Drivers of the adoption of first- and lower-tier sustainable supplier development practices

Abstract

The aim of the paper is twofold. First, to examine which specific stakeholder pressures motivate the firm's adoption of both first- and lower-tier supplier development practices. Second, to examine the relationship between stakeholder pressures and supplier development practices, considering the transparency level of the firm's supply chain structure. Based on a sample of 100 European manufacturing firms and employing WarpPLS 6.0 software the following results were obtained. First, stakeholder pressures positively influence the adoption of both first- and lower-tier supplier development practices. Second, supply chain transparency positively moderates the relationship between stakeholder pressures and first-tier sustainable supplier development practices.

Keywords: sustainability, drivers, suppliers

INTRODUCTION

In the current socioeconomic scenario, managing sustainability has become a key concern for many firms, and especially for those operating in business-to-business (B2B) contexts (e.g., Kapitan et al., 2018; Sharma et al., 2010). Sustainability comprises the capacity of firms to satisfy the needs of the current generation, without compromising the capacity of future generations to satisfy their potential needs (Kapitan et al., 2018; United Nations, 1987). The literature has recognized three key dimensions of sustainability - economic, social and environmental, which are often operationalized as the triple bottom line (e.g., Elkington, 1998). Whilst traditionally firms have only focused on managing the economic dimension of sustainability by prioritizing cost issues, they have recently started to also consider the social and environmental dimensions of sustainability (e.g., Porter & Kramer, 2006; Sancha et al., 2015). This is due to the rapid growth of socially and environmentally responsible consumerism (Carrigan & Attalla 2001; Shaw & Shiu

2002), which is every day more prominent in the current business environment (Markovic et al., 2018; Sierra et al., 2017;), where stakeholders are increasingly aware of the firm's unsustainable practices and penalize them (Iglesias et al., 2018) by becoming firm antagonists and spreading negative word-of-mouth regarding the firm on diverse online and offline platforms (Vallaster & von Wallpach, 2013).

Nonetheless, despite the importance for firms to manage sustainability not only by considering its economic dimension but also the social and environmental ones, it is unlikely that a focal firm is perceived as sustainable if its supply chain partners (e.g., suppliers) are not perceived as such (Hartmann & Moeller, 2014; Sancha et al., 2015; Wilhelm et al. 2016). In fact, economic, social, and environmental regulations are becoming stricter and forcing firms to implement practices that do not only extend sustainability internally but also upstream their supply chain. Although these regulations mainly come from the government, other stakeholders also pressure firms in the same direction. For instance, activists and NGOs regularly carry out campaigns pressuring firms to spread sustainability along the supply chain (Gunther, 2015). These pressures can even come from primary stakeholders, such as the firm's employees, managers or shareholders (Buysse & Verbecke, 2003).

Given these pressures from stakeholders, firms are increasingly focusing on extending sustainability across the entire supply chain, and particularly to their suppliers, because suppliers are the most immediate and visible echelon of the supply chain (Sancha et al., 2015). To do so, firms have started to implement sustainable supplier development practices, which can be defined as a set of practices oriented toward boosting supplier performance and/or capabilities with regards to sustainability (Krause et al., 2000). These practices include coaching suppliers in health, safety and environmental issues, and helping them assess their economic, environmental and social performance, among others (e.g., Gimenez et al., 2012; Rao, 2002; Zhu & Sarkis, 2004;).

Most of the previous research on supplier development practices has focused on examining what drives firms to adopt these practices at the first tier of their supply chain, neglecting the lower tiers (Grimm et al., 2014, 2016). This is surprising since most of the sustainability issues take place precisely at the lower tiers of the supply chain (Choi & Linton, 2001; Koplin et al. 2007; Plambeck et al., 2012; Rao, 2002;). Whilst previous research has acknowledged that stakeholders are increasingly pressuring firms to extend sustainability in their first tier suppliers (Gonzalez-Benito & Gonzalez-Benito, 2006; Sancha et al., 2015), it is unclear which specific pressures motivate

firms to implement and extend sustainability to lower tier suppliers. Thus, the first research objective of this paper is to examine which specific stakeholder pressures motivate the firm's adoption of both first- and lower-tier supplier development practices.

