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LINKING COLLABORATIVE SUPPLIER SOCIAL SUSTAINABILITY PRACTICES AND SUPPLIER PERFORMANCE IN ASYMMETRIC POWER RELATIONSHIPS WITH BUYERS

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Abstract. This article objective is to identify factors related to collaborative supplier social sustainability practices and supplier international performance, and to propose a set of propositions regarding their relationships within a conceptual model. The research context includes manufacturing companies of various sizes located in Poland, which are predominantly Polish-owned and act as suppliers to large foreign buyers in relationships characterized by power asymmetry. The study determines which operationalizations of the main factors should be retained through factor extraction, evaluates their internal consistency using exploratory factor analysis, and validates the control variables. The conceptual model distinguishes between two areas of supplier collaboration on social sustainability practices: supply chain collaboration and horizontal collaboration. Future research may focus on examining the direct impact of these forms of collaboration on suppliers' financial and non-financial performance in the context of their international operations.

Keywords: collaborative social sustainability practices, supplier performance, supply chain sustainability management, horizontal collaboration, supply chain collaboration, manufacturing companies, power asymmetry, exploratory factor analysis.

JEL Classification: M14, M19.

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1. Introduction

Multinational enterprises (MNEs), acting as large buyers, face increasing pressure from customers and society to ensure that not only tier-one suppliers but also lower-tier suppliers avoid causing environmental or social harm (Hartmann & Moeller, 2014). The literature highlights the growing importance of supply chain transparency (Sodhi & Tang, 2019), particularly regarding the visibility of lower-tier suppliers and their sustainability performance (Sen & Bhattacharya, 2001). From the perspective of MNEs, there is an increasing emphasis on supplier selection based on sustainability performance (Moheb-Alizadeh & Handfield, 2018). For example, Winter and Lasch (2016) examine the integration of social criteria into supplier evaluations. Moreover, weaker suppliers, whose relationships with buyers are often characterized by power asymmetries, are increasingly pressured by both regulatory requirements and demands from powerful international buyers to adopt and enhance social sustainability practices (Villena & Gioia, 2018; Buzzao & Rizzi, 2021).

Sustainability practices, including their social dimensions, have been extensively examined in the sustainable supply chain management (SSCM) literature (Sodhi & Tang, 2019), with a focus on suppliers (Ingenbleek & Krampe, 2023), large international buyers (Benstead et al., 2018), or both (Villena & Gioia, 2018; Villena et al., 2021). This article adopts the perspective of suppliers. The development and implementation of social sustainability practices (SSPs) by weaker suppliers, in collaboration with more powerful buyers, have been widely studied, particularly in the context of developing countries, where social challenges are especially acute (Siemieniako et al., 2021; 2022a). Some studies have also examined the implementation of SSPs across entire supply chains, including downstream supplier collaboration (Villena & Gioia, 2018). However, few studies address horizontal collaboration, such as among manufacturing suppliers (Touboulic et al., 2014) or between suppliers in distribution channels (Limoubpratum et al., 2015; Galdeano-Gómez et al., 2015). Similarly, limited research exists on SSPs collaboration between suppliers and non-business entities, such as nonprofit organizations (NPOs) and non-governmental organizations (NGOs) (Siemieniako et al., 2022a). Overall, the literature points to a lack of sufficient collaboration on social sustainability between business organizations, particularly MNEs as buyers, and NGOs as third-party partners, despite the evidence of positive outcomes such partnerships can yield (Siemieniako et al., 2021).

In research on suppliers' social sustainability practices, various conceptual approaches have been adopted, including supplier commitment (Villena & Gioia, 2018) and the allocation of supplier resources to sustainability initiatives (Ingenbleek & Krampe, 2023). Improved supplier performance in social sustainability can enhance corporate reputation, employee loyalty, and engagement (Pagell & Gobeli, 2009). Research by Gong et al. (2019) highlighted the importance of customer awareness, supplier sustainability capabilities, and stakeholder engagement in improving suppliers' social sustainability performance.

The relationship between suppliers' SSPs and their performance remains underexplored at both theoretical and empirical levels (Mani et al., 2018). Moreover, existing findings on this relationship are inconclusive. While some studies confirm a positive association between SSPs and supplier performance (Akamp & Müller, 2013; Mani et al., 2020), others challenge this link (Mani et al., 2018). Large buyers often pass the costs of implementing SSPs onto their suppliers, potentially diminishing supplier profitability (Huq & Stevenson, 2020). As a result, some suppliers may engage in "mock compliance" when adopting SSPs (Huq et al., 2014). Previous research has frequently considered supplier performance as a mediating factor between suppliers SSPs and buyers supply chain performance (Pagell & Gobeli, 2009; Saunders et al., 2015). However, this article focuses on the direct relationship between suppliers' SSPs and their performance, as this area remains limited in the existing literature. Additionally, this article develops a measurement scale and proposes a conceptual model to guide future research.

