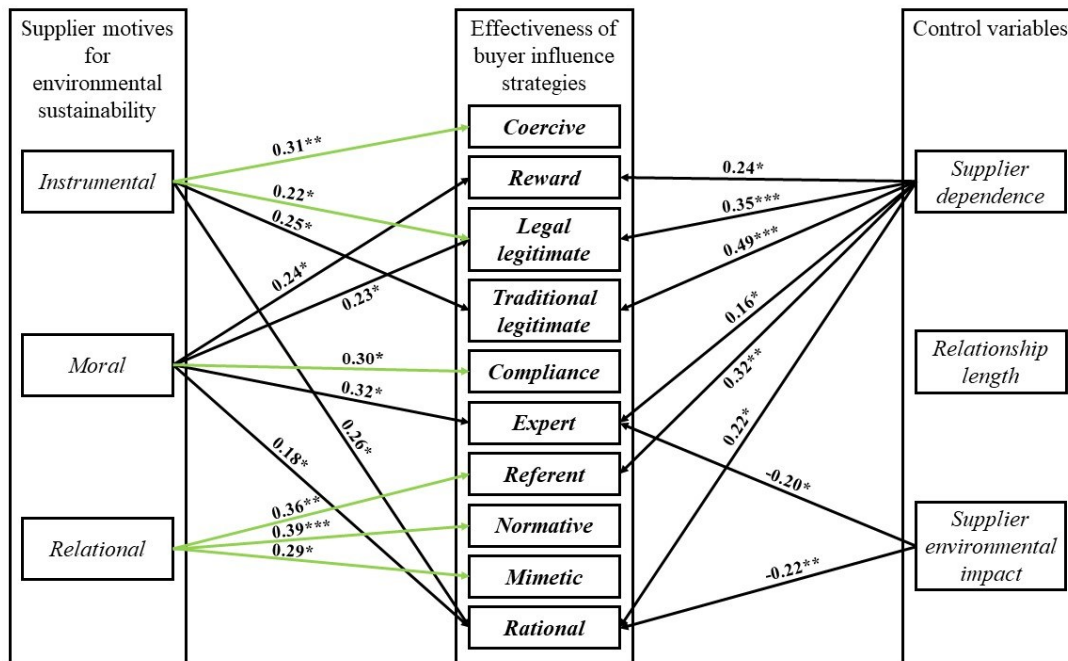


Figure 7. Empirical Model
 Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
 Only significant paths are shown.
 Beta coefficients are rounded to two decimals.
 Supported hypothesized paths are indicated in green.

3.4. Expert interviews as the qualitative study

3.4.1. Sample: PSM and sustainability professionals

Through the integrative literature review, nine buyer influence strategies were identified. However, academic research in the field of PSM has not kept pace with industry practice regarding environmental sustainability (Arora et al., 2020, p. 720; Panigrahi et al., 2019, p. 27; Schoenherr et al., 2012, p. 4565; Stange et al., 2022, p. 1). This gap can be attributed to a relatively limited understanding of individual buyers' behavior and decision-making (Carter & Liane, 2011, p. 57; Gattiker & Carter, 2010, p. 73), even though individual buyers often hold the responsibility for influencing suppliers (Schoenherr et al., 2012, p. 4564). Therefore, the qualitative study aims to specify these nine constructs and potentially discover additional constructs from the buyer side on the individual level, providing additional validation for the quantitative study. The sample for the qualitative study consists of the case company's professionals who are increasingly involved in environmental sustainability in the context of PSM. The sampling aim was to select participants with varying characteristics, such as subcategory managed, gender, nationality, and level of experience. PSM professionals were selected based on the three main supplier categories: External Manufacturing, Direct Materials, and Equipment. This is to ensure the qualitative study concerns the same phenomenon as the quantitative study, i.e. valid method triangulation. In total nine PSM professionals were selected with at least two PSM professionals for each of the three supply categories. Additionally, two sustainability professionals were selected as they could provide supplemental insights into the semiconductor manufacturer's environmental sustainability context. An overview of the characteristics of the qualitative study's participants is presented in Appendix O.

3.4.2. Data collection: Semi-structured expert interviews

As the main aim of the qualitative study is to understand the individual PSM professionals, an individual approach through expert interviews was favored over an interactive approach ([Acocella, 2012, p. 1135](#); [Schiele et al., 2022, p. 287](#)). All participants classify as experts because they were able to relate the questions to their category or sustainability objectives, category or sustainability strategy, and own ways of supplier engagement ([Bogner et al., 2009, p. 117](#)). However, it should be noted that for most participants motivating suppliers to become more environmentally sustainable is still a growing element of their tasks. For expert interviews, it is recommended to use an interview guide based on general topics as it allows the interviewees to more freely elaborate on their perspectives ([Bogner et al., 2009, p. 31](#)). A semi-structured approach to the expert interviews is chosen because the focal questions define the specific areas of interest to be explored but at the same time allow for a divergence to pursue inputs and responses in more detail to ensure a thorough examination of the subject matter ([Britten, 1999, p. 13](#); [Gill et al., 2008, p. 291](#)). Additionally, the semi-structured approach benefits the reliability of the results by delving deeper into inputs and responses whilst ensuring equality among cases through an interview guide ([Delke, 2022, pp. 214, 215](#)). In the context of reliability, the interview guides designed for this study (see [Appendix P](#)) provide a knowledge base in the field of sustainable PSM to the extent that they could, in principle, be repeated by anyone. That is because each question has an outline based on existing literature. The specific measures to ensure reliability and validity in the expert interviews are presented in [Appendix Q](#).

The interview guide comprises five topics and eighteen main questions for the PSM professionals, ten main questions for the sustainability professionals, and a set of sub-questions. In principle, each main question was asked, and the sub-questions were used to expand upon a point when deemed necessary. The first topic explores the role and responsibilities of the interviewees with the intent of better understanding the background of the experts. This information could be useful when diving deeper into the subject in the subsequent sections. The interviews progressed with questions on the objectives and the corresponding strategy for sustainability and the supply categories. These questions were asked to better understand the context of the semiconductor manufacturer and its experts. Subsequently, these questions were followed by a set of explorative questions on supplier engagement for environmental sustainability. When no new ideas were provided the interview continued with a more deductive approach where the interviewees were asked to reflect on the list of influence strategies presented in [Table 1](#). Finally, the interview concluded with questions aimed at assessing the case company and its experts' contingency factors in terms of resources and competences.

The interviews were conducted in the last three weeks of June 2023. All interviews took around one hour to be completed, ranging from 30 minutes for the shortest interview to one hour and 25 minutes for the longest interview. The interviews with the Dutch participants were conducted face-to-face whilst the other interviews were conducted in an online environment via MS Teams. All interviews were recorded with informed consent. The recordings were transcribed via MS Stream. Once the transcripts were corrected for transcription errors the recordings were deleted. Finally, the transcripts were anonymized to remove or shield any personal information that could be traced to the participants or the semiconductor manufacturer. The transcripts served as the main source of qualitative data for the subsequent data analysis. The approach to the qualitative data analysis can be found in [Appendix R](#).

3.4.3. Results: Empirical evidence from experts

From the analysis of the expert interviews, several key themes and strategies for influencing suppliers' behavior toward environmental sustainability emerged, leading to a revised list of influence strategies presented in [Table 9](#) below. In the revised list, the influence strategies identified in the integrative literature review are supported by practical examples from the experts. Furthermore, rational pressure is identified as an additional non-mediated influence strategy used in practice.

Table 9. Revised Influence Strategies.

Influence strategy	Description	Example
<i>Mediated</i>	<i>Direct influence to bring about action from the supplier</i>	
Coercive pressure	<i>Punishing or withholding punishment</i>	“you might lose some business or lose some allocation or you may be phased-out from our business”
Reward pressure	<i>Rewarding or withholding rewards</i>	“if the semiconductor manufacturer is not satisfied with your response, you will not get any new business”
Legal legitimate pressure	<i>Legitimizing demands with legal certainty or judiciary right</i>	“sometimes you use regulations and legal rights to push through certain things that set a door open”
<i>Non-mediated</i>	<i>Indirect influence that depends on the supplier's perception</i>	
Compliance pressure	<i>Legitimizing demands with an indirect legal obligation</i>	“if you still want to produce here [in Europe] in 10 years, you have to do something, because otherwise, you can lose your permit”
Traditional legitimate pressure	<i>Legitimizing demands on the basis of shared values and beliefs</i>	“I know for my suppliers that some do want to participate in sustainability and I know we do, so I think together we can get there”
Expert pressure	<i>Sharing desired expertise and knowledge</i>	“we can propose some experts to them [the suppliers] so that they can invite the experts to their company to talk to their staff”
Referent pressure	<i>Creating a positive reputation a supplier wants to identify with</i>	“when we do a good job regarding ESG it becomes well-known in the market, so if they are our supplier they will get a good reputation as well”
Normative pressure	<i>Engaging stakeholders and leveraging social influence</i>	“we could start something like a corporate ESG workshop just to invite customers, and suppliers to, like, a supplier day, where we talk about business and rate them accordingly”
Mimetic pressure	<i>Encouraging supplier competition</i>	“supplier A already complies with this. So, why supplier B cannot do it?”
Rational pressure	<i>Using logical arguments and factual evidence</i>	“you can actually win more business from our customers because this kind of deployment is the market chain”

Besides the revised list, the findings regarding influence strategy effectiveness from the buyer side are that (1) positive approaches are preferred over coercive and legal ones, (2) non-mediated influence strategies are more universally applicable than mediated influence strategies, (3) supplier dependence can be a caveat for influence strategy effectiveness, and (4) non-mediated buyer influence strategies without relational gains are less commonly used. Additionally, the qualitative study provides insights that supplement the quantitative study beyond the effectiveness of the influence strategies themselves. These additional findings have implications for how the influence strategies can be effectively performed by the buyer: (1) sourcing managers find it challenging to balance environmental sustainability with other sourcing objectives and (2) PSM and sustainability professionals have complementary competences. These findings are outlined below.

Positive approaches are preferred

Most experts expressed a preference for positive and collaborative approaches over coercive and legal ones. A positive approach is favored because of a better fit with their sourcing strategy, its positive impact on the relationship, and the fact that coercive and legal pressures are typically considered as measures of last resort.

*“Especially after COVID, the entire environment is a big change. **We are talking more about collaboration and partnership with the supplier instead of, in the past, we would probably just force them, give them pressure, and follow up with them to make sure they can achieve the goal. But today I would say a long-term business relationship with the supplier is an important area we need to focus on. So yeah, that is something that I will continue to drive.**”* – PSM Professional 9

*“A coercive pressure I wouldn’t use because it’s probably the last resort. If we do this then it kind of damages the relationship and you basically just cut them off. **If you’re not ready to cut off the supplier we want to adopt a more positive approach.**”* – PSM Professional 4

In that regard, the experts unanimously emphasize the effectiveness of reward pressure in influencing supplier behavior. This includes offering new business, partnership opportunities, and awards as a form of recognition for suppliers who meet or exceed sustainability goals.

*“I think it is different for all sorts of different situations, but in common I will say that **the reward pressure is the key one.** Yeah. They [the suppliers] understand that the semiconductor manufacturer is very focused on this [environmental sustainability]. So, **if they don’t comply with the requirements, they will not get new business.**”* – PSM Professional 1

*“Another thing is probably a long-term partnership, to **secure a long-term business for them [the suppliers]. It could be an incentive for them to continue work on this area to make sure the environmental responsibility will continue to improve and we achieve even higher goals.**”* – PSM Professional 9

Furthermore, referent and expert pressure are perceived as positive and collaborative approaches to engaging suppliers for environmental sustainability. The underlying concept is that the semiconductor manufacturer should set a good example to effectively engage suppliers and that the aim should be to work toward a common industry standard.

*“The reward pressure, the referent pressure, right, **where you have them identify with you as a branding and positive reputation.** I think that that is more positive and more collaborative, I think that that would be something we should strive towards.” – PSM Professional 4*

*“When we do a good job regarding ESG it becomes well-known in the market, so **if they are our supplier they will get a good reputation as well.** If our supplier aligns their ESG with the semiconductor manufacturer and we sustain it together. I believe they can get the same good reputation as well and it will be recognized by other customers and in the markets.” – PSM Professional 3*

*“So, we also can think of some ongoing program, we may work together with some key suppliers first. To work together with the supplier, **we can propose some of the experts to them so that they can invite the experts to their company to have a talk with their staff.**” – PSM Professional 3*

Non-mediated influence strategies are more universally applicable

Additionally, certain experts recognized that mediated influence strategies may not be universally applicable. For instance, in situations where the sourcing manager cannot allocate more or less business, non-mediated influence strategies are considered to be more suitable. Through the inductive approach, one new non-mediated influence strategy was identified: rational pressure. It involves the use of compelling arguments to influence the supplier.

*“I normally start with the reasons. For example, actually, this kind of requirement is for the good of you, meaning that you can increase your own advantage or competence. So it’s not only for the business between you and the semiconductor manufacturer, but **you can actually win more business from our customers because this kind of deployment is the market chain.** So you just need to be aware and really take action to achieve it.” – PSM Professional 1*

*“If you can’t punish them with the amount of business because you’re bound to them, for example, and you have no alternative, you’ll have to influence them in a different way, then it will also concern **emphasizing more on the soft side why it is important for all of us to become more sustainable.**” – PSM Professional 5*

*“At some point, I think that if legislation comes or indeed our customers demand a certain standard, at some point you would have no choice as the semiconductor manufacturer. Then you have to take some more rigorous measures. **Now I think you still have the opportunity to work towards that new situation with suppliers.**” – PSM Professional 7*

Supplier dependence can be a caveat for influence strategy effectiveness

However, multiple experts mentioned that supplier dependence can be a potential caveat. They emphasized that suppliers that are less dependent on the semiconductor manufacturer might be less receptive to influence, even when the sourcing manager presents compelling arguments.

*“It is not just, okay, we know what we want, but that often also means that suppliers have to invest a considerable amount of money in changes in their production process or way of working. So all the things we ask cost money. That is actually what matters. So even though they think our request is logical and they understand our question and it is all very sympathetic, but if the semiconductor manufacturer is the only one who asks it that way, then **the chance is small that the supplier says, fine, even if you only have a few percent of my total production volume, we will make that multi-million investment for you.**” – PSM Professional 5*

*“I don’t think it’s just something that the semiconductor manufacturer itself can influence because as any you know initiatives like this will only cost them [the suppliers] money and in return they want to see some ROI. Because anybody in such a capital intensive business or industry, I think only ROI, or if it makes business sense, or **end customers who are really influential will get them to do it.**” – PSM Professional 2*

In support of this, numerous experts note the effectiveness of engaging multiple stakeholders and encouraging supplier competition as a non-mediated strategy. Here, it becomes apparent that the influence strategies often are not applied as a stand-alone strategy, but that buyers can use multiple strategies at once. For example, through an ESG workshop, normative, mimetic, expert, referent, and reward pressure can be effectively combined, depending on the possibilities and the perceptions of the suppliers.

*“We could start something like **a corporate ESG workshop just to invite customers, and suppliers** to, like, a supplier day, where we talk about business and rate them accordingly.” – PSM Professional 2*

*“And so, of course, our supplier rating, if they do not have right then, then they get scored down, right and it brings their overall scores down, it becomes visible to their management, right. And **we do show comparative performance** between them and other suppliers that they deal with.” – PSM Professional 4*

*“And not only the semiconductor manufacturer, but the other customers will probably also require the same things. So basically you **need to fulfill such kind of criteria to be a preferred supplier for the semiconductor manufacturer.** That is something that we are trying to tell them and following with them to make sure they will have such kind of activity continuously.” – PSM Professional 9*

*“I can say that **supplier A already complies with this. So, why supplier B cannot do it?** And when they hear supplier A, they try to compete with supplier A. And normally it works.” – PSM Professional 1*

Non-mediated buyer influence strategies without relational gains are less common

In contrast to other non-mediated influence strategies, non-mediated buyer influence strategies without relational gains were less consistently addressed for their effectiveness. Generally, the sourcing managers tend to rely less on the regulations that apply to the semiconductor manufacturer for influencing their suppliers. Several experts did note that, especially among the external manufacturing category, there are suppliers who share the semiconductor manufacturer's environmental sustainability values. However, it was not explicitly mentioned as a deliberate strategy for influencing them. On one occasion, a form of traditional legitimate pressure was mentioned, where the sourcing manager uses a perceived natural right to influence.

*"I have got to be honest; **I would just tell them this is the way it's going to be.** That's something that we need. This is why it's going to be moving forward, and if you want to be part of, you know, our supply base, you'll do it."* – PSM Professional 8

Balancing environmental sustainability with other sourcing objectives is challenging

Various experts highlighted the challenge of balancing environmental sustainability with their sourcing objectives within a sourcing strategy. The main sourcing objectives are cost savings, supply assurance, and quality. For strategic suppliers, often external manufacturers, innovation, and strategic alignment are additional sourcing objectives. Currently, environmental sustainability is assessed as a part of quality within the supplier evaluation. The sourcing managers are responsible for evaluating whether their suppliers report their environmental impacts and whether they have committed to reduction targets. The evaluation is shared with the suppliers in quarterly business review meetings.

*"The overall intention is that the realization must also grow among suppliers that it **[environmental sustainability] actually becomes a kind of mandatory requirement, just like the quality and quality processes.** That was very different perhaps twenty years ago. You see that a lot of suppliers have actually developed over time to a certain professional level in that area. And I think it's related to environmental sustainability, that it's something too that has been put on the radar of the company in recent years."* – PSM Professional 5

"I see a bit of a parallel with the past, with quality, ISO [International Organization for Standardization] 9000. Companies did not have that, ah they all saw that as ballast, and is that necessary? And we still supply good products, then we also have to meet ISO 9000, the whole system with all kinds of requirements? So they were also pushing for a long time until almost all customers started asking, you must have ISO 9000, they couldn't get around it. So, now I see a bit of the same trend happening." – PSM Professional 6

*"The semiconductor manufacturer has a good reputation for good quality, and we have been starting the sharing [of knowledge] with our suppliers for quality. **I'm sure in terms of ESG we can do the same.**"* – PSM Professional 2

However, while environmental sustainability aligns with quality, buyers emphasize the potential conflict it presents with their other sourcing objectives, especially cost savings. This is because environmental sustainability, much like quality, often comes at a premium.

*“I mean procurement is a support function. Our key KPIs [key performance indicators] are still cost savings and margins and assurance of supply. So, you see, until now, none of this really fits with ESG. What ESG does is increase cost and, you know, potentially even take away resources. **This is a little bit contradictory to procurement.** We need to find a balance there. And it’s not something so easy.” – PSM Professional 2*

“This [environmental sustainability] is a subject that also competes with other objectives. Where the supplier, perhaps in terms of sustainability, wants to go further than the competitor, but in terms of price is much more expensive. Possibly as a result. Is that then the preferred supplier? So, you have a number of things that you have to take into consideration. Can we still guarantee supply and the quality we need?” – PSM Professional 5

Hence, several sourcing managers underscore that the procurement function predominantly serves a supporting role in achieving sustainability. This aligns with the insights acquired from interviews with sustainability professionals, where it was evident that initiatives to reduce Scope 3 environmental impacts are primarily implemented by the sustainability team. For example, Sustainability Professional 2 referred to initiatives focussed on supplier operations, such as reducing test time, extending the life of consumables, reducing scrap materials, and replacing parts instead of whole machines.

*It’s a timing issue as well. Sometimes even though we have things like this [environmental sustainability], it’s not so easy to push through with suppliers because there are other battles to fight and **there are always other big battles to fight, unfortunately.**” – PSM Professional 2*

*“So I can only say when this [environmental sustainability] becomes our focus, it will be driven from operations, quality, and then **the procurement team can only support.** We cannot be in the driver’s seat because they’re directly, I would say, conflicting.” – PSM Professional 2*

*“I just think that this is a subject where I fulfill an **executive role.** The people within the company, the really knowledgeable people, they reach out and we get to work with it.” – PSM Professional 5*

PSM and sustainability professionals have complementary competences

Overall, the interviews revealed that the sourcing managers mainly possess social-oriented competences. They presented how they convey environmental requirements to the supplier. Through regular interactions, including quarterly meetings, the sourcing managers present and sell facts to the supplier by employing, i.a. rational pressure. Throughout the interviews, the sourcing managers consistently showed an understanding of the supplier’s position and the ability to adapt to supplier-specific traits. In doing so, the consensus was that the supplier needs

to see the benefits of sustainability. Ultimately, the sourcing managers know the relevant internal departments to collaborate with to contribute to achieving environmental sustainability. Thus, the sourcing managers displayed high levels of communication skills, thoughtfulness towards others, supplier relationship management, and cross-functional teamworking. Furthermore, most of the sourcing managers showed elements of cognition-oriented and functional-oriented competences. For example, various sourcing managers applied strategic context to the sustainability procedure of the semiconductor manufacturer.

On the other hand, sustainability professionals complement the sourcing managers' cognition-oriented and functional-oriented competences by understanding the business case for sustainability and knowing the relevant frameworks and laws. Even more so, sustainability professionals excel in meta-oriented competences. Understanding the business case for sustainability fosters a belief in the benefits of sustainable practices. In this context, the sustainability team takes the lead by sharing experiences with suppliers and coaching on the implementation of sustainability initiatives. So, where the PSM professionals manage the relationship with the supplier, the sustainability professionals advance the commitment to achieving environmental sustainability.

3.5. Results: Synthesis of the quantitative and qualitative study

The quantitative study demonstrates the effect of instrumental, moral, and relational supplier motives for environmental sustainability, supplier dependence, and supplier environmental impact on the effectiveness of buyer influence strategies for motivating suppliers to improve their environmental sustainability performance. In support of that, the qualitative study offers expert validation for the effectiveness of coercive pressure, reward pressure, legal legitimate pressure, traditional legitimate pressure, compliance pressure, expert pressure, referent pressure, normative pressure, mimetic pressure, and rational pressure from the buyer side. Integrating the results from different sources (i.e. buyers and suppliers) and different methods (i.e. qualitative and quantitative) provides a more holistic and nuanced perspective than addressing them in isolation. So, the synthesis of the results of both studies shows how the quantitative results relate to qualitative results. The additional results of the qualitative study are not included in the synthesis.

First, the qualitative study revealed that sourcing managers prefer positive approaches over negative approaches. The quantitative study shows that although positive influence strategies such as reward pressure and more negative influence strategies such as coercive pressure can both be effective, different supplier motives impact their effectiveness. Where the effectiveness of coercive pressure is positively impacted by instrumental supplier motives, the effectiveness of reward pressure is positively impacted by moral supplier motives. Both instrumental and moral motives have a positive impact on legal legitimate pressure. So, where sourcing managers generally prefer not to use coercive or legal legitimate pressure, it can be effective for instrumentally motivated suppliers.

Second, the qualitative study revealed that non-mediated influence strategies are more universally applicable than mediated influence strategies. In support of this, the quantitative study shows that the three supplier motives each have a positive impact on the effectiveness of at least two non-mediated influence strategies. So, where sourcing managers may perceive mediated influence strategies (i.e. coercive, reward, and legal legitimate pressure) as inapplicable in certain situations, alternative non-mediated influence strategies may be equally effective.

Third, the qualitative study revealed that sourcing managers perceive supplier dependence as a possible caveat for influence strategy effectiveness. The quantitative study supports this finding by showing that supplier dependence positively impacts the effectiveness of the majority of the influence strategies.

Fourth, the qualitative study revealed that non-mediated buyer influence strategies without relational gains (i.e. traditional legitimate and compliance pressure) are less commonly used by sourcing managers. The quantitative study shows that the effectiveness of traditional legitimate pressure is positively impacted by instrumental supplier motives and supplier dependence and that the effectiveness of compliance pressure is positively impacted by moral supplier motives. The effect of supplier dependence on the effectiveness of traditional legitimate pressure is especially strong. So, where sourcing managers utilize non-mediated buyer influence strategies without relational gains relatively less compared to other strategies, they can be effective for certain suppliers.

