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Explaining the business case for environmental management practices in SMEs: The role of organisational capabilities for environmental communication

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ABSTRACT

The preservation of the natural environment demands engagement of small and medium-sized enterprises in terms of the rethinking of their operations and aligns their efforts with the implementation of environmental management practices by the development of organisational capabilities for environmental communication. By performing Partial Least Squares-Structural Equation Modelling using data from 112 Danish small firms in the printing and graphic industry, the study suggests that environmental management practices can boost competitive advantage in terms of lower costs and improved reputation following from the development of organisational capabilities for environmental communication. Thus, the study provides some insight in regard to the strategic significance of environmental management practices and the related communication mechanisms among small firms.

1. Introduction

There has been an increasing interest of businesses to become sustainable and create societal value by integrating environmental and social issues into corporate strategies (Baumgartner and Rauter, 2017). Considering the environmental dimension of sustainability in businesses, firms can reduce their impact on the biosphere and society in general by implementing environmental management practices, which can cover aspects in operations and management systems (e.g., ISO 14000 and EMAS schemes), while at the same time become more competitive (Cantele and Zardini, 2018; Christmann, 2000; Hart, 1995). Environmental management practices are defined as organisational actions and decisions concerning the development and introduction of new or improved products, processes, organisational routines and/or management systems, in order to decrease negative impacts on the natural environment (González-Benito and González-Benito, 2005). They constitute a way to materialise corporate response to global challenges represented by the Sustainable Development Goals (United Nations, 2015), particularly those concerned with the biosphere.

While most empirical examinations of the strategic importance of environmental management practices have focused on larger firms, small and medium-sized enterprises (SMEs) have been gaining attention as a setting to be investigated. SMEs are essential for the economies of nations as they constitute a critical community in terms of environmental impact (Gadenne et al., 2009). Research has suggested that SMEs have a potential to address the making of products, processes, and technologies more 'environmentally-friendly' (Caldera et al., 2018; Klewitz and Hansen, 2014) in the form of environmental management practices that pave the way to boost competitiveness (Aragón-Correa et al., 2008; Brammer et al., 2012; Cantele and Zardini, 2018; Leonidou et al., 2017). Despite the growing research on the strategic significance of environmental management practices in SMEs, studies predominantly focus on the direct influence of such practices on competitive advantage. However, there has been an insistent call for insight on explanations of such an influence by addressing mediating and/or moderating attributes (Cantele and Zardini, 2018; Grewatsch and Kleindienst, 2017).

On the other hand, the development of SMEs in terms of corporate greening over the last years suggests that this setting must move forward beyond the implementation of environmental management practices. In this sense, SMEs should find the mechanisms to communicate their commitment and related actions to their stakeholders as part of an environmentally-oriented sustainable strategy (Demjanovičová and Varmus, 2021) Yet, the study of the communication of actions concerning environmental protection in SMEs remains an under-researched topic (Dias et al., 2019; Nielsen and Thomsen, 2009).

This study draws on the resource-based view (RBV) of the firm

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(Barney, 1991; Dierickx and Cool, 1989; Wernerfelt, 1984) to investigate the role of organisational capabilities for environmental communication in explaining the influence of environmental management practices on competitive advantage in SMEs. An environmentally-oriented sustainable strategy comprises not only the planning, design and implementation of environmental management practices but the communication mechanisms to engage with stakeholder dialogue (González-Benito and González-Benito, 2005; Räty et al., 2016). Hence, organisational capabilities for environmental communication become a pertinent attribute to be explored in a setting characterised by relative societal obscurity (Brammer et al., 2012). Furthermore, the ultimate implications on competitive advantage in terms of lower cost and reputation are approached as they constitute benefits for SMEs when becoming environmentally proactive (Brammer et al., 2012; Jorge et al., 2015; Reyes-Rodríguez et al., 2016). Thus, the research question of this study is: to what extent do organisational capabilities for environmental communication mediate the relationship between the adoption of environmental management practices and competitive advantage in lower costs and reputation in SMEs?

In addressing the research question, organisational capabilities for environmental communication are proposed as a means that allows the strategic outcomes of environmental management practices in SMEs. Based on data from SMEs in the Danish printing and graphic industry, the paper seeks to contribute to literature on both the competitive implications of environmental management practices, and the communication of those practices among SMEs by investigating two issues: (i) The linkage between environmental management practices and the development of organisational capabilities for environmental communication; and (ii), the influence of organisational capabilities for environmental communication on improved competitiveness in terms of lower cost and reputation.

The following sections present the theoretical background and propose the conceptual model and related hypotheses. A description of methodological and research design features is described afterwards, which is followed by the analysis and study results. The remaining sections discuss the key findings and, following the discussion, conclusions are outlined.

2. Theoretical background

This section discusses the strategic significance of environmental management practices in firms focusing on the influence on competitive advantage. Then, the discussion focuses on environmental management in the SME setting and the communication of environmental issues in firms.

2.1. Environmental management practices and competitive advantage

Theoretical discussions on corporate environmental sustainability emerged shedding light on how it is materialised in firms in the form of practices, suggesting that it covers operational aspects, in which products and processes are intervened to become more environmentally friendly (Tondolo et al., 2020), as well as managerial aspects through the implementation of environmental management systems and related standards (Johnstone, 2020). Then, attention has been paid to how environmental management practices simultaneously mitigate firms' impact on the biosphere and contribute to enhance competitive advantage (Hart, 1995).

The RBV (Barney, 1991; Dierickx and Cool, 1989; Wernerfelt, 1984) argues that the firm's ability to manage the limits of the natural environment paves the way to develop organisational resources and capabilities (Caldera et al., 2018; Hart, 1995; Sharma and Vredenburg, 1998), that constitute a source of heterogeneity across firms because they are socially complex and deeply embedded in the firm (Barney, 1991). They are based on the combination of resources and assets (Amit and Schoemaker, 1993) and the result of path dependencies in learning processes over time, which ultimately confers competitive advantage (Dierickx and Cool, 1989).