The research context comprises manufacturing companies of various sizes located in Poland, primarily under Polish ownership, that operate as suppliers to large foreign buyers in relationships characterized by power asymmetry. These Polish suppliers, representing firms from the Central and Eastern European (CEE) region, are engaged in diverse forms of international activity. Their buyers are typically powerful MNEs based in Western countries. The disparity in resources between suppliers and buyers creates an asymmetry of power within these relationships, enabling buyers to exert pressure on suppliers to meet social sustainability outcomes.

The objective of this article is to identify factors related to suppliers' collaborative social sustainability practices and supplier international performance, and to propose a set

of propositions regarding these relationships within a conceptual model. The model also incorporates the influence of control variables, such as company size. The study determines which operationalizations of the main factors should be retained through factor extraction, evaluates their internal consistency using exploratory factor analysis (EFA), and validates the control variables.

The study is organized as follows. The next section presents the literature review, which is three-fold. It discusses power asymmetry, power consequences and performance in business relationships; collaborative supplier social sustainability practices; and the links between these practices, supplier performance, and buyer supply chain performance. The subsequent section outlines the research methodology, divided into two parts: data collection and measurement development. The following section presents the results of the empirical quantitative study. The next section discusses the study's contributions to research on the relationship between collaborative supplier social sustainability practices and supplier performance. It also introduces a conceptual model, offers suggestions for future research, and outlines managerial implications and study limitations. The final section presents the conclusions.

2. Literature review

2.1. Power asymmetry, power consequences and performance in business relationships

The concept of power is widely recognized in the literature as a central phenomenon in business-to-business relationships (Meehan & Wright, 2012; Cowan et al., 2015). Cowan et al. (2015) define power in social exchange as the ability to influence the behavior of another party. It becomes evident when one firm makes a demand that conflicts with the interests of another, eliciting resistance from the latter. Power asymmetry in business relationships, such as buyer-supplier relationship, not only reflects resource imbalances between parties but also shapes how power, derived from these asymmetries, can redefine the resource landscape within the relationship. These shifts in power asymmetries can, in turn, affect actors' expectations regarding value creation outcomes within the relationship (Pérez & Cambra-Fierro, 2015; Siemieniako & Mitręga, 2018). In the context of social sustainability practices, power asymmetry within relational structures can act as an antecedent to the development and implementation of such practices, from the perspectives of both weaker and stronger actors in business relationships (Siemieniako, 2025). For example, Marttinen and Kähkönen (2022) examined power dynamics in multi-tier supply chains and found that sustainability requirements cascade from focal firms to lower-tier suppliers. Their study revealed significant variations in the power of actors across different tiers, shaping their ability to enforce sustainability requirements throughout the supply chain.

A power perspective can also be applied to examine the consequences of social sustainability practices for social value creation and for the performance of actors within a business relationship (Siemieniako, 2025). Power-related outcomes in business relationships often involve the use of power as a result of actions taken within the relationship (Vann Yaroson et al., 2023). Research in this area has shown that actors employ various power-related mechanisms, both intentional and unintentional, that emerge from power-driven practices and significantly influence performance of actors in the relationship (Siemieniako et al., 2022b). The literature identifies several types of intentional power-related practices, including power-shifting tactics (Siemieniako et al., 2022b), countervailing power strategies (Lacoste & Johnsen, 2015),

efforts by weaker actors to enhance their power (Siemieniako et al., 2022b), and approaches to leveraging power (e.g., Oukes et al., 2019; Siemieniako & Mitręga, 2018). For example, Siemieniako and Mitręga (2018), in their empirical research, identified several power-leveraging strategies used by weaker suppliers, particularly in the context of non-mediated power. These include extraordinary efforts to fulfil more powerful buyer requirements, orientation toward product specialisation, learning to work together with dominant buyer and maintaining a reasonable share of sales to the large customer. Unintentional power-related practices, aimed at achieving the objectives of actors within the relationship, can also alter power positions in the short or long term. When such practices lead to perceived imbalances in the distribution of costs and benefits, they may generate tensions that escalate power use, particularly by the stronger party.

The exercise of power by influential actors, such as MNEs, can be interpreted as a strategic response to the need for adaptation in the face of dynamic shifts and turbulence in the business environment. Recent studies on power asymmetry in business-to-business (B2B) relational structures (Foss & Klein, 2023; Voola et al., 2022) emphasize the growing regulatory pressure to align with the United Nations Sustainable Development Goals (SDGs), particularly in addressing critical issues such as forced labor and child labor (Siemieniako et al., 2021). These regulatory pressure significantly influence power dynamics by prompting MNEs to cascade sustainability goals throughout their supply chains and intensify compliance efforts.

However, research by Cuevas et al. (2015) suggests that goal congruence, rather than power asymmetry, is a more decisive factor in achieving favorable outcomes in business relationships. In such settings, behavioral power can be effectively utilized to coordinate actions and resolve conflicts (Bachmann, 2001).