4. DISCUSSION: THE IMPACT OF SUPPLIER MOTIVES ON THE EFFECTIVENESS OF BUYER INFLUENCE

In response to rising pressures, manufacturing industries are increasingly adopting environmental sustainability as a corporate goal, relying on suppliers to achieve these objectives. However, research in the field of PSM tends to focus on the consequences of influencing suppliers rather than the underlying motives guiding suppliers to improve their sustainability performance. This study aimed to explore the impact of supplier motives for environmental sustainability on the effectiveness of buyer influence through a mixed-methods case study. The findings show how instrumental, moral, and relational supplier motives positively impact mediated and non-mediated buyer influence. This chapter begins with a discussion of the findings in the empirical model, complemented by the findings of the expert interviews as outlined in the synthesis of the results. Next, the additional findings of the expert interviews are discussed. Finally, this chapter concludes with a discussion of the study's implications for research and practice.

4.1. Discussion of results

4.1.1. The positive effects of supplier motives on the effectiveness of buyer influence

As hypothesized, instrumental motives increase the effectiveness of coercive pressure, indicating that suppliers with instrumental motives are driven towards improved environmental sustainability performance by the costly economic and reputational impact of punishment on their profitability ([Brønn & Vidaver-Cohen, 2009, p. 94](#)). Similarly, instrumental motives positively affect the effectiveness of legal legitimate pressure. Thus, indicating that legal agreements can be an effective tool for influencing instrumentally motivated suppliers. Conversely, no effect of instrumental motives on the effectiveness of reward pressure was identified. Interestingly, the qualitative results show that buyers prefer to use reward pressure over coercive and legal legitimate pressure, while the quantitative results show that instrumental motives increase the effectiveness of coercive and legal legitimate pressure and not the effectiveness of reward pressure. So, where buyers generally prefer to use reward pressure instead of coercive or legal legitimate pressure, coercive and legal legitimate pressure seem to be more effective than reward pressure for instrumentally motivated suppliers. The lack of an effect of instrumental motives on the effectiveness of reward pressure can be explained through the lens of ethical egoism and consequentialism. Under the assumption of ethical egoism and consequentialism, suppliers with instrumental motives would engage in environmental sustainability if there is a net positive benefit for them ([Paulraj et al., 2017, p. 242](#)). Therefore, it is plausible that instrumentally motivated suppliers perceive the rewards offered by the buyer as not impactful enough to facilitate the change toward environmental sustainability in an advantageous way. This could potentially explain the positive impact of instrumental motives on rational pressure. The absence of an effect on reward pressure suggests that suppliers driven by instrumental motives may not perceive the advantages of environmental sustainability. On the other hand, the positive effect on rational pressure indicates that these suppliers are likely to be influenced by the facts, logic, and evidence provided by the buyer on the advantages for the supplier to become more environmentally sustainable. Furthermore, the results reveal a positive effect of instrumental motives on the effectiveness of traditional legitimate pressure. Interestingly, while buyers did not indicate to use traditional legitimate pressure as much, the results suggest that it can be effective for

suppliers with instrumental motives. The effectiveness of non-mediated influence strategies, such as traditional legitimate pressure, depends on the perceptions of the supplier ([Gelderman et al., 2021, p. 4](#); [Zhao et al., 2008, p. 370](#)). A plausible explanation for this significant effect is that suppliers driven by instrumental motives may seek to avert perceived consequences of non-compliance with the buyer's legitimate requests. For instance, these suppliers may perceive that adhering to the buyer's requests can safeguard their profits by helping to avoid potential negative publicity or costly repercussions. Unexpectedly, with rational pressure and traditional legitimate pressure, instrumental motives do not only have a positive impact on mediated buyer influence but also on non-mediated buyer influence. This is significant because buyers perceive mediated influence as inapplicable under certain circumstances and this finding suggests that non-mediated influence strategies may be equally effective for instrumentally motivated suppliers.

Surprisingly, in contrast to instrumental motives, moral motives exhibit a positive influence on the effectiveness of reward pressure. This outcome can be explained by the norm of reciprocity and relational trust, as delineated in Social Exchange Theory (SET) ([Dowell et al., 2015, p. 120](#)). Reward pressure is positively related to goodwill trust ([Pulles et al., 2014, p. 27](#)). In this context, goodwill trust refers to the supplier's faith in the good intentions of the buying firm ([Das & Teng, 2001, p. 256](#); [Pulles et al., 2014, p. 22](#)). In the presence of trust in an exchange relationship, parties are more inclined to fulfill their commitments due to the belief that their efforts will be reciprocated ([Casidy & Yan, 2022, p. 313](#); [Colquitt et al., 2012, p. 2](#)). So, according to SET, moral motives positively influence the effectiveness of reward pressure because doing good (environmental sustainability) will be reciprocated with something positive (rewards). For instance, suppliers with moral motives may respond more positively to rewards because they want to be recognized for doing what is right. This finding reinforces the notion that moral motives and financial performance are not mutually exclusive but can be complementary instead ([Paulraj et al., 2017, p. 254](#)). In contrast to instrumentally motivated suppliers, suppliers guided by moral motives may view rewards as favorable because they inherently recognize environmental sustainability as a beneficial end in itself since it aligns with their ethical virtues ([Paulraj et al., 2017, p. 244](#)). Consequently, in the case of a morally motivated supplier, the exchange of rewards between the buyer and the supplier is more symmetrical, reflecting mutual value offered by both parties ([Nyaga et al., 2013, p. 59](#)). Furthermore, moral motives show a significant positive effect on the effectiveness of legal legitimate pressure and compliance pressure. These findings imply that suppliers driven by moral motives are more receptive to ethical considerations captured in legal agreements, whether presented in mediated or non-mediated contexts. In fact, morally motivated suppliers may even perceive compliance with legal requirements as a prerequisite for contributing to a more sustainable world ([Paulraj et al., 2017, p. 253](#)). Interestingly, although buyers did not emphasize the use of compliance pressure, the findings imply it can be effective for suppliers driven by moral motives. Contrary to the hypothesis, the results reveal no effect of moral motives on the effectiveness of traditional legitimate pressure. Thus, this finding suggests that morally motivated suppliers do not necessarily perceive that the buyer has a natural right to influence them. This may be because these suppliers engage in sustainability due to their intrinsic higher-order values and not because of pressure to conform to the external demands of the buyer ([Paulraj et al., 2017, p. 244](#)). Unexpectedly, moral motives positively influence the effectiveness of both expert pressure and rational pressure. This can be attributed to the notion that ethical understanding, such as recognizing that environmental sustainability is the

right thing to do, necessitates learning from others ([Annas, 2007, p. 4](#)). The buyer's expertise can potentially assist the supplier in fulfilling their responsibility for the environment more effectively and efficiently ([Brønn & Vidaver-Cohen, 2009, p. 96](#)). Thus, expertise with an emphasis on moral benefits could make rational pressure and expert pressure effective tools for suppliers who feel a responsibility towards the environment.

Finally, most hypotheses concerning the impact of relational supplier motives on buyer influence effectiveness found support in the results. Relational motives have a positive effect on referent, normative, and mimetic pressure. The findings suggest that these non-mediated influence strategies effectively serve relational ends ([Maloni & Benton, 2000, p. 64](#)). Referent pressure exists when the supplier admires the buyer's operations and therefore values being identified with it, leading to the acceptance of the buyer's influence as the supplier seeks to establish a relationship ([Nyaga et al., 2013, p. 47](#); [Zhao et al., 2008, p. 372](#)). In this context, the relationship with the buyer is the goal in itself. Furthermore, consistent with Institutional Theory, normative pressure seems to be an effective strategy to meet the relationally motivated supplier's need for social legitimacy among its stakeholders ([Paulraj et al., 2017, p. 243](#); [Zhu et al., 2013, p. 107](#)). Moreover, also in line with Institutional Theory, the results indicate that mimetic pressure effectively addresses the supplier's need to reduce uncertainty and achieve a competitive advantage ([DiMaggio & Powell, 1983, p. 150](#); [Kauppi & Luzzini, 2022, p. 80](#); [Villena & Dhanorkar, 2020, p. 704](#)). Contrary to expectations, relational motives do not positively impact the effectiveness of expert pressure. This finding can be explained by the "relational view of competitive advantage" by [Dyer and Singh \(1998, p. 661\)](#). The relational view proposes that firms can obtain a competitive advantage by creating synergies (i.e. relational rents) through collaboration with other firms ([Dyer & Singh, 1998, p. 667](#); [Schiele, 2019, p. 63](#)). The relational view aligns with the utilitarian principle of relational motives by accentuating that relational rents maximize the overall good for both parties in the exchange relationship ([Paulraj et al., 2017, p. 243](#); [Schiele, 2019, p. 63](#)). In contrast, expert pressure, through the sharing of knowledge and transfer of expertise, could be perceived by suppliers as unilateral and transactional ([Dyer & Singh, 1998, p. 672](#)). So, expert pressure might not resonate as strongly with the relational goals (e.g. competitive advantage) that these suppliers seek to achieve in their interactions with the buyer, thereby making it less effective. Furthermore, relational motives, unlike instrumental and moral motives, do not positively affect the effectiveness of rational pressure. When relational motives are strong, the influence of rational pressure could be limited as the focus on relational goals might outweigh the need for supplementary logical reasoning to influence the supplier's behavior. Additionally, rational pressure could be less effective for these suppliers when the emphasis is on the benefits for one of the parties instead of the combined advantages for all stakeholders involved. In contrast to moral and instrumental motives, relational motives do not positively impact the effectiveness of mediated buyer influence. This result is complementary to the finding that buyers believe that mediated influence strategies may not apply in certain situations.

4.1.2. The positive effects of supplier dependence on the effectiveness of buyer influence

Supplier dependence was controlled for because it can explain how buyer influence affects supplier adoption of environmental sustainability ([Frooman, 1999, p. 196](#); [Saeed et al., 2018, p. 4](#); [Sarkis et al., 2011, p. 9](#); [Wolf, 2014, p. 319](#)). The results reveal that supplier dependence has a positive impact on the effectiveness of multiple influence strategies, which can be explained through the lenses of Resource Dependence Theory (RDT) and the resource-based view (RBV). Specifically, supplier dependence significantly enhances the effectiveness of

influence strategies directly related to the buyer-supplier relationship, except for coercive pressure. This distinction is notable, as the influence of compliance pressure, normative pressure, and mimetic pressure originate from sources external to the semiconductor manufacturer, such as international legislation, industry standards, and competitors. Unsurprisingly, the impact of supplier dependence is most pronounced in the case of traditional legitimate pressure, underscoring that suppliers with higher levels of dependence are more inclined to feel that the buyer has the right to influence them. So, where buyers utilize traditional legitimate pressure relatively less compared to other strategies, it can prove effective for highly dependent suppliers. These findings are consistent with predictions derived from RDT, which suggests that greater supplier dependence increases the effectiveness of buyer influence ([Hillman et al., 2009, p. 1405](#); [Pulles et al., 2022, p. 6](#); [Sarkis et al., 2011, p. 9](#)). In addition, these results align with the findings in the qualitative study, indicating that as supplier dependence increases, buyer influence effectiveness increases.

Furthermore, opposing predictions grounded in RDT and the RBV can explain the insignificant effect of supplier dependence on coercive pressure. Punishments imposed through coercive pressure can prove detrimental to highly dependent suppliers because they may not possess the resources needed for enhancing environmental sustainability ([González et al., 2008, p. 1033](#); [Zhao et al., 2008, p. 370](#)). Their lack of control over the necessary resources can be attributed to the sacrifices dependent suppliers make to sustain exchange relationships, which then comes at the expense of environmental performance ([Z. Zhang et al., 2021, p. 4](#)). Moreover, as a form of negative reinforcement, coercive pressure can erode the supplier's sense of autonomy and competence ([Chae et al., 2017, p. 52](#)). So, the findings seem to support the "resource paradox", proposing that resource-dependent suppliers are more easily influenced by the buyer to become more environmentally sustainable unless this influence negatively impacts its resources, and, thus, its ability to lower environmental impacts.

4.1.3. The negative effects of supplier environmental impact on the effectiveness of buyer influence

Environmental impact is included as a control variable because suppliers with higher environmental impacts may require bigger changes in organizational behavior to become more sustainable, potentially affecting the perceived effectiveness of the buyer's influence. The results show the negative effects of supplier environmental impact on the effectiveness of expert pressure and rational pressure. A possible explanation, from an RBV perspective, is that more impactful suppliers have more expertise in-house than firms with smaller impacts, making expert pressure less effective ([I. J. Chen & Kitsis, 2017, p. 1469](#)). Moreover, suppliers with higher environmental impacts may already be more convinced of the benefits of environmental sustainability due to the increased chance that their investment will be recovered, making rational pressure less effective ([Min & Choi, 2020, p. 5](#); [van Hoof & Lyon, 2013, p. 277](#)).

Alternatively, suppliers with high environmental impacts might face cognitive dissonance when confronted with information that contradicts their current organizational behavior. That means that information advocating for environmental sustainability, as presented through expert pressure or rational pressure, could create a psychologically uncomfortable dissonance between the supplier's unsustainable practices and the new information. To reduce this discomfort, the supplier can either change its behavior to align with the belief or change the belief to align with its behavior. The results indicate that expert pressure and rational pressure become less effective at influencing the supplier's behavior as

environmental impact increases. If the dissonance is not reduced by behavioral change, the supplier could misperceive, misinterpret, reject, or refute the information to decrease the psychological discomfort ([Harmon-Jones & Mills, 2019, p. 6](#)). For example, they could argue that environmental sustainability is unnecessary, impractical, or too costly. The seeming preference for changing the belief over behavior can be explained by the need for consistency. Generally, people appear to bring their beliefs into line with what they have already done ([Cialdini, 2006, p. 44](#)).

4.2. Discussion of additional qualitative results

4.2.1. Integrating environmental sustainability with other sourcing objectives

In the expert interviews, various PSM professionals highlighted the challenge of balancing environmental sustainability with their sourcing objectives. While purchasing's contribution to objectives such as cost savings, supply assurance, quality, and innovation is often more evident, contributions to environmental sustainability may be more difficult to observe ([Krause et al., 2009, p. 23](#)). So, for successful integration of environmental sustainability in a sourcing strategy, purchasing value should be measurable in linked economic and environmental terms ([Boons & Lüdeke-Freund, 2013, p. 13](#); [Carter & Rogers, 2008, p. 378](#); [Pagell & Shevchenko, 2014, p. 48](#)). This section presents a discussion on how environmental sustainability relates to the primary objectives of key supply categories: cost savings, supply assurance, quality, innovation, and strategic positioning ([Schiele, 2019, pp. 48, 49](#)).

First of all, under close collaboration with other functions, purchasing has the potential to realize cost savings through product optimization, especially for strategic purchases ([Hesping & Schiele, 2016, p. 111](#)). Product optimization is a tactical sourcing lever that involves the refinement of the design, functions, and materials of purchased goods ([Schiele, 2019, p. 67](#)). Such refinements on the demand side, in combination with process optimization on the supply side, can result in significant savings in purchasing and operational costs by more efficiently managing natural resources like water and energy while minimizing waste ([Blome et al., 2014, p. 33](#); [Whelan & Fink, 2016, p. 6](#)). By decreasing (the expenses for) resource consumption and waste treatment, purchasing can contribute simultaneously to the economic and environmental performance of the buying firm ([Zhu et al., 2013, p. 114](#)). Additionally, sustainable PSM contributes to financial risk reduction by reducing supply risk and reputational risk ([Foerstl et al., 2010, p. 127](#); [Lam, 2018, p. 2405](#); [Murfield & Tate, 2017, p. 1335](#)). Increased environmental sustainability performance reduces the likelihood of supply disruptions and reputational damage due to, e.g. breaches of environmental regulations ([Cousins et al., 2004, p. 558](#); [Krause et al., 2009, p. 18](#); [Miemezyk & Luzzini, 2019, p. 240](#)). Besides cost savings and risk management, environmental innovations can enhance value creation for the buyer and supplier in terms of growth in revenues and profitability ([Hermundsdottir & Aspelund, 2022, p. 7](#)). However, as noted by several PSM professionals in the expert interviews, environmental product and process optimizations require costly investments. So, cost savings can only be enjoyed when the initial investment is recovered, introducing a trade-off between short-term and long-term financial benefits ([Zhu et al., 2013, p. 114](#)).

In contrast to cost savings, various PSM professionals perceive environmental sustainability as compatible with quality, highlighting its similarities to quality processes and the International Organization for Standardization (ISO) 9000 certification. As is the case with numerous organizations, environmental sustainability serves as a distinguished manifestation

of quality within the semiconductor manufacturer's purchasing department ([Schiele, 2019, p. 49](#)). ISO 14001 is a business process standard, similar to ISO 9000, that involves implementing a management system to proactively monitor, report and reduce environmental impacts ([González et al., 2008, p. 1035](#); [Handfield et al., 2005, p. 16](#); [Monczka et al., 2008, p. 296](#)). While ISO 9000 empowers all employees to maintain a quality standard, ISO 14001 serves the same purpose for environmental sustainability ([Sarkis et al., 2010, p. 163](#)). This can explain the integration of environmental sustainability into quality standards, as ISO 9000-certified supply chains can ensure a more seamless adoption of ISO 14001 standards ([Handfield et al., 2005, p. 16](#)).

For strategic suppliers, mainly external manufacturers, innovation, and strategic alignment were mentioned by PSM professionals as additional sourcing objectives. Firms that aim to take the leadership position regarding innovation need to integrate their entire supply chain ([Neumüller et al., 2016, p. 196](#)). Therefore, purchasing contributes to achieving innovations by (1) ensuring the flow of innovation from suppliers, and (2) managing the collaborative innovation processes ([Schiele, 2019, p. 49](#)). Environmental sustainability and innovation are cyclically linked because firms require innovative capabilities to achieve environmental sustainability, whilst environmental sustainability drives firms to innovate ([Lintukangas et al., 2019, p. 1](#)). So, when the buyer and its strategic suppliers are aligned on a business and technological level, they should be able to strategically align with other key customer needs in the supply chain, such as environmental sustainability ([Monczka et al., 2008, p. 326](#)). Environmentally aligned supply chains may be more difficult to imitate, leading to enhanced competitiveness and economic performance ([Dabhilkar et al., 2016, p. 17](#)).

4.2.2. Bundling the complementary competences of PSM and sustainability professionals

The expert interviews revealed that PSM professionals and sustainability professionals have complementary competences regarding sustainable PSM. This is noteworthy because it can have an impact on how sustainable PSM is performed by the purchasing and sustainability departments ([Jia et al., 2021, p. 1656](#)). Influence may be more or less effective when it stems from different functions because buyer-supplier relationships are shaped by the individual points of contact ([Schoenherr et al., 2012, p. 4564](#)). The results reveal that PSM professionals have strong commercial- and social-oriented competences, which are both needed to effectively exert influence ([Beske-Janssen et al., 2023, p. 1](#); [Schulze & Bals, 2020, p. 5](#)). Therefore, PSM professionals should manage mediated influence strategies, which carry significant commercial implications as they concern business allocation decisions ([Maloni & Benton, 2000, p. 54](#)).

Additionally, the results show that sustainability professionals complement the buyers' competences by understanding the business case for sustainability and knowing the relevant frameworks and laws ([Schulze & Bals, 2020, p. 9](#)). This, combined with their strong commitment to change, may make sustainability professionals well-suited to lead or support PSM professionals in conducting compliance pressure, expert pressure, and rational pressure. For example, rational pressure may be more effective when used by an individual with high sustainability expertise ([Yukl et al., 2008, p. 618](#)). The idea that sustainability professionals could lead supplier influence efforts gains support from the finding that PSM professionals perceive purchasing as a complementary function regarding environmental sustainability. Ultimately, regardless of the function, managerial incentives could play a pivotal role in effectively operationalizing sustainable PSM strategies by aligning the interest of the firm with

the employees ([Epstein & Rejc Buhovac, 2014, p. 121](#); [Villena & Dhanorkar, 2020, p. 706](#); [Wijethilake & Ekanayake, 2018, p. 163](#)).

4.3. Research implications

This study holds implications for PSM research by validating and introducing causal mechanisms and important constructs. First of all, this study enriches current sustainable PSM research by drawing on multiple theories to predict the effectiveness of buyer influence ([Kitsis & Chen, 2020, p. 326](#); [Makadok et al., 2018, p. 1538](#); [Vanpoucke et al., 2016, p. 733](#)). Prior research has broadly investigated the consequences of mediated and non-mediated buyer influence, such as supplier satisfaction, collaboration, adaptation, integration, and performance ([Benton & Maloni, 2005, p. 6](#); [Maloni & Benton, 2000, p. 57](#); [Nyaga et al., 2013, p. 45](#); [Terpend & Ashenbaum, 2012, p. 58](#); [Zhao et al., 2008, p. 375](#)), and has vastly overlooked the underlying motives that guide suppliers to improve their sustainability performance ([Paulraj et al., 2017, p. 239](#)). The few studies that address instrumental, moral, and relational motives mostly examine their effect on the adoption of environmental practices by suppliers, without considering the role of buyer influence ([Baliga et al., 2020, p. 363](#); [Paulraj et al., 2017, p. 248](#)). That is while environmental sustainability is often pulled through supply chains by customer demands ([Elkington, 1998, p. 106](#); [Giunipero et al., 2012, p. 261](#); [Hariyani et al., 2023, p. 8](#); [Lee et al., 2014, p. 39](#); [Min & Choi, 2020, pp. 9, 10](#); [Murfield & Tate, 2017, p. 1329](#)). The findings of this study, including a series of supported hypotheses, introduce new relationships, demonstrating that instrumental, moral, and relational supplier motives can predict the effectiveness of buyer influence strategies. Specifically, the findings partially support the hypotheses that instrumental motives increase mediated buyer influence effectiveness, moral motives increase the effectiveness of non-mediated influence without relational gains, and relational motives increase the effectiveness of non-mediated influence with relational gains.

Additionally, the findings support prior resource-dependency research, indicating that highly resource-dependent firms are more receptive to their customer's influence ([Brown et al., 1995, p. 384](#); [Eggert & Hartmann, 2021, pp. 4, 5](#); [Goodman & Dion, 2001, p. 296](#); [Zhao et al., 2008, p. 369](#)), except if this influence negatively impacts their resources and ability to lower environmental impacts ([Z. Zhang et al., 2021, p. 4](#)). Furthermore, this study provides a more nuanced understanding of environmental sustainability performance, introducing it as a novel contingency factor in sustainable PSM research ([Eggert & Hartmann, 2021, p. 10](#)). By considering environmental impact as an independent variable, this study demonstrates its potential to adversely impact the effectiveness of the buyer's expert pressure and rational pressure strategies. This reevaluation shows that a supplier's environmental impact is not only an outcome of sustainable PSM ([Arora et al., 2020, p. 714](#); [Eggert & Hartmann, 2021, p. 3](#); [Gelderman et al., 2021, p. 5](#)) but that it can also inform sustainable PSM strategies.

Existing PSM research often excludes non-mediated sources of influence from their analysis under the argument that they are not specifically exercised to influence the supplier ([Handley & Benton Jr, 2012, p. 253](#); [Pulles et al., 2014, p. 19](#)). Although the effectiveness of non-mediated influence depends on the perception of the supplier ([Zhao et al., 2008, p. 370](#)), this study shows that non-mediated influence can be consciously exercised through influence strategies. So, through expert validation, this study affirms the practical distinction between mediated and non-mediated buyer influence within the semiconductor industry. This finding is consistent with prior research, which found support for this dichotomy in the context of the automotive industry ([Maloni & Benton, 2000, p. 54](#)). Moreover, the experts in this study

highlighted the universal applicability of non-mediated influence strategies compared to mediated influence strategies. This, in combination with the finding that instrumental, moral, and relational supplier motives positively impact the effectiveness of multiple non-mediated influence strategies, sheds new light on the significance of non-mediated buyer influence in the context of sustainable PSM. Where previous studies argue that buyer influence is mainly exerted in mediated ways ([Handley & Benton Jr, 2012, p. 253](#); [Hunt & Nevin, 1974, p. 191](#); [Vos et al., 2021, p. 3](#)), this study shows that, in the context of sustainable PSM, non-mediated buyer influence is employed the most.