Competitive advantage in lower costs is achieved when environmental management practices are directed towards a more efficient use of resources. Under the RBV, this form of competitive advantage is achieved as environmental management practices contribute to developing organisational capabilities for continuous improvement and innovation (Annunziata et al., 2018; Christmann, 2000; Hart, 1995; Sharma and Vredenburg, 1998).

The implementation of environmental management practices can signal the firm's concern for the natural environment (Testa et al., 2018). This can influence the judgments of stakeholders, which builds a greater goodwill and ultimately improves firm's reputation (Darnall et al., 2010). Under the RBV perspective, reputation is built because the firm develops organisational capabilities for stakeholder integration when carrying out environmental management practices (Annunziata et al., 2018; Darnall et al., 2010; Hart, 1995; Sharma and Vredenburg, 1998).

Despite the growing interest in the strategic relevance of environmental management, research has largely been concerned with determining the direct consequences on competitive advantage. Yet, some scholars have recognised that the business case for environmental management practices is highly complex, where internal and external factors must be considered in its characterisation (Grewatsch and Kleindienst, 2017). They argue for the need to involve mediation attributes and moderating factors to explain competitive advantage. Organisational capabilities can be thus approached as some of those mediation attributes in the relationship between environmental management practices and competitive advantage (Cantele and Zardini, 2018; Grewatsch and Kleindienst, 2017; Reyes-Rodríguez et al., 2020). Hence, approaching organisational capabilities as mediation attributes will contribute to the call for a deeper understanding of the relationship between environmental management practices and competitive advantage (Cantele and Zardini, 2018; Grewatsch and Kleindienst, 2017).

2.2. SMEs and environmental management

The literature focused on environmental management in SMEs has followed different paths. On the one hand, research has highlighted SMEs' inability to effectively adopt environmental management practices (Gadenne et al., 2009) due to lack of resources (Bianchi and Noci, 1998), awareness and expertise among managers (del Brío and Junquera, 2003), and strategic orientation towards opportunities to reap competitive gains derived from implementing such practices (Worthington and Patton, 2005).

Conversely, research has shed light on proactive stances of SMEs towards environmental issues (Aragón-Correa et al., 2008; Caldera et al., 2018; Klewitz and Hansen, 2014; Leonidou et al., 2017), highlighting that such firms are able to overcome barriers to engage with efforts to show their commitment (Oliveira Neto et al., 2017). In this sense, literature argues for SMEs' environmental engagement through the implementation of environmental management systems that set goals, policies and standards (Johnstone, 2020) and guides actions towards the greening of products, process and operations (Buffa et al., 2018; Vargas-Berrones et al., 2020). This stream of research argues that well-known characteristics of SMEs such as flexibility, agility and niche targeting, simple capital structures and entrepreneurial vision (Yu, 2001) constitute advantages that pave the way to true commitment to environmental protection.

This stream of research has recently provided more insight regarding the consideration of environmental protection as a business opportunity (Jernström et al., 2017) and the influence of environmental management practices on competitive advantage in SMEs. Improvements in lower costs competitive advantage is the most common result when adopting environmental management practices related to efficiency of processes (Aragón-Correa et al., 2008; Brammer et al., 2012; Caldera

et al., 2018; Cantele and Zardini, 2018). Notwithstanding, when focusing on product and organisational innovations that are environmentally sound, opportunities to improve firm reputation, attract environmentally aware customers (Cantele and Zardini, 2018; Jorge et al., 2015) and increase market shares (Brammer et al., 2012; Leonidou et al., 2016) have also been uncovered. Some studies have advanced in applying the RBV when addressing organisational capabilities, defined as abilities of the organisation with the purpose of achieving a particular end result, utilising a set of resources (Helfat and Peteraf, 2003). Examples of these organisational capabilities include shared vision, stakeholder management and strategic proactivity (Aragón-Correa et al., 2008; Caldera et al., 2018). Yet, such studies have understood the role of organisational resources and capabilities as attributes that lead the adoption of environmental management practices rather than to explain how such practices can boost competitive advantage. Thus, the need for approaching organisational capabilities as attributes that mediate the influence of environmental management practices on competitive advantage becomes relevant in this setting (Cantele and Zardini, 2018; Grewatsch and Kleindienst, 2017).

2.3. Environmental issues and communication

Corporate commitment with environmental sustainability is materialised by carrying out actions for pollution prevention and rational use of resources in the form of environmental management practices. However, despite the abovementioned evidence arguing for the positive implications of environmental management practices on competitive advantage, literature has highlighted the importance of signal such commitment to stakeholders through communicational efforts (McCullough et al., 2020). Whereas the implementation environmental management practices can be considered as a manifestation of commitment, the communication of those practices and results to stakeholders and the public confers a more strategic approach to environmental sustainability (Ramya et al., 2020; Testa et al., 2018; Reyes-Rodríguez and Ulhøi, 2021). Yet, it is emphasised that the evidence of implementation of actual practices is essential to make such environmental communication more substantive and credible, otherwise the firm may incur in greenwashing (Testa et al., 2018).

The study of environmental communication in the SME setting, still in its infancy, has argued that such firms predominantly communicate their efforts to customers in a business-to-business configuration to maintain competitiveness and receive support to their innovations around environmental issues (Demjanovičová and Varmus, 2021). Furthermore, it has been acknowledged that SMEs have moved from "one-way communication" structures based on traditional reporting schemes to a dialogical form exhibiting more engagement with stakeholders based on effective communication channels (Corazza, 2019; Reyes-Rodríguez and Ulhøi, 2021).

3. Research model and hypotheses

A conceptual model was developed (see Fig. 1) to bridge some of the gaps previously identified. It indicates that environmental management practices can be related to organisational capabilities for environmental communication. Also, the conceptual model shows that such organisational capabilities contribute to improving competitive advantage in terms of lower costs and reputation.