2.2. Collaborative supplier social sustainability practices

Collaboration between suppliers and other entities on sustainability practices, including social sustainability, often originates from strategies and actions initiated by large buyers, particularly MNEs), that actively involve their suppliers (Klassen & Vereecke, 2012; Villena & Gioia, 2018). Klassen and Vereecke (2012) identified monitoring and collaboration as two key capabilities that firms can develop to address social issues. Compared to monitoring, collaborative practices demand a higher level of coordination, enabling firms to work jointly with suppliers, customers, and other stakeholders to improve social outcomes (de Bakker & Nijhof, 2002). Such collaboration is facilitated when large buyers act as role models by exemplifying their own sustainability practices. In these cases, supplier training and development initiatives have been shown to enhance suppliers' sustainability processes and performance (Klassen & Vereecke, 2012).

Moreover, large buyers play a critical role in encouraging supplier engagement with a broader range of stakeholders. For instance, industry organizations associated with MNEs conduct training sessions and conferences on sustainability, including social sustainability, targeting both tier-one and lower-tier suppliers (Villena & Gioia, 2018). Additionally, financial incentives from MNEs not only demonstrate the buyers' commitment but also help reduce suppliers' resistance to obtaining third-party certifications (Klassen & Vereecke, 2012). By creating and nurturing a collaborative environment, MNEs enable the adoption of sustainability practices among their suppliers, fostering engagement that extends to lower-tier suppliers.

Mani and Gunasekaran (2018), in their study on the adoption of social sustainability practices by suppliers in emerging economies, emphasize that such implementation is primarily influenced by various stakeholder groups. They identify two key motivations driving suppliers

to engage in social sustainability practices. First, adoption can enhance financial performance, consistent with the stakeholder theory perspective (Branco & Rodrigues, 2008). Second, suppliers may seek to align with stakeholder norms and expectations, driven by institutional and legitimacy mechanisms (Campbell, 2007).

Villena and Gioia (2018) propose a framework for building sustainability capabilities within supply networks. Collaborative social sustainability practices have also been explored in the literature on coopetition for sustainable development (Christ et al., 2017; Manzhynski & Figge, 2020). For example, Benstead et al. (2018) investigated social sustainability in the context of horizontal collaboration between buyers. Horizontal collaboration, also referred to as peer-to-peer cooperation, represents a joint approach to addressing social sustainability challenges, such as modern slavery within business operations and supply chains (Benstead et al., 2018).

Studies on collaborative sustainability practices, including social sustainability practices, often associate these practices with sustainability performance outcomes (e.g., Gimenez et al., 2012; Peloza, 2009; Mani & Gunasekaran, 2018). Researchers examining the relationship between collaborative social sustainability practices and social sustainability performance have emphasized the role of power asymmetry in shaping this dynamic (Talay et al., 2020; Huq & Stevenson, 2020; Touboulic & Walker, 2015). In their conceptual article on power asymmetries in partnerships addressing grand challenges, complex social and environmental issues, Gray et al. (2022) proposed four trajectories for shifting power in such contexts. They argued that a collaborative trajectory is particularly effective for addressing grand challenges when power differences between the actors are minimal and there is a low degree of goal congruence among them.

2.3. Collaborative supplier social sustainability practices, supplier performance and buyers supply chain performance

Research in the supply chain field consistently highlights a positive relationship between supplier performance and buyer supply chain performance (Foerstl et al., 2010; Gualandris et al., 2014; Mani et al., 2018). The findings of Mani et al. (2018) underscore the importance of collaboration and supplier development in advancing social sustainability practices, which, in turn, enhance supplier social performance. However, their study also revealed mixed results regarding the implementation of social sustainability practices at supplier sites. These practices were found to impact supply chain performance in different ways: indirectly, by improving supplier performance as a mediating factor (Carter, 2005); directly, by enhancing the buyer's overall supply chain performance (Gualandris et al., 2014); or, in some cases, having no significant relationship at all (Hollos et al., 2012).

Pagell and Gobeli (2009) found that better working conditions for suppliers' employees lead to improved product quality by boosting employee motivation, which indirectly impacts the buyer's operational performance. Similarly, Saunders et al. (2015) identified supplier performance as a key mediating factor in determining buyer supply chain performance within the construction sector. Other studies (Gimenez et al., 2012; Klassen & Vereecke, 2012) also provide evidence of a direct relationship between supplier social sustainability practices and buyer supply chain performance. These findings suggest that buyer supply chain performance is influenced by both the supplier's performance and the positive relationship between supplier social sustainability practices and supplier performance.