Finally, this study broadens the theoretical frame within sustainable PSM research by validating and introducing mediated and non-mediated buyer influence constructs ([Panigrahi et al., 2019, p. 27](#)). In addition to the deductive validation of nine influence strategy constructs, rational pressure was inductively identified in the expert interviews. The validation and introduction of these constructs facilitate a comparative analysis between diverse sources of influence originating from distinct theoretical backgrounds ([DiMaggio & Powell, 1983, p. 150](#); [French & Raven, 1959, p. 151](#)). The comparison of different influence strategies at an equal level of analysis enhances the predictive power of the existing theories. This enhancement in predictability contributes to bridging the academic-practitioner gap in PSM research by offering more precise guidelines for practical applications ([Stange et al., 2022, p. 1](#)). Finally, these multi-item constructs may inform future empirical research for further investigation. Especially since the inter-rater reliability analysis of double responses (see [Appendix S](#)) suggests suitable construct validity of the measurement items.

4.4. Practical implications

The insights gained from this research can guide and empower PSM professionals to make meaningful contributions toward shaping a sustainable world ([Schoenherr et al., 2012, p. 4566](#)). As a first step, the Supplier Prioritization Cube (see [Figure 3](#)) can assist PSM professionals in establishing well-informed priorities for engaging numerous suppliers to reduce environmental impacts ([H. Hofmann et al., 2014, p. 170](#)). This tool is designed to set the priorities where the most substantial gains can be made. By considering financial, relational, and environmental facets within buyer-supplier relationships, the cube enables PSM professionals to strategically focus their efforts.

Secondly, the quantitative findings from this study can guide PSM professionals in forming a supplier engagement strategy aimed at motivating suppliers to enhance their environmental sustainability performance. The results show how supplier motives for environmental sustainability, supplier dependence, and supplier environmental impact can affect the effectiveness of the buyer's influence strategies (see [Figure 7](#)). Purchasing, as the main boundary-spanning function toward suppliers, is in the prime position to identify these supplier-specific traits ([Beske-Janssen et al., 2023, p. 3](#); [Blome et al., 2014, p. 33](#); [C. Zhang et al., 2010, p. 318](#)). This understanding can be cultivated through regular interactions with suppliers in key purchasing processes such as negotiations, purchase-to-pay, and supplier evaluations ([Schiele, 2019, pp. 57, 58](#)). For instance, PSM professionals can distinguish whether their supplier's actions are mainly driven by instrumental, moral, or relational considerations. Furthermore, PSM professionals can identify the level of supplier dependence through (1) the financial magnitude of the buyer's business, (2) the supplier's need for the buyer's technological expertise, (3) the availability of alternative buyers, and (4) the supplier's switching costs, incurred when replacing the buyer ([Caniëls & Gelderman, 2007, p. 224](#)).

Finally, the identification of the supplier's environmental impact may be supported by sustainability professionals who have full-time dedication to sustainability initiatives, such as supplier environmental impact assessments ([Villena & Gioia, 2018, pp. 75, 76](#)).

Thirdly, once the supplier-specific traits are identified, PSM can consider what influence strategies to use. The study provides a list of ten influence strategies (see [Table 9](#)) that could effectively influence suppliers to become more environmentally sustainable, contingent on supplier-specific traits. First of all, the findings indicate that coercive pressure and legal legitimate pressure can be effective control measures against environmentally unsustainable practices from certain suppliers ([Q. Zhang et al., 2020, p. 641](#)). On the one hand, these mediated influence strategies may be perceived by PSM professionals as more practical than reward pressure. When effective, they can be used repeatedly without incurring the cost of providing rewards ([Chae et al., 2017, p. 45](#); [Dari-Mattiacci & Geest, 2009, p. 382](#)). In fact, when threats of punishment or legal action are effective, the pressure can be applied several times without actually resorting to punishment or legal measures ([Dari-Mattiacci & Geest, 2009, p. 365](#)). Conversely, in case reward pressure is effective, the rewards must be provided. On the other hand, however, consistent use of threats can lead to a preferential issue, putting the buying firm at a competitive disadvantage. In general, how satisfied a supplier is with a customer is directly influenced by the customer's (1) profitability, (2) growth opportunity, (3) relational behavior, and (4) operative excellence ([Vos et al., 2016, p. 4621](#)). In turn, supplier satisfaction has a positive impact on the tendency to award preferred customer status, which leads to preferential treatment ([Schiele, 2020, p. 123](#)). Whereas reward pressure can positively contribute to profitability, growth opportunities, and relational behavior, coercive pressure and legal legitimate pressure can negatively impact these determinants of supplier satisfaction. For instance, punishment and legal action can harm the buyer-supplier relationship, whilst rewards can increase the profitability and growth opportunities for the supplier ([Maloni & Benton, 2000, p. 64](#); [Nyaga et al., 2013, p. 58](#); [Pulles et al., 2014, p. 31](#); [Schiele, 2019, p. 71](#); [Vos et al., 2021, p. 10](#)). Thus, when considering the use of mediated influence, PSM professionals are not only recommended to consider its expected effectiveness based on supplier-specific traits but also to weigh their implications for other sourcing objectives, such as cost savings and competitiveness.

In addition to mediated influence strategies, PSM professionals may consider leveraging non-mediated sources of influence. Non-mediated influence strategies may be more positive than coercive and legal legitimate pressure and less costly when compared to reward pressure ([Nyaga et al., 2013, p. 56](#)), making them a potentially appealing alternative. Therefore, non-mediated influence strategies may be less conflicting with other sourcing objectives, allowing a more unified integration of environmental sustainability in a sourcing strategy. Nonetheless, firms may be less aware of the existence of non-mediated sources of influence ([Benton & Maloni, 2005, p. 4](#); [Kim & Zhu, 2018, p. 9](#); [Pulles et al., 2014, p. 19](#); [Terpend & Ashenbaum, 2012, p. 54](#)). That is because the existence of non-mediated sources of influence depends on the perceptions of the supplier ([Zhao et al., 2008, p. 370](#)), providing the supplier with a higher sense of autonomy when compared to the use of mediated influence ([Chae et al., 2017, p. 43](#)). In spite of this, the findings of this study suggest that instrumental, moral, and relational supplier motives, supplier dependence, and supplier environmental impact can predict the effectiveness of non-mediated influence strategies (see [Figure 7](#)). This can guide PSM professionals in selecting non-mediated influence strategies. Furthermore, while mediated influence strategies seem to present a trade-off between punishing and rewarding,

multiple non-mediated influence strategies may be leveraged simultaneously. For example, an ESG workshop offers a platform to efficiently integrate multiple non-mediated influence strategies. This approach enables PSM professionals to maintain a seemingly homogeneous supplier engagement strategy whilst different suppliers may be influenced by distinct elements of this approach. However, it is important to note that non-mediated sources of influence are not uniformly built or operationalized. For instance, while rational pressure may be more easily constructed and applied by the individual, referent pressure is predominantly shaped by the buying firm's reputation and the supplier's desire to conduct business with the buying firm ([Terpend & Ashenbaum, 2012, p. 67](#)). Finally, for both fundamental and practical reasons, sustainability professionals could lead or support PSM professionals in the implementation of non-mediated influence strategies ([Villena & Gioia, 2018, pp. 75, 76](#)). For example, sustainability professionals can assist PSM professionals in employing compliance pressure and rational pressure by keeping them informed on the relevant legal frameworks and by building a compelling business case for environmental sustainability ([Schulze & Bals, 2020, p. 9](#)). This contributes to both the effectiveness and the efficiency of the supplier engagement strategy.

5. LIMITATIONS AND FUTURE RESEARCH SUGGESTIONS

Like a spider in the center of a web, the PSM function has become intricately involved in various tasks over recent years ([Delke, 2022, p. 47](#)). This research highlights the pivotal role of the PSM function and PSM professionals in the achievement of corporate environmental sustainability. However, the methods presented in this study – strategies through which a manufacturing firm can influence its key suppliers to become more environmentally sustainable – are positioned at the bottom level of the strategy hierarchy (see [Appendix T](#)). Arguably, without a radical shift in business models and a comprehensive vision on consumption and production, there is only so much the PSM function can contribute to achieving substantive environmental sustainability ([Pagell & Shevchenko, 2014, p. 46](#)). So, as environmental sustainability should be handled both top-down and bottom-up ([Ellram & Tate, 2023, p. 11](#)), future research is recommended to adopt a holistic functional approach to analyzing corporate environmental sustainability.

Additionally, despite multiple measures in the design of the supplier survey and the reasonable predictive power of the structural model, this study carries a potential risk of hypothetical bias. The evaluation of the influence strategies was limited to their effectiveness, lacking differentiation between perceived effectiveness and actual occurrence. Ideally, both the usage and effectiveness are measured. Therefore, future research could examine the constructs from this study empirically. Following on from this, future research may choose a unit of analysis that is closer located to the end consumer than this study's case company. Research suggests that the closer a firm is located to the end consumer, the higher its levels of sustainable PSM practices ([Schmidt et al., 2017, p. 3](#)). Moreover, as this research is limited to the semiconductor industry, future research should incorporate a wider range of environmentally impactful industries. For instance, experts from industries with different contextual dynamics may have different views on supplier engagement ([Kumar & Rahman, 2015, p. 123](#)), providing opportunities for refinement of the list of influence strategies (see [Table 9](#)).

Furthermore, this study includes a non-response bias and missing values for environmental impact. This limits the generalizability of the study's findings regarding environmental impact. Future research can lower the chance of non-response bias by conducting research in a setting with more supply chain visibility ([Hariyani et al., 2023, p. 13](#)), possibly with buyer-supplier dyads located closer to end consumers. Additionally, future research could span beyond buyer-supplier dyads by including sub-tier suppliers in the analysis ([Villena & Dhanorkar, 2020, pp. 730, 731](#)). Moreover, the relatively low size and variability of the supplier survey sample (see [Table 6](#)) limit the generalizability of the findings. Having a sample size ($N = 86$) at the lower end of the recommended range for PLS path modeling ([Hair et al., 2021, p. 18](#)), increases the chance of faulty inclusion or exclusion of measurement items. Therefore, future research is recommended to collect more data across multiple industries.

Finally, *post hoc* multivariate analysis of variance (MANOVA) revealed significant differences in instrumental and relational motives between suppliers located in the Americas (AMER) and Asia-Pacific (APAC) (see [Appendix U](#)). On average, APAC suppliers scored significantly higher on instrumental and relational motives than AMER suppliers. However, the sample of AMER suppliers is too small to generalize these findings. Prior research suggests that influence strategy effectiveness could depend on the culture of the recipient ([Zhao et al., 2008, p. 382](#)). Therefore, future research is recommended to investigate potential cross-cultural contingencies in buyer influence and supplier motives ([Eggert & Hartmann, 2021, p. 10](#)).

BIBLIOGRAPHY

- Acocella, I. (2012). The focus groups in social research: advantages and disadvantages. *Quality & Quantity*, 46(4), 1125-1136. doi:10.1007/s11135-011-9600-4
- Adesanya, A., Yang, B., Bin Iqdara, F. W., & Yang, Y. (2020). Improving sustainability performance through supplier relationship management in the tobacco industry. *Supply Chain Management: An International Journal*, 25(4), 413-426. doi:10.1108/SCM-01-2018-0034
- Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. (2007). Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations. *Academy of Management Review*, 32(3), 836-863. doi:10.5465/amr.2007.25275678
- Ahmed, W., Najmi, A., & Khan, F. (2020). Examining the impact of institutional pressures and green supply chain management practices on firm performance. *Management of Environmental Quality: An International Journal*, 31(5), 1261-1283. doi:10.1108/MEQ-06-2019-0115
- Annas, J. (2007). Virtue ethics.
- Anscombe, G. E. M. (1958). Modern Moral Philosophy. *Philosophy*, 33(124), 1-19. doi:10.1017/S0031819100037943
- Apple Inc. (2022). Apple calls on global supply chain to decarbonize by 2030 [Press release]. Retrieved from <https://www.apple.com/newsroom/2022/10/apple-calls-on-global-supply-chain-to-decarbonize-by-2030/>
- Aragón-Correa, J. A., & Sharma, S. (2003). A Contingent Resource-Based View of Proactive Corporate Environmental Strategy. *The Academy of Management Review*, 28(1), 71-88. doi:10.2307/30040690
- Arjoon, S. (2000). Virtue Theory as a Dynamic Theory of Business. *Journal of Business Ethics*, 28(2), 159-178. doi:10.1023/A:1006339112331
- Armstrong, J. S., & Overton, T. S. (1977). Estimating Nonresponse Bias in Mail Surveys. *Journal of Marketing Research*, 14(3), 396-402. doi:10.1177/002224377701400320
- Arora, A., Arora, A. S., Sivakumar, K., & Burke, G. (2020). Strategic sustainable purchasing, environmental collaboration, and organizational sustainability performance: the moderating role of supply base size. *Supply Chain Management: An International Journal*, 25(6), 709-728. doi:10.1108/SCM-07-2019-0284
- Ashforth, B. E., & Gibbs, B. W. (1990). The Double-Edge of Organizational Legitimation. *Organization Science*, 1(2), 177-194. doi:10.1287/orsc.1.2.177
- Baliga, R., Raut, R., & Kamble, S. (2020). The effect of motivators, supply, and lean management on sustainable supply chain management practices and performance. *Benchmarking: An International Journal*, 27(1), 347-381. doi:10.1108/BIJ-01-2019-0004
- Barclay, D., Thompson, R., & Higgins, C. (1995). The Partial Least Squares (PLS) Approach to Causal Modeling: Personal Computer Use as an Illustration. *Technology Studies*, 2.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99-120. doi:10.1177/014920639101700108
- Baron, D. P. (2001). Private Politics, Corporate Social Responsibility, and Integrated Strategy. *Journal of Economics & Management Strategy*, 10(1), 7-45. doi:<https://doi.org/10.1111/j.1430-9134.2001.00007.x>
- Bartos, K. E., Schwarzkopf, J., Mueller, M., & Hofmann-Stoelting, C. (2022). Explanatory factors for variation in supplier sustainability performance in the automotive sector – A quantitative analysis. *Cleaner Logistics and Supply Chain*, 5, 100068. doi:<https://doi.org/10.1016/j.clscn.2022.100068>
- BBC News. (2015). Volkswagen says 800,000 cars may have false CO2 levels. Retrieved from <https://www.bbc.com/news/business-34712435>
- Benton, W. C., & Maloni, M. (2005). The influence of power driven buyer/seller relationships on supply chain satisfaction. *Journal of Operations Management*, 23(1), 1-22. doi:<https://doi.org/10.1016/j.jom.2004.09.002>
- Beske-Janssen, P., Johnsen, T., Constant, F., & Wieland, A. (2023). New competences enhancing Procurement's contribution to innovation and sustainability. *Journal of Purchasing and Supply Management*, 29(3), 100847. doi:<https://doi.org/10.1016/j.pursup.2023.100847>
- Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.

- Blome, C., Hollos, D., & Paulraj, A. (2014). Green procurement and green supplier development: antecedents and effects on supplier performance. *International Journal of Production Research*, 52(1), 32-49. doi:10.1080/00207543.2013.825748
- Bogner, A., Littig, B., & Menz, W. (2009). *Interviewing Experts*: Springer.
- Boiral, O. (2007). Corporate Greening Through ISO 14001: A Rational Myth? *Organization Science*, 18(1), 127-146. doi:10.1287/orsc.1060.0224
- Boons, F., & Lüdeke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 45, 9-19. doi:<https://doi.org/10.1016/j.jclepro.2012.07.007>
- Bourgeois, L. J. (1981). On the Measurement of Organizational Slack. *The Academy of Management Review*, 6(1), 29-39. doi:10.2307/257138
- Brammer, S., & Millington, A. (2006). Firm size, organizational visibility and corporate philanthropy: an empirical analysis. *Business Ethics: A European Review*, 15(1), 6-18. doi:<https://doi.org/10.1111/j.1467-8608.2006.00424.x>
- Brennan, R., & Turnbull, P. W. (1999). Adaptive Behavior in Buyer–Supplier Relationships. *Industrial Marketing Management*, 28(5), 481-495. doi:[https://doi.org/10.1016/S0019-8501\(99\)00057-7](https://doi.org/10.1016/S0019-8501(99)00057-7)
- Britten, N. (1999). *Qualitative interviews in healthcare* (2 ed.). London: BMJ Books.
- Brønn, P. S., & Vidaver-Cohen, D. (2009). Corporate Motives for Social Initiative: Legitimacy, Sustainability, or the Bottom Line? *Journal of Business Ethics*, 87(1), 91-109. doi:10.1007/s10551-008-9795-z
- Brown, J. R., Lusch, R. F., & Nicholson, C. Y. (1995). Power and relationship commitment: their impact on marketing channel member performance. *Journal of Retailing*, 71(4), 363-392. doi:[https://doi.org/10.1016/0022-4359\(95\)90019-5](https://doi.org/10.1016/0022-4359(95)90019-5)
- Caniëls, M. C. J., & Gelderman, C. J. (2007). Power and interdependence in buyer supplier relationships: A purchasing portfolio approach. *Industrial Marketing Management*, 36(2), 219-229. doi:<https://doi.org/10.1016/j.indmarman.2005.08.012>
- Caniëls, M. C. J., Vos, F. G. S., Schiele, H., & Pulles, N. J. (2018). The effects of balanced and asymmetric dependence on supplier satisfaction: Identifying positive effects of dependency. *Journal of Purchasing and Supply Management*, 24(4), 343-351. doi:<https://doi.org/10.1016/j.pursup.2017.11.003>
- Carr, A. S., & Pearson, J. N. (1999). Strategically managed buyer–supplier relationships and performance outcomes. *Journal of Operations Management*, 17(5), 497-519. doi:[https://doi.org/10.1016/S0272-6963\(99\)00007-8](https://doi.org/10.1016/S0272-6963(99)00007-8)
- Carter, C. R., & Liane, E., P. (2011). Sustainable supply chain management: evolution and future directions. *International Journal of Physical Distribution & Logistics Management*, 41(1), 46-62. doi:10.1108/09600031111101420
- Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. *International Journal of Physical Distribution & Logistics Management*, 38(5), 360-387. doi:10.1108/09600030810882816
- Casidy, R., & Yan, L. (2022). The effects of supplier B2B sustainability positioning on buyer performance: The role of trust. *Industrial Marketing Management*, 102, 311-323. doi:<https://doi.org/10.1016/j.indmarman.2022.02.005>
- Chae, S., Choi, T. Y., & Hur, D. (2017). Buyer Power and Supplier Relationship Commitment: A Cognitive Evaluation Theory Perspective. *Journal of Supply Chain Management*, 53(2), 39-60. doi:<https://doi.org/10.1111/jscm.12138>
- Chen, I. J., & Kitsis, A. M. (2017). A research framework of sustainable supply chain management. *The International Journal of Logistics Management*, 28(4), 1454-1478. doi:10.1108/IJLM-11-2016-0265
- Chen, X., Yi, N., Zhang, L., & Li, D. (2018). Does institutional pressure foster corporate green innovation? Evidence from China's top 100 companies. *Journal of Cleaner Production*, 188, 304-311. doi:<https://doi.org/10.1016/j.jclepro.2018.03.257>
- Chen, Y., & Chen, I. J. (2019). Mixed sustainability motives, mixed results: the role of compliance and commitment in sustainable supply chain practices. *Supply Chain Management: An International Journal*, 24(5), 622-636. doi:10.1108/SCM-10-2018-0363

- Chiu, S.-C., & Sharfman, M. (2011). Legitimacy, Visibility, and the Antecedents of Corporate Social Performance: An Investigation of the Instrumental Perspective. *Journal of Management*, 37(6), 1558-1585. doi:10.1177/0149206309347958
- Chkanikova, O. (2015). Sustainable Purchasing in Food Retailing: Interorganizational Relationship Management to Green Product Supply. *Business Strategy and the Environment*, 25(7), 478-494. doi:<https://doi.org/10.1002/bse.1877>
- Cialdini, R. B. (2006). *Influence: The Psychology of Persuasion*: Harper Collins.
- Clément, A., Robinot, É., & Trespeuch, L. (2023). The use of ESG scores in academic literature: a systematic literature review. *Journal of Enterprising Communities: People and Places in the Global Economy*, ahead-of-print(ahead-of-print). doi:10.1108/JEC-10-2022-0147
- Colquitt, J. A., Lepine, J. A., Piccolo, R. F., Zapata, C. P., & Rich, B. L. (2012). Explaining the justice-performance relationship: trust as exchange deepener or trust as uncertainty reducer? *J Appl Psychol*, 97(1), 1-15. doi:10.1037/a0025208
- Corporate Sustainability Due Diligence (CSDD) Directive, (2022).
- Corporate Sustainability Reporting Directive (CSRD), (2022).
- Coşkun, S. S., Kumru, M., & Kan, N. M. (2022). An integrated framework for sustainable supplier development through supplier evaluation based on sustainability indicators. *Journal of Cleaner Production*, 335, 130287. doi:<https://doi.org/10.1016/j.jclepro.2021.130287>
- Cousins, P. D., Lamming, R. C., & Bowen, F. (2004). The role of risk in environment-related supplier initiatives. *International Journal of Operations & Production Management*, 24(6), 554-565. doi:10.1108/01443570410538104
- Cox, A. (2004). Business relationship alignment: on the commensurability of value capture and mutuality in buyer and supplier exchange. *Supply Chain Management: An International Journal*, 9(5), 410-420. doi:10.1108/13598540410560793
- Crane, A. (1999). Are You Ethical? Please Tick Yes Or No On Researching Ethics in Business Organizations. *Journal of Business Ethics*, 20(3), 237-248. doi:10.1023/A:1005817414241
- Creswell, J. W., & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*: SAGE Publications.
- Dabhilkar, M., Bengtsson, L., & Lakemond, N. (2016). Sustainable supply management as a purchasing capability. *International Journal of Operations & Production Management*, 36(1), 2-22. doi:10.1108/IJOPM-12-2014-0609
- Dahlstrom, R., & Boyle, B. A. (1994). Behavioral Antecedents To Intrinsic Motivation In Capital Equipment Exchange Relationships. *Journal of Applied Business Research (JABR)*, 10(2), 51-62. doi:<https://doi.org/10.19030/jabr.v10i2.5938>
- Daily, B. F., & Huang, S. c. (2001). Achieving sustainability through attention to human resource factors in environmental management. *International Journal of Operations & Production Management*, 21(12), 1539-1552. doi:10.1108/01443570110410892
- Daly, H. E. (1996). *Beyond Growth: The Economics of Sustainable Development* Boston: Beacon Press.
- Dari-Mattiacci, G., & Geest, G. D. (2009). Carrots, Sticks, and the Multiplication Effect. *The Journal of Law, Economics, and Organization*, 26(2), 365-384. doi:10.1093/jleo/ewn026
- Darnall, N., & Edwards Jr., D. (2006). Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. *Strategic Management Journal*, 27(4), 301-320. doi:<https://doi.org/10.1002/smj.518>
- Das, T. K., & Teng, B.-S. (2001). Trust, Control, and Risk in Strategic Alliances: An Integrated Framework. *Organization Studies*, 22(2), 251-283. doi:10.1177/0170840601222004
- Delamare Le Deist, F., & Winterton, J. (2005). What Is Competence? *Human Resource Development International*, 8, 27-46. doi:10.1080/1367886042000338227
- Delke, V. (2022). Industry 4.0 in purchasing and supply management: Defining Future Roles and Skills.
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. *Journal of the Academy of Marketing Science*, 40(3), 434-449. doi:10.1007/s11747-011-0300-3
- Difrancesco, R. M., Luzzini, D., & Patrucco, A. S. (2022). Purchasing realized absorptive capacity as the gateway to sustainable supply chain management. *International Journal of Operations & Production Management*, 42(5), 603-636. doi:10.1108/IJOPM-10-2021-0627

- DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *48*(2), 147-160. doi:10.2307/2095101
- Dkhili, H., & Ben Dhiab, L. (2021). The impact of national culture on environmental performance: case for GSS countries. *Marketing and Management of Innovations*, 304-311. doi:10.21272/mmi.2021.1-23
- Dowell, D., Morrison, M., & Heffernan, T. (2015). The changing importance of affective trust and cognitive trust across the relationship lifecycle: A study of business-to-business relationships. *Industrial Marketing Management*, 44, 119-130. doi:<https://doi.org/10.1016/j.indmarman.2014.10.016>
- Drolet, A. L., & Morrison, D. G. (2001). Do We Really Need Multiple-Item Measures in Service Research? *Journal of Service Research*, 3(3), 196-204. doi:10.1177/109467050133001
- Dubois, A., & Pedersen, A.-C. (2002). Why Relationships Do Not Fit into Purchasing Portfolio Models — A Comparison Between the Portfolio and Industrial Network Approaches. *European Journal of Purchasing & Supply Management*, 8, 35-42. doi:10.1016/S0969-7012(01)00014-4
- Dyer, J. H., & Singh, H. (1998). The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage. *Academy of Management Review*, 23(4), 660-679. doi:10.5465/amr.1998.1255632
- Eggert, J., & Hartmann, J. (2021). Purchasing's contribution to supply chain emission reduction. *Journal of Purchasing and Supply Management*, 27(2), 100685. doi:<https://doi.org/10.1016/j.pursup.2021.100685>
- Ehm, H., Neau, C., Martens, C., Lauer, T., Ponsignon, T., & Garcia, J. (2019). *Research Opportunities regarding Tree and Network Product Structure Representations in a Semiconductor Supply Chain*.
- Ehrgott, M., Reimann, F., Kaufmann, L., & Carter, C. R. (2013). Environmental Development of Emerging Economy Suppliers: Antecedents and Outcomes. *Journal of Business Logistics*, 34(2), 131-147. doi:<https://doi.org/10.1111/jbl.12015>
- Eisenhardt, K. M. (1989). Building Theories from Case Study Research. *The Academy of Management Review*, 14(4), 532-550. doi:10.2307/258557
- Elking, I., Paraskevas, J.-P., Grimm, C., Corsi, T., & Steven, A. (2017). Financial Dependence, Lean Inventory Strategy, and Firm Performance. *Journal of Supply Chain Management*, 53(2), 22-38. doi:<https://doi.org/10.1111/jscm.12136>
- Elkington, J. (1998). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*: New Society Publishers, Stony Creek, CT.
- Ellram, L., & Tate, W. (2023). *A Roadmap to Net-Zero Greenhouse Gas Emissions*. Whitepaper. Arizona State University. CAPS Research.
- Emerson, R. M. (1976). Social Exchange Theory. *Annual Review of Sociology*, 2(1), 335-362. doi:10.1146/annurev.so.02.080176.002003
- Epstein, M. J., & Rejc Buhovac, A. (2014). *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts* (2 ed.): Routledge.
- Fawcett, S. E., McCarter, M. W., Fawcett, A. M., Webb, G. S., & Magnan, G. M. (2015). Why supply chain collaboration fails: the socio-structural view of resistance to relational strategies. *Supply Chain Management: An International Journal*, 20(6), 648-663. doi:10.1108/SCM-08-2015-0331
- Fayezi, S., Stekelorum, R., El Baz, J., & Laguir, I. (2020). Paradoxes in supplier's uptake of GSCM practices: institutional drivers and buyer dependency. *Journal of Manufacturing Technology Management*, 31(3), 479-500. doi:10.1108/JMTM-05-2019-0171
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods*, 5(1), 80-92. doi:10.1177/160940690600500107
- Fleith de Medeiros, J., Bisognin Garlet, T., Duarte Ribeiro, J. L., & Nogueira Cortimiglia, M. (2022). Success factors for environmentally sustainable product innovation: An updated review. *Journal of Cleaner Production*, 345, 131039. doi:<https://doi.org/10.1016/j.jclepro.2022.131039>

- Foerstl, K., Azadegan, A., Leppelt, T., & Hartmann, E. (2015). Drivers of Supplier Sustainability: Moving Beyond Compliance to Commitment. *Journal of Supply Chain Management*, 51, 67-92. doi:10.1111/jscm.12067
- Foerstl, K., Reuter, C., Hartmann, E., & Blome, C. (2010). Managing supplier sustainability risks in a dynamically changing environment-Sustainable supplier management in the chemical industry. *Journal of Purchasing and Supply Management*, 16(2), 118-130. doi:10.1016/j.pursup.2010.03.011
- French, J., & Raven, B. (1959). *The bases of social power* (Vol. 6).
- Friedman, M. (1962). *Capitalism and freedom*. Chicago: University of Chicago Press.
- Friedman, M. (1970, September 13). The Social Responsibility of Business Is to Increase Its Profits. *New York Times*, pp. 122-126. Retrieved from <https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html>
- Frooman, J. (1999). Stakeholder Influence Strategies. *The Academy of Management Review*, 24(2), 191-205. doi:10.2307/259074
- Fu, W., & Su, H.-C. (2020). Take actions or outsource? An empirical examination of strategic environmental options on greenhouse gas emissions. *International Journal of Operations & Production Management*, 40(6), 753-776. doi:10.1108/IJOPM-02-2020-0088
- Gattiker, T. F., & Carter, C. R. (2010). Understanding project champions' ability to gain intra-organizational commitment for environmental projects. *Journal of Operations Management*, 28(1), 72-85. doi:<https://doi.org/10.1016/j.jom.2009.09.001>
- Gelderman, C. J. (2003). *A portfolio approach to the development of differentiated purchasing strategies*. (Phd Thesis 2 (Research NOT TU/e / Graduation TU/e)). Technische Universiteit Eindhoven, Retrieved from <https://pure.tue.nl/ws/portalfiles/portal/1800909/200312759.pdf>
- Gelderman, C. J., van Hal, L., Lambrechts, W., & Schijns, J. (2021). The impact of buying power on corporate sustainability - The mediating role of suppliers' traceability data. *Cleaner Environmental Systems*, 3, 100040. doi:<https://doi.org/10.1016/j.cesys.2021.100040>
- Gelderman, C. J., & Van Weele, A. J. (2003). Handling measurement issues and strategic directions in Kraljic's purchasing portfolio model. *Journal of Purchasing and Supply Management*, 9(5), 207-216. doi:<https://doi.org/10.1016/j.pursup.2003.07.001>
- Gelderman, C. J., & Van Weele, A. J. (2005). Purchasing Portfolio Models: A Critique and Update. *Journal of Supply Chain Management*, 41(3), 19-28. doi:<https://doi.org/10.1111/j.1055-6001.2005.04103003.x>
- Genç, K. Y. (2013). Culture as a Strategic Resource for Organizations and an Assessment on Cultures of Turkish Large Firms. *Procedia - Social and Behavioral Sciences*, 75, 525-531. doi:<https://doi.org/10.1016/j.sbspro.2013.04.057>
- Geng, R., Mansouri, S. A., & Aktas, E. (2017). The relationship between green supply chain management and performance: A meta-analysis of empirical evidences in Asian emerging economies. *International Journal of Production Economics*, 183, 245-258. doi:<https://doi.org/10.1016/j.ijpe.2016.10.008>
- Giannakis, M., Dubey, R., Vlachos, I., & Ju, Y. (2020). Supplier sustainability performance evaluation using the analytic network process. *Journal of Cleaner Production*, 247, 119439. doi:<https://doi.org/10.1016/j.jclepro.2019.119439>
- Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *Br Dent J*, 204(6), 291-295. doi:10.1038/bdj.2008.192
- Gimenez, C., & Tachizawa, E. M. (2012). Extending sustainability to suppliers: a systematic literature review. *Supply Chain Management: An International Journal*, 17(5), 531-543. doi:10.1108/13598541211258591
- 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. doi:10.1016/j.pursup.2012.06.003
- González, P., Sarkis, J., & Adenso-Díaz, B. (2008). Environmental management system certification and its influence on corporate practices. *International Journal of Operations & Production Management*, 28(11), 1021-1041. doi:10.1108/01443570810910179

- Goodman, L. E., & Dion, P. A. (2001). The Determinants of Commitment in the Distributor–Manufacturer Relationship. *Industrial Marketing Management*, 30(3), 287-300. doi:[https://doi.org/10.1016/S0019-8501\(99\)00092-9](https://doi.org/10.1016/S0019-8501(99)00092-9)
- Gopal, S., Staufer-Steinnocher, P., Xu, Y., & Pitts, J. (2022). Semiconductor Supply Chain: A 360-Degree View of Supply Chain Risk and Network Resilience Based on GIS and AI. In S. Kummer, T. Wakolbinger, L. Novoszel, & A. M. Geske (Eds.), *Supply Chain Resilience: Insights from Theory and Practice* (pp. 303-313). Cham: Springer International Publishing.
- Govindan, K., Seuring, S., Zhu, Q., & Azevedo, S. G. (2016). Accelerating the transition towards sustainability dynamics into supply chain relationship management and governance structures. *Journal of Cleaner Production*, 112, 1813-1823. doi:<https://doi.org/10.1016/j.jclepro.2015.11.084>
- Greenhouse Gas Protocol. (2013). *Technical Guidance for Calculating Scope 3 Emissions*. Retrieved from https://ghgprotocol.org/sites/default/files/2023-03/Scope3_Calculation_Guidance_0%5B1%5D.pdf
- Greenwood, R., Hinings, C. R., & Whetten, D. (2014). Rethinking Institutions and Organizations. *Journal of Management Studies*, 51(7), 1206-1220. doi:<https://doi.org/10.1111/joms.12070>
- Gregor, S. (2006). The Nature of Theory in Information Systems. *MIS Quarterly*, 30(3), 611-642. doi:10.2307/25148742
- Griffith, D., Harvey, M., & Lusch, R. (2006). Social Exchange in Supply Chain Relationships: The Resulting Benefits of Procedural and Distributive Justice. *Journal of Operations Management*, 24, 85-98. doi:10.1016/j.jom.2005.03.003
- Grimm, J. H., Hofstetter, J. S., & Sarkis, J. (2014). Critical factors for sub-supplier management: A sustainable food supply chains perspective. *International Journal of Production Economics*, 152, 159-173. doi:<https://doi.org/10.1016/j.ijpe.2013.12.011>
- Gualandris, J., Golini, R., & Kalchschmidt, M. (2014). Do supply management and global sourcing matter for firm sustainability performance? *Supply Chain Management: An International Journal*, 19(3), 258-274. doi:10.1108/SCM-11-2013-0430
- Gulati, R. (2007). Silo Busting: How to Execute on the Promise of Customer Focus. *Harvard Business Review*, 85, 98-108, 145.
- Haghani, M., Bliemer, M. C. J., Rose, J. M., Oppewal, H., & Lancsar, E. (2021). Hypothetical bias in stated choice experiments: Part I. Macro-scale analysis of literature and integrative synthesis of empirical evidence from applied economics, experimental psychology and neuroimaging. *Journal of Choice Modelling*, 41, 100309. doi:<https://doi.org/10.1016/j.jocm.2021.100309>
- Hahn, R., & Kühnen, M. (2013). Determinants of sustainability reporting: a review of results, trends, theory, and opportunities in an expanding field of research. *Journal of Cleaner Production*, 59, 5-21. doi:<https://doi.org/10.1016/j.jclepro.2013.07.005>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Evaluation of the Structural Model. In J. F. Hair Jr, G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, & S. Ray (Eds.), *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook* (pp. 115-138). Cham: Springer International Publishing.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. doi:10.1108/EBR-11-2018-0203
- Hair, J. F., Sarstedt, M., & Ringle, C. M. (2019). Rethinking some of the rethinking of partial least squares. *European Journal of Marketing*, 53(4), 566-584. doi:10.1108/EJM-10-2018-0665
- Handfield, R., Sroufe, R., & Walton, S. (2005). Integrating environmental management and supply chain strategies. *Business Strategy and the Environment*, 14(1), 1-19. doi:<https://doi.org/10.1002/bse.422>
- Handley, S. M., & Benton Jr, W. C. (2012). Mediated power and outsourcing relationships. *Journal of Operations Management*, 30(3), 253-267. doi:<https://doi.org/10.1016/j.jom.2011.11.004>
- Hariyani, D., Mishra, S., Hariyani, P., & Sharma, M. K. (2023). Drivers and motives for sustainable manufacturing system. *Innovation and Green Development*, 2(1), 100031. doi:<https://doi.org/10.1016/j.igd.2022.100031>
- Harland, J., Reichelt, T., & Yao, M. (2008, 19-22 May 2008). *Environmental sustainability in the semiconductor industry*. Paper presented at the 2008 IEEE International Symposium on Electronics and the Environment.

- Harmon-Jones, E., & Mills, J. (2019). An introduction to cognitive dissonance theory and an overview of current perspectives on the theory. In (pp. 3-24).
- Hart, S. L., & Dowell, G. (2011). Invited Editorial: A Natural-Resource-Based View of the Firm: Fifteen Years After. *Journal of Management*, 37(5), 1464-1479. doi:10.1177/0149206310390219
- Hartmann, J., & Moeller, S. (2014). Chain liability in multitier supply chains? Responsibility attributions for unsustainable supplier behavior. *Journal of Operations Management*, 32(5), 281-294. doi:<https://doi.org/10.1016/j.jom.2014.01.005>
- Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135. doi:10.1007/s11747-014-0403-8
- Hermundsdottir, F., & Aspelund, A. (2022). Competitive sustainable manufacturing - Sustainability strategies, environmental and social innovations, and their effects on firm performance. *Journal of Cleaner Production*, 370, 133474. doi:<https://doi.org/10.1016/j.jclepro.2022.133474>
- Hesping, F. H., & Schiele, H. (2015). Purchasing strategy development: A multi-level review. *Journal of Purchasing and Supply Management*, 21(2), 138-150. doi:<https://doi.org/10.1016/j.pursup.2014.12.005>
- Hesping, F. H., & Schiele, H. (2016). Matching tactical sourcing levers with the Kraljič matrix: Empirical evidence on purchasing portfolios. *International Journal of Production Economics*, 177, 101-117. doi:<https://doi.org/10.1016/j.ijpe.2016.04.011>
- Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource Dependence Theory: A Review. *Journal of Management*, 35(6), 1404-1427. doi:10.1177/0149206309343469
- Hoffman, A. J., & Bazerman, M. H. (2005). Changing environmental practice: understanding and overcoming the organizational and psychological barriers.
- Hoffmann, P., Schiele, H., & Krabbendam, K. (2013). Uncertainty, supply risk management and their impact on performance. *Journal of Purchasing and Supply Management*, 19, 199-211. doi:10.1016/j.pursup.2013.06.002
- Hofmann, H., Busse, C., Bode, C., & Henke, M. (2014). Sustainability-Related Supply Chain Risks: Conceptualization and Management. *Business Strategy and the Environment*, 23(3), 160-172. doi:<https://doi.org/10.1002/bse.1778>
- Hofmann, K. H., Theyel, G., & Wood, C. H. (2012). Identifying Firm Capabilities as Drivers of Environmental Management and Sustainability Practices – Evidence from Small and Medium-Sized Manufacturers. *Business Strategy and the Environment*, 21(8), 530-545. doi:<https://doi.org/10.1002/bse.739>
- Hofstede, G. (1994). The business of international business is culture. *International Business Review*, 3(1), 1-14. doi:[https://doi.org/10.1016/0969-5931\(94\)90011-6](https://doi.org/10.1016/0969-5931(94)90011-6)
- Hofstede, G., & Bond, M. H. (1988). The Confucius connection: From cultural roots to economic growth. *Organizational Dynamics*, 16(4), 5-21. doi:[https://doi.org/10.1016/0090-2616\(88\)90009-5](https://doi.org/10.1016/0090-2616(88)90009-5)
- Hsu, C.-C., Tan, K.-C., & Mohamad Zailani, S. H. (2016). Strategic orientations, sustainable supply chain initiatives, and reverse logistics. *International Journal of Operations & Production Management*, 36(1), 86-110. doi:10.1108/IJOPM-06-2014-0252
- Hunt, S. D., & Nevin, J. R. (1974). Power in a Channel of Distribution: Sources and Consequences. *Journal of Marketing Research*, 11(2), 186-193. doi:10.1177/002224377401100210
- Hwang, B.-N., Huang, C.-Y., & Wu, C.-H. (2016). A TOE Approach to Establish a Green Supply Chain Adoption Decision Model in the Semiconductor Industry. *Sustainability*, 8(2), 168. Retrieved from <https://www.mdpi.com/2071-1050/8/2/168>
- Hyatt, D. G., & Berente, N. (2017). Substantive or Symbolic Environmental Strategies? Effects of External and Internal Normative Stakeholder Pressures. *Business Strategy and the Environment*, 26(8), 1212-1234. doi:<https://doi.org/10.1002/bse.1979>
- Intergovernmental Panel on Climate Change. (2014). *Climate Change 2014: Synthesis Report*. Retrieved from https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf
- Intergovernmental Panel on Climate Change. (2018). *Global Warming of 1.5°C*. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SR15_Full_Report_HR.pdf

- Ireland, R. D., & Webb, J. W. (2007). A multi-theoretic perspective on trust and power in strategic supply chains. *Journal of Operations Management*, 25(2), 482-497. doi:<https://doi.org/10.1016/j.jom.2006.05.004>
- Jia, M., Stevenson, M., & Hendry, L. C. (2021). The boundary-spanning role of first-tier suppliers in sustainability-oriented supplier development initiatives. *International Journal of Operations & Production Management*, 41(11), 1633-1659. doi:10.1108/IJOPM-12-2020-0856
- Jiang, Y., Jia, F., Blome, C., & Chen, L. (2020). Achieving sustainability in global sourcing: towards a conceptual framework. *Supply Chain Management: An International Journal*, 25(1), 35-60. doi:10.1108/SCM-12-2018-0448
- Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A Review of the Quality Indicators of Rigor in Qualitative Research. *American Journal of Pharmaceutical Education*, 84(1), 7120. doi:<https://doi.org/10.5688/ajpe7120>
- Johnson, J. L., Sakano, T., Cote, J. A., & Onzo, N. (1993). The exercise of interfirm power and its repercussions in U.S.-Japanese channel relationships. *Journal of Marketing*, 57, 1-10. doi:10.2307/1252023
- K. Roehrich, J., Grosvold, J., & U. Hoejmoose, S. (2014). Reputational risks and sustainable supply chain management. *International Journal of Operations & Production Management*, 34(5), 695-719. doi:10.1108/IJOPM-10-2012-0449
- Kaderabek, A., & Sinibaldi, J. (2022). Assessing Measurement Error in Hypothetical Questions. *Survey Practice*. doi:<https://doi.org/10.29115/SP-2022-0010>
- Kang, H. (2013). The prevention and handling of the missing data. *Korean J Anesthesiol*, 64(5), 402-406. doi:10.4097/kjae.2013.64.5.402
- Kaptein, M. (2008). Developing and testing a measure for the ethical culture of organizations: The corporate ethical virtues model. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 29(7), 923-947.
- Karim, A., & Arif-Uz-Zaman, K. (2013). A methodology for effective implementation of lean strategies and its performance evaluation in manufacturing organizations. *Business Process Management Journal*, 19(1), 169-196. doi:10.1108/14637151311294912
- Kaufmann, L., & Gaeckler, J. (2015). A structured review of partial least squares in supply chain management research. *Journal of Purchasing and Supply Management*, 21(4), 259-272. doi:<https://doi.org/10.1016/j.pursup.2015.04.005>
- Kauppi, K., & Hannibal, C. (2017). Institutional pressures and sustainability assessment in supply chains. *Supply Chain Management: An International Journal*, 22(5), 458-472. doi:10.1108/SCM-01-2017-0004
- Kauppi, K., & Luzzini, D. (2022). Measuring institutional pressures in a supply chain context: scale development and testing. *Supply Chain Management: An International Journal*, 27(7), 79-107. doi:10.1108/SCM-04-2021-0169
- Kembro, J., & Selviaridis, K. (2015). Exploring information sharing in the extended supply chain: an interdependence perspective. *Supply Chain Management: An International Journal*, 20(4), 455-470. doi:10.1108/SCM-07-2014-0252
- Ketilson, L. H. (1991). An examination of the use of legitimate power in marketing channels. *The International Review of Retail, Distribution and Consumer Research*, 1(5), 527-548. doi:10.1080/09593969100000021
- Kim, D.-Y., & Zhu, P. (2018). Supplier dependence and R&D intensity: The moderating role of network centrality and interconnectedness. *Journal of Operations Management*, 64(1), 7-18. doi:<https://doi.org/10.1016/j.jom.2018.11.002>
- Kitsis, A. M., & Chen, I. J. (2020). Do motives matter? Examining the relationships between motives, SSCM practices and TBL performance. *Supply Chain Management: An International Journal*, 25(3), 325-341. doi:10.1108/SCM-05-2019-0218
- Knight, L., Tate, W., Carnovale, S., Di Mauro, C., Bals, L., Caniato, F., . . . Wagner, S. M. (2022). Future business and the role of purchasing and supply management: Opportunities for 'business-not-as-usual' PSM research. *Journal of Purchasing and Supply Management*, 28(1), 100753. doi:<https://doi.org/10.1016/j.pursup.2022.100753>