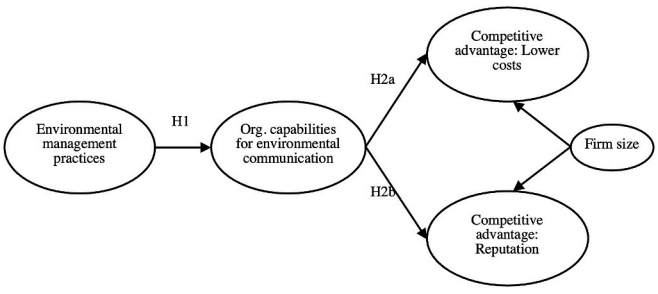

Fig. 1. Hypothesised research model.

The conceptual model thus portrays organisational capabilities for environmental communication as a mediator variable, or generating mechanism (Baron and Kenny, 1986; MacKinnon, 2008), through which environmental management practices is able to influence competitive advantage.

A form to make environmental management practices strategically valuable for firms is to make them visible by providing credible information (Testa et al., 2018). Developing organisational capabilities for environmental communication allows firms to signal their qualities and values, particularly related to their environmental protection, presumed as unobservable (Connelly et al., 2011). These organisational capabilities comprise the processes and mechanisms that address the interactions and exchange of information between a firm and its external stakeholders regarding the firm's environmental efforts (Du et al., 2010; Maas et al., 2014; Reyes-Rodríguez and Ulhøi, 2021). Firms deploy such organisational capabilities with a view towards reducing information asymmetries between the firm and its stakeholders (Connelly et al., 2011; Testa et al., 2018).

Drawing on the RBV and communication theory, organisational capabilities for environmental communication can be understood as "the set of abilities, henceforth termed resources, which a communicator has for the use in the communication process" (Jablin et al., 1994). Knowledge and communication capacities are suggested as resources that are allocated to determine the content and delivery process of the demonstrative and factual messages (Jablin and Sias, 2001; Testa et al., 2018). An overall strategy towards environmental sustainability implies the alignment between environmental management practices and communication mechanisms (Räty et al., 2016; Testa et al., 2018). That is, the ongoing implementation of environmental management practices serves as the direct source of the necessary knowledge on technical aspects and routines that a firm translates into demonstrative messages (Leonidou et al., 2014). Organisational capabilities for environmental communication are required to encode and decode the messages (Jablin and Sias, 2001) in relation to the current environmental management practices. They include the effective use of channels, the extent of personalisation and language variety during the communication process (Aerts and Cormier, 2009).

SMEs' arrangements of organisational communication are heavily based on informality and interpersonal interactions (Nielsen and Thomsen, 2009). Hence, organisational capabilities for environmental communication have a tacit nature in this setting, which contributes to their social complexity and ambiguity and helps to fence imitation (Amit and Schoemaker, 1993; Barney, 1991; Wernerfelt, 1984). Organisational capabilities for environmental communication in SMEs are strongly based on verbal and face-to-face interactions, regarded as the richest form of communication (Aerts and Cormier, 2009), that favours an active stakeholder dialogue (Corazza, 2019; Räty et al., 2016; Reyes-Rodríguez and Ulhøi, 2021). Such interactions occur, for example, when customers are advised in their choices based on arguments related to environmental qualities of products and processes. Therefore, the following Hypothesis is suggested:

Hypothesis 1. Environmental management practices positively influence organisational capabilities for environmental communication in SMEs.

The degree of engagement in the communication of environmental issues can determine cost savings of a firm at different levels. In the absence of communication with respect to environmental commitment and related practices, stakeholders will tend to assume the worst, perceiving that the firm signals unresponsiveness (Testa et al., 2018). The deployment of organisational capabilities for environmental

communication for the delivery of credible information demonstrating firm's practices towards environmental commitment through a skilful use of communication channels, makes stakeholders more confident (Testa et al., 2018). A strong confidence of stakeholders facilitates collaboration that saves transaction costs (Woo et al., 2016) and avoid potential costs associated with penalties and litigations (Walker and Wan, 2012).

On the other hand, organisational capabilities for environmental communication are developed to strategically shape stakeholders' behaviour and persuade them of convenient choices (Cornelissen, 2011; Maas et al., 2014), which can also lead to the reduction of firm's operational costs (Maas et al., 2014; Woo et al., 2016). For example, a firm can persuade customers of a convenient choice, namely a product or manufacturing technique with larger environmental qualities that confers cost-efficiency benefits. In this case, the firm signals involvement in caring for the natural environment that has also the possibility to generate value to customers (Connelly et al., 2011; Testa et al., 2018). Managers can point out the consequences of environmental management practices on the attributes of a product or process and the associated cost-efficiency benefits to reinforce their own attractiveness compared to any other less-environmentally-friendly option (Leonidou et al., 2014). Therefore, the SME can lower operational costs because of the strategic use of organisational capabilities for environmental communication. Given the above, the following Hypothesis is suggested:

Hypothesis2a. Organisational capabilities for environmental communication positively influence competitive advantage in terms of lower costs in SMEs.

SMEs' managers perceive that a strategic management of external organisational communication in general may offer tools that can be applied to raise awareness of their activities and reputation (Liao et al., 2017; Nielsen and Thomsen, 2009). In a similar vein, potential reputational benefits of firms' environmental efforts may not be reaped when environmental management practices are less visible to stakeholders (Hart, 1995; Testa et al., 2018). Organisational capabilities for environmental communication can contribute to "establishing and maintaining favourable reputations with stakeholder groups upon which the organisation is dependent" (Cornelissen, 2011). That is, firms are able to achieve a positive exposure in order to manage perceptions and impressions of stakeholders (Liao et al., 2017; Testa et al., 2018).