Research exploring the relationship between suppliers' social sustainability practices and supplier performance remains limited. Mani et al. (2020) provided evidence that the adoption of social sustainability practices by suppliers positively impacts supplier performance. Similarly, Akamp and Müller (2013) found a positive correlation between supplier social sustainability practices, such as employee training and engagement initiatives, and enhanced performance in large manufacturing firms. Improvements in working conditions at supplier sites have been associated with fewer workplace accidents, reduced operational disruptions, and fewer delivery delays. These improvements contribute to enhanced supplier performance through more reliable supply chains, shorter lead times (Yuan & Woodman, 2010), and higher product quality driven by increased employee motivation (Pagell et al., 2010).

Carter and Jennings (2004) examined social sustainability issues at supplier locations and their indirect relationship with supply chain performance. Through the lens of purchasing social responsibility, they found that the adoption of social sustainability practices leads to improved supplier performance, evidenced by reduced lead times, fewer errors, and greater operational efficiency. Similarly, Sancha et al. (2015) supported the adoption of social sustainability practices, emphasizing their positive effect on supplier performance.

3. Research method

3.1. Data collection

A study on the impact of collaborative social sustainability practices on the international performance of companies was conducted as part of a broader cross-sectional survey in 2021. The sample consisted of 277 internationally oriented manufacturing suppliers in Poland, each with at least 51% Polish ownership. This criterion was intended to exclude suppliers with foreign capital, particularly subsidiaries of MNEs operating in Poland. The focus on Polish manufacturing firms situates the study within the context of a transforming country with a typical internationalization pathway in which local businesses collaborate with large MNEs as buyers. The quantitative survey was administered using computer-assisted telephone interviewing (CATI) by trained interviewers. This study was part of a larger research project (Ciszewska-Mlinarič et al., 2024) examining the impact of dynamic capabilities on supplier performance. However, the research results presented in this article have not been published previously.

The focus was on the manufacturing industry, as this sector is of strategic importance for economic growth and includes many suppliers that export in various forms to serve large international buyers. Some of the surveyed suppliers provided manufacturing outsourcing services (38%), including outsourcing related to the development of product or technological innovations, or both. Another group of suppliers offered products under their own brand to foreign buyers (62%). The respondents in this study were owners and senior managers, as they possess the most knowledge and decision-making authority in the surveyed companies with respect to international market activities and cooperation with MNEs as buyers. This was particularly important given the single-informant approach. Table 1 presents detailed characteristics of the sample.

Table 1. Descriptive statistics of the sample companies (N = 277) (source: Ciszewska-Mlinarič et al., 2024)

Sample characteristics	Freq.	%		Freq.	%
Firm age (years of operation)			Position		
5–10 years	32	12	CEO/owner	20	7.2
11–20 years	54	19	CEO	47	17
21–30 years	59	21	Sales executive director	114	41.2
>30 years	132	48	Senior level directors (exports/ foreign sales)	96	34.7
Firm size (number of employees)			Gender		
10 to 249	158	57	Male	198	71.5
250 to 499	85	31	Female	79	28.5
500 and more	34	12	Other	0	
Ownership			Experience at company		
100% of Polish capital	221	79.8	2–5 years	68	25
Majority share of Polish capital (75–99%)	27	9.7	6–10 years	96	35
Majority share of Polish capital (51–74%)	29	10.5	11–15 years	64	23
			Above 15 years	49	18
Industry					
High-, and medium-high tech	138	50	Degree of Internationalization (FS/TS)		
Medium-low and low-tech	139	50	10 to 25	109	39
			26 to 50	101	36
Sector/segments			51 to 75	47	17
Only B2B	194	70	76 to 100	20	7
Only B2C	11	4			
B2B and B2C	72	26	Internationalization scope (no. of markets)		
			2 to 5	32	12
Value chain position			6 to 10	86	31
The firm sells semi-finished products that are further processed by buyers in international markets or finished products that are marketed under the buyers' brand.	105	38	11 to 20	114	41
			>20	45	16
			Internationalization speed (years from founding)		
			3 and less	117	42
			4 to 10	129	47
The firm sells branded finished products in international markets	172	62	Above 10	31	11
			Firm international experience (no. of years selling abroad)		
			Up to 10	46	17
			11 to 20	81	29
			21 to 30	71	26
			>30	79	29

3.2. Measurement development

The core of the research framework for this study is the assumption that a supplier's collaborative social sustainability practices influence supplier performance. The development of the measures was based on the existing literature and, where necessary, the measures were adapted to fit the research objectives and the specific context of the study.

This article focuses on supplier's collaborative practices for social sustainability, which were identified based on a review of relevant literature (see Table 2). In this study, the practices originally proposed by Villena and Gioia (2018) as buyer-initiated practices are reformulated to reflect their implementation by suppliers. In the original framework by Villena and Gioia (2018), these practices are associated with building sustainability capabilities and are organized into four main dimensions: working with key stakeholders (e.g. NGOs, industry and international organizations, etc.), sustainability training, setting and enforcing sustainability expectations in contracts, working together to deal with surprises. In addition to the 13 practices adapted from Villena and Gioia (2018) and other sources (e.g., Sodhi & Tang, 2019; Carrigan et al., 2017; Cockburn-Wootten et al., 2018), one additional practice was drawn from related literature (e.g., Sodhi & Tang, 2019; Cockburn-Wootten et al., 2018), i.e. "We work with our organization's key stakeholders on social sustainability" (SSP1).