The pressure exerted by stakeholders on the firm's sustainability strategy (e.g., extension of sustainability upstream the supply chain) might be influenced by the extent to which stakeholders know the structure of the firm's supply chain (e.g., suppliers, suppliers' location). The transparency of the chain is then one factor that can play a role in the adoption of SD practices. Supply chain transparency can be defined as the extent to which the information regarding the supply chain structure is available to the different stakeholders (Awaysheh & Klassen, 2012). As supply chains can be long and complex, the visibility that stakeholders have about who suppliers are and/or where they are located becomes more limited as we move to the upstream side of the chain (Carter et al. 2014), especially if sustainability marketing communications are not in place (Chamorro et al., 2009; Kapitan et al., 2018; Simula et al., 2009). Thus, the intensity of stakeholder pressures for adopting supplier development practices may vary depending on the visibility of the firm's supply chain structure. Accordingly, the second research objective of this paper is to examine the relationship between stakeholder pressures and supplier development practices, considering the transparency level of the firm's supply chain structure.

By adopting the lenses of stakeholder theory we aim to contribute to the current literature that studies pressures to the implementation of SD practices not to first but also to lower tier suppliers. Understanding what circumstances favor the adoption of these practices will help firms understand the required capabilities to cope with relevant stakeholder pressures. It also provides global policy makers with knowledge regarding how to set the appropriate guidelines to promote the adoption of SD practices that help in extending sustainability to suppliers.

The remainder of the paper is organized as follows. First, the theoretical background on sustainability in lower tier suppliers and stakeholders' pressures is presented and hypotheses are developed. Second, the methodology used to test the developed hypotheses is described. Third, data analysis and results are presented. Finally, discussion on the results along with further research lines are provided.

THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Sustainable supplier development practices

To extend sustainability to suppliers, firms ought to develop and implement certain sustainable supplier development practices, which aim at improving supplier sustainability performance or capabilities. In that sense, supplier development practices entail both assessment of suppliers and collaboration with them (e.g., Gualandris & Kalchschmidt, 2014; Lee & Klassen, 2008; Vachon & Klassen, 2006). Focal firms assess suppliers by making use of questionnaires, non-regulatory standards and/or third-party audits (Min & Galle, 1997; Walton et al., 1998), and even make company visits (Large & Gimenez, 2011). Once the evaluation is conducted, focal firms quantify and communicate the results to their suppliers to make them aware of the possible discrepancies between their performance and the focal firm's expectations (Prahinski & Benton, 2004). If these discrepancies are prominent, focal firms give suppliers suggestions for improvement, and even collaborate with them to help them implement such suggestions (Krause et al., 2000).

Given the importance of sustainable supplier development practices, there is a wide body of research that has empirically examined their antecedents (e.g., Blome et al., 2014; Bowen et al. 2001; Gonzalez-Benito & Gonzalez-Benito, 2006; Large & Gimenez, 2011; Mathiyazhagan et al. 2014; Reuter et al., 2010; Sancha et al. 2015; Vachon & Klassen, 2006; Zhu & Sarkis, 2004). However, the literature on sustainable supplier development practices has predominantly focused on first-tier suppliers (Gimenez & Tachizawa, 2012; Grimm et al. 2018; Markman & Krause, 2016), largely neglecting what drives firms to implement sustainable supplier development practices in lower tiers. The literature on lower tier suppliers has started to emerge in the last years (e.g., Grimm et al. 2014; 2016, 2018; Tachizawa & Wong, 2014; Wilhelm et al., 2016a), and has mainly focused on understanding what strategies, practices and mechanisms focal firms can implement to extend sustainability to lower tier suppliers (e.g., Tachizawa and Wong, 2014; Wilhelm et al. 2016). The literature that explores the extension of sustainability to lower tiers seems to concur on the fact that traditional supplier development practices (i.e., assessment and collaboration) help to improve the lower tier compliance with the focal firm's sustainability requirements (Grimm et al., 2016, 2018; Jabbour et al., 2015; Wolf, 2011). However, it has not explored why focal firms implement supplier development practices to manage lower tier suppliers. In other words, what pressures focal firms to implement supplier development practices beyond their visible horizon (i.e., lower tier suppliers) remains unanswered. In this paper, we are