Stakeholders interpret the meaning of the information they receive and determine their actions towards firms (Wong et al., 2014). However, they can quickly become sceptical when it comes to information related to environmental efforts (Du et al., 2010). Therefore, reinforcing the visibility of environmental commitment and related practices through organisational capabilities for environmental communication can raise confidence and support of stakeholders (Testa et al., 2018). Stakeholders will then perceive that the firm is signalling conformity to social norms on environmental protection (Wong et al., 2014). Hence, the firm is able to build higher reputation and better image as environmentally friendly, which constitutes a competitive advantage. This discussion leads to the following Hypothesis:

Hypothesis2b. Organisational capabilities for environmental communication positively influence competitive advantage in terms of reputation in the SME.

Finally, firm size is known to be an important contextual property to be considered when studying environmental management among both large firms (Christmann, 2000; Darnall et al., 2010) and SMEs (Jorge et al., 2015). Despite the interest in SMEs of the present study, it must be acknowledged that such a setting does not represent a homogeneous community of firms (Brammer et al., 2012). Firm size is thus included as a variable to control for potential differences in competitive advantage in lower costs and reputation, respectively (see Fig. 1).

4. Methodology

This section presents the methodological aspects of the study by providing an overview of the empirical setting where data was collected, an account of the sampling procedures and a description of the measurements of the constructs.

4.1. Empirical setting

The Danish printing and graphic industry was chosen to contrast the hypotheses of this study. Denmark provides a suitable context for studying environmental management issues among SMEs, as they account for more than 95 percent of companies (Nielsen, 2014). The country is among the leaders regarding environmentally responsible production and consumption with initiatives that can be traced back before the 1990's (Remmen, 2001). Printing and graphic firms are associated with activities that are known to impose substantial impact on the natural environment in terms of resource consumption and emissions (Larsen et al., 2006). As a result, environmental protection costs are significant and constitute a strategic issue for such firms. Regarding environmental management issues, firms in this sector are very strictly regulated but most of them are far above the demands from regulations (Grakom, 2015; Larsen et al., 2006).

4.2. Sampling and data collection procedures

In line with previous studies in the field, a single industry approach was chosen to control for internal processes, business practices, and external factors (Annunziata et al., 2018; Aragón-Correa et al., 2008).

An on-line questionnaire was developed to collect data and measure the constructs of the study, which was administered to 446 member SMEs of the Danish printing and graphic trade association (Grakom). Such firms account for more than 90 percent of total production volume in the country, which ensures the representativeness of the sample despite it being a pre-recruited, non-probabilistic panel (Couper, 2000). General owner-managers were targeted as respondents as those individuals in the SME setting are the most knowledgeable about their organisation and play a crucial role in implementing environmental management practices, which is an usual profile of respondents in environmental management research (Aragón-Correa et al., 2008; Leonidou et al., 2017). The trade association played a significant role in assisting the data collection by distributing the questionnaires to the targeted SMEs and motivating them to cooperate with their responses with the purpose of finding ways to improve the industrial sector. This assisting role was expected to ensure a higher response rate.

Of the 446 questionnaires, 134 were completed and returned after two waves of follow-up reminders sent out five and six weeks after the initial distribution of the questionnaire. 20 surveys were discarded as firms indicated that most of their sales stem from non-printing and graphic related activities. Two further surveys were discarded because they came from large firms (more than 250 employees; (Eurostat, 2019), leaving a final sample of 112 firms. In the final sample, micro-firms (with less than 10 employees) corresponded to 42.9% of the final sample size, small firms (between 10 and 49 employees) corresponded to 40.2%, and medium-sized ones (between 50 and 249 employees; (Eurostat, 2019), accounting for the remaining 17% of final sample size. On average, 76.71% of the total sales volume in the sampled firms is due to printing-related activities (e.g., pre-press, pre-media, printing, and bookbinding), while the remaining 23.29% of total sales volume comes from graphic, advertising and communication-related activities.

Wave analysis was carried out to determine the representativeness of the sample (Fowler, 2009) based on statistical tests of independence for respondents to the first e-mail invitation and after the reminders. Non-response bias was not evidenced as the tests did not reveal significant differences between the groups in variables such as number of employees and volume of sales.

4.3. Measures

The measurement of the different constructs relied on owner-managers' self-perceptions, which is commonly accepted in strategic and environmental management research (Aragón-Correa et al., 2008; Cantele and Zardini, 2018; Leonidou et al., 2017). Perceptual measures are considered to fulfil reliability and validity requirements and are particularly useful when applied to the SME setting as respondents are often reluctant to provide hard data related to organisational performance (Sapienza et al., 1988). The questionnaire was based on five-point Likert scales (Hinkin, 1995). Most of the items were derived and adopted from previous literature (see Appendix).

Regarding environmental management practices, 12 items were used to measure the extent of firms' implementation of such practices. The items comprised aspects at managerial, product and process level, respectively. After performing an exploratory principal component analysis (EPCA), items were grouped into three factors labelled as 'Management-related', 'Process-related', and 'Product-related' environmental management practices.

The measurement of organisational capabilities for environmental communication comprised six items. Due to the relative scarcity of scales and items in the literature regarding this construct, the majority of the items were formulated after a round of interviews during the questionnaire development stage. All six items formed a single construct after performing the EPCA.

Two groups of items measured competitive advantage relative to the firm's competitors: competitive advantage in terms of lower costs (three items), and competitive advantage in terms of reputation (three items). The items of lower costs formed one factor and items of reputation formed another factor after performing the EPCA.

Finally, firm size was measured as the natural logarithm of the number of employees, a common measure used in business literature to reduce skewness in the distribution (Becker et al., 2019).

5. Results

5.1. Selected modelling approach

Partial Least Squares-Structural Equation Modelling (PLS-SEM) approach was employed to analyse the data and test the research hypotheses using the SmartPLS software (Ringle et al., 2005). For this study, PLS-SEM is more suitable than covariance-based SEM because (i) it is robust, especially when sample sizes are small relative to the number and complexity of constructs, such as higher-order latent constructs; (ii) it allows for the joint use of formative and reflective constructs in the same model; and (iii) it is reliable as its bootstrapping-based capabilities can provide solid results despite limitations in terms of sample size (Hair et al., 2011). For this study, the modelling strategy follows Hair et al.'s recommendations (2014; 2011) for evaluating both measurement and structural models.