Supplier international performance was differentiated into financial and non-financial dimensions, based on previous literature (e.g., Dikova et al., 2016; Brouthers et al., 1999; Evans & Mavondo, 2002; Azar & Drogendijk, 2014). Financial international performance (FIP) was measured by three items. Respondents were asked to rate their firm's financial indicators in international markets in 2020 compared to 2019, using a seven-point scale ranging from a very significant decrease (more than 20%) to a very significant increase (more than 20%) (see Table 2). Non-financial international performance (NFIP) was also measured using three items. Respondents rated the level of their company's international non-financial performance in 2020 compared to 2019 on a scale of 1 to 7, with 1 indicating "very unsatisfactory" and 7 indicating "very satisfactory" (see Table 2).

Table 2. Sources of items in the questionnaire

Item	Statement	Source of item
SSP1	We work with our organization's key stakeholders on social sustainability.	Bacq and Eddleston (2018), Fowler et al. (2019), Sodhi and Tang (2019), Cockburn-Wootten et al. (2018)
SSP2	We work closely with local and international NGOs on social sustainability.	Rodríguez Bolívar et al. (2016), Villena and Gioia (2018)
SSP3	We share resources with industry partners to achieve industry-wide social sustainability goals.	Carrigan et al. (2017), Villena and Gioia (2018)
SSP4	We are committed to the development/application of industry standards and trainings for social sustainability.	Carrigan et al. (2017), Villena and Gioia (2018)
SSP5	We support collegial learning on social sustainability, e.g. supplier-to-supplier learning panel.	Sigala (2019), Villena and Gioia (2018)
SSP6	We have been selected by clients to pilot new social sustainability initiatives.	Villena and Gioia (2018)

End of Table 2

Item	Statement	Source of item
SSP7	Staff of our organization regularly participate in social sustainability trainings conducted by industry organizations.	Villena and Gioia (2018)
SSP8	Our organization's personnel regularly participate in social sustainability trainings conducted by international buyers.	Huq and Stevenson (2020), Huq et al. (2014), Klassen and Vereecke (2012)
SSP9	We participate in the promotion of social sustainability trainings by professional organizations.	Villena and Gioia (2018)
SSP10	Our buyers review contracts with our organization to include social sustainability criteria.	Snyder and Maslov (2023), Villena and Gioia (2018)
SSP11	There are potential penalties for our organization for not meeting social sustainability criteria in the contracts agreed with buyers.	Huq and Stevenson (2020), Villena and Gioia (2018)
SSP12	Our organization works with relevant stakeholders to deal with unexpected situations regarding social sustainability.	Fowler et al. (2019), Sodhi and Tang (2019), Villena and Gioia (2018)
SSP13	We work with competitors to understand social sustainability issues.	Manzhynski and Figge (2020), Villena and Gioia (2018)
SSP14	We work with buyers to address anomalies related to social sustainability.	Huq et al. (2014), Huq et al. (2016), Villena and Gioia (2018)
SSP15	We work with other sub-suppliers to address anomalies related to sustainability in the social area.	Meinlschmidt et al. (2018), Villena and Gioia (2018)
NFIP1	Increase in foreign market share	Dikova et al. (2016), Brouthers et al. (1999)
NFIP2	Achievement of strategic objectives	Evans and Mavondo (2002), Azar and Drogendijk (2014), Dikova et al. (2016), Brouthers et al. (1999)
NFIP3	Effectiveness of marketing on foreign markets	Dikova et al. (2016), Brouthers et al. (1999)
NFIP4	Effectiveness of distribution on foreign markets	
NFIP5	Reputation of the company on foreign markets	
NFIP6	Overall satisfaction with performance in foreign markets	Evans and Mavondo (2002), Azar and Drogendijk (2014), Dikova et al. (2016), Brouthers et al. (1999)
FIP1	Value of sales in foreign markets	Evans and Mavondo (2002), Azar and Drogendijk (2014)
FIP2	Profitability of sales on foreign markets	
FIP3	Value of sales from new products/services in foreign markets	

The study uses three control variables. First, a company's size, measured by the number of employees, acts as an indicator of its available resources and should be considered in performance analyses. Second, value chain position (VCP), a binary variable, was determined by respondents selecting the statement that best described their company's situation (see Table 1). Lastly, the sector, also a binary variable, was determined based on whether the company operated exclusively in the business-to-business (B2B) market or in both the business-to-business and business-to-consumer (B2C) markets.