interested in determining what drives buying firms to implement sustainable supplier development practices not only at the first tier level but also at lower tier levels.

Stakeholder pressures and sustainable supplier development practices

The stakeholder theory can help understand what pressures firms to adopt sustainable supplier development practices. The stakeholder theory argues that firms should not only satisfy the needs of customers but also the demands of all firm's stakeholders (Freeman, 1984, 2004, 2005). In relation to sustainability, stakeholders expect transparency, respect, and environmentally- and socially-oriented behaviors from firms (Gonzalez-Benito & Gonzalez-Benito, 2006; Waddock et al., 2003). Accordingly, they pressure firms to include in their supplier base environmentally- and socially- responsible suppliers (Altmann, 2015). These stakeholder pressures influence the focal firm's adoption of sustainable supplier development practices (Wolf, 2014) as a way to guarantee that its operations and actions are sustainable and therefore in line with stakeholder demands (Ageron et al., 2012; Sancha et al., 2015).

As stakeholders are various (e.g., employees, shareholders, government, media, regulators, non-governmental organizations, competitors), so are their demands (Henriques & Sadorsky, 1996, 1999). The literature shows that stakeholders pressure firms to adopt sustainability oriented practices. For instance, all too often, customers, media and regulators demand firms to check their sustainability behaviors in all stages of their supply chains (Beske et al., 2008; Leire & Mont, 2010; Schaltegger & Burritt, 2014; Seuring & Müller, 2008). In that sense, public attention pressures firms to deal with unsustainable behaviors from their supply chain partners (e.g., suppliers) as a way to protect their reputation (Grimm et al., 2016). In addition, the extension of sustainability to suppliers, both at the first and lower tier levels, results from consumers, regulatory agents and non-governmental organizations pressures (Gualandris et al., 2015). Consumers' communities expect more and more to get knowledge about the (environmental and social) conditions under which the products they purchase have been manufactured (Collins et al. 2007; Gonzalez-Benito & Gonzalez-Benito, 2006; Locke & Romis, 2007). This fact, pressures firms to make sure that the upstream side of their supply chains is both environmental and socially friendly through the implementation of practices such as sustainable supplier development practices. Finally, the role of top management, corporate boards and stakeholders in the implementation of sustainability practices such as supplier development practices has been stressed in earlier research

(e.g., Carter & Rogers, 2008; Pagell & Wu, 2009; Wolf, 2011). Finally, employees can also exert pressure on the extension of sustainability to suppliers as their motivation and satisfaction increases when they work in firms with a clear social orientation (Gualandris et al., 2014; Pagell & Gobeli, 2009; Sancha et al., 2016). Based on the stakeholder theory and the abovementioned empirical evidence, we hypothesize:

H1: Stakeholder pressures lead to the adoption of first tier sustainable SD practices
H2: Stakeholder pressures lead to the adoption of lower tier sustainable SD practices

The moderating role of supply chain transparency in the relationships between stakeholder pressures and sustainable supplier development practices

Despite the importance of the extension of sustainability to suppliers, and especially to lower-tier suppliers, this can be a complex practice given the power asymmetries and the limited transparency that characterize focal firm-supplier interactions (Grimm et al., 2016). This complexity lies in the difficulty for focal firms to identify and locate its supply chain members (e.g., suppliers) (Choi et al., 2001). In fact, managing lower- tier suppliers is especially complex given the lack of transparency that often exits in multi-tier supply chains (Choi & Linton, 2011).

