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The dual customer environmental and corporate reputation pressures on environmental management systems: the performance implications of manufacturing exports

Abstract

Purpose: This study explores the joint effects of customer environmental and corporate reputation pressures on environmental management systems (EMS), especially among export manufacturers.

Design: This study collected empirical data from 437 manufacturers in different regions to explore different emphases among export and domestic manufacturers in handling customer environmental pressures and performance implications.

Findings: Although the environmental corporate pressures might initially enhance firms' environmental compliance and reputation, they can also absorb customer green pressures and support EMS and sustainable performance. As firms engage more towards exports, both customer environmental and corporate pressures intensify that leading to stronger EMS implementation as well as sustainable performances, mainly in environmental measures.

Implications: The findings imply that export manufacturing contexts can be a useful asset for sustainable development.

Originality/value: The study offers an alternative approach in understanding customer environmental pressures to accommodate resources for sustainable development.

Keywords: Environmental compliance, Environmental management, Green supply chain

1. Introduction

Global buyers and customers such as Apple, Nike, Unilever, and Walmart are the supply chain leaders who take the lead in controlling their impact on the environment to ensure sustainable businesses. Nike has relied inter-organizational collaboration mechanisms in ensuring supplier compliance with a number of its indices, such as Considered Index, Manufacturing Sustainability Index and Sourcing index to enhance the environmental performance of their contracted product manufacturers (Angeles, 2014; Rani & Saha, 2021). Walmart engages Project Gigaton aims to collaborate with suppliers to avoid the emissions of one billion metric tons of greenhouse gas throughout their value chain (J. Wong, 2021). Customer environmental pressures (CEP) can be described as increasing demands on environmental compliances from buyers. From manufacturing firms' point of view, those high customers' environmental requirements create significant pressures on environmental management processes as well as ability to demonstrate the environmental outputs. In the lens of the institutional theory (DiMaggio & Powell, 1983), customer environmental pressures includes these three major categories: coercive, normative, and mimetic pressures. Literature have shown the coercive nature from customers' expectation of a firm's EMS adoption (Hoejmose, Grosvold, & Millington, 2014; Yang, Wang, Gu, & Xie, 2021). Many manufacturing firms have to adopt environmental practices under such normative pressures to gain direct investment from supply chain partners (Liu, Ke, Wei, Gu, & Chen, 2010; Zhu & Sarkis, 2007). Sharing best practices via environmental improvement workshops and training could represent mimic nature of such green collaborations (Mishra, Singh, & Rana, 2022; Van Hoof & Thiell, 2014).

With globalization and wider export networks, these global supply chain leaders offer an opportunity as well as pressure onto their suppliers to take coordinated action against the sustainability risks associated with increasing customers' environmental demands for more sustainable products. Exports to European nations would require manufacturers to commit to Eco-Management and Audit Scheme (EMAS) (Daddi, Testa, Frey, & Iraldo, 2016a; Morrow & Rondinelli, 2002). Furthermore, extended producer responsibility should be applied to most electronic products when exporting to European nations (Gu, Wu, Xu, Mu, & Zuo, 2016). These buyers continually ask the manufacturers to apply and monitor daily activities using environmental management systems (EMS), and to certify with international standards such as the ISO14000 series. EMSs provide a set of management processes that aim to help firms to identify, measure, and control the environmental impacts of firms (Giorgos

Papagiannakis, 2019). Research often debate on whether the adoptions on volunteer basis and where the motivation or pressures come from (Daddi et al., 2016a).

Since these processes can be adopted on a volunteer basis, many companies engage an EMS to respond to institutional regulations from governmental agencies, environmental laws in the local markets. In practices, firm's reputation, image, and legitimacy are the key organizational factors. For most of public or large corporations, the environmental management systems and associated outputs can be scrutinized by public judgements, mainly from external stakeholders. Therefore, some degrees of pressures to gain “corporate reputation” or “corporate image” might exist to signal to these stakeholders on their environmental commitments. The environmental corporate reputation pressures (CRP) exist when firms pay high attention to enhance their corporate image and meet regulatory compliance for their environmental practices. The main components of CRP include green corporate image and corporate environmental legitimacy (Martín-de Castro, Amores-Salvadó, Navas-López, & Balarezo-Núñez, 2019). However, this concept is largely understudied, or limited within conceptual and theoretical framework (Martín-de Castro, Amores-Salvadó, Navas-López, & Balarezo-Nuñez, 2017; Martín-de Castro et al., 2019) especially in regards to reputational outputs (Kumar, 2018). Research in this area have extensively examined a direct impact of environmental corporate reputation pressure and their environmental strategies and performance (Baah, Jin, & Tang, 2020; Gallego-Alvarez, Ortas, Vicente-Villardón, & Alvarez Etxeberria, 2017) or consumer purchase intention (Qasim, Siam, & Sallaeh, 2017). Besides, research also have mixed debates on identifying where the initial motivations to adopt EMS and environmental strategies come from (Daddi et al., 2016a).