This study seeks to identify which items should be retained through factor extraction and to assess their internal consistency reliability using exploratory factor analysis (EFA) (Gerbing & Anderson, 1988). EFA was applied to identify variables related to supplier social sustainability practices and supplier international performance. Factor analysis is commonly used for data reduction, allowing researchers to extract a smaller set of factors that account for a significant share of the variance present in a large set of variables (Ford et al., 1986). It can also serve as a tool for establishing hypotheses about cause-and-effect mechanisms or to classify variables for further analysis (Mulaik, 1988). For factor extraction, Principal Axis Factoring and Promax rotation were employed. Then Cronbach's alpha coefficients (α) was checked to assessed scales reliability. Lastly, nonparametric Mann-Whitney U and Kruskal-Wallis H tests were applied to assess the significance of differences of the levels of factors according to company size, value chain position and sector. The SPSS software was used to conduct all statistical analyses.

4. Results

To identify variables related to suppliers' collaborative social sustainability practices and to reduce data dimensionality, exploratory factor analysis (EFA) was conducted using SPSS software. First, the adequacy of the sample for EFA was assessed. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were used to evaluate the suitability of the data for factor analysis. The Bartlett's test was statistically significant, and the KMO value exceeded 0.9, classified as "perfect", indicating that the data were appropriate for conducting EFA (see Table 3).

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.93
Bartlett's Test of Sphericity	Approx. Chi-Square	5945.50
	df	105
	Sig.	0.000

A common scree plot and Kaiser's criterion of retaining factors with eigenvalues greater than one were used to determine the number of factors to extract. Only factors with eigenvalues above 1 were retained. Principal Axis Factoring with Promax rotation was applied for factor extraction. The exploratory factor analysis revealed that the items related to suppliers' collaborative social sustainability practices loaded onto two distinct factors, indicating a lack of cohesion across all items.

As a result of the analysis, two factors (constructs) related to SSPs were identified. The first factor, *supply chain collaboration* (SCC), refers to vertical collaboration within the supply chain, involving buyers, suppliers, and in some cases, non-business organizations. The second factor, *horizontal collaboration* (HC), refers to collaboration between buyers or between suppliers operating within the same industry.

The rotated factor loadings are presented in Table 4. No items had factor loadings below 0.6, and no items showed problematic cross-loadings above 0.45.

Table 4. EFA results – identification of SCC and HC factors

Factor	Item	Loading	
SCC	SSP2 We work closely with local and international NGOs on social sustainability.	.970	–.022
	SSP3 We share resources with industry partners to achieve industry-wide social sustainability goals.	.941	.007
	SSP12 Our organization works with relevant stakeholders to deal with unexpected situations regarding social sustainability.	.909	–.019
	SSP10 Our buyers review contracts with our organization to include social sustainability criteria.	.884	.049
	SSP9 We participate in the promotion of social sustainability trainings by professional organizations.	.865	.102
	SSP7 Staff of our organization regularly participate in social sustainability trainings conducted by industry organizations.	.861	.123
	SSP15 We work with other sub-suppliers to address anomalies related to sustainability in the social area.	.857	.088
	SSP11 There are potential penalties for our organization for not meeting social sustainability criteria in the contracts agreed with buyers.	.855	–.117
	SSP14 We work with buyers to address anomalies related to social sustainability.	.831	.117
	SSP8 Our organization's personnel regularly participate in social sustainability trainings conducted by international clients.	.805	.139
	SSP4 We are committed to the development/application of industry standards and trainings for social sustainability.	.784	.190
	SSP1 We work with our organization's key stakeholders on social sustainability.	.734	.042
HC	SSP5 We support collegial learning on social sustainability, e.g. supplier-to-supplier learning panel.	–.056	.972
	SSP13 We work with competitors to understand social sustainability issues.	.131	.772
	SSP6 We have been selected by clients to pilot new social sustainability initiatives.	.006	.736

In the next step, Cronbach's alpha coefficients (α) was checked to assess the reliability of the scales. The Cronbach's alpha for the twelve-item *supply chain collaboration* (SCC) scale was 0.98. For the three-item *horizontal collaboration* (HC) scale, the alpha was 0.88, both exceeding the commonly accepted thresholds of 0.6 or 0.7 (Griethuijsen et al., 2014). However, a high alpha value in the case of SCC may suggest that some of the items are redundant because they measure exactly the same property of the scale (these are twin questions) instead of measuring different aspects of it (Cronbach, 1951). To address this issue, eight of the twelve SCC items were removed. As a result, a reduced four-item SCC scale was proposed (see Table 5). The Cronbach's alpha for the reduced SCC scale was 0.89, indicating strong internal consistency.

Table 5. Cronbach Alpha reliability results

Factor	Item	Cronbach's alpha
SCC	SSP1 We work with our organization's key stakeholders on social sustainability.	0.89
	SSP7 Staff of our organization regularly participate in social sustainability trainings conducted by industry organizations.	
	SSP14 We work with buyers to address anomalies related to social sustainability.	
	SSP15 We work with other sub-suppliers to address anomalies related to sustainability in the social area.	
HC	SSP5 We support collegial learning on social sustainability, e.g. supplier-to-supplier learning panel.	0.88
	SSP6 We have been selected by clients to pilot new social sustainability initiatives.	
	SSP13 We work with competitors to understand social sustainability issues.	