However, as the focal firm's supply chain becomes more visible (e.g., its structure and partners are known), it also becomes more exposed to stakeholder scrutiny, and therefore more vulnerable to adverse stakeholder reactions (Lourenço et al. 2012). Thus, the pressure from stakeholders to implement practices that aim to reduce unsustainable supplier behaviours becomes greater. The more stakeholders know about the firm's supply chain, the higher their pressure to focal firms to implement sustainable supplier development practices both at the first- and lower-tier suppliers' levels (Hartmann and Moeller; 2014). Previous literature argues that the more visible an organization is, the higher the pressure from stakeholders to pursue environmental practices (Bowen, 2000; Henriques & Sadorsky, 1999; Tate et al., 2010). However, it is plausible to expect that this reasoning does not only apply to environmental practices but also to practices that aim to extend sustainability along the entire supply chain (e.g., suppliers). In line with this reasoning, we argue that the more transparent a supply chain is (in terms of manufacturing processes, sources of raw material, and structure), the stronger the influence of stakeholder pressures on the adoption of first- and lower-tier sustainable supplier development practices since it is will be more easily and

closely publicly scrutinized by stakeholders (March & Simon, 1958). Therefore, the intensity of stakeholder pressures for adopting sustainable supplier development practices may varies depending on the visibility of the firm's supply chain structure. Thus, we hypothesize that:

H3: SC transparency positively moderates the relationship between stakeholder pressures first tier sustainable SD practices

H4: SC transparency positively moderates the relationship between stakeholder and lower tier sustainable SD practices

METHODOLOGY

Questionnaire design and measures

The survey instrument employed in the study was developed based on a literature review. A pre-test was carried out with a group of academics as a way to check the understanding and clarity of the items. As a result, minor changes regarding the wording of some items were implemented. Multiple items are considered per each of the constructs of the study. In our model we have the following constructs: *Stakeholder Pressures*, *First Tier Sustainable Supplier Development Practices*, *Lower Tier Sustainable Supplier Development Practices* and *Supply Chain Transparency*. Appendix A provides a detailed list of the items used.

Stakeholder Pressures – This construct includes the following stakeholders' groups: shareholders, employees/unions, top managers, suppliers, competitors, governments and regulatory agents, customers/consumers, financial institutions, non-governmental organizations and media. The construct was adapted based on Buysse and Verbeke (2003) and Gonzalez-Benito and Gonzalez-Benito (2006).

First Tier Sustainable Supplier Development Practices – This construct includes items related to practices such as assessment, provision of feedback, provision of training or development of joint efforts between a buying firm and its first tier suppliers with respect to sustainability issues.

Lower Tier Sustainable Supplier Development Practices – This construct includes items related to practices such as assessment, provision of feedback, visits, provision of training or development of joint efforts between a buying firm and its lower tier suppliers with respect to sustainability issues.

The constructs related to sustainable supplier development practices were adapted based on Krause et al. (2000) and Vachon and Klassen (2008).

Supply Chain Transparency – The construct includes items related to the extent to which the end user is aware of the way the product is manufactured, type of raw material used or structure of the supply chain, among others. The construct is based on Awaysheh and Klassen (2012). Respondents were asked to answer each question on a Likert scale ranging from 1 to 5 where higher values indicate greater pressure, higher levels of practices implementation and higher awareness respectively. *Stakeholder Pressures* construct was considered a formative construct while *First Tier Sustainable Supplier Development Practices*, *Lower Tier Sustainable Supplier Development Practices* and *Supply Chain Transparency* were considered reflective constructs.