5.2. Measurement model

In the measurement model, environmental management practices were analysed as a hierarchical (second-order) latent variable model (Lohmöller, 1989), based on a two-stage approach (Wilson, 2010). In the first stage, a measurement model is estimated only for the environmental management practices second-order latent variable by using the repeated indicators approach (Lohmöller, 1989) as Fig. 2 illustrates.

During this stage, the second-order latent variable is specified with all the indicators of all the three first-order latent variables, which in turn are specified with their respective indicators (see Fig. 2). Furthermore, the construct is specified as a reflective-formative type of latent variable (Hair et al., 2014). Results of this first measurement model are shown in Table 1.

According to the assessment criteria, consistent results of this first measurement model were found. *Internal consistency reliability* was met since all the three first-order latent variables had composite reliability values greater than 0.7 (Bagozzi and Yi, 1988). All the indicator loadings were statistically significant and higher than 0.7, which accounts for *indicator reliability*. The three first-order latent variables showed *convergent validity* because all values of average variance extracted (AVE) were above the threshold level of 0.5 (Fornell and Larcker, 1981). Finally, *discriminant validity* was evidenced because the squared root of the respective AVE for each pair of latent variables were always larger than their shared correlation (Fornell and Larcker, 1981).

In the second stage, the second-order latent variable is re-specified, using the calculated latent variable scores as observed indicators. A second measurement model is then estimated, including the second-order latent variable and the other first-order latent variables corresponding to organisational capabilities for environmental communication and the two forms of competitive advantage (see Table 2).

Results of this second measurement model also met the assessment criteria of internal consistency reliability, indicator reliability,

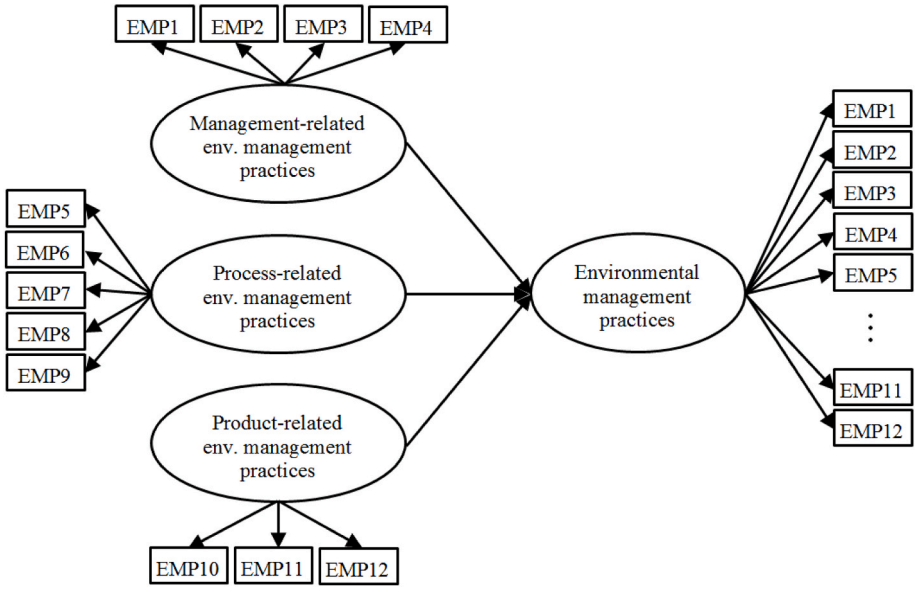

Fig. 2. Conceptual representation of the repeated indicators approach in PLS to specify environmental management practices.

Table 1
Results of the first stage in the measurement model.

Constructs	Scale items	Standardised loadings	t-value	Cronbach alpha	CR	AVE
Management-related environmental management practices	EMP1	0.949	72.065	0.932	0.952	0.832
	EMP2	0.919	40.345			
	EMP3	0.930	36.208			
	EMP4	0.847	23.323			
Process-related environmental management practices	EMP5	0.881	32.812	0.902	0.927	0.719
	EMP6	0.822	22.204			
	EMP7	0.825	19.831			
	EMP8	0.856	30.120			
	EMP9	0.854	28.030			
Product-related environmental management practices	EMP10	0.886	31.976	0.833	0.900	0.750
	EMP11	0.897	27.890			
	EMP12	0.812	14.565			

Notes: CR=Composite reliability; AVE = Average Variance Extracted. Acronyms for scale items used in this table are listed in the Appendix.

Table 2
Results of the second stage in the measurement model.

Constructs	Scale Items/Indicator of first-order latent variables	Standardised loadings	t-value	Weights	t-value	Chronbach alpha	CR	AVE
Environmental management practices	MGEMP	0.926	19.906	0.600	4.581	N/A	N/A	N/A
	PCEMP	0.824	12.356	0.362	2.583			
	PDEMP	0.749	8.192	0.195	1.371			
Org. capabilities for environmental communication	ENC1	0.908	50.634	0.245	15.487	0.903	0.928	0.723
	ENC2	0.889	31.683	0.245	14.537			
	ENC3	0.845	22.803	0.238	14.063			
	ENC4	0.853	25.351	0.241	14.236			
	ENC5	0.747	12.172	0.205	7.213			
Competitive advantage: Lower costs	CAC1	0.927	43.069	0.401	17.560	0.891	0.931	0.818
	CAC2	0.917	49.043	0.375	16.347			
	CAC3	0.869	25.721	0.328	12.082			
Competitive advantage: Reputation	CAR1	0.937	46.957	0.341	22.904	0.928	0.954	0.874
	CAR2	0.939	57.991	0.340	16.600			
	CAR3	0.929	48.556	0.389	14.428			
Firm Size	SIZE	1.000	N/A	1.000	N/A	1.000	1.000	1.000

Notes: CR=Composite reliability; AVE = Average Variance Extracted; MGEMP = Management-related environmental management practices; PCEMP = Process-related environmental management practices; PDEMP = Product-related environmental management practices. Acronyms for scale items used in this table are listed in the Appendix. MGEMP, PCEMP, and PDEMP are the latent variable scores calculated during the first stage of the measurement model.

convergent validity and discriminant validity (see Tables 2 and 3).