Therefore, this study empirically examines the joint effects between corporate reputation pressures with customer environmental pressures, which could help to elaborate some of these mixed debates. This study argues that these two aspects together can nudge manufacturers to better manage their EMS systems. Furthermore, this study moves the discussions to how to be green under such pressures? How can manufacturers handle and convert these pressures in supporting the EMS processes? Have the export manufacturers faced more challenges compared to the domestic firms? Given the pressures from buyers, which business contexts may support better the environmental management systems implementation?

This study enhances some of the previous empirical work calling for more empirical studies on the customer side of the supply chain since it reflects today's fast-changing consumer preferences toward

more sustainable products and services (Gualandris & Kalchschmidt, 2014; Zimmerling, Purdik, & Welp, 2017). It is even more important to the export manufacturers to identify potential pressures to meet the global consumer needs. Global trade and a sustainable approach to meeting environmental and safety standards can be the key to export growth (Davis, Kaplinsky, & Morris, 2018; Kaplinsky, 2010). For domestic manufacturers, it is important to know which approach can enhance green capability and which lessons can be learned from supply chain partners. A better understanding of these pressures and EMS in the export contexts would help manufacturing managers in stretching appropriate resources to meet the increasingly global sustainable standards. These results might be useful for government agencies in regulated environmental and sustainable policies for export-oriented industries as well as local manufacturing conditions.

The paper is organized as follows. The first section examines a conceptual framework based on literature reviews of customer environmental and corporate reputation pressure. The second section provides a research methodology and research hypotheses. The third section discusses the study design and empirical findings. The last section discusses the results in light of current literature, managerial contributions and limitations.

2. Conceptual framework and literature review

The next sections define Customer environmental pressures (CEP) and examine their relationship with EMS in the enhancement of both business and environmental performance. The research model developed in the next section provides environmental corporate reputation pressures (CRP) and examines its influence on the relationship among export and domestic manufacturers.

2.1 Customer environmental pressures (CEP) and Environmental management system (EMS)

EMS systems include different management processes to identify, control and reduce the negative environmental impact of their operations (Daddi et al., 2016a; Pagell, Wiengarten, & Fynes, 2013). This system provides a systematic approach to setting environmental targets, how to achieve these environmental goals and to demonstrate that environmental targets have been met (Giorgos Papagiannakis, 2019; Wiengarten, Pagell, & Fynes, 2013). EMSs also provides a set of environmental policy notes, environmental protocols for educating and training employees, and monitoring the environmental impact of operations (Ann, Zailani, & Abd Wahid, 2006; Giorgos Papagiannakis, 2019).

EMSs enhance firms' corporate reputation through the perception of being environmentally friendly (Daddi et al., 2016a). EMSs can lead to better supply chain relationships with customers, suppliers, communities and other stakeholders (Morrow & Rondinelli, 2002) The next sections discuss the relationship between customer environmental pressures and EMS processes.

Customer environmental pressures (CEP) have been described as the increasing demands on environmental compliances from buyers, such as environmental vendor certification (Holguín-Veras, Campbell, Kalahasthi, & Wang, 2017; Lee, 2019; Wiengarten, Onofrei, Humphreys, & Fynes, 2018), customer environmental direct investment (Caniëls, Gehrsitz, & Semeijn, 2013; Pagell et al., 2013; Yalabik & Fairchild, 2011) and customer environmental collaborative activities (Caniëls et al., 2013; Carballo-Penela, Mateo-Mantecón, Alvarez, & Castromán-Diz, 2018; Melander, 2017). From manufacturing firms' point of view, those high customers' environmental requirements create significant pressures on environmental management processes as well as ability to demonstrate the environmental outputs. In the lens of the institutional theory, three major categories exist: coercive, normative, and mimetic pressures (DiMaggio & Powell, 1983). In the relation to customer environmental pressures, literature have shown the coercive nature from customers' expectation of a firm's EMS adoption (Hoejmose, Grosvold, et al., 2014; Yang et al., 2021). To gain direct investment from supply chain partners, many manufacturing firms have to adopt under such normative pressures (Liu et al., 2010; Zhu & Sarkis, 2007).