Sample and data collection

Data from a sample of European manufacturing firms was collected in 2016 – 2017. AMADEUS (Bureau Van Dijk) Database was used to extract the list of firms which had at least 50 employees in the food, textile, chemical and electronics industries. After having eliminated firms that did not meet the criteria and had no complete contact details we were left with a sample of 517 firms. We first contacted firms to request the participation in the study and to verify who the key respondent was in case they agreed to participate. This allowed us to minimize key informant bias (Kumar et al., 1993). Next, an electronic version of the questionnaire was submitted to the participant that was followed up by two waves of remainders. One remainder two weeks after the electronic questionnaire was submitted and then a final remainder one week after. As a result of this process a number of 100 useful and complete responses was obtained; representing an effective response rate of 19.34% which is similar to previous studies in the field (e.g. Akamp & Muller, 2013).

DATA ANALYSIS AND RESULTS

The objective of the paper is to study both direct and indirect relationships between different constructs. More specifically, we aim to understand the influence that stakeholder pressure has on the implementation of both first and lower tier sustainable supplier development practices. In addition, we also study the moderating role played by supply chain transparency on the abovementioned relationships.

To achieve these objectives and test the hypothesized relationships we used WarpPLS 6.0 software program (Kock, 2017). The underlying algorithm employed by WarpPLS is partial least squares (PLS) regression, whose main characteristic is its ability to minimize multicollinearity among latent variables. This was the most suitable method for data analysis for the following reasons. First, the impossibility to meet the normality and minimum sample size assumptions for using parametric structural equation modeling (Pavlou & Fygenson, 2006). Second, the advantage of estimating all the hypothesized relationships simultaneously. Third, PLS can be applied to small samples, as in our case (n=100) (Urbach & Ahlemann, 2010). In fact, with small sample sizes, it may be difficult to identify linear relationships that are strong enough to be statistically significant. Since WarpPLS implements nonlinear analysis algorithms, it can be useful in the analysis of small samples, using jackknife as a resampling procedure to statistical significance estimation of the p-values.

The evaluation of our model is divided in two stages. First, we assessed the quality and adequacy of our measurement model. The measurement model specifies the relationship between indicators and latent constructs. As the model includes both reflective and formative constructs, different measures were used. Second, the structure model was analyzed, which includes the estimation of direct and indirect paths coefficients and tests the strength of the hypothesized relationships.

Measurement Assessment

The adequacy of the reflective scales (i.e., *First Tier Sustainable Supplier Development Practices*, *Lower Tier Sustainable Supplier Development Practices* and *Supply Chain Transparency*) was assessed by analyzing the following aspects: (1) convergent validity, (2) discriminant validity and (3) reliability. Convergent validity was checked both at the item and construct levels. At the item level, as shown in Table 1, all item loadings are significant and greater than the 0,7 suggested threshold (Hulland, 1999). At the construct level, the Average Variance Extracted of each construct is greater than the suggested threshold of 0,5. (Peng & Lai, 2012). Thus, showing that convergent validity is met both at the item and construct level. To check discriminant validity, we compare the square root of the AVE of each construct with the shared variance between each pair of constructs (Morgan et al., 2007). Results in Table 2 show that the square root value of AVE is greater than all inter-construct correlations providing evidence that discriminant validity is also met. Finally, to check reliability of reflective constructs we analyzed the Cronbach's alpha and

Dijkstra's consistent (PLSc) values of each construct. As shown in Table 1 all values are greater than the suggested threshold of 0,7 (Nunnally, 1978). These results show that our measures are reliable.