- Koberg, E., & Longoni, A. (2019). A systematic review of sustainable supply chain management in global supply chains. *Journal of Cleaner Production*, 207, 1084-1098. doi:<https://doi.org/10.1016/j.jclepro.2018.10.033>
- Kock, F., Berbekova, A., & Assaf, A. G. (2021). Understanding and managing the threat of common method bias: Detection, prevention and control. *Tourism Management*, 86, 104330. doi:<https://doi.org/10.1016/j.tourman.2021.104330>
- Kock, N. (2017). Common Method Bias: A Full Collinearity Assessment Method for PLS-SEM. In H. Latan & R. Noonan (Eds.), *Partial Least Squares Path Modeling: Basic Concepts, Methodological Issues and Applications* (pp. 245-257). Cham: Springer International Publishing.
- Koo, T. K., & Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *J Chiropr Med*, 15(2), 155-163. doi:10.1016/j.jcm.2016.02.012
- Kraljic, P. (1983). Purchasing Must Become Supply Management. *Harvard Business Review*, 61, 109-117.
- Krause, D. R., Vachon, S., & Klassen, R. D. (2009). Special topic forum on sustainable supply chain management: introduction and reflections on the role of purchasing management. *Journal of Supply Chain Management*, 45(4), 18-25.
- Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Quality & Quantity*, 47(4), 2025-2047. doi:10.1007/s11135-011-9640-9
- Kumar, D., & Rahman, Z. (2015). Sustainability adoption through buyer supplier relationship across supply chain: A literature review and conceptual framework. *International Strategic Management Review*, 3(1-2), 110-127. doi:<https://doi.org/10.1016/j.ism.2015.04.002>
- Lado, A. A., Paulraj, A., & Chen, I. J. (2011). Customer focus, supply-chain relational capabilities and performance. *The International Journal of Logistics Management*, 22(2), 202-221. doi:10.1108/095740911111156550
- Lam, H. K. S. (2018). Doing good across organizational boundaries. *International Journal of Operations & Production Management*, 38(12), 2389-2412. doi:10.1108/IJOPM-02-2018-0056
- Laplume, A. O., Sonpar, K., & Litz, R. A. (2008). Stakeholder theory: Reviewing a theory that moves us. *Journal of Management*, 34(6), 1152-1189.
- Lee, S.-Y., Klassen, R. D., Furlan, A., & Vinelli, A. (2014). The green bullwhip effect: Transferring environmental requirements along a supply chain. *International Journal of Production Economics*, 156, 39-51. doi:<https://doi.org/10.1016/j.ijpe.2014.05.010>
- Lim, A., & Tsutsui, K. (2012). Globalization and Commitment in Corporate Social Responsibility: Cross-National Analyses of Institutional and Political-Economy Effects. *American Sociological Review*, 77(1), 69-98. doi:10.1177/0003122411432701
- Lin, F., Lin, S.-W., & Lu, W.-M. (2018). Sustainability Assessment of Taiwan's Semiconductor Industry: A New Hybrid Model Using Combined Analytic Hierarchy Process and Two-Stage Additive Network Data Envelopment Analysis. *Sustainability*, 10(11), 4070. Retrieved from <https://www.mdpi.com/2071-1050/10/11/4070>
- Lintukangas, K., Kahkonen, 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). doi:10.1016/j.pursup.2019.100558
- Little, T. D., Jorgensen, T. D., Lang, K. M., & Moore, E. W. G. (2014). On the Joys of Missing Data. *Journal of Pediatric Psychology*, 39(2), 151-162. doi:10.1093/jpepsy/jst048
- Liu, L., Zhang, M., Hendry, L. C., Bu, M., & Wang, S. (2018). Supplier Development Practices for Sustainability: A Multi-Stakeholder Perspective. *Business Strategy and the Environment*, 27(1), 100-116. doi:<https://doi.org/10.1002/bse.1987>
- Loomis, J. B. (2014). 2013 WAEA Keynote Address: Strategies for Overcoming Hypothetical Bias in Stated Preference Surveys. *Journal of Agricultural and Resource Economics*, 39(1), 34-46. Retrieved from <http://www.jstor.org.ezproxy2.utwente.nl/stable/44131313>
- Luukkainen, L., & Kähkönen, A.-K. (2023). Developing the application model for the Kraljic's purchasing portfolio. *International Journal of Procurement Management*, 16(2), 177-195. doi:10.1504/ijpm.2023.128475

- M. Lo, S. (2014). Effects of supply chain position on the motivation and practices of firms going green. *International Journal of Operations & Production Management*, 34(1), 93-114. doi:10.1108/IJOPM-04-2012-0133
- Ma, Y., Wang, J., & Lv, X. (2022). Institutional pressures and firms' environmental management behavior: the moderating role of slack resources. *Journal of Environmental Planning and Management*, 1-23. doi:10.1080/09640568.2022.2079077
- MacKenzie, S. B., & Podsakoff, P. M. (2012). Common Method Bias in Marketing: Causes, Mechanisms, and Procedural Remedies. *Journal of Retailing*, 88(4), 542-555. doi:<https://doi.org/10.1016/j.jretai.2012.08.001>
- Makadok, R., Burton, R., & Barney, J. (2018). A practical guide for making theory contributions in strategic management. *Strategic Management Journal*, 39(6), 1530-1545. doi:<https://doi.org/10.1002/smj.2789>
- Maloni, M. J., & Benton, W. C. (2000). Power Influences in the Supply Chain. *Journal of Business Logistics*, 21, 16-36.
- Marquis, C., & Qian, C. (2014). Corporate Social Responsibility Reporting in China: Symbol or Substance? *Organization Science*, 25(1), 127-148. doi:10.1287/orsc.2013.0837
- Marshall, D., McCarthy, L., McGrath, P., & Claudy, M. (2015). Going above and beyond: how sustainability culture and entrepreneurial orientation drive social sustainability supply chain practice adoption. *Supply Chain Management*, 20, 434-454.
- Maurer, C. C., Bansal, P., & Crossan, M. M. (2011). Creating Economic Value Through Social Values: Introducing a Culturally Informed Resource-Based View. *Organization Science*, 22(2), 432-448. Retrieved from <http://www.jstor.org.ezproxy2.utwente.nl/stable/20868869>
- Melvin, C. (2023). Supply Chain Collaboration Key to Making Chip Industry More Sustainable: Takeaways From SEMICON Europa 2022. *Semiconductor Equipment and Materials International (SEMI)*. Retrieved from <https://www.semi.org/en/blogs/technology-and-trends/supply-chain-collaboration-key-to-making-chip-industry-more-sustainable>
- Miemczyk, J., Johnsen, T. E., & Macquet, M. (2012). Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels. *Supply Chain Management: An International Journal*, 17(5), 478-496. doi:10.1108/13598541211258564
- Miemczyk, J., & Luzzini, D. (2019). Achieving triple bottom line sustainability in supply chains: The role of environmental, social and risk assessment practices. *International Journal of Operations & Production Management*, 39(2), 238-259. doi:10.1108/IJOPM-06-2017-0334
- Min, H., & Choi, S.-B. (2020). Green sourcing practices in Korea. *Management Research Review*, 43(1), 1-18. doi:10.1108/MRR-11-2018-0446
- Minkov, M., & Hofstede, G. (2012). Is National Culture a Meaningful Concept?: Cultural Values Delineate Homogeneous National Clusters of In-Country Regions. *Cross-Cultural Research*, 46(2), 133-159. doi:10.1177/1069397111427262
- Mitsuhashi, H., & Greve, H. R. (2009). A Matching Theory of Alliance Formation and Organizational Success: Complementarity and Compatibility. *The Academy of Management Journal*, 52(5), 975-995. Retrieved from <http://www.jstor.org.ezproxy2.utwente.nl/stable/40390327>
- Mohr, J., & Nevin, J. R. (1990). Communication Strategies in Marketing Channels: A Theoretical Perspective. *Journal of Marketing*, 54(4), 36-51. doi:10.1177/002224299005400404
- Monczka, R., Handfield, R., Giunipero, L., & Patterson, J. (2008). *Purchasing and Supply Chain Management*: Cengage Learning.
- Monczka, R., & Petersen, K. J. (2012). The competitive potential of supply management. *Supply Chain Management Review*, 16.
- Moore, S. G., Neal, D. T., Fitzsimons, G. J., & Shiv, B. (2012). Wolves in sheep's clothing: How and when hypothetical questions influence behavior. *Organizational Behavior and Human Decision Processes*, 117(1), 168-178. doi:<https://doi.org/10.1016/j.obhdp.2011.08.003>
- Munir, K. A. (2020). Challenging Institutional Theory's Critical Credentials. *Organization Theory*, 1(1), 2631787719887975. doi:10.1177/2631787719887975
- Murfield, M. L., & Tate, W. L. (2017). Buyer and supplier perspectives on environmental initiatives. *The International Journal of Logistics Management*, 28(4), 1319-1350. doi:10.1108/IJLM-06-2016-0138

- Nagati, H., & Rebolledo, C. (2013). Supplier development efforts: The suppliers' point of view. *Industrial Marketing Management*, 42(2), 180-188. doi:<https://doi.org/10.1016/j.indmarman.2012.12.006>
- Narasimhan, R., Nair, A., Griffith, D. A., Arlbjørn, J. S., & Bendoly, E. (2009). Lock-in situations in supply chains: A social exchange theoretic study of sourcing arrangements in buyer–supplier relationships. *Journal of Operations Management*, 27(5), 374-389. doi:<https://doi.org/10.1016/j.jom.2008.10.004>
- Negri, M., Cagno, E., Colicchia, C., & Sarkis, J. (2021). Integrating sustainability and resilience in the supply chain: A systematic literature review and a research agenda. *Business Strategy and the Environment*, 30(7), 2858-2886. doi:<https://doi.org/10.1002/bse.2776>
- Neumüller, C., Lasch, R., & Kellner, F. (2016). Integrating sustainability into strategic supplier portfolio selection. *Management Decision*, 54(1), 194-221. doi:10.1108/MD-05-2015-0191
- Ni, W., & Sun, H. (2018). A contingent perspective on the synergistic effect of governance mechanisms on sustainable supply chain. *Supply Chain Management: An International Journal*, 23(3), 153-170. doi:10.1108/SCM-08-2017-0260
- Norwood, F. B., & Lusk, J. L. (2011). Social Desirability Bias in Real, Hypothetical, and Inferred Valuation Experiments. *American Journal of Agricultural Economics*, 93(2), 528-534. doi:<https://doi.org/10.1093/ajae/aaq142>
- Nyaga, G. N., Lynch, D. F., Marshall, D., & Ambrose, E. (2013). Power Asymmetry, Adaptation and Collaboration in Dyadic Relationships Involving a Powerful Partner. *Journal of Supply Chain Management*, 49(3), 42-65. doi:<https://doi.org/10.1111/jscm.12011>
- O'Rourke, D. (2005). Market Movements: Nongovernmental Organization Strategies to Influence Global Production and Consumption. *Journal of Industrial Ecology*, 9, 115-128. doi:10.1162/1088198054084608
- OECD. (2022). *The Climate Action Monitor 2022*.
- Olsen, R. F., & Ellram, L. M. (1997). A portfolio approach to supplier relationships. *Industrial Marketing Management*, 26(2), 101-113. doi:[https://doi.org/10.1016/S0019-8501\(96\)00089-2](https://doi.org/10.1016/S0019-8501(96)00089-2)
- Padhi, S. S., Wagner, S. M., & Aggarwal, V. (2012). Positioning of commodities using the Kraljic Portfolio Matrix. *Journal of Purchasing and Supply Management*, 18(1), 1-8. doi:<https://doi.org/10.1016/j.pursup.2011.10.001>
- Pagell, M., & Shevchenko, A. (2014). Why Research in Sustainable Supply Chain Management Should Have no Future. *Journal of Supply Chain Management*, 50(1), 44-55. doi:<https://doi.org/10.1111/jscm.12037>
- Pagell, M., Wu, Z., & Wasserman, M. E. (2010). Thinking Differently about Purchasing Portfolios: An Assessment of Sustainable Sourcing. *Journal of Supply Chain Management*, 46(1), 57-73. doi:<https://doi.org/10.1111/j.1745-493X.2009.03186.x>
- Panigrahi, S. S., Bahinipati, B., & Jain, V. (2019). Sustainable supply chain management. *Management of Environmental Quality: An International Journal*, 30(5), 1001-1049. doi:10.1108/MEQ-01-2018-0003
- Parker, P. M. (1997). *National cultures of the world: A statistical reference*. Westport, CT: Greenwood.
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Serv Res*, 34(5 Pt 2), 1189-1208.
- Paulraj, A., Chen, I. J., & Blome, C. (2017). Motives and Performance Outcomes of Sustainable Supply Chain Management Practices: A Multi-theoretical Perspective. *Journal of Business Ethics*, 145. doi:10.1007/s10551-015-2857-0
- Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology*, 63(1), 539-569. doi:10.1146/annurev-psych-120710-100452
- Pulles, N. J., Ellegaard, C., & Veldman, J. (2022). The Interplay Between Supplier-Specific Investments and Supplier Dependence: Do Two Pluses Make a Minus? *Journal of Management*, 0(0), 01492063221087643. doi:10.1177/01492063221087643
- Pulles, N. J., & Loohuis, R. P. A. (2020). Managing Buyer-Supplier Conflicts: The Effect of Buyer Openness And Directness On A Supplier's Willingness to Adapt. *Journal of Supply Chain Management*, 56(4), 65-81. doi:<https://doi.org/10.1111/jscm.12240>

- Pulles, N. J., Veldman, J., & Schiele, H. (2016). Winning the competition for supplier resources: The role of preferential resource allocation from suppliers. *International Journal of Operations & Production Management*, 36(11), 1458-1481. doi:10.1108/IJOPM-03-2014-0125
- Pulles, N. J., Veldman, J., Schiele, H., & Sierksma, H. (2014). Pressure or Pamper? The Effects of Power and Trust Dimensions on Supplier Resource Allocation. *Journal of Supply Chain Management*, 50(3), 16-36. doi:<https://doi.org/10.1111/jscm.12049>
- Purvis, B., Mao, Y., & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, 14(3), 681-695. doi:10.1007/s11625-018-0627-5
- Ramsay, J. (1996). The Case Against Purchasing Partnerships. *International Journal of Purchasing and Materials Management*, 32(3), 13-19. doi:<https://doi.org/10.1111/j.1745-493X.1996.tb00226.x>
- Raworth, K. (2017). *Doughnut economics : seven ways to think like a 21st-century economist*: London : Random House.
- Reichenbachs, M., Schiele, H., & Hoffmann, P. (2017). Strategic supply risk: exploring the risks deriving from a buying firm being of low importance for its suppliers. *International Journal of Risk Assessment and Management*, 20(4), 350-373. doi:10.1504/ijram.2017.087904
- Reuter, C., Foerstl, K., Hartmann, E., & Blome, C. (2010). SUSTAINABLE GLOBAL SUPPLIER MANAGEMENT: THE ROLE OF DYNAMIC CAPABILITIES IN ACHIEVING COMPETITIVE ADVANTAGE. *Journal of Supply Chain Management*, 46(2), 45-63. doi:<https://doi.org/10.1111/j.1745-493X.2010.03189.x>
- Roberts, P., & Priest, H. (2006). Reliability and validity in research. *Nursing standard*, 20(44), 41-46.
- Rodrigue, M., Magnan, M., & Cho, C. H. (2013). Is Environmental Governance Substantive or Symbolic? An Empirical Investigation. *Journal of Business Ethics*, 114(1), 107-129. doi:10.1007/s10551-012-1331-5
- Saeed, A., Jun, Y., Nubuor, S. A., Priyankara, H. P. R., & Jayasuriya, M. P. F. (2018). Institutional Pressures, Green Supply Chain Management Practices on Environmental and Economic Performance: A Two Theory View. *Sustainability*, 10(5), 1517. Retrieved from <https://www.mdpi.com/2071-1050/10/5/1517>
- 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. doi:10.1108/SCM-07-2014-0239
- 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. doi:<https://doi.org/10.1016/j.jom.2009.10.001>
- Sarkis, J., Zhu, Q., & Lai, K.-h. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics*, 130(1), 1-15. doi:<https://doi.org/10.1016/j.ijpe.2010.11.010>
- Sarstedt, M., & Cheah, J.-H. (2019). Partial least squares structural equation modeling using SmartPLS: a software review. *Journal of Marketing Analytics*, 7(3), 196-202. doi:10.1057/s41270-019-00058-3
- Schiele, H. (2019). Purchasing and Supply Management. In (pp. 45-73).
- Schiele, H. (2020). Comparing public and private organisations in their quest to become a preferred customer of suppliers. *Journal of Public Procurement*, 20(2), 119-144. doi:10.1108/JOPP-10-2018-0041
- Schiele, H., Hoffmann, P., & Körber, T. (2021). Synchronicity Management: Mitigating Supply Chain Risks by Systematically Taking Demand Changes as Starting Point—A Lesson From the COVID-19 Crisis. *IEEE Engineering Management Review*, 49, 55-62.
- Schiele, H., Krummacker, S., Hoffmann, P., & Kowalski, R. (2022). The “research world café” as method of scientific enquiry: Combining rigor with relevance and speed. *Journal of Business Research*, 140, 280-296. doi:<https://doi.org/10.1016/j.jbusres.2021.10.075>
- Schmidt, C. G., Foerstl, K., & Schaltenbrand, B. (2017). The Supply Chain Position Paradox: Green Practices and Firm Performance. *Journal of Supply Chain Management*, 53(1), 3-25. doi:<https://doi.org/10.1111/jscm.12113>
- Schoenherr, T., Modi, S. B., Benton, W. C., Carter, C. R., Choi, T. Y., Larson, P. D., . . . Wagner, S. M. (2012). Research opportunities in purchasing and supply management. *International Journal of Production Research*, 50(16), 4556-4579. doi:10.1080/00207543.2011.613870

- Schulze, H., & Bals, L. (2020). Implementing sustainable purchasing and supply management (SPSM): A Delphi study on competences needed by purchasing and supply management (PSM) professionals. *Journal of Purchasing and Supply Management*, 26(4). doi:10.1016/j.pursup.2020.100625
- Schulze, H., Bals, L., & Johnsen, T. E. (2019). Individual competences for sustainable purchasing and supply management (SPSM). *International Journal of Physical Distribution & Logistics Management*, 49(3), 287-304. doi:10.1108/IJPDLM-01-2018-0036
- Sharma, S., & Henriques, I. (2005). Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal*, 26(2), 159-180. doi:<https://doi.org/10.1002/smj.439>
- Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*, 53(11), 2322-2347. doi:10.1108/EJM-02-2019-0189
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333-339. doi:<https://doi.org/10.1016/j.jbusres.2019.07.039>
- Stange, R., Schiele, H., & Henseler, J. (2022). Advancing purchasing as a design science: Publication guidelines to shift towards more relevant purchasing research. *Journal of Purchasing and Supply Management*, 28(1), 100750. doi:<https://doi.org/10.1016/j.pursup.2022.100750>
- Sun, C., & Rose, T. (2015). Supply Chain Complexity in the Semiconductor Industry: Assessment from System View and the Impact of Changes. *IFAC-PapersOnLine*, 48(3), 1210-1215. doi:<https://doi.org/10.1016/j.ifacol.2015.06.249>
- Tachizawa, E. M., & Wong, C. Y. (2015). The Performance of Green Supply Chain Management Governance Mechanisms: A Supply Network and Complexity Perspective. *Journal of Supply Chain Management*, 51(3), 18-32. doi:<https://doi.org/10.1111/jscm.12072>
- Terpend, R., & Ashenbaum, B. (2012). The Intersection of Power, Trust and Supplier Network Size: Implications for Supplier Performance. *Journal of Supply Chain Management*, 48(3), 52-77. doi:<https://doi.org/10.1111/j.1745-493X.2011.03261.x>
- Thomas, D. R. (2006). A General Inductive Approach for Analyzing Qualitative Evaluation Data. *American Journal of Evaluation*, 27(2), 237-246. doi:10.1177/1098214005283748
- Torraco, R. J. (2005). Writing Integrative Literature Reviews: Guidelines and Examples. *Human Resource Development Review*, 4(3), 356-367. doi:10.1177/1534484305278283
- U.S. Securities and Exchange Commission. (2022). SEC Proposes Rules to Enhance and Standardize Climate-Related Disclosures for Investors [Press release]. Retrieved from <https://www.sec.gov/news/press-release/2022-46#>
- United Nations. (1998). *Kyoto Protocol to the United Nations Framework*. Retrieved from <https://unfccc.int/resource/docs/convkp/kpeng.pdf>
- United Nations. (2015a). *Paris Agreement*. Retrieved from https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
- United Nations. (2015b). *Transforming our World: The 2030 Agenda for Sustainable Development*. Retrieved from <https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- United Nations. (2022). *Nationally determined contributions under the Paris Agreement: Synthesis report by the secretariat*. Retrieved from https://unfccc.int/sites/default/files/resource/cma2022_04.pdf
- United Nations. (n.d.). *Causes and Effects of Climate Change*. Retrieved from <https://www.un.org/en/climatechange/science/causes-effects-climate-change>
- van Hoof, B., & Lyon, T. P. (2013). Cleaner production in small firms taking part in Mexico's Sustainable Supplier Program. *Journal of Cleaner Production*, 41, 270-282. doi:<https://doi.org/10.1016/j.jclepro.2012.09.023>
- Vanneste, B. S., Puranam, P., & Kretschmer, T. (2014). Trust over time in exchange relationships: Meta-analysis and theory. *Strategic Management Journal*, 35(12), 1891-1902. doi:<https://doi.org/10.1002/smj.2198>

- Vanpoucke, E., Quintens, L., & Van Engelshoven, M. (2016). The role of motivation in relating green supply chain management to performance. *Supply Chain Management: An International Journal*, 21(6), 732-742. doi:10.1108/SCM-05-2016-0143
- Villard, A., Lelah, A., & Brissaud, D. (2015). Drawing a chip environmental profile: environmental indicators for the semiconductor industry. *Journal of Cleaner Production*, 86, 98-109. doi:<https://doi.org/10.1016/j.jclepro.2014.08.061>
- Villena, V. H., Choi, T. Y., & Revilla, E. (2019). Revisiting Interorganizational Trust: Is More Always Better or Could More Be Worse? *Journal of Management*, 45(2), 752-785. doi:10.1177/0149206316680031
- Villena, V. H., & Dhanorkar, S. (2020). How institutional pressures and managerial incentives elicit carbon transparency in global supply chains. *Journal of Operations Management*, 66(6), 697-734. doi:<https://doi.org/10.1002/joom.1088>
- Villena, V. H., & Gioia, D. (2018). On the riskiness of lower-tier suppliers: Managing sustainability in supply networks. *Journal of Operations Management*, 64, 65-87. doi:10.1016/j.jom.2018.09.004
- Vitolla, F., Raimo, N., Rubino, M., & Garzoni, A. (2019). The impact of national culture on integrated reporting quality. A stakeholder theory approach. *Business Strategy and the Environment*, 28(8), 1558-1571. doi:<https://doi.org/10.1002/bse.2332>
- Vos, F. G. S., Schiele, H., & Hüttinger, L. (2016). Supplier satisfaction: Explanation and out-of-sample prediction. *Journal of Business Research*, 69(10), 4613-4623. doi:<https://doi.org/10.1016/j.jbusres.2016.04.013>
- Vos, F. G. S., Van der Lelij, R., Schiele, H., & Praas, N. H. J. (2021). Mediating the impact of power on supplier satisfaction: Do buyer status and relational conflict matter? *International Journal of Production Economics*, 239, 108168. doi:<https://doi.org/10.1016/j.ijpe.2021.108168>
- Weele, A. J. v. (2010). *Purchasing and Supply Chain Management: Analysis, Strategy, Planning and Practice*. London: Cengage Learning.
- Whelan, T., & Fink, C. (2016). The comprehensive business case for sustainability. *Harvard Business Review*, 21(2016).
- Wijethilake, C., & Ekanayake, A. (2018). Proactive Strategic Responses to Corporate Sustainability Pressures: A Sustainability Control System Framework. In M. A. Malina (Ed.), *Advances in Management Accounting* (Vol. 30, pp. 129-173): Emerald Publishing Limited.
- Wilson, E. J. (1996). Theory transitions in organizational buying behavior research. *Journal of Business & Industrial Marketing*, 11(6), 7-19. doi:10.1108/08858629610151271
- Wohlgezogen, F., Hofstetter, J. S., Brück, F., & Hamann, R. (2021). Supplier Engagement in Sustainability Programs: A Field Experiment of Enabling Versus Coercive Formalization. *Organization & Environment*, 34(3), 435-458. doi:10.1177/1086026620921454
- Wolf, J. (2014). The Relationship Between Sustainable Supply Chain Management, Stakeholder Pressure and Corporate Sustainability Performance. *Journal of Business Ethics*, 119(3), 317-328. doi:10.1007/s10551-012-1603-0
- World Commission on Environment & Development. (1987). *Our common future*. Retrieved from Oxford:
- Wu, T., Jim Wu, Y.-C., Chen, Y. J., & Goh, M. (2014). Aligning supply chain strategy with corporate environmental strategy: A contingency approach. *International Journal of Production Economics*, 147, 220-229. doi:<https://doi.org/10.1016/j.ijpe.2013.02.027>
- Wu, Z., & Pagell, M. (2011). Balancing priorities: Decision-making in sustainable supply chain management. *Journal of Operations Management*, 29(6), 577-590. doi:<https://doi.org/10.1016/j.jom.2010.10.001>
- Yuan Wang, K., & Clegg, S. (2002). Trust and decision making: are managers different in the People's Republic of China and in Australia? *Cross Cultural Management: An International Journal*, 9(1), 30-45. doi:10.1108/13527600210797334
- Yukl, G., Seifert, C. F., & Chavez, C. (2008). Validation of the extended Influence Behavior Questionnaire. *The Leadership Quarterly*, 19(5), 609-621. doi:<https://doi.org/10.1016/j.leaqua.2008.07.006>