Absence of multicollinearity was checked by examining the variance inflation factor (VIF) values, which ranged from 1.70 to 1.76, and therefore, below the threshold value of 5 (Hair et al., 2014). As for the weights of the indicators, Table 2 shows that only the indicator corresponding to product-related environmental management practices was not statistically significant. However, following the requirements of Hair et al. (2014), it was not necessary to discard such an indicator because the corresponding loading is larger than 0.50 and statistically significant.

Table 3
Correlation matrix.

Constructs/variables	1.	2.	3.	4.	5.
1. Firm size	**1000**				
2. Environmental management practices	0.480*	**N/A**			
3. Org. capabilities for environmental communication	0.367*	0.668*	**0.850**		
4. Competitive advantage: Lower costs	0.400*	0.616*	0.552*	**0.904**	
5. Competitive advantage: Reputation	0.311*	0.621*	0.604*	0.722*	**0.935**

Notes: Diagonal elements in bold face are the square root of the construct's average variance extracted (AVE); N/A = Not applicable.
* $p < 0.01$.

5.3. Structural model

5.3.1. Assessment of the structural model and hypothesised paths

To test the significance of the hypothesised paths, a structural model following a bootstrapping procedure of 5000 sub-samples was run with 112 cases, which corresponds to the final sample size of the study (Hair et al., 2011). Table 4 shows the results of the structural model.

The statistically significant parameter predicting that environmental management practices contribute to the development of organisational capabilities for environmental communication supports Hypothesis 1. A positive and statistically significant parameter estimate for the path between organisational capabilities for environmental communication and competitive advantage in lower costs provides support for Hypothesis 2a. Finally, Hypothesis 2b is supported given the positive and statistically significant parameter regarding the relationship between organisational capabilities for environmental communication and competitive advantage in reputation.

The influence of firm size as control variable was tested for the dependent variables in the structural model. That influence was positive and statistically significant only on competitive advantage in terms of lower costs.

The variances explained for organisational capabilities for environmental communication and competitive advantage in both lower costs and reputation were considerable (i.e., R^2 values larger than 0.3). In addition, values of Q^2 greater than zero were found for organisational capabilities for environmental communication and for competitive advantage in both lower costs and reputation, respectively. Hence, the structural model has adequate predictive relevance. (Chin, 1998; Hair

Table 4
Results of the structural model: PLS path coefficients.

Effects	Path coefficient	t-value (bootstrap)	Percentile bootstrap 90% confidence interval		Result
			Lower	Upper	
Hypothesised effects					
H1: Environmental management practices → Org. capabilities for environmental communication	0.668**	10.951	0.568	0.769	**Supported**
H2a: Org. capabilities for environmental communication → Competitive advantage: Lower costs	0.468**	7.022	0.358	0.578	**Supported**
H2b: Org. capabilities for environmental communication → Competitive advantage: Reputation	0.567**	9.034	0.464	0.670	**Supported**
Control effects					
Firm size → Competitive advantage: Lower costs	0.228*	2.982	0.102	0.353	**Supported**
Firm size → Competitive advantage: Reputation	0.103	1.316	−0.026	0.231	Not supported
R^2 for competitive advantage: Lower costs					0.349
R^2 for competitive advantage: Reputation					0.374
R^2 for org. capabilities for environmental communication					0.447
Q^2 for competitive advantage: Lower costs					0.264
Q^2 for competitive advantage: Reputation					0.301
Q^2 for org. capabilities for environmental communication					0.297

*p < 0.01; **p < 0.001.
Notes: R^2 = Percentage of variance explained of endogenous latent variables; Q^2 = Predictive relevance of endogenous latent variables.

et al., 2011).

5.3.2. Assessment of mediating effects

A subsequent analysis assessed the intensity and statistical significance of organisational capabilities for environmental communication as a mediator in the structural model. Mediation is assessed by examining the comparison between direct and total effects and the effect sizes (Hair et al., 2011).

According to Table 5, both direct and total effects of environmental management practices on competitive advantage in lower costs and reputation, respectively are statistically significant. Hence,

Table 5
Assessment of mediating effects.

Effects	Path coefficient	t-value (bootstrap)	Percentile bootstrap 90% confidence interval	
			Lower	Upper
Direct effects				
Environmental management practices → Competitive advantage: Lower costs	0.523**	5.083	0.354	0.692
Environmental management practices → Competitive advantage: Reputation	0.436**	4.548	0.279	0.595
Indirect effects				
Environmental management practices → Competitive advantage: Lower costs	0.121*	1.996	0.021	0.123
Environmental management practices → Competitive advantage: Reputation	0.214**	3.878	0.220	0.304
Total effects				
Environmental management practices → Competitive advantage: Lower costs	0.644**	8.647	0.521	0.766
Environmental management practices → Competitive advantage: Reputation	0.650**	9.161	0.534	0.767

*p < 0.05; **p < 0.001.

organisational capabilities for environmental communication are considered a partial mediator (Baron and Kenny, 1986; MacKinnon, 2008).

Subsequently, statistical significance of the mediating effects was tested by analysing the indirect effects of environmental management practices on lower costs and reputation competitive advantage, respectively. The test was carried out by following the bootstrapping approach. Indirect effects were statistically significant for the two forms of competitive advantage (see Table 5). Hence, the mediating effects of organisational capabilities for environmental communication were statistically significant.

Finally, the assessment of effect sizes for variance explained (f^2) and predictive relevance (q^2) shown in Table 6 indicates that effect sizes for environmental management practices were regarded as medium (i.e., between 0.15 and 0.35; (Chin, 1998; Hair et al., 2014).