Table 1. Assessment of reflective measurement model

Constructs & Indicators	Mean	SD	Stand. loadings	P Value	Cronbach α	Dijkstra's PLSc	AVE
First Tier Sustainable SD practices					0.912	0.914	0.792
SDF1	2.86	1.31	0.985	<0.001			
SDF2	2.64	1.25	0.979	<0.001			
SDF3	2.73	1.36	0.984	<0.001			
SDF4	1.93	1.08	0.946	<0.001			
Lower Tier Sustainable SD practices					0.944	0.947	0.783
SDS1	1.98	1.16	0.905	0.006			
SDS2	1.82	1.09	0.958	0.004			
SDS3	1.78	1.05	0.981	0.008			
SDS4	1.55	0.92	0.969	0.016			
SDS5	1.79	1.07	0.975	0.009			
SDS6	1.98	1.16	0.982	0.006			
Supply Chain Transparency					0.885	0.890	0.704
SCT1	2.93	1.35	0.912	<0.001			
SCT2	3.36	1.42	0.938	<0.001			
SCT3	2.63	1.47	0.971	<0.001			
SCT4	2.66	1.21	0.862	0.001			
SCT5	3.21	1.41	0.827	0.003			

Table 2. Measurement assessment (discriminant validity)

Reflective constructs	(1)	(2)	(3)
First Tier Sustainable SD practices (1)	0.890		
Lower Tier Sustainable SD practices (2)	0.563	0.885	
Supply Chain Transparency (3)	0.155	0.327	0.829
Stakeholder pressures (4)	0.433	0.426	0.276

Notes: AVE square root and correlations shown on diagonal and off diagonal, respectively.

The adequacy of formative scales is analyzed differently than for reflective scales. As formative indicators do not have to be strongly correlated (Diamontopoulos, 1999) neither convergent validity, discriminant validity nor reliability can be used. In the case of formative indicators, Chin (1998) suggests analyzing the following aspects: multicollinearity between indicators, indicators' relative importance, and indicators' absolute importance. Variance Inflation Factors (VIFs) were computed to assess multicollinearity between indicators. Table 3 shows that all VIFs are below the boundary value of 2,5 suggesting that multicollinearity is not a problem. The relative and

absolute indicator's relative importance is checked by looking at the indicators' outer weights and outer loadings. All indicators' weight of the formative construct regarding Stakeholder Pressures are significant and all loadings are greater than 0.5. Thus, suggesting that all indicators should be retained.

Table 3. Assessment of formative measurement model

Indicator	Mean	SD	VIF	Stand. loadings	Weight	P Value
Stakeholder pressures:						
EP1	3.33	1.20	2.328	0.816	0.113	0.052
EP2	2.79	0.97	2.210	0.921	0.140	0.035
EP3	3.42	0.85	2.196	0.763	0.111	0.074
EP4	2.34	0.87	2.204	0.724	0.235	0.001
EP5	2.63	1.05	2.224	0.901	0.125	0.052
EP6	3.59	0.92	1.675	0.821	0.123	0.054
EP7	3.03	1.02	2.251	0.910	0.225	0.002
EP8	2.36	0.96	2.081	0.778	0.190	0.007
EP9	2.65	0.95	1.517	0.660	0.132	0.043
EP10	2.72	1.01	1.897	0.863	0.130	0.046

Notes: P Values < 0.05 and VIFs < 2.5 are desirable for formative constructs.

Finally, since data were collected from a single informant and at a single point in time, common method variance could be a threat to our results. Both a priori and a posteriori procedures were used. A priori procedures were implemented to minimize the issue. In that sense, in the questionnaire design stage we segmented the questionnaire questions into sections pertaining into dependent and independent variables and dependent variables were placed after independent variables in the questionnaire (Podsakoff et al., 2003). In the case of a posteriori procedures, we checked the presence of CMV by performing the Harman's one factor test (Podsakoff & Organ, 1986). CMV would be a threat if a there was only one factor accounting for the majority of covariance. The results indicate that five factors emerge and that one single factor only accounts for the 35,28% of the total variance. Therefore, we conclude that CMV is not a threat to our results.