Exploratory factor analysis was also conducted for the *supplier international performance* construct. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity were calculated to assess the suitability of the data for factor analysis (see Table 6). Principal Axis Factoring with Promax rotation was used for factor extraction. The analysis confirmed the existence of the two assumed factors: *financial international performance* (FIP) and *non-financial international performance* (NFIP) of the supplier (see Table 7).

Table 6. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.91
Bartlett's Test of Sphericity	Approx. Chi-Square	2011.49
	df	36
	Sig.	0.000

Table 7. EFA results for NFIP and FIP factors

Factor	Item	Loading		Cronbach's alpha
NFIP (non-financial international performance)	NFIP6 Overall satisfaction with performance in foreign markets	.958	–.055	0.93
	NFIP3 Effectiveness of marketing on foreign markets	.930	–.002	
	NFIP4 Effectiveness of distribution on foreign markets	.862	–.071	
	NFIP2 Achievement of strategic objectives	.827	.150	
	NFIP1 Increase in foreign market share	.690	.277	
	NFIP5 Reputation of the company on foreign markets	.590	–.057	
FIP (financial international performance)	FIP1 Value of sales in foreign markets	–.004	.962	0.85
	FIP2 Profitability of sales on foreign markets	.010	.773	
	FIP3 Value of sales from new products/services in foreign markets	–.061	.706	

The Cronbach's alpha for the six-item NFIP scale was 0.93, and for the three-item FIP scale, it was 0.85, both exceeding the acceptable threshold of 0.6 or 0.7 (Griethuijsen et al., 2014).

Finally, the Mann–Whitney U test (suitable for two-group comparisons) and the Kruskal–Wallis H test (suitable for comparisons involving more than two groups) were applied to assess the significance of differences across control variables (Liu et al., 2022). The analysis examined whether the levels of SCC, HC, FIP, and NFIP differed based on the three control variables: company size, value chain position, and sector. The analysis proofed the lack of significance of differences for value chain position and sector across any of the four constructs. However, significant differences were found based on company size.

Table 8 summarizes the Kruskal–Wallis H test results for SCC, HC, FIP, and NFIP by company size. The findings reveal statistically significant differences among small, medium, and large companies for SCC ($H(2) = 94.52$, $p < 0.001$) and HC ($H(2) = 40.12$, $p < 0.001$).

Table 8. Kruskal-Wallis H test results

Test statistics	SCC	HC	FIP	NFIP
Chi-Square	94.516	40.124	2.716	2.846
df	2	2	2	2
Asymp. Sig.	.000	.000	.257	.241

5. Discussion

5.1. Conceptual model and propositions for future research

The main contribution of the article is the development of a methodology to measure the supplier's collaborative social sustainability practices in relation to both the financial and non-financial performance of their international operations. Additionally, the article proposes a set of propositions concerning the relationships between these constructs within a conceptual model (see Figure 1). The study also examines control variables and concludes that only company size has a statistically significant effect.

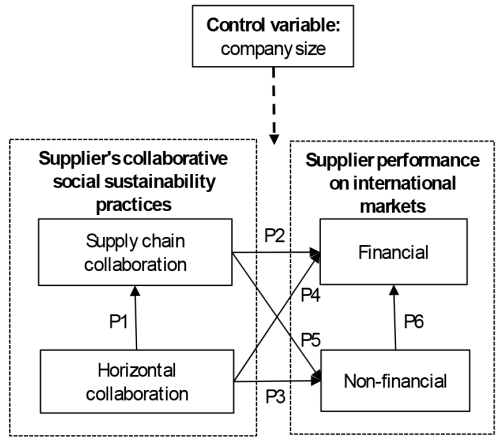

Figure 1. Conceptual model of collaborative supplier social sustainability practices in relation to supplier international performance

The conceptual model presented in this article supports the development of several propositions (P1 to P6) aimed at advancing research on suppliers' collaborative social sustainability practices in relation to their performance. A key contribution of this study is the distinction between two constructs within the broader category of supplier collaboration practices for social sustainability: *supply chain collaboration* and *horizontal collaboration*. Supply chain collaboration, in the context of social sustainability practices, primarily refers to vertical collaboration within the buyer's supply chain, involving first-tier suppliers (Mani et al., 2018) as well as downstream suppliers (Villena & Gioia, 2018). It may also encompass collaboration exclusively between suppliers and their sub-suppliers, for example, to consolidate their collective power and act in opposition to buyers' demands (Touboulic et al., 2014).