The majority of effect sizes for organisational capabilities for environmental communication were small (i.e., between 0.02 and 0.15). Interestingly, results showed that the mediation of organisational capabilities for environmental communication led to improvements in both variance explained and predictive relevance for competitive advantage in reputation larger than the respective improvements for competitive advantage in lower costs.

6. Discussion

This study addresses the discussion about the strategic significance of

Table 6
Effect sizes for explained variance and predictive relevance.

Latent variable/construct	Competitive advantage: Lower cost		Competitive advantage: Reputation	
	f^2	q^2	f^2	q^2
Environmental management practices	0.272	0.168	0.180	0.114
Org. capabilities for environmental communication	0.039	0.027	0.119	0.086

Notes: f^2 = Effect size on variance explained; q^2 = Effect size on predictive relevance.

environmental management practices in SMEs. The analysis shows that if firms implement arrangements of environmental management practices, they can indeed boost competitive advantage by developing organisational capabilities for environmental communication.

In the sampled SMEs, environmental management practices comprise management-related (e.g., adoption of environmental management systems, environmental audits, etc.), process-related (e.g., substitution of process inputs, changes in processes and procedures, etc.), and product-related practices (e.g., product design towards reduction of resource consumption and waste generation, see Table 1 and Fig. 2). The additional constructs of the research model were validated by establishing the measurement model (see Table 2). The results evidence that the implementation of environmental management practices are associated to the development of organisational capabilities for environmental communication (see the result of Hypothesis 1 in Table 4). This is in line with literature that argues for the consistency between messages and actions regarding responses to environmental concerns (Du et al., 2010; Testa et al., 2018; Reyes-Rodríguez and Ulhøi, 2021).

Further, the results show that the development of unique and valuable organisational capabilities for environmental communication lead SMEs to outperform competitors in terms of lowered costs and higher reputation (see results of hypotheses 2a and 2b in Table 4). This confirms the evidence from previous studies on the possibility of SMEs saving substantial costs as well as obtaining an enhanced corporate image and leadership in their markets when engaging with environmental preservation and developing organisational capabilities (Cantele and Zardini, 2018; Jorge et al., 2015; Leonidou et al., 2017).

The findings stress the importance of organisational capabilities for environmental communication in making visible environmental management practices to the scrutiny of external stakeholders as a precondition to pursue the noted competitive benefits (Aerts and Cormier, 2009; Testa et al., 2018; Reyes-Rodríguez and Ulhøi, 2021). These organisational capabilities are competitively valuable as they are complex, causally ambiguous (Barney, 1991; Dierickx and Cool, 1989), and imply the allocation of valuable resources such as knowledge as well as communication capacities and skills (Jablin and Sias, 2001). This constitutes a contribution to literature on the applicability of the RBV in SMEs, particularly, by emphasising the instrumental role of organisational capabilities as an organisational attribute that mediates the relationship between environmental management practices and competitive advantage (see Tables 5 and 6). It can be alternatively said that environmental management practices can boost competitive advantage in SMEs through, or because of, the development of organisational capabilities for environmental communication.

Moreover, the positive influence of organisational capabilities for environmental communication on competitive advantage sheds light on the relevance of environmental communication in SMEs as they have similar obligations to stakeholders than larger counterparts (Dias et al., 2019; Nielsen and Thomsen, 2009). Findings highlight the strategic use of this particular form of communication by organisations to meet their mission and goals (Heide et al., 2018) in terms of achievement of competitive advantage. Furthermore, when considering organisational capabilities for environmental communication together with environmental management practices, it can be argued that they empirically support a more integrative view of organisational communication. That is, the alignment of organisations' behaviours, symbols, and messages with the aim to appear consistent and coherent across different audiences (Christensen and Cornelissen, 2011).

With respect to the effect of firm size, findings showed that larger businesses in the sampled SMEs are able to perceive greater reductions in their costs compared to their smaller counterparts. This suggests that larger SMEs may be able to reap economies of scale benefits due to resource availability (Brammer et al., 2012). Nevertheless, the achievement of competitive advantage in reputation seems to be robust regardless of firm size. In this respect, some further analyses were carried out by comparing means of the main constructs of the study across the groups of micro, small and medium-sized firms. In general, statistically significant differences were evidenced, where micro-firms obtained the lowest scores whereas medium-sized firms obtained the highest scores. As for the case of competitive advantage in differentiation, pair comparisons with Bonferroni tests revealed that there were significant differences between micro firms and the other two groups but no significant differences in reputation between small and medium-sized firms. This can be explained by the overall low societal visibility that commonly characterises smaller firms (Brammer et al., 2012) which makes them to be considered as a particular community of businesses (Allet, 2017).

Some limitations in the study should be mentioned. The study has focused only on the environmental dimension of sustainability in SMEs. Sustainability in businesses must address not only the environmental, but also the social and economic dimensions. Further research should explore the role of organisational capabilities for communication regarding responses to social and economic issues jointly. The intended control for industrial sector and geographical location limits the potential to draw broad inferences. Thus, it is necessary to replicate the study to SMEs in other sectors and geographical settings to verify the external validity of the relationships. Moreover, the cross-sectional design of this study did not allow the analysis of dynamic effects on organisational capabilities for environmental communication and competitive advantage. Longitudinal analyses would be fruitful for exploring the shaping of such organisational capabilities over time. Finally, the percentages of variance explained of both forms of competitive advantage accounted for the mediation of organisational capabilities for environmental communication (less than 40 percent, see Table 4) calls for further research. Approaching further mediating organisational capabilities and/or processes can be helpful in elaborating on the differences in competitive aspects in the SME setting, which can also cover further dimensions besides lower cost and reputation. This would certainly confer more sophistication to the research model. However, the small sample size imposed a limitation in this regard despite the PLS-SEM approach is appropriate to deal with this issue.