Path model evaluation

The second step in our analysis was to test the hypothesized relationships through path model evaluation. Before estimating the coefficients of both direct and moderating effects, we checked for the presence of multicollinearity between independent variables. We computed VIF between constructs and the results show that the maximum value for VIF coefficient is 1.58 (Table 4),

which is far below the suggested threshold of 5, showing that multicollinearity is not present. In the analysis we included as control variables both firm's size and sales.

Table 4. Block variance inflation factors.

Predictor Constructs	First Tier Sustainable SD practices	Lower Tier Sustainable SD practices
SC Transparency x Stakeholder pressures	1.139	1.457
Stakeholder pressures	1.139	1.256
First Tier Sustainable SD practices		1.583

The results of the path model evaluation are shown in Figure 1.

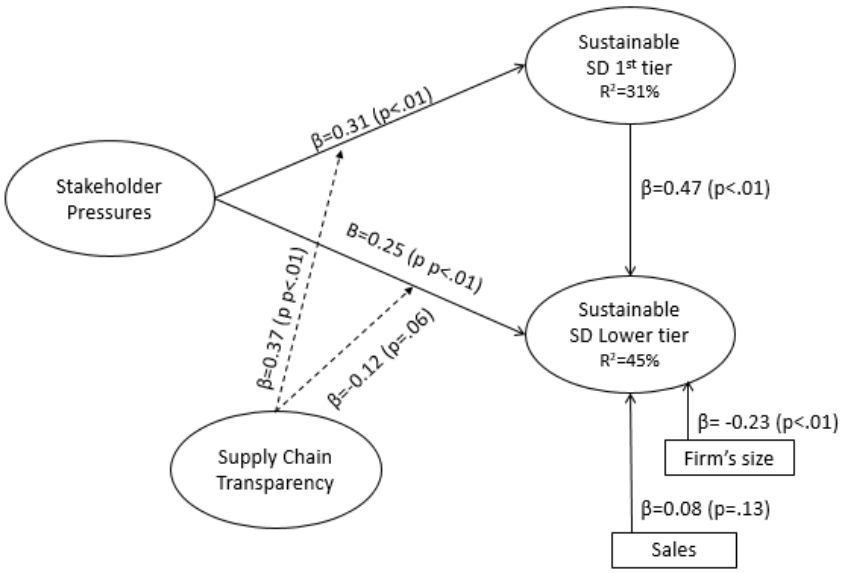

Figure 1. Path model relationships

The results show that the relationship between stakeholder pressures and first tier sustainable SD practices is positive and significant (β=0,31, p<0,01). Thus providing support for H1 which hypothesized a positive and direct relationship between stakeholder pressures and first-tier sustainable supplier development practices. In the case of H2, we hypothesized a positive and direct relationship between stakeholder pressures and the adoption of lower-tier sustainable SD practices. The results show that the relationship between stakeholder pressures and lower tier sustainable SD practices is positive and significant (β=0,25, p<0,01). Thus, providing support to

H2. H3 hypothesized a positive moderating role of supply chain transparency in the relationship between stakeholder pressures and first-tier sustainable supplier development practices. H3 is supported as the moderating role is positive and significant (β=0,37, p<0,01). H4 which hypothesized a positive moderating role of supply chain transparency in the relationship between stakeholder pressures and lower-tier sustainable supplier development practices is not supported. The moderating role of supply chain transparency is significant at the 10% level but negative (β= -0,12, p=0,06). The implications of these results will be provided in the next section.