- Zhang, C., Viswanathan, S., & Henke, J. W. (2010). The boundary spanning capabilities of purchasing agents in buyer–supplier trust development. *J. Oper. Manag.*, 29(4), 318–328. doi:10.1016/j.jom.2010.07.001
- Zhang, Q., Pan, J., Xu, D., & Feng, T. (2020). Balancing coercive and non-coercive powers to enhance green supplier integration: do relationship commitment and closeness matter? *Supply Chain Management: An International Journal*, 25(6), 637-653. doi:10.1108/SCM-03-2019-0140
- Zhang, Z., Hu, D., & Liang, L. (2021). The impact of supplier dependence on suppliers' CSR: The moderating role of industrial dynamism and corporate transparency. *Journal of Purchasing and Supply Management*, 27(5), 100702. doi:<https://doi.org/10.1016/j.pursup.2021.100702>
- Zhao, X., Huo, B., Flynn, B. B., & Yeung, J. H. Y. (2008). The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain. *Journal of Operations Management*, 26(3), 368-388. doi:<https://doi.org/10.1016/j.jom.2007.08.002>
- Zhu, Q., Sarkis, J., & Lai, K.-h. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management*, 19(2), 106-117. doi:<https://doi.org/10.1016/j.pursup.2012.12.001>

APPENDIX

Appendix A: The Kraljic Matrix

High	Leverage <i>exploitation of full purchasing power</i>	Strategic <i>development of long-term relationships</i>
Profit impact	Routine <i>efficient processing</i>	Bottleneck <i>volume assurance and search for alternatives</i>
Low	Low	High
	Supply Risk	

Adapted from: [Gelderman and Van Weele \(2005, p. 20\)](#); [Kraljic \(1983, pp. 111, 112\)](#); [Schiele \(2019, p. 65\)](#)

Appendix B: Typology of Competence

	<i>Occupational</i>	<i>Personal</i>
<i>Conceptual</i>	Cognitive competence	Meta competence
<i>Operational</i>	Functional competence	Social competence

Adapted from: [Delamare Le Deist and Winterton \(2005, p. 39\)](#)

Appendix C: Measurement Items Supplier Survey

Construct	Measurement items
<i>Motives</i>	
Moral motives	<i>Our firm engages in sustainability ...</i>
Moral_Motive1	because we feel the responsibility to the environment.
Moral_Motive2	because of genuine concern for the environment.
Moral_Motive3	because top management believes environmental sustainability is a valuable part of the corporate strategy.
Moral_Motive4	because it is the right thing to do.
Instrumental motives	<i>Our firm engages in sustainability ...</i>
Instrumental_Motive1	due to the shareholders' demand for sustainability improvements.
Instrumental_Motive2	to avoid poor publicity.
Instrumental_Motive3	to appease our shareholders.
Instrumental_Motive4	to increase profitability.
Instrumental_Motive5	to avoid costly repercussions.
Relational motives	<i>Our firm engages in sustainability ...</i>
Relational_Motive1	to increase our customer base.
Relational_Motive2	to differentiate us from our competitors.
Relational_Motive3	as it is a source of sustained competitive advantage.
Relational_Motive4	due to the stakeholders' expectations for sustainability improvements.
<i>Influence strategies</i>	
Coercive pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Coercive_Pressure1	not receiving very good treatment from the semiconductor manufacturer, if we fail to be more environmentally sustainable.
Coercive_Pressure2	the semiconductor manufacturer making things difficult for us, if we fail to be more environmentally sustainable.
Coercive_Pressure3**	penalties from the semiconductor manufacturer, if we fail to be more environmentally sustainable.
Coercive_Pressure4**	the semiconductor manufacturer withdrawing certain services or resources we need, if we fail to be more environmentally sustainable.
Coercive_Pressure5*	the semiconductor manufacturer withholding their contracts if our firm does not meet their requests to become more environmentally sustainable.
Reward pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Reward_Pressure1	incentives offered by the semiconductor manufacturer to become more environmentally sustainable.
Reward_Pressure2	our feeling that by becoming more environmentally sustainable, we will be favored by the semiconductor manufacturer on other occasions.

Reward_Pressure3	rewards offered by the semiconductor manufacturer to become more environmentally sustainable.
Reward_Pressure4	not receiving the rewards offered by the semiconductor manufacturer, if we fail to be more environmentally sustainable.
Legal legitimate pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Legal_Legit_Pressure1	the semiconductor manufacturer referring to portions of an agreement to gain our commitment to becoming environmentally sustainable.
Legal_Legit_Pressure2	the semiconductor manufacturer making a point to refer to any legal agreement.
Legal_Legit_Pressure3	the semiconductor manufacturer using sections of our sales agreement as a "tool" to get us to commit to environmental sustainability.
Compliance pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Compliance_Pressure1*	environmental regulations and restrictions imposed on the semiconductor manufacturer.
Compliance_Pressure2	European Union legislation (e.g. directives).
Compliance_Pressure3	international standards and regulations.
Traditional legitimate pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Trad_Legit_Pressure1	our perception that the semiconductor manufacturer has the right to tell us what to do.
Trad_Legit_Pressure2	our feeling that we should accept the semiconductor manufacturer's requests and recommendations since they are our customer.
Trad_Legit_Pressure3	our belief that the semiconductor manufacturer has the right to expect suppliers to follow their instructions.
Expert pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Expert_Pressure1	our perception that the semiconductor manufacturer is an expert in the semiconductor industry.
Expert_Pressure2**	our respect for the judgment of the semiconductor manufacturer's representatives.
Expert_Pressure3	our perception that the semiconductor manufacturer retains environmental sustainability expertise that makes them likely to suggest the proper thing to do.
Referent pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Referent_Pressure1**	our admiration for the way the semiconductor manufacturer runs their business.
Referent_Pressure2	our pride to be affiliated with the semiconductor manufacturer.

Referent_Pressure3	our colleagues that talk up the semiconductor manufacturer as a great business with which to be associated.
Normative pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Normative_Pressure1	what we see and hear at trade shows and vendor exhibitions.
Normative_Pressure2	certain environmental sustainability practices becoming a norm within our industry.
Normative_Pressure3	opinions of consulting companies and external auditors on the best practices regarding environmental sustainability.
Normative_Pressure4	non-governmental organizations.
Mimetic pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Mimetic_Pressure1	what competitors and peers do and are doing.
Mimetic_Pressure2**	the environmental sustainability practices and tools that appear to benefit our competitors and peers.
Mimetic_Pressure3	a need to imitate environmental sustainability practices of key competitors that serve the same major clients.
Mimetic_Pressure4	a pressure to act in response to our competitors.
Mimetic_Pressure5	what others in the industry are doing.
Rational pressure	<i>Our current or future consideration to commit to environmental sustainability practices that align with the semiconductor manufacturer would be influenced by ...</i>
Rational_Pressure1	facts and logic used by the semiconductor manufacturer to make a persuasive case for committing to environmental sustainability.
Rational_Pressure2	the clear explanation why environmental sustainability is necessary.
Rational_Pressure3	the explanation why environmental sustainability would be practical and cost effective.
Rational_Pressure4	information or evidence provided by the semiconductor manufacturer to show that environmental sustainability is likely to be successful.

Dependence

Supplier dependence	
Supplier_Dependence1	In this relationship, our company is very dependent on the semiconductor manufacturer.
Supplier_Dependence2	To achieve our business goals, our company has to maintain this relationship to the customer.
Supplier_Dependence3	If the relationship were to end earlier than contracted, our business goals would be negatively affected.
Supplier_Dependence4	Our company would face great challenges if the customer did not continue the contractual relationship.
Supplier_Dependence5	We have no good alternatives to the semiconductor manufacturer.

Note: *Items dropped for internal consistency reliability reasons, **Items dropped for collinearity reasons

Appendix D: Descriptive Statistics and Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Instrumental_Motives																
2 Moral_Motives	.29**															
3 Relational_Motives	.56**	.49**														
4 Coercive_Pressure	.29**	.15	.19													
5 Reward_Pressure	.38**	.26*	.30**	.39**												
6 Legal_Legit_Pressure	.32**	.20	.21	.65**	.56**											
7 Trad_Legit_Pressure	.38**	.11	.32**	.46**	.40**	.59**										
8 Compliance_Pressure	-.10	.23*	.09	.43**	.29**	.58**	.31**									
9 Expert_Pressure	.45**	.44**	.51**	.40**	.56**	.45**	.46**	.31**								
10 Referent_Pressure	.22*	.16	.41**	.35**	.49**	.54**	.55**	.32**	.67**							
11 Normative_Pressure	.41**	.36**	.57**	.46**	.47**	.57**	.55**	.46**	.62**	.51**						
12 Mimetic_Pressure	.38**	.10	.40**	.45**	.39**	.57**	.51**	.32**	.40**	.46**	.74**					
13 Rational_Pressure	.50**	.32**	.50**	.15	.46**	.37**	.44**	.16	.64**	.43**	.52**	.45**				
14 Environmental_Impact	-.03	.22	.08	-.12	-.25	-.22	-.03	-.03	-.15	-.09	-.07	-.24	-.19			
15 Supplier_Dependence	.30**	.06	.37**	.22*	.34**	.41**	.56**	.16	.34**	.43**	.35**	.33**	.42**	-.12		
16 Relationship_Length	-.04	.07	.06	.00	-.11	.00	.06	.03	-.04	-.04	.06	.05	.08	.14	.06	
Mean	3.78	4.50	4.22	3.49	3.91	3.64	3.60	3.97	4.13	3.95	3.84	3.68	3.98	504319	3.67	17.15
Standard Deviation	0.74	0.50	0.60	0.92	0.73	0.79	0.78	0.77	0.70	0.70	0.63	0.77	0.56	1560030	0.73	8.73
Minimum	1.80	3.00	2.75	1.00	1.75	1.00	1.00	1.00	1.00	2.00	1.00	1.00	3.00	0.00	1.80	0.00
Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	10336142	5.00	40.00

Note: *Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed)

Appendix E: Introductory Text for Influence Questions

This section includes a set of questions on what would influence your decision as a supplier to become more environmentally sustainable. It could be that your firm did not experience one or more of the following sources of influence, in that case, please answer the question as to how it would influence you if it were to be applied by the semiconductor manufacturer. Your honest and genuine feedback is highly valued and there are no right or wrong answers. As stated, your response will not be shared with anyone, and it will be anonymized once it is linked to other data.

Appendix F: Order of Influence Questions

Prompt

Can you order the following survey question topics to maximize the likelihood of response and minimize the social desirability bias? Therefore, please consider the emotional annotation of the words and how a supplier may perceive the topic.

Response

To maximize the likelihood of response and minimize social desirability bias, you can consider the following order for the survey question topics:

1. Logical reasoning (= *Rational pressure*): Start with this topic as it focuses on the logical and practical reasons for engaging in environmental sustainability. It provides a neutral and rational perspective that suppliers may perceive as less emotionally charged.
2. Expertise (= *Expert pressure*): Follow logical reasoning with the topic of expertise, as it emphasizes the knowledge and credibility of the focal firm (= *the semiconductor manufacturer*). Suppliers may perceive this topic as valuable and relevant, rather than socially desirable.
3. Incentives (= *Reward pressure*): Introduce the topic of incentives after expertise to highlight the potential benefits or rewards offered by the focal firm (= *the semiconductor manufacturer*). This topic can generate interest and engagement from suppliers without directly influencing their responses to other topics.
4. Consequences (= *Coercive pressure*): Place the topic of consequences after incentives. This topic explores the potential negative outcomes or penalties associated with not engaging in environmental sustainability. By discussing consequences after incentives, suppliers may feel more comfortable providing candid responses without the fear of being judged.
5. Legal compliance (= *Legal legitimate and compliance pressure*): Proceed with the topic of legal compliance, which focuses on the legal obligations and regulations related to environmental sustainability. Suppliers may perceive this topic as more objective and compliance-driven, reducing the influence of social desirability bias.
6. Industry practices (= *Mimetic pressure*): Next, introduce the topic of industry practices, which examines what competitors and peers are doing in terms of environmental sustainability. By placing it in the middle, suppliers may have a better context to provide their perspectives without feeling the need to conform to perceived industry norms.
7. Social expectations (= *Normative pressure*): Follow industry practices with the topic of social expectations, which explores what stakeholders and external parties expect from suppliers regarding environmental sustainability. By placing it after industry practices, suppliers can provide their views based on their own experiences rather than feeling pressured by external influences.

8. Natural compliance (= *Traditional legitimate pressure*): Place the topic of natural compliance after social expectations. This topic focuses on the perceived rightness or obligation to follow the requests and recommendations of the focal firm (= *the semiconductor manufacturer*) as a customer. Suppliers may feel more comfortable expressing their genuine thoughts after discussing social expectations.

9. Customer reference (= *Referent pressure*): Introduce the topic of customer reference near the end, which emphasizes the value of being associated with the focal firm (= *the semiconductor manufacturer*) as a customer. Suppliers may feel more open to discussing this topic once they have provided their views on other factors that influence their engagement in environmental sustainability.

By ordering the survey question topics in this way, you provide a logical flow that gradually introduces different perspectives, minimizes potential social desirability bias, and encourages suppliers to provide candid responses based on their genuine perceptions and experiences.

Appendix G: Levene's Test, t-test, and Robust Tests for Non-response Bias

Levene's Test and t-test Environmental Impact

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Higher
Environmental_Impact	Equal variances assumed	31.06	<.001	-3.618	108	<.001	<.001	-4200884	1160967	-6502122	-6502122
	Equal variances not assumed			-2.561	35.869	0.007	0.015	-4200884	1640062	-874262	-874262

Levene's Test and t-test Moral Motives

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Higher
Moral_Motives	Equal variances assumed	4.47	.038	.278	108	.391	.782	.03047	.10965	-.18758	.24853
	Equal variances not assumed			.269	67.133	.394	.789	.03047	.11319	-.19545	.25640

Robust Tests Moral Motives

Robust Test of Equality of Means				
Moral_Motives				
	Statistic*	df1	df2	Sig.
Welch	.072	1	67.133	.789
Brown-Forsythe	.072	1	67.133	.789

*Note: Asymptotically F distributed

Appendix H: Indicator Loadings Measurement Model

	Outer loadings
Coercive_Pressure1 <- Coercive_Pressure	0.930
Coercive_Pressure2 <- Coercive_Pressure	0.954
Coercive_Pressure3 <- Coercive_Pressure	0.922
Coercive_Pressure4 <- Coercive_Pressure	0.902
Coercive_Pressure5 <- Coercive_Pressure	0.913
Expert_Pressure1 <- Expert_Pressure	0.934
Expert_Pressure2 <- Expert_Pressure	0.961
Expert_Pressure3 <- Expert_Pressure	0.926
Instrumental_Motive1 <- Instrumental_Motives	0.715
Instrumental_Motive2 <- Instrumental_Motives	0.891
Instrumental_Motive3 <- Instrumental_Motives	0.821
Instrumental_Motive4 <- Instrumental_Motives	0.842
Instrumental_Motive5 <- Instrumental_Motives	0.855
Legal_Legit_Pressure1 <- Legal_Legit_Pressure	0.934
Legal_Legit_Pressure2 <- Legal_Legit_Pressure	0.954
Legal_Legit_Pressure3 <- Legal_Legit_Pressure	0.934
Compliance_Pressure2 <- Compliance_Pressure	0.949
Compliance_Pressure3 <- Compliance_Pressure	0.974
Mimetic_Pressure1 <- Mimetic_Pressure	0.911
Mimetic_Pressure2 <- Mimetic_Pressure	0.907
Mimetic_Pressure3 <- Mimetic_Pressure	0.934
Mimetic_Pressure4 <- Mimetic_Pressure	0.891
Mimetic_Pressure5 <- Mimetic_Pressure	0.899
Moral_Motive1 <- Moral_Motives	0.910
Moral_Motive2 <- Moral_Motives	0.927
Moral_Motive3 <- Moral_Motives	0.808
Moral_Motive4 <- Moral_Motives	0.865
Normative_Pressure1 <- Normative_Pressure	0.836
Normative_Pressure2 <- Normative_Pressure	0.824
Normative_Pressure3 <- Normative_Pressure	0.880
Normative_Pressure4 <- Normative_Pressure	0.858
Rational_Pressure1 <- Rational_Pressure	0.876
Rational_Pressure2 <- Rational_Pressure	0.873
Rational_Pressure3 <- Rational_Pressure	0.896
Rational_Pressure4 <- Rational_Pressure	0.926
Referent_Pressure1 <- Referent_Pressure	0.956
Referent_Pressure2 <- Referent_Pressure	0.937
Referent_Pressure3 <- Referent_Pressure	0.930
Relational_Motive1 <- Relational_Motives	0.837
Relational_Motive2 <- Relational_Motives	0.824
Relational_Motive3 <- Relational_Motives	0.886
Relational_Motive4 <- Relational_Motives	0.838
Reward_Pressure1 <- Reward_Pressure	0.890
Reward_Pressure2 <- Reward_Pressure	0.880

Reward_Pressure3 <- Reward_Pressure	0.924
Reward_Pressure4 <- Reward_Pressure	0.811
Trad_Legit_Pressure1 <- Trad_Legit_Pressure	0.918
Trad_Legit_Pressure2 <- Trad_Legit_Pressure	0.914
Trad_Legit_Pressure3 <- Trad_Legit_Pressure	0.942
Supplier_Dependence1 <- Supplier_Dependence	0.818
Supplier_Dependence2 <- Supplier_Dependence	0.823
Supplier_Dependence3 <- Supplier_Dependence	0.812
Supplier_Dependence4 <- Supplier_Dependence	0.890
Supplier_Dependence5 <- Supplier_Dependence	0.790

Appendix I: Internal Consistency Reliability and Convergent Validity Measurement Model

<i>Initial internal consistency reliability</i>			<i>Convergent validity</i>	
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Instrumental_Motives	0.883	0.888	0.915	0.684
Moral_Motives	0.901	0.913	0.931	0.772
Relational_Motives	0.870	0.888	0.910	0.717
Coercive_Pressure	0.962	1.077	0.967	0.854
Reward_Pressure	0.901	0.919	0.930	0.769
Legal_Legit_Pressure	0.935	0.949	0.958	0.885
Trad_Legit_Pressure	0.916	0.920	0.947	0.855
Compliance_Pressure	0.823	0.360	0.784	0.593
Expert_Pressure	0.935	0.944	0.958	0.885
Referent_Pressure	0.935	0.938	0.959	0.885
Normative_Pressure	0.871	0.875	0.912	0.722
Mimetic_Pressure	0.947	0.951	0.959	0.825
Rational_Pressure	0.915	0.915	0.940	0.797
Supplier_Dependence	0.884	0.886	0.915	0.684

<i>Internal consistency reliability after dropping Compliance_Pressure1</i>			<i>Convergent validity</i>	
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Instrumental_Motives	0.883	0.888	0.915	0.683
Moral_Motives	0.901	0.912	0.931	0.772
Relational_Motives	0.870	0.888	0.910	0.716
Coercive_Pressure	0.962	1.077	0.967	0.854
Reward_Pressure	0.901	0.919	0.930	0.769
Legal_Legit_Pressure	0.935	0.949	0.958	0.885
Trad_Legit_Pressure	0.916	0.920	0.947	0.855
Compliance_Pressure	0.921	0.992	0.961	0.925
Expert_Pressure	0.935	0.944	0.958	0.885
Referent_Pressure	0.935	0.938	0.959	0.885
Normative_Pressure	0.871	0.875	0.912	0.722
Mimetic_Pressure	0.947	0.951	0.959	0.825
Rational_Pressure	0.915	0.915	0.940	0.797
Supplier_Dependence	0.884	0.886	0.915	0.684

<i>Internal consistency reliability after assessment of structural model and dropping Coercive_Pressure5</i>			<i>Convergent validity</i>	
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Instrumental_Motives	0.883	0.887	0.915	0.683
Moral_Motives	0.901	0.911	0.931	0.772
Relational_Motives	0.870	0.890	0.910	0.716
Coercive_Pressure	0.924	0.927	0.963	0.929

Reward_Pressure	0.901	0.904	0.932	0.774
Legal_Legit_Pressure	0.935	0.939	0.959	0.885
Trad_Legit_Pressure	0.884	0.886	0.915	0.684
Compliance_Pressure	0.921	0.929	0.962	0.926
Expert_Pressure	0.872	0.884	0.940	0.886
Referent_Pressure	0.884	0.894	0.945	0.896
Normative_Pressure	0.871	0.875	0.912	0.722
Mimetic_Pressure	0.933	0.935	0.952	0.832
Rational_Pressure	0.915	0.915	0.940	0.797
Supplier_Dependence	0.916	0.935	0.946	0.855

Appendix J: Discriminant Validity Measurement Model

	Heterotrait-monotrait ratio (HTMT)
Environmental_Impact <-> Coercive_Pressure	0.120
Expert_Pressure <-> Coercive_Pressure	0.486
Expert_Pressure <-> Environmental_Impact	0.160
Instrumental_Motives <-> Coercive_Pressure	0.402
Instrumental_Motives <-> Environmental_Impact	0.063
Instrumental_Motives <-> Expert_Pressure	0.519
Legal_Legit_Pressure <-> Coercive_Pressure	0.688
Legal_Legit_Pressure <-> Environmental_Impact	0.231
Legal_Legit_Pressure <-> Expert_Pressure	0.498
Legal_Legit_Pressure <-> Instrumental_Motives	0.354
Compliance_Pressure <-> Coercive_Pressure	0.416
Compliance_Pressure <-> Environmental_Impact	0.034
Compliance_Pressure <-> Expert_Pressure	0.350
Compliance_Pressure <-> Instrumental_Motives	0.159
Compliance_Pressure <-> Legal_Legit_Pressure	0.624
Mimetic_Pressure <-> Coercive_Pressure	0.507
Mimetic_Pressure <-> Environmental_Impact	0.253
Mimetic_Pressure <-> Expert_Pressure	0.440
Mimetic_Pressure <-> Instrumental_Motives	0.414
Mimetic_Pressure <-> Legal_Legit_Pressure	0.606
Mimetic_Pressure <-> Compliance_Pressure	0.340
Moral_Motives <-> Coercive_Pressure	0.202
Moral_Motives <-> Environmental_Impact	0.237
Moral_Motives <-> Expert_Pressure	0.499
Moral_Motives <-> Instrumental_Motive	0.334
Moral_Motives <-> Legal_Legit_Pressure	0.217
Moral_Motives <-> Compliance_Pressure	0.252
Moral_Motives <-> Mimetic_Pressure	0.104
Normative_Pressure <-> Coercive_Pressure	0.562
Normative_Pressure <-> Environmental_Impact	0.072
Normative_Pressure <-> Expert_Pressure	0.707
Normative_Pressure <-> Instrumental_Motives	0.473
Normative_Pressure <-> Legal_Legit_Pressure	0.621
Normative_Pressure <-> Compliance_Pressure	0.524
Normative_Pressure <-> Mimetic_Pressure	0.820
Normative_Pressure <-> Moral_Motives	0.411
Rational_Pressure <-> Coercive_Pressure	0.212
Rational_Pressure <-> Environmental_Impact	0.201
Rational_Pressure <-> Expert_Pressure	0.720
Rational_Pressure <-> Instrumental_Motives	0.559
Rational_Pressure <-> Legal_Legit_Pressure	0.398
Rational_Pressure <-> Compliance_Pressure	0.174
Rational_Pressure <-> Mimetic_Pressure	0.486
Rational_Pressure <-> Moral_Motives	0.356
Rational_Pressure <-> Normative_Pressure	0.584