7. Conclusions

The aim of this study was to deepen understanding the relationship between environmental management practices and competitive advantage in the context of SMEs by approaching organisational capabilities for environmental communication as a mediator attribute. Previous literature has mainly studied the direct effects of environmental management on competitive advantage. The analysis has contributed to the growing research on SMEs by arguing for an indirect influence of environmental management practices on competitive advantage, where organisational capabilities for environmental communication mediate the relationship. Support for the strategic relevance of SMEs' responses to environmental concerns allows us to evidence that the RBV can be considered as a theoretical framework to approach relevant resources and capabilities associated with environmental management in that setting. Thus, the study contributes to literature on the RBV in SMEs.

On the other hand, the study contributes to the field of business communication by providing evidence on environmental communication in SMEs understood as a form of organisational capabilities that help to make visible environmental efforts and pave the way to the achievement of competitive benefits. Through organisational capabilities for environmental communication, SMEs are able to engage in an active dialogue with stakeholders and outperform competitors through the reduction of expenses and the improvement of their reputation.

It must be noted that SMEs' managers should frame environmental management practices in an overall strategy towards corporate sustainability that comprises making visible those practices to stakeholders. It is important to bear in mind that such an overall strategy requires first the rethinking of products, processes, and managerial aspects to

successfully implement environmental management practices in these fronts. Then, once such practices are in place, SME's are able to engage with the communication of their environmental commitment to inform the market and stakeholders by developing organisational capabilities for environmental communication. In this sense, SMEs must strive for a dialogue with stakeholders based on concrete, factual and verifiable information in the delivered messages and in line with their ongoing environmental management practices. At the same time, SMEs should take advantage of what qualities characterise them (e.g., simplicity, informality, etc.) to explore rich and effective communicative mechanisms.

Finally, regulators and governments should provide incentives and conditions to the SME setting in their territories to engage with the introduction of environmental management practices so that they can perceive their strategic value, and also highlight the importance of communicate their actions and results of their efforts to their stakeholders as long as they "walk the talk" by maintaining a coherence between discourse and action.

CRediT authorship contribution statement

Juan Felipe Reyes-Rodríguez: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - original draft, Writing - review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix

Table A1
Operationalisation of constructs

Construct	Order	Item code	Item description	Sources
Environmental management practices (*1 = 'we have not implemented anything regarding this practice at all'; 5 = 'we have fully implemented this practice and it is a regular routine'*)	Second-order		Compound of three dimensions and twelve indicators	
Management-related environmental management practices	First-order	EMP1	Audit system to check accomplishment of environmental goals	Aragón-Correa (1998); González-Benito and González-Benito (2005)
		EMP2	Assignation of responsibilities to carry out environmental plans	
		EMP3	Audit system to ensure continuous improvement regarding less environmental impacts	
		EMP4	The use of Environmental Management Systems (e.g. ISO 14001, EMAS, etc.)	
Process-related environmental management practices	First-order	EMP5	Substitution of harmful substances by environmentally friendly ones (e.g. cleaning and washing agents, dampening solution additives, inks, etc.)	Sharma and Vredenburg (1998); González-Benito and González-Benito (2005)
		EMP6	Substitution of products containing volatile organic solvents by products with less volatile substances	
		EMP7	Process modifications to reduce consumption of raw materials	
		EMP8	Process modifications to reduce waste/emissions (e.g. paper, excess ink when changing from one colour to another, etc.)	
		EMP9	Changes in working procedures to reduce energy and material consumption (e.g. maintenance, printer calibration, etc.)	
Product-related environmental management practices	First-order	EMP10	Product designs focused on reducing resource consumption and waste generation in product usage	González-Benito and González-Benito (2005)
		EMP11	Product designs focused on reducing resource consumption and waste generation during production and distribution	
		EMP12	Selection of cleaner transportation methods	
Org. capabilities for environmental communication (*1 = 'completely disagree'; 5 = 'completely agree'*)	First-order	ENC1	Our firm has developed mechanisms to educate/create awareness among customers about critical environmental issues (e.g., climate change, etc.)	Own elaboration after prior interviews; ENC3 adapted from Wong et al. (2014)
		ENC2	Our firm uses other electronic means (e.g. Information Systems) to share concrete environmental information of products/processes with customers	
		ENC3	Our firm regularly updates our website with concrete information related to environmental protection (e.g. news about new initiatives, projects, etc.)	
		ENC4		

(*continued on next page*)

Table A1 (*continued*)

Construct	Order	Item code	Item description	Sources
			Our firm uses mechanisms such as public presentations, workshops, seminars, press releases, etc., to communicate our environmental efforts to the public	
		ENC5	Our firm gives advice to our customers on alternatives to make conscious choices of products based on environmental arguments (e.g. paper/ink types, acquisition of CO_2 credits, etc.)	
Competitive advantage: Lower costs (*1 = 'completely disagree'; 5 = 'completely agree'*)	First-order	CAC1	Relative to our competitors, environmental management in our firm helps to have lower costs of compliance with environmental regulations (e.g. decreased fee of waste treatment/discharge, etc.)	Sharma and Vredenburg (1998); Christmann (2000); González-Benito and González-Benito (2005)
		CAC2	Relative to our competitors, environmental management in our firm helps to increase process/production efficiency (e.g. better use of printers, etc.)	
		CAC3	Relative to our competitors, environmental management in our firm helps to have lower operational costs (e.g. production, distribution, etc.)	
Competitive advantage: Reputation (*1 = 'completely disagree'; 5 = 'completely agree'*)	First-order	CAR1	Relative to our competitors, environmental management in our firm helps to achieve an overall better corporate reputation/image	Sharma and Vredenburg (1998); Delmas et al. (2011)
		CAR2	Relative to our competitors, environmental management in our firm helps to improve loyalty of existing customers	
		CAR3	Relative to our competitors, environmental management in our firm helps to establish better relationships with stakeholders (e.g. local communities, regulators, environmental groups, etc.)	

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