In addition to business actors (i.e., buyers and suppliers), supply chain collaboration can also involve non-business organizations such as NGOs, nonprofit organizations, local or national government institutions, or industry bodies. The participation of non-business organizations, such as in the form of partnerships, can create pathways for social sustainable practices, balancing power between business and public or non-profit entities (Gray et al., 2022; Schneiberg & Soule, 2005). In practice, this means reducing power on the side of MNEs acting as buyers (Siemieniako et al., 2022a). Based on the broad range of collaborative supplier social sustainability practices included in the factor analysis, the findings suggest that collaboration with a wide range of stakeholders, both business and non-business, is most appropriate in the supply chain collaboration for achieving social sustainabillity performance (e.g., Siemieniako et al., 2022a).

Horizontal collaboration as a form of development and implementation of social sustainability practices – also discussed in the context of coopetition (Christ et al., 2017), refers to collaboration between buyers or between suppliers within the same industry to develop policies and initiatives related to social sustainability. Benstead et al. (2018) also highlight horizontal collaboration among non-business organizations as a common response to issues such as modern slavery.

Given that the conceptual model distinguishes between two types of supplier collaboration in social sustainability practices, such us *supply chain collaboration* and *horizontal collaboration,* future research may examine the direct impact of these forms of collaboration on suppliers' financial and non-financial performance in international operations (P2, P3, P4, and P5). In addition, it is proposed that future research test the effect of horizontal collaboration on supply chain collaboration, as the two are complementary (P1) (see Benstead et al., 2018). The model also suggests examining the relationship between *non-financial and financial performance* (P6), as prior research has indicated a potential causal link (Siemieniako & Mitręga, 2018).

5.2. Managerial implications

This article offers several important managerial implications, particularly for supplier–buyer relationships characterized by power asymmetry, where weaker suppliers develop and implement social sustainability practices collaboratively. Managers on the supplier side should not limit their collaborative efforts to buyers alone, efforts that are often reactive responses to buyers' requirements to comply with internal social sustainability policies. Sole reliance on buyer-driven collaboration risks shifting the burden and cost of implementing social sustainability practices onto suppliers, potentially harming their financial performance. Therefore, it is recommended that suppliers also engage downstream suppliers and non-business organi-

zations, such as NGOs, in collaborative social sustainability practices. Establishing partnerships with non-business entities can help mitigate excessive power asymmetry within the supply chain, particularly by reducing power on the side of MNEs as buyers.

5.3. Limitations

The survey was conducted among companies with majority Polish ownership, and data were collected in Poland. Therefore, the findings may be limited to the national context, although they may also be relevant to the broader Central and Eastern European region. Another limitation is that the survey does not take into account factors such as the size of the R&D and sales and marketing departments. Additionally, a limitation arises from how financial performance (FIP) was measured, based on relative year-over-year comparisons rather than absolute values. This approach was adopted due to the anticipated difficulty in obtaining actual financial data.

Despite a rigorous respondent selection procedure, the study is subject to the general limitations of quantitative research methods. These include the inability to capture all nuances relevant to the research objectives, the use of predominantly closed-ended questions that may restrict respondents' ability to fully express their views, and the challenge of capturing the complexity of the studied phenomena. Furthermore, the omission of certain items related to suppliers' social sustainability practices may also be considered a limitation.

Finally, limitations exist in the sample selection regarding company size. The smallest enterprises (10–49 employees) were excluded, based on the assumption that companies of this size typically lack the capacity to engage in international operations.

6. Conclusions

The relationship between suppliers' collaborative social sustainability practices and their performance remains underexplored at both theoretical and empirical levels. Therefore, the aim of this article is to identify factors influencing the link between these phenomena.

The article highlights power asymmetry between weaker suppliers and stronger buyers as a key factor shaping the relationship between collaborative social sustainability practices and supplier performance. Power asymmetry within buyer–supplier relationships serves as an antecedent to the development and implementation of collaborative social sustainability practices, from the perspectives of both less powerful suppliers and more dominant buyers. In the context of power-imbalanced business relationships, the article emphasizes the cascading of social sustainability requirements from buyers to first-tier and subsequently to lower-tier suppliers. The power dynamics in business relationships, which is related to utilize various power-related mechanisms, is a factor that can both support and act as a barrier to the effective implementation of social sustainability practices in supply chains. The article adopts a power perspective to examine the consequences of social sustainability practices in terms of supplier performance.

The suppliers examined in this study are manufacturing companies located in Poland, which operate as suppliers to large foreign buyers, often MNEs), within relationships characterized by power asymmetry. A methodology was developed to measure suppliers' collaborative social sustainability practices in relation to the financial and non-financial performance of their international operations. The article focuses on presenting the statistical analysis procedures used to develop the measurement scales. The study identifies which operationalizations of the main factors should be retained through factor extraction, evaluates their

internal consistency using exploratory factor analysis, and validates the control variables. Through this validation, the study concludes that only company size is statistically significant as a control variable. Finally, a conceptual model and a series of hypotheses are proposed to advance research on the relationship between suppliers' collaborative social sustainability practices and supplier performance.

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