Referent_Pressure <-> Coercive_Pressure	0.408
Referent_Pressure <-> Environmental_Impact	0.093
Referent_Pressure <-> Expert_Pressure	0.760
Referent_Pressure <-> Instrumental_Motives	0.251
Referent_Pressure <-> Legal_Legit_Pressure	0.582
Referent_Pressure <-> Compliance_Pressure	0.353
Referent_Pressure <-> Mimetic_Pressure	0.486
Referent_Pressure <-> Moral_Motives	0.178
Referent_Pressure <-> Normative_Pressure	0.567
Referent_Pressure <-> Rational_Pressure	0.472
Relational_Motives <-> Coercive_Pressure	0.251
Relational_Motives <-> Environmental_Impact	0.098
Relational_Motives <-> Expert_Pressure	0.585
Relational_Motives <-> Instrumental_Motive	0.654
Relational_Motives <-> Legal_Legit_Pressure	0.229
Relational_Motives <-> Compliance_Pressure	0.105
Relational_Motives <-> Mimetic_Pressure	0.446
Relational_Motives <-> Moral_Motive	0.552
Relational_Motives <-> Normative_Pressure	0.654
Relational_Motives <-> Rational_Pressure	0.562
Relational_Motives <-> Referent_Pressure	0.466
Relationship_Length <-> Coercive_Pressure	0.022
Relationship_Length <-> Environmental_Impact	0.142
Relationship_Length <-> Expert_Pressure	0.041
Relationship_Length <-> Instrumental_Motives	0.083
Relationship_Length <-> Legal_Legit_Pressure	0.029
Relationship_Length <-> Compliance_Pressure	0.027
Relationship_Length <-> Mimetic_Pressure	0.097
Relationship_Length <-> Moral_Motives	0.118
Relationship_Length <-> Normative_Pressure	0.072
Relationship_Length <-> Rational_Pressure	0.088
Relationship_Length <-> Referent_Pressure	0.043
Relationship_Length <-> Relational_Motives	0.063
Reward_Pressure <-> Coercive_Pressure	0.493
Reward_Pressure <-> Environmental_Impact	0.275
Reward_Pressure <-> Expert_Pressure	0.636
Reward_Pressure <-> Instrumental_Motives	0.422
Reward_Pressure <-> Legal_Legit_Pressure	0.612
Reward_Pressure <-> Compliance_Pressure	0.323
Reward_Pressure <-> Mimetic_Pressure	0.423
Reward_Pressure <-> Moral_Motives	0.283
Reward_Pressure <-> Normative_Pressure	0.523
Reward_Pressure <-> Rational_Pressure	0.496
Reward_Pressure <-> Referent_Pressure	0.549
Reward_Pressure <-> Relational_Motives	0.329
Reward_Pressure <-> Relationship_Length	0.113
Supplier_Dependence <-> Coercive_Pressure	0.264

Supplier_Dependence <-> Environmental_Impact	0.125
Supplier_Dependence <-> Expert_Pressure	0.383
Supplier_Dependence <-> Instrumental_Motives	0.336
Supplier_Dependence <-> Legal_Legit_Pressure	0.447
Supplier_Dependence <-> Compliance_Pressure	0.176
Supplier_Dependence <-> Mimetic_Pressure	0.356
Supplier_Dependence <-> Moral_Motives	0.111
Supplier_Dependence <-> Normative_Pressure	0.385
Supplier_Dependence <-> Rational_Pressure	0.469
Supplier_Dependence <-> Referent_Pressure	0.485
Supplier_Dependence <-> Relational_Motives	0.421
Supplier_Dependence <-> Relationship_Length	0.072
Supplier_Dependence <-> Reward_Pressure	0.387
Trad_Legit_Pressure <-> Coercive_Pressure	0.529
Trad_Legit_Pressure <-> Environmental_Impact	0.042
Trad_Legit_Pressure <-> Expert_Pressure	0.518
Trad_Legit_Pressure <-> Instrumental_Motives	0.428
Trad_Legit_Pressure <-> Legal_Legit_Pressure	0.641
Trad_Legit_Pressure <-> Compliance_Pressure	0.342
Trad_Legit_Pressure <-> Mimetic_Pressure	0.552
Trad_Legit_Pressure <-> Moral_Motives	0.118
Trad_Legit_Pressure <-> Normative_Pressure	0.603
Trad_Legit_Pressure <-> Rational_Pressure	0.479
Trad_Legit_Pressure <-> Referent_Pressure	0.601
Trad_Legit_Pressure <-> Relational_Motives	0.352
Trad_Legit_Pressure <-> Relationship_Length	0.065
Trad_Legit_Pressure <-> Reward_Pressure	0.437
Trad_Legit_Pressure <-> Supplier_Dependence	0.603

Appendix K: Collinearity Measurement Model

	<i>Collinearity</i>	<i>Collinearity after dropping highly correlated items</i>
	VIF	VIF
Coercive_Pressure1	4.367	4.162
Coercive_Pressure2	5.746	4.642
Coercive_Pressure3*	8.236	
Coercive_Pressure4*	9.632	
Coercive_Pressure5**	8.033	3.148
Expert_Pressure1	4.658	2.491
Expert_Pressure2*	5.852	
Expert_Pressure3	3.225	2.491
Instrumental_Motive1	1.510	1.510
Instrumental_Motive2	3.608	3.608
Instrumental_Motive3	2.464	2.464
Instrumental_Motive4	2.191	2.191
Instrumental_Motive5	2.843	2.843
Legal_Legit_Pressure1	4.174	4.174
Legal_Legit_Pressure2	4.564	4.564
Legal_Legit_Pressure3	3.553	3.553
Compliance_Pressure2	3.666	3.666
Compliance_Pressure3	3.666	3.666
Mimetic_Pressure1	5.521	3.061
Mimetic_Pressure2*	5.845	
Mimetic_Pressure3	5.022	4.686
Mimetic_Pressure4	3.462	3.356
Mimetic_Pressure5	3.576	3.342
Moral_Motive1	3.541	3.541
Moral_Motive2	4.044	4.044
Moral_Motive3	1.969	1.969
Moral_Motive4	2.399	2.399
Normative_Pressure1	2.032	2.032
Normative_Pressure2	2.047	2.047
Normative_Pressure3	2.764	2.764
Normative_Pressure4	2.302	2.302
Rational_Pressure1	2.908	2.908
Rational_Pressure2	2.583	2.583
Rational_Pressure3	3.628	3.628
Rational_Pressure4	4.551	4.551
Referent_Pressure1*	5.011	
Referent_Pressure2	4.158	2.685
Referent_Pressure3	3.493	2.685
Relational_Motive1	1.725	1.725
Relational_Motive2	2.721	2.721
Relational_Motive3	3.745	3.745
Relational_Motive4	2.223	2.223
Reward_Pressure1	4.543	4.543
Reward_Pressure2	3.525	3.525

Reward_Pressure3	4.295	4.295
Reward_Pressure4	1.666	1.666
Trad_Legit_Pressure1	3.217	3.217
Trad_Legit_Pressure2	2.923	2.923
Trad_Legit_Pressure3	4.415	4.415
Supplier_Dependence1	2.103	2.103
Supplier_Dependence2	2.396	2.396
Supplier_Dependence3	2.628	2.628
Supplier_Dependence4	3.195	3.195
Supplier_Dependence5	1.897	1.897

*Note: *Items dropped for internal consistency reliability reasons, **Items dropped for collinearity reasons*

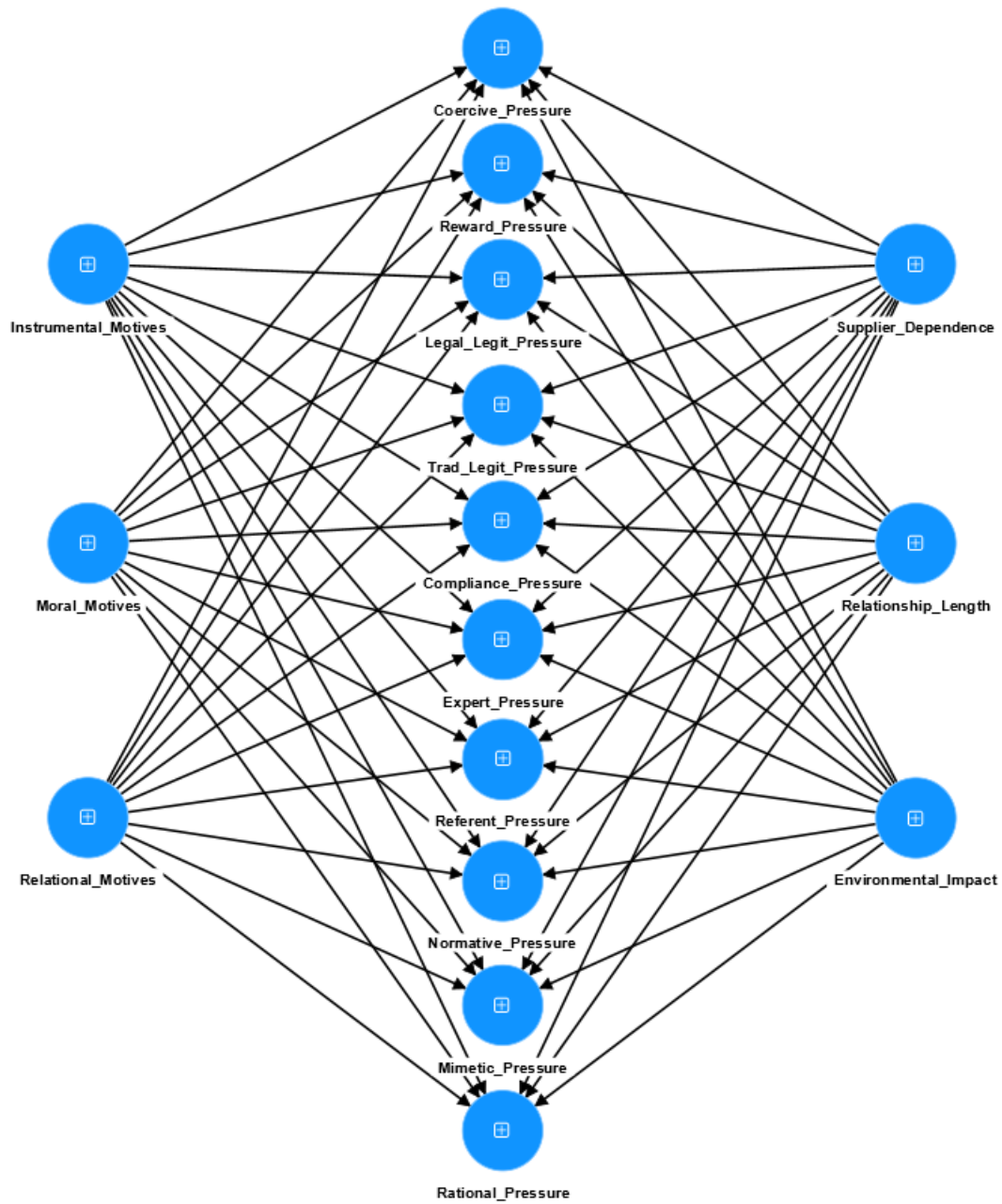
Appendix L: Explanatory Power Structural Model

	R-square	R-square adjusted
Coercive_Pressure	0.171	0.108
Expert_Pressure	0.431	0.387
Legal_Legit_Pressure	0.279	0.225
Compliance_Pressure	0.116	0.049
Mimetic_Pressure	0.288	0.233
Normative_Pressure	0.384	0.337
Rational_Pressure	0.442	0.400
Referent_Pressure	0.279	0.225
Reward_Pressure	0.311	0.258
Trad_Legit_Pressure	0.366	0.318

Appendix M: Predictive Power Structural Model

	Q ² predict	PLS-SEM_RMSE	LM_RMSE
Coercive_Pressure1	-0.128	0.978	1.187
Coercive_Pressure2	-0.134	1.098	1.369
Expert_Pressure1	0.022	0.734	0.803
Expert_Pressure3	0.159	0.685	0.783
Legal_Legit_Pressure1	-0.053	0.815	0.857
Legal_Legit_Pressure2	0.021	0.797	0.915
Legal_Legit_Pressure3	0.026	0.923	1.056
Compliance_Pressure2	-0.101	0.879	1.029
Compliance_Pressure3	-0.059	0.802	0.832
Mimetic_Pressure1	-0.028	0.819	1.003
Mimetic_Pressure3	0.061	0.863	0.988
Mimetic_Pressure4	0.015	0.902	1.013
Mimetic_Pressure5	0.092	0.767	0.888
Normative_Pressure1	0.128	0.755	0.924
Normative_Pressure2	0.097	0.629	0.844
Normative_Pressure3	0.128	0.653	0.800
Normative_Pressure4	0.159	0.739	0.815
Rational_Pressure1	0.242	0.549	0.620
Rational_Pressure2	0.158	0.601	0.735
Rational_Pressure3	0.130	0.594	0.680
Rational_Pressure4	0.234	0.525	0.560
Referent_Pressure2	0.083	0.643	0.722
Referent_Pressure3	0.121	0.768	0.896
Reward_Pressure1	-0.175	0.918	1.015
Reward_Pressure2	-0.107	0.806	0.923
Reward_Pressure3	-0.003	0.837	0.876
Reward_Pressure4	0.101	0.882	0.945
Trad_Legit_Pressure1	0.320	0.749	0.862
Trad_Legit_Pressure2	0.077	0.754	0.841
Trad_Legit_Pressure3	0.143	0.779	0.971

Appendix N: Empirical Model in SmartPLS 4



Appendix O: Sample Characteristics Expert Interviews

Interviewee	Function	Category	Subcategory*	Gender	Nationality
PSM Professional 1	Sourcing Manager	External Manufacturing	Subcon/OSAT	Male	Taiwanese
PSM Professional 2	Sourcing Manager	External Manufacturing	Foundry	Female	Singaporean
PSM Professional 3	Sourcing Manager	Direct Materials	A&T Materials	Female	Malaysian
PSM Professional 4	Sourcing Manager	External Manufacturing	Foundry	Male	Singaporean
PSM Professional 5	Sourcing Manager	Direct Materials	FE Materials	Male	Dutch
PSM Professional 6	Sourcing Manager	Equipment	FE Equipment	Male	Dutch
PSM Professional 7	Sourcing Manager	Equipment	FE Materials/ Equipment	Male	Dutch
PSM Professional 8	Sourcing Manager	External Manufacturing	Subcon/OSAT	Male	American
PSM Professional 9	Sourcing Manager	Equipment	A&T Equipment	Male	Taiwanese
Sustainability Professional 1	Program Manager	ESG	Product Carbon Footprint	Female	American
Sustainability Professional 2	Operations and Supply Chain Manager	Operations	Subcon/OSAT	Female	Singaporean

*Note: Subcon/OSAT = subcontractor/outsourced assembly and test, A&T = assembly and test, FE = front end

Appendix P1: Interview Guide Purchasing

Introduction	Introduce yourself
Briefing	Ask the question: Is it possible to record the interview? Explain: <ul style="list-style-type: none">• Purpose of the research• Purpose of the interview• Procedure of the interview Ask the question: Do you have any questions before starting the interview?

Topic 1: Role and responsibilities

Question 1: **Would you be so kind as to introduce yourself and your function?**

Back-up:

- Time period
 - Responsibilities
 - Category
 - Number of suppliers
-

Topic 2: Category objectives

Outline topic 2 from literature:

Today, PSM is mainly concerned with supply assurance, quality, speed, costs, innovation, strategic positioning, and flexibility (Schiele, 2019, pp. 48, 49). In other words; to get supplies in the right quantity, of the right quality, at the right time, for the right price, with the right novelty, from the right source, and with the right flexibility to adjust to changes (Monczka et al., 2008, p. 8).

Question 2: **What are the objectives for your category?**

Question 2a: **What factors or considerations led to the objectives for your category?**

Question 2b: **How do your category objectives integrate with your overall business objectives?**

Question 2c: **How are the objectives for your category quantified?**

Back-up:

- Supply assurance
 - Cost (price)
 - Quality (PPM)
 - Speed (lead times)
 - Flexibility
 - Innovation
 - Supplier development
 - Preferred customer status
-

Topic 3: Category strategy

Outline topic 3 from literature:

Category strategy involves the development of specific strategies for each sourcing category. These strategies align with the objectives outlined in the corporate budget planning and determine how those objectives are translated into actions within the category (Schiele, 2019, p. 56). In the Kraljic Matrix, supplies are categorized along two dimensions: (1) 'profit impact' and (2) 'supply risk' (high vs. low) (Kraljic, 1983, p. 112). Profit impact refers to the extent to which a particular supply item or category affects the organization's overall profitability. Supply risk pertains to the probability and impact of an undesired event associated with a particular supply item or category (Hoffmann et al., 2013, p. 201; Schiele et al., 2021, p. 56). The Kraljic Matrix allows PSM professionals to trade-off exploiting purchasing power and managing supply risk for four different supply categories: (1) routine (low, low), (2) leverage (high, low), (3) bottleneck (low, high), and (4) strategic (high, high) (Kraljic, 1983, p. 110). In turn, the recommended supply category strategies are (1) efficient processing for routine items, (2)

exploitation of full purchasing power for leverage items, (3) volume assurance (at cost premium if necessary) and search for alternatives for bottleneck items, and (4) the development of long-term relationships for strategic items (Gelderman & Van Weele, 2005, p. 20; Kraljic, 1983, p. 112; Schiele, 2019, p. 65).

Question 3: How would you describe the sourcing strategy for your category?

Question 3a: How do you achieve the objectives for your category?

Question 3b: How does your category strategy integrate with the semiconductor manufacturer's overall business strategy?

Question 3c: How does the semiconductor manufacturer's environmental sustainability approach integrate with your category strategy?

Back-up:

- Exploiting purchasing power (transactional) vs. Development of long-term relationships (relational)
- Risk reduction through multiple sourcing vs. Cost reduction through single sourcing
- High stock vs. Just-in-time
- Local sourcing vs. Global sourcing
- Sourcing levers
- Supplier satisfaction through reliability, profitability, relational behavior, operational excellence

Topic 4a: Supplier engagement (inductive)

Outline topic 4 from literature:

Institutional Theory provides a framework for understanding how firms are influenced by pressures that originate from their external environment (Villena & Dhanorkar, 2020, p. 701; Wijethilake & Ekanayake, 2018, p. 135). According to Institutional Theory, firms strive to conform to coercive, normative, and mimetic institutional pressures to gain legitimacy within their external environment (DiMaggio & Powell, 1983, p. 150). Coercive pressures are exerted by stakeholders on which a firm depends – e.g. the government or a key customer – leading to repercussions in events of non-compliance (Fayezi et al., 2020, p. 482; Vos et al., 2021, p. 2). Normative pressures represent the expectations from stakeholders on which a firm does not directly depend – e.g. NGOs, media, or the broader society – that can lead to bad publicity and reputational harm when these are not met (Hariyani et al., 2023, p. 7; Saeed et al., 2018, p. 4). Mimetic pressures originate from competitors as a means to mitigate uncertainty, as firms face a competitive disadvantage if they fail to imitate their industry peers (Ahmed et al., 2020, p. 4; DiMaggio & Powell, 1983, p. 150; Hariyani et al., 2023, p. 7). Complementary to Institutional Theory, Social Exchange Theory (SET) postulates that seeking rewards and avoidance of punishment are fundamental motivations for inter-organizational relationships (Blau, 1964; Emerson, 1976, p. 352; Nyaga et al., 2013, p. 44). Whereas coercive pressure can explain the latter, reward pressure – the ability to offer rewards (Nyaga et al., 2013, p. 47) – can explain the former. In addition to coercive and reward pressure, French and Raven (1959, pp. 153-156) identified three other influence strategies: legitimate pressure, referent pressure, and expert pressure. These five pressures are generally categorized into mediated (direct) and non-mediated (indirect) sources of influence (Vos et al., 2021, p. 3).

Question 4: What do you perceive as the main motive for the suppliers you manage within your category to actively engage in sustainability practices?

Question 5: How would you influence the suppliers you manage within your category to become more environmentally sustainable?

Question 5a: Could you provide examples of specific influence strategies you have used for the suppliers you manage within your category?

Question 5b: Do you always use the same influence strategies to influence the suppliers you manage within your category?

➔ **If not, how do you determine which strategy to use for different suppliers you manage within your category?**

➔ **If yes, why do you use the same influence strategies regardless of the situation?**

Question 5c: **Could you come up with any additional ideas of how you can influence the suppliers you manage within your category to become more environmentally sustainable?**

Back-up:

- Influence strategies
- Buyer dependence
 - o Spend
- Supply risk
 - o Ease of switching
- Growth potential
- Relationship
 - o Individual
 - o Business as a whole

Topic 4b: Supplier engagement (deductive)

Outline topic 4 from literature:

I would like to discuss a list of influence strategies commonly found in literature that are used to drive improvements in suppliers' environmental sustainability performance. Explain and show:

Influence strategy	Description	Underlying principle
<i>Mediated</i>	<i>Direct influence to bring about action from the supplier</i>	
Coercive pressure	<i>Punishing or withholding punishment</i>	Loss aversion
Reward pressure	<i>Rewarding or withholding rewards</i>	Reciprocity
Legal legitimate pressure	<i>Legitimizing demands with legal certainty or judiciary right</i>	Legitimacy
<i>Non-mediated</i>	<i>Indirect influence that depends on the supplier's perception</i>	
Compliance pressure	<i>Legitimizing demands with an indirect legal obligation</i>	Legitimacy
Traditional legitimate pressure	<i>Legitimizing demands on the basis of shared values and beliefs</i>	Similarity
Expert pressure	<i>Sharing desired expertise and knowledge</i>	Authority
Referent pressure	<i>Creating a positive reputation a supplier wants to identify with</i>	Sympathy
Normative pressure	<i>Engaging stakeholders and leveraging social influence</i>	Responsibility
Mimetic pressure	<i>Encouraging supplier competition</i>	Scarcity

Question 6: **Which influence strategies from the provided list do you find most applicable or effective for driving improvements in the environmental performance of the suppliers you manage within your category, and why?**

Question 6a: **Could you provide specific examples of instances where you have used any of these influence strategies with the suppliers you manage within your category?**

Question 6b: **Could you provide specific examples of how you expect you would use any of these influence strategies with the suppliers you manage within your category to become more environmentally sustainable?**

Question 6c: **Which influence strategies from the provided list do you find inapplicable or ineffective for driving improvements in the environmental performance of the suppliers you manage within your category, and why?**

Question 7: **What are the main factors or considerations that affect your choice of influence strategies when engaging the different suppliers you manage within your category?**

- Question 7a: **Could you provide examples of how you experienced that these factors or considerations have influenced your decision to use specific influence strategies for the different the suppliers you manage within your category?**
- Question 7b: **Could you provide examples of how you expect that these factors or considerations could influence your decision to use specific influence strategies for the different the suppliers you manage within your category?**
- Question 7c: **How does the degree of dependence on a particular supplier influence your choice of influence strategies when engaging the suppliers you manage within your category to become more environmentally sustainable?**
- Question 7d: **How does the closeness of the relationship with a particular supplier influence your choice of influence strategies when engaging the suppliers you manage within your category to become more environmentally sustainable?**
- Question 8: **How do you establish priorities when it comes to engaging the suppliers you manage within your category to become more environmentally sustainable?**
- Question 8a: **How does the priority of a particular supplier influence your choice of influence strategies when engaging the suppliers you manage within your category to become more environmentally sustainable?**
-

Topic 5a: Buyer contingency factors (resources)

Outline question 5 from literature:

Prior research highlights the importance for scholars and practitioners to identify and understand the contingency factors that enable or inhibit a positive relationship between practice (i.e. influence strategies) and performance (i.e. environmental sustainability) (Aragón-Correa & Sharma, 2003, p. 83; Eggert & Hartmann, 2021, p. 4; Hart & Dowell, 2011, p. 1473; Schmidt et al., 2017, p. 4). From the buyer's perspective, both at the firm and individual level, certain preliminary capabilities are required to effectively influence a supplier. These capabilities consist of sufficient resources (human, financial, and physical), appropriate mandates (legal and authorization), and adequate competences (skills, knowledge, and expertise) (Barney, 1991, p. 101; Carter & Rogers, 2008, p. 374; Hariyani et al., 2023, p. 8; Karim & Arif-Uz-Zaman, 2013, p. 179; Pulles et al., 2016, p. 1466). For instance, in the case of referent pressure, a buying firm requires sufficient human, financial, and physical resources to showcase exemplary environmental sustainability performance. Additionally, a buying firm needs enough financial resources to exert coercive or reward pressure (Wijethilake & Ekanayake, 2018, p. 143). Furthermore, individual buyers require authorization from their superordinate to apply any influence strategy. For expert pressure, a buyer necessitates the expertise and knowledge a supplier desires, such as know-how on environmental sustainability (Schulze et al., 2019, p. 292). However, findings suggest that not only resource-rich firms engage in sustainability practices and that top management commitment acts as a stronger determinant (Blome et al., 2014, p. 44).