DISCUSSION AND CONCLUSION

The objective of the paper was twofold. First, to understand the impact of stakeholder pressures on the adoption of both first- and lower-tier supplier development practices. Second, to examine the relationship between stakeholder pressures and supplier development practices, considering the transparency level of the firm's supply chain structure. The discussion section is organized based on these two research objectives

Stakeholder pressures and sustainable supplier development practices

In line with previous literature, stakeholders pressure the adoption of sustainable supplier development practices in the first-tier level (e.g., Blome et al., 2014; Large & Gimenez, 2011; Sancha et al., 2015). This suggests that stakeholder groups such as consumers, media, employees or even financial institutions and the government influence on the sustainability strategies of firms, forcing them to implement practices that extend the boundaries of their responsibility (e.g., suppliers). In addition, the results show that this influence goes beyond the first-tier suppliers and extends to lower tiers. Lower-tier suppliers are not always visible to the firm, hence the extension of sustainability to lower-tiers suppliers can become a challenge for the focal firm (Tachizawa and Wong, 2014). By analyzing this research objective, we have been able to contribute to the current literature on stakeholder pressures and sustainable supplier development practices by showing that not only stakeholders pressures firms to extend sustainability to first tier supplier levels but also to lower echelons in the chain that can even lie beyond their visible horizon (Carter et al., 2014).

The role of supply chain transparency on the relationship between stakeholder pressures and sustainable supplier development practices

The results show that supply chain transparency positively moderates the relationship between stakeholder pressures and first-tier sustainable supplier development practices. This implies that making the supply chain more visible by specifying the raw materials used in the manufacturing process or by describing the manufacturing process can make stakeholder pressures more effective in their objective (i.e., pushing firms to implement sustainable practices with their first-tier suppliers). Surprisingly, this is only the case for first-tier supplier development practices and does not apply in the case of lower tiers. This can be explained by the limited scope that the focal firm might have regarding the implementation of practices with suppliers that lie beyond their visible horizon.

The paper has some limitations that need to be acknowledged. First, the sample is only representative of European countries. Therefore, results needs to be interpreted in the context of developing countries. Second, while the results show that stakeholders influence firms to adopt practices that aim to extend sustainability both to first- and lower-tier levels, no discussion is provided with respect to the effectiveness of the practices in extending sustainability to lower tiers. Future research should analyze which practices can be used to achieve this aim.

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Appendix A. List of items

Construct	No.	Item	Sources (adapted from)
Stakeholder pressures *(Formative construct)*	EP1	Shareholders	Buysse and Verbeke (2003) and Gonzalez-Benito and Gonzalez-Benito (2006)
	EP2	Employees/unions	
	EP3	Top managers	
	EP4	Suppliers	
	EP5	Competitors	
	EP6	Governments and regulatory agents	
	EP7	Customers/consumers	
	EP8	Financial institutions	
	EP9	Non-governmental organizations	
	EP10	Media	
First Tier Sustainable SD practices *(Reflective construct)*	SDF1	We assess our 1st tier suppliers' sustainability performance through formal evaluation, using established guidelines and procedures	Krause et al. (2000) and Vachon and Klassen (2008)
	SDF2	We perform sustainability audits to our 1st tier suppliers' internal management systems	
	SDF3	We provide our 1st tier suppliers with feedback about the results of the sustainability evaluation	
	SDF4	We provide training related to sustainability practices to our 1st tier suppliers	
Lower Tier Sustainable SD practices *(Reflective construct)*	SDS1	We assess our lower tier suppliers' sustainability performance through formal evaluation, using established guidelines and procedures	
	SDS2	We perform sustainability audits to our lower tier suppliers' internal management systems	
	SDS3	We provide our lower tier suppliers with feedback about the results of the sustainability evaluation	
	SDS4	We provide training related to sustainability practices to our lower tier suppliers	
	SDS5	We visit our lower suppliers' premises (e.g., factories) to help them improve their sustainability performance (e.g., provide advice and share know-how about sustainability issues)	
	SDS6	We make joint efforts with our lower tier supplier to improve our sustainability performance	
Supply Chain Transparency *(Reflective construct)*	SCT1	How our product is manufactured	Awaysheh and Klassen (2012)
	SCT2	The type of raw materials that go into the product	
	SCT3	Where the raw materials are sourced	
	SCT4	The structure of our supply chain	
	SCT5	The name of the company that manufactures the product	