- Question 9: **How do you perceive your level of authorization to apply various influence strategies when engaging the suppliers you manage within your category?**
- Question 9a: **Are there any specific authorization constraints or limitations that you have encountered in your efforts to influence the suppliers you manage within your category?**
- Question 10: **How would you describe the level of resources provided by top management or your direct management to support influence strategies toward the suppliers you manage within your category?**
- Question 10a: **What types of resources do you consider crucial for effectively implementing influence strategies toward the suppliers you manage within your category?**
- Question 10b: **Are there any specific resource constraints or limitations that you have encountered in your efforts to influence the suppliers you manage within your category?**

Question 11: **How would you evaluate the semiconductor manufacturer's ability to showcase exemplary environmental sustainability performance to the suppliers you manage within your category?**

Question 11a: **Could you provide examples of instances where the semiconductor manufacturer's exemplary environmental sustainability performance has positively influenced a supplier's environmental sustainability performance?**

Question 12: **How would you evaluate the semiconductor manufacturer's level of environmental sustainability expertise and knowledge that the suppliers you manage within your category may seek or value?**

Question 12a: **Could you provide examples of instances where the semiconductor manufacturer's know-how on environmental sustainability has positively influenced a supplier's environmental sustainability performance?**

Question 13: **How would you evaluate the semiconductor manufacturer's ability to offer trainings regarding environmental sustainability to the suppliers you manage within your category?**

Question 13a: **Could you provide examples of instances where a training offered by the semiconductor manufacturer has positively influenced a supplier's environmental sustainability performance?**

Back-up:

- Resources (human, financial, and physical)
- Top management commitment
- Coercive pressure
- Rewards pressure
- Referent pressure
- Expert pressure

Topic 5b: Buyer contingency factors (competences)

Outline question 5 from literature:

In their Delphi study, Schulze and Bals (2020, pp. 8, 9) identified essential competences needed by PSM professionals to effectively implement sustainability. They categorize the competences according to the typology of Delamare Le Deist and Winterton (2005, p. 39), which includes: cognitive, functional, social, and meta competences. Cognition-oriented competences enable buyers to understand the interconnectedness of environmental sustainability and the strategic context of the semiconductor manufacturer through conceptual and systematic ways of thinking (Schulze & Bals, 2020, p. 7). Functional-oriented competences provide buyers with the necessary expertise to integrate sustainability criteria into their category management, i.e. demand planning, category strategy, supplier identification and selection, negotiation and contracting, executing, and supplier evaluation (Hsu et al., 2016, p. 95; Schiele, 2019, pp. 55-58). Social-oriented competences are crucial for buyers to effectively engage suppliers and avoid conflicts by applying the most appropriate influence strategies and using deliberately chosen expression and framing (Pulles & Loohuis, 2020, p. 76). Specifically, "thoughtfulness towards others" implies that buyers need to show an understanding of the supplier's motives to improve its environmental sustainability performance. Meta-oriented competences play a key role in driving sustainable practices. Buyers who are committed to change and willing to lead sustainability initiatives can influence external suppliers and internal colleagues and foster a commitment to sustainability throughout the supply chain (Beske-Janssen et al., 2023, p. 35).

Question 14: **How informed are you of the semiconductor manufacturer's environmental sustainability approach?**

Question 14a: **What do you perceive as the main motive for the semiconductor manufacturer to actively engage in sustainability practices?**

Question 14b: **How aware are you of the business case for the semiconductor manufacturer's environmental sustainability approach?**

Question 14c: **How aware are you of the regulatory frameworks and laws the semiconductor manufacturer is subject to regarding environmental sustainability?**

- Question 15: **How would you integrate environmental sustainability criteria into your category management activities?**
- Question 15a: **How would you integrate environmental sustainability criteria into your demand planning, category strategy, supplier identification and selection, negotiation and contracting, executing, and supplier evaluation?**
- Question 16: **How would you communicate the semiconductor manufacturer's environmental sustainability requirements and expectations toward the suppliers you manage within your category?**
- Question 16a: **Could you explain the methods or channels you use to effectively communicate requirements and expectations toward the suppliers you manage within your category?**
- Question 17: **How do you collaborate with relevant internal departments to drive environmental sustainability initiatives within your category?**
- Question 17a: **Could you provide an example of a recent collaboration between your category management team and other internal departments to implement environmental sustainability initiatives?**
- Question 18: **How do you perceive your personal commitment to driving sustainability initiatives within your category?**
- Question 18a: **Could you provide an example of a sustainability initiative you initiated and led within your category?**

Back-up:

- Systems Thinking Competence
- Critical Thinking
- Basic Sustainability Knowledge
- Supplier Relationship Management (application of tools)
- Communication Skills
- Cross-functional Teamworking
- Thoughtfulness towards others
- Supplier Relationship Management (communication)
- Commitment to Change
- Supplier Relationship Management (cooperative attitude)

Debriefing	<p>Summarizing the main points mentioned during the interview.</p> <p>Is there anyone you would recommend me to also talk with about this topic?</p> <p>What could I do to improve the interview?</p> <p>Were there any questions you found difficult to answer?</p> <p>From my side, there are no further questions. Is there anything else you want to share before finishing the interview?</p>
Closure	<p>Thank you for participating in the interview.</p>

Interview questions are inspired by the interview questions from: Foerstl et al. (2015, pp. 91, 92); Liu et al. (2018, p. 115); Murfield and Tate (2017, p. 1380)

Appendix P2: Interview Guide Sustainability

Introduction	Introduce yourself
Briefing	Ask the question: Is it possible to record the interview? Explain: <ul style="list-style-type: none">• Purpose of the research• Purpose of the interview• Procedure of the interview Ask the question: Do you have any questions before starting the interview?

Topic 1: Role and responsibilities

Question 1: **Would you be so kind as to introduce yourself and your function?**

Back-up:

- Time period
 - Responsibilities
 - Sustainability-related efforts
-

Topic 2: Sustainability objectives

Outline topic 2 from literature:

PSM scholars often distinguish between three dimensions of motives to engage in sustainability practices: moral, instrumental, and relational (Baliga et al., 2020, p. 351). Moral motives are characterized by ethical standards and moral principles that stem from a feeling of responsibility and that sustainability is “the right thing to do” (Aguilera et al., 2007, p. 839; Baliga et al., 2020, p. 351). Moral motives draw from a stewardship perspective, i.e. the theory that suggests that managers left on their own act as responsible stewards of the assets they control (Baliga et al., 2020, p. 356). Instrumental motives are reflected by the desire for economic reward or avoidance of punishment that originates from self-interest (Kitsis & Chen, 2020, p. 327). In other words, firms with instrumental motives adopt sustainable practices when it increases value from a shareholder perspective (Baliga et al., 2020, p. 366). Relational motives derive from the supplier’s will for positive relationships with its customer and other key stakeholders (Kitsis & Chen, 2020, p. 327). Contrary to instrumental motives, relational motives suggest that firms consider the interest of multiple stakeholders (e.g. the government, customers, employees).

Question 2: **What do you perceive as the main motive for the semiconductor manufacturer to actively engage in sustainability practices?**

Based on the semiconductor manufacturer’s Corporate Sustainability Report 2022 I understand that the semiconductor has the following goals regarding environmental sustainability:

Data anonymized

Question 2a: **Is this list complete or did I miss anything?**

Question 2b: **What factors or considerations led the semiconductor manufacturer to set the objective of **data anonymized** specifically by the year **data anonymized**?**

Question 2c: **How do the semiconductor manufacturer’s objectives relate to sustainability goals set by governments and industry benchmarks?**

Back-up:

- Stewardship (the right thing to do)
- Shareholders (self-interest)
- Stakeholders (positive relationships)
 - Governments (local, national, supranational)
 - Societal organizations (e.g. non-government organizations (NGOs) and media)
 - Finance intermediaries (e.g. shareholders, creditors, and insurance companies),
 - Business partners (e.g. customers, suppliers, and employees)

- Competitors

Topic 3: Sustainability strategy

Outline topic 3 from literature:

Given the heterogeneity of sustainability strategies, sustainability management is divided into two dimensions: substantive and symbolic (Ashforth & Gibbs, 1990, p. 178; Hyatt & Berente, 2017, p. 1213; Ma et al., 2022, p. 2). Substantive sustainability management includes the commitment to proactively improve the organization's sustainability performance and requires integral changes in the firm (Hyatt & Berente, 2017, p. 1213; Ma et al., 2022, p. 2; Sharma & Henriques, 2005, p. 169). Environmental sustainability tends to be operationalized by creating innovations and enhancing efficiency (e.g. product redesign, process optimization, and recycling) (Blome et al., 2014, p. 39; Miemczyk & Luzzini, 2019, p. 241; Tachizawa & Wong, 2015, p. 24).

Question 3: **How would you describe the semiconductor manufacturer's strategic approach to achieving carbon neutrality and the optimization of natural resources?**

Question 3a: **How does your environmental sustainability approach integrate with the semiconductor manufacturer's overall business strategy?**

Question 3b: **What specific initiatives has the semiconductor manufacturer implemented within the organization to facilitate this environmental sustainability approach?**

Question 3c: **What will carbon neutrality look like for the semiconductor manufacturer, including the approach to offsetting any remaining emissions?**

Question 3d: **Considering the improvements in the semiconductor manufacturer's sustainability performance, how do you perceive the progress toward achieving your environmental objectives?**

Back-up:

- Product or process optimization
- Innovation
- Organizational structures
- Responsibilities
- Education and training
- Stakeholder engagement

Topic 4: Supplier engagement

Outline topic 4 from literature:

Environmental sustainability objectives usually present the minimization of emissions, energy consumption, waste generation, and the use of resources to combat climate change (Geng et al., 2017, p. 249). Scope 3 relates to the environmental impacts that occur beyond the semiconductor manufacturer's direct control, encompassing both upstream and downstream activities (Eggert & Hartmann, 2021, p. 3). However, despite Scope 3 encompassing both upstream and downstream GHG emissions, the majority of GHG emissions occur upstream (Eggert & Hartmann, 2021, p. 1). This, in conjunction with the observation that sustainability is being pulled upstream in supply chains (Elkington, 1998, p. 106; Giunipero et al., 2012, p. 261; Hariyani et al., 2023, p. 8; Min & Choi, 2020, pp. 9, 10; Murfield & Tate, 2017, p. 1329), explains why Scope 3 GHG emissions are measured and managed at the supply side. However, given that the more impactful firms often have extensive supplier networks comprising thousands of suppliers, it is improbable for such firms to simultaneously engage all suppliers in actively reducing GHG emissions. Therefore, as in all areas of supplier management and sustainability, priorities have to be set (Ellram & Tate, 2023, p. 13).

Question 4: **What is the role of your suppliers in achieving carbon neutrality and the optimization of natural resources?**

Question 4a: **What environmental sustainability objectives do you have regarding your suppliers?**

I understand that you are assessing the semiconductor manufacturer's contribution to your suppliers' carbon footprint and are committed to working with them to reduce their carbon footprint.

Question 4b: **How does the semiconductor manufacturer establish priorities when it comes to engaging suppliers to improve their environmental sustainability performance?**

Question 4c: **Could you elaborate on any additional action plans or initiatives that are being considered to further reduce your suppliers' environmental footprint after working with them to reduce their carbon footprint?**

Back-up:

- Renewable energy
- Water and waste recycling
- Other GHG emissions
 - o nitrous oxide (N₂O)
 - o methane (CH₄)
 - o fluorinated gases
 - hydrofluorocarbons (HFCs)
 - perfluorocarbons (PFCs)
 - sulfur hexafluoride (SF₆)
- Non-GHG emissions
 - o nitrogen oxides (NO_x)
 - o sulfur oxides (SO_x)
 - o volatile organic compounds (VOCs)

Topic 5a: Buyer contingency factors (resources)

Outline topic 5a from literature:

From the buyer's perspective, both at the firm and individual level, certain preliminary capabilities are required to effectively influence a supplier. These capabilities consist of sufficient resources (human, financial, and physical), appropriate mandates (legal and authorization), and adequate competences (skills, knowledge, and expertise) (Barney, 1991, p. 101; Carter & Rogers, 2008, p. 374; Hariyani et al., 2023, p. 8; Karim & Arif-Uz-Zaman, 2013, p. 179; Pulles et al., 2016, p. 1466). For instance, in the case of referent pressure, a buying firm requires sufficient human, financial, and physical resources to showcase exemplary environmental sustainability performance. For expert pressure, a buyer necessitates the expertise and knowledge a supplier desires, such as know-how on environmental sustainability (Schulze et al., 2019, p. 292). However, findings suggest that not only resource-rich firms engage in sustainability practices and that top management commitment acts as a stronger determinant (Blome et al., 2014, p. 44).

Question 5: **How would you describe the level of resources provided by top management or your direct management to support the semiconductor manufacturer's environmental sustainability approach?**

Question 5a: **What types of resources do you consider crucial for effectively implementing and advancing environmental sustainability within the semiconductor manufacturer?**

Question 5b: **Are there any specific resource constraints or limitations that you have encountered in your efforts toward environmental sustainability?**

Question 6: **How would you evaluate the semiconductor manufacturer's ability to showcase exemplary environmental sustainability performance to your suppliers?**

Question 6a: **Could you provide examples of instances where the semiconductor manufacturer's exemplary environmental sustainability performance has positively influenced a supplier's environmental sustainability performance?**

Question 7: **How would you evaluate the semiconductor manufacturer's level of environmental sustainability expertise and knowledge that suppliers may seek or value?**

Question 7a: **Could you provide examples of instances where the semiconductor manufacturer's know-how on environmental sustainability has positively influenced a supplier's environmental sustainability performance?**

Back-up:

- Resources (human, financial, and physical)
 - Top management commitment
 - Referent pressure
 - Expert pressure
-

Topic 5b: Buyer contingency factors (competences)

Outline topic 5b from literature:

In addition to resources, a buyer should have the necessary legal mandate for applying legitimate pressure (Giunipero et al., 2012, p. 261; Hariyani et al., 2023, p. 6). Furthermore, individual buyers require, among others, the competences of “Basic Sustainability Knowledge”, “Cross-functional Teamworking”, and “Commitment to Change” to effectively influence a supplier (Schulze & Bals, 2020, p. 9).

Question 8: How do the sustainability team and the procurement team collaborate to ensure the implementation of supplier engagement regarding environmental sustainability?

Question 8a: Could you provide examples of successful collaborations between the two teams and their impact on improving environmental sustainability performance?

Question 8b: What factors or considerations drive the integration between the sustainability and procurement teams regarding environmental sustainability?

Question 9: How informed is the procurement team of the semiconductor manufacturer’s environmental sustainability approach?

Question 9a: How aware is the procurement team of the business case for the semiconductor manufacturer’s environmental sustainability approach?

Question 9b: How aware is the procurement team of the regulatory frameworks and laws the semiconductor manufacturer is subject to regarding environmental sustainability?

Question 10: How would you evaluate the procurement team’s commitment to environmental sustainability?

Question 10a: How proactive is procurement in bringing in new sustainability initiatives and practices?

Question 10b: Could you provide examples of sustainability initiatives that have been initiated by the procurement team that have positively impacted the semiconductor manufacturer’s environmental sustainability performance?

Back-up:

- Cross-functional Teamworking
 - o Aware of the sustainability team
 - Basic Sustainability Knowledge
 - o Business case
 - o Regulatory frameworks and laws
 - Commitment to Change
 - o Passionate
 - o Personal commitment
 - o Leadership
-

Debriefing Summarizing the main points mentioned during the interview.

Is there something I could do to improve the interview?

Were there any questions you found difficult to answer?

From my side, there are no further questions. Is there anything else you want to share before finishing the interview?

Closure

Thank you for participating in the interview.

Interview questions are inspired by the interview questions from: Foerstl et al. (2015, pp. 91, 92); Grimm et al. (2014, p. 171); Jia et al. (2021, p. 1658); Reuter et al. (2010, p. 62)

Appendix Q: Measures for Validity and Reliability in Expert Interviews

Requirement	Description	Measures
Reliability	Ensuring that a repetition of the interview questions in different circumstances would likely yield similar results.	A semi-structured interview guide is developed and used to ensure quality among cases.
Content validity	Ensuring that the interview questions capture relevant aspects of the intended constructs.	<p>A diverse sample is selected based on varying characteristics.</p> <p>The relevance of the interview questions is outlined based on existing literature.</p> <p>The semi-structured approach facilitates asking all participants a similar set of questions, contributing to achieving data saturation.</p> <p>The interview questions are reviewed by a non-participating PSM professional.</p>
Construct validity	Ensuring that the interview questions accurately measure the intended constructs.	The interview questions are inspired by previously validated interview questions.

Appendix R: Inductive and Deductive Data Analysis Expert Interviews

A hybrid approach of inductive and deductive coding is chosen for analyzing the expert interviews. Inductive coding involves the process of assigning codes to raw data, which leads to the emergence of concepts and themes through careful interpretation based on a thorough examination of the raw data ([Thomas, 2006, p. 238](#)). Deductive coding refers to the process that seeks to test whether data are consistent with established concepts by applying pre-defined codes. Utilizing a hybrid approach that combines both inductive and deductive analysis is a common and effective practice due to its capacity to demonstrate a rigorous process of thematic analysis ([Fereday & Muir-Cochrane, 2006, p. 81](#); [Thomas, 2006, p. 238](#)).

Once the transcripts were rectified for transcription errors, anonymized, and organized according to the themes outlined in the semi-structured interview guides, they were imported into the qualitative data analysis software, ATLAS.ti 23. As a first step, the sections on “Topic 4b: Supplier engagement (deductive)” were coded in a single-case manner. [Table 1](#) served as a coding manual for this section as it aligns with the theoretical framework and adds to the credibility of the study ([Fereday & Muir-Cochrane, 2006, pp. 83, 84](#)). Subsequently, the cases were cross-examined to identify similarities and differences, indicating areas of consensus and areas of potential conflict ([Fereday & Muir-Cochrane, 2006, p. 89](#)). Next, the transcripts underwent both single-case and cross-case inductive analyses. This process takes into account two commonly accepted principles in inductive coding: (1) multiple codes may be assigned to one segment of text, and (2) a considerable portion of the text may remain unassigned to any code ([Thomas, 2006, p. 242](#)). Adherence to such established rules is especially important because a researcher’s preconceptions and biases can influence decisions and actions throughout the qualitative research process ([Jessica L. Johnson et al., 2020, p. 139](#)).

Appendix S: Inter-rater Reliability of Double Responses

In the supplier survey, there were two instances where two responses from the same supplier were received. Only the first responses were included in the quantitative data analysis as these are more likely to be the main points of contact for the semiconductor manufacturer. The fact that several double responses were received may be due to internal miscommunications. This unforeseen event provides the opportunity for an inter-rater reliability assessment. When different raters consistently agree on the measurements, it enhances the construct validity of the measurement items, ensuring that they accurately capture the intended construct.

Following the guidelines proposed by [Koo and Li \(2016, p. 159\)](#), an inter-rater reliability check was conducted using a two-way mixed-effects model for absolute agreement based on the mean of two raters. The obtained intraclass correlation coefficients for the two suppliers demonstrated good (0.76) and moderate (0.63) reliability, respectively ([Koo & Li, 2016, p. 162](#)). The high reliability observed in one supplier's responses can be attributed to their status as a preferred supplier. Preferred suppliers may be more likely to provide more accurate and consistent responses to their important customers. On the other hand, the other supplier is not necessarily a preferred supplier, potentially providing a reason for the somewhat lower reliability. Overall, the results of the inter-reliability check affirm the quality of the responses and indicate appropriate construct validity of the measurement items.

*Interclass Correlation Coefficient Supplier A**

	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Average Measures	.76	0.59	0.86	4.14	54	54	<.001

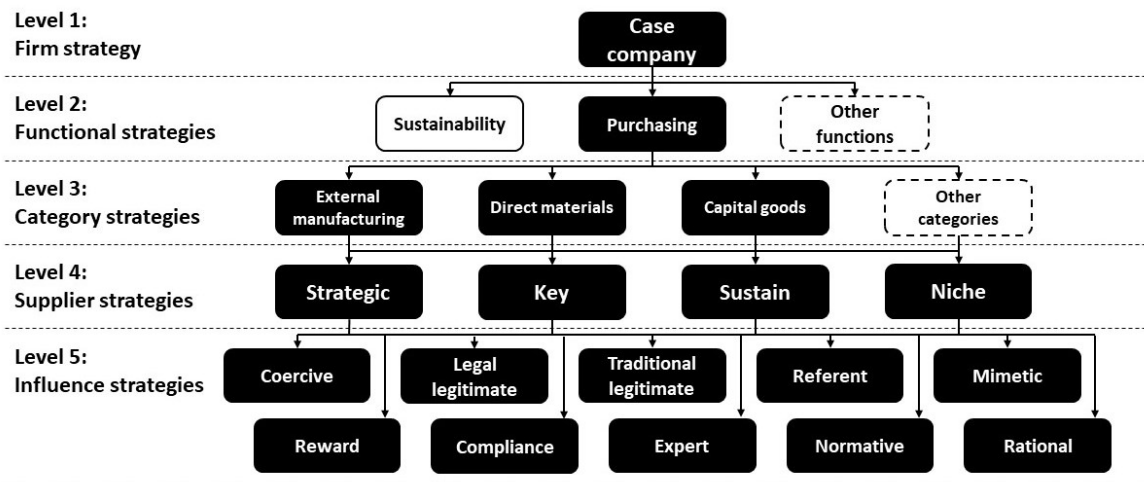
**Note: Mean of Two Raters, Absolute-agreement, Two-way Mixed-effects Model*

*Interclass Correlation Coefficient Supplier B**

	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Average Measures	.63	0.33	0.79	4.14	54	54	<.001

**Note: Mean of Two Raters, Absolute-agreement, Two-way Mixed-effects Model*

Appendix T: Position of Influence Strategies in Strategy Hierarchy



Adapted from: [Hesping and Schiele \(2015, p. 139\)](#)

Appendix U: Post Hoc MANOVA for Motives between Geographical Locations

Dependent Variable	(I) Region	(J) Region	Mean Difference (I-J)
Instrumental_Motives	APAC	AMER	.55*
		EMEA	.42
	AMER	APAC	-.55*
		EMEA	-.13
	EMEA	APAC	-.42
		AMER	.13
Moral_Motives	APAC	AMER	-.16
		EMEA	.07
	AMER	APAC	.16
		EMEA	.23
	EMEA	APAC	-.07
		AMER	-.23
Relational_Motives	APAC	AMER	.34*
		EMEA	.34
	AMER	APAC	-.34*
		EMEA	0
	EMEA	APAC	-.34
		AMER	0

Note: *The mean difference is significant at the .05 level