This study adopted a theoretical framework, which combines the institutional theory and the knowledge-based view. According to the institutional view, firms absorb external pressures and convert these formal and informal pressures into organizational rules within their firms. While governmental regulations represent formal, coercive pressures, customer environmental requirements reflecting represent informal institutional pressures that can be delivered mainly through normative and coercive isomorphism (DiMaggio & Powell, 1983). Customers can coerce a manufacturer to conform to environmental standards that are operated by their networks. In some multi-national corporations, normative pressures exist to highlight the alignment with institutional regulations and local government environmental guidelines. Literature refers to environmental knowledge development and environmental collaboration in environmental supply chain management (Hongyi Sun, 2018; Pham & Pham, 2021). In the view of knowledge-based theory (KBV), customer environmental knowledge can be transferred and accumulated throughout supply chain learning, joint green collaboration and supply chain integration. This study examines, in supply chain contexts, the relationship between customer environmental pressures and EMS processes.

Research indicated three major customer's involvements in environmental activities. Customers use and expect environmental vendor certification to be used in suppliers manufacturing sites (Riillo, 2017; Vachon, 2007); customer's direct investment into cleaner production (Ağan, Kuzey, Acar, & Açıkgöz, 2016; Gualandris & Kalchschmidt, 2014; Laari, Töyli, Solakivi, & Ojala, 2016) and environmental collaborative activities (Agyemang, Zhu, Adzanyo, Antarciuc, & Zhao, 2018; Xu, Boh, Luo, & Zheng, 2018). All of these customer expectations and requirements create both normative and coercive pressures leading to a higher level of EMS adoption.

Customers of an organisation often use environmental vendor certification to certify environmental performance (from the buyer perspective) or provide certainty that they implement environmental vendor certification programs with other suppliers. Green certifications from the third party such as the International Standard Organization ISO14001 help firms to improve their image by demonstrating environmental commitment and legitimating organisational activities to different stakeholders (Martín-de Castro et al., 2017). Manufacturers increase the use of ISO 14001 certification to qualify their EMS processes in response to these normative pressures from stakeholders such as customers and regulatory agencies (Curkovic & Sroufe, 2011; Martín-de Castro et al., 2017; Wiengarten et al., 2013). When customers require manufacturers to obtain ISO 14001 certification, this indicates integrating environmental concerns into a firm's subsequent organization's environmental priorities. This process creates several collaborative activities that enhance environmental knowledge within manufacturing firms.

Customer environmental collaboration takes the form of joint planning and decision making on environmental issues thus leading to the solid development of the firm's internal EMS processes. The KBV implies that knowledge can be accumulated from joining activities with customers on environmental workshops, training, consultancy and environmental certifications processes. These joint workshops on green vendor certification can help manufacturers accumulate collaborative knowledge learned from external partners (Carballo-Penela, Mateo-Mantecón, Alvarez, & Castromán-Diz, 2018; Laari et al., 2016; Melander, 2017, 2018). These forms of collaboration can mimic or standardize processes of the selection of cleaner and preventive technologies (Kong, Feng, & Ye, 2016; Sartal, Llach, Vázquez, & de Castro, 2017), to the more systematic approach in controlling environmental impact. Also, customer environmental collaboration is directly associated with a proactive environmental practice (Vachon, 2007), which play a critical role in EMS processes. Empirical studies in the operations and environmental areas suggest that such a practice is often

associated with positive environmental processes and performance (Aboelmaged, 2018; Sartal et al., 2017).

When customer's organizations make a direct investment into environmental activities, it fosters the relationship such as trust and commitment (Gualandris & Kalchschmidt, 2016; C. Y. Wong, Boon-itt, & Wong, 2011), and increases bonds among supply chain partners. These activities comprise of direct participation of the customers with its manufacturers on environmental collaboration and develop environmental solutions (Carballo-Penela et al., 2018) and to the selection of cleaner and preventive technologies (Kong et al., 2016; Sartal et al., 2017). Other studies refer to environmental customer cooperation (Geng, Mansouri, & Aktas, 2017; C. Y. Wong, Wong, & Boon-itt, 2020) in strategic information sharing and to improve visibility and enable joint planning for environmental goals and processes (Yu, Chavez, Feng, & Wiengarten, 2014). These environmental collaborative activities and joint knowledge on environmental solutions can influence EMS processes through aligning product design or process modifications toward more environmentally accepted standards and approaches in reducing waste in the logistics process (Xu et al., 2018). The above discussions lead to the following hypotheses:

H1: CEP is positively related to EMS processes

2.2 The relationship between EMS and performances

An EMS is part of an organization's management system, which support the development, implementation, and monitoring of environmental policy and environmental impacts. This system includes several environmental processes related to the achievement of environmental performance (EVP) such as waste reduction, emission and other resources like water and energy (Boiral & Henri, 2012; Geng et al., 2017). Literature also argues that EMS leads to the reduction of operational costs (fewer returns, fewer craps) and improving business performance (BUP) that refers to improvement in market share, revenue and profits (enhance the image, customer acceptance). EMS processes have been used in many manufacturing firms with aims to reduce waste during their operations (Wiengarten et al., 2013; Christina W. Y. Wong, Lai, Shang, Lu, & Leung, 2012), to minimize carbon emissions (Carballo-Penela et al., 2018; Dou, Zhu, & Sarkis, 2015), reduce energy and resources. Through the EMS review and monitoring processes, manufacturers can monitor and achieve their environmental targets (Daddi et al., 2016a; Geng et al., 2017). Although the expected positive results from such EMS on environmental measures, literature still debate the true benefits from EMS processes on the bottom

line aspects such as business and financial performances (Riillo, 2017; Younis, Sundarakani, & Vel, 2016). Literature calls for more investigation on performance implications since several studies found U shape patterns of these relationships (Ester Martínez-Ros, 2019; Riillo, 2017). While most of these reported findings come from a particular industry or country-specific examinations, this study again examines the performance implications of EMS in wider global manufacturing practices. Recent studies observed high levels of international difusions of such environmental management standards and practices (Muñoz-Torres, Fernández-Izquierdo, Rivera-Lirio, Ferrero-Ferrero, & Escrig-Olmedo, 2020; To & Lee, 2014):

H2a: EMS positively influences environmental performance.

&

H2b: EMS positively influences business performance.

2.3 The mediating role of Environmental corporate pressures (CEP)

This study argues whether the firm's environmental corporate pressures could appear in an early stage of EMS adoption, absorb customer environmental pressures and indirectly facilitate the EMS processes.

The study defines the environmental corporate reputation pressures (CEP) as expectations and legitimated environmental practice to enhance environmental corporate and reputation (Ferrón-Vilchez, 2016; Quintana-García, Benavides-Chicón, & Marchante-Lara, 2020). Previous studies refer to these concepts as corporate environmental responsibility (Ganescu & Dindire, 2014) and linkage to corporate environmental performance and corporate reputation (Toms, 2002). When customers require use and expect environmental vendor certification, i.e ISO 14001 certification, to be used in suppliers in manufacturing sites, this indicates integration of environmental concerns into a firm's strategy and subsequent organization's environmental priorities (Riillo, 2017; Vachon, 2007). Truong and Pinkse (2019) investigate firms' environmental product preannouncement as a signal at an early stage in the environmental systems. Besides, customer's direct investment into cleaner production (Ağan et al., 2016; Gualandris & Kalchschmidt, 2014; Laari et al., 2016) and environmental collaborative activities (Agyemang et al., 2018; Xu et al., 2018) with suppliers (the manufacturers) create both normative and mimetic pressures leading to a higher level of exposure to the external community (Marquis, Glynn, & Davis, 2007; Neubaum, Dibrell, & Craig, 2012), thus enhance corporate environmental reputation.

Hypothesis H3a: Customer environmental pressures positively influence Environmental corporate reputation pressures

Since one of the main aims of an EMS is to control environmental impacts and to comply with a set of environmental standards, CEP can influence and enhance EMS processes through different stages. Through the diffusion of environmental innovation, this study suggests that depending on their internal organization process and organizational capability, different environmental management processes might respond to environmental pressure in diverse ways. The higher the need for communication of the environmental goals and achievement, the more systematic approach should be adopted to demonstrate the results. EMS provides effective demonstration tools for corporate to communicate to the external business environment on their commitment and achievement of the environmental goals (Johnstone & Hallberg, 2020; Martín-de Castro et al., 2017). In addition, corporate pressures can play important roles in terms of promotion of environmental conservation efforts by employees, integration of environmental considerations into selecting, prioritising the existing processes to monitor and assess the environmental impacts.

Hypothesis H3b: Environmental corporate reputation pressures positively influence EMS processes.

Initially, companies are concerned with the compliance of environmental legislations without extra costs on penalties. Gatti, Pizzetti, and Seele (2021) referred it to as communication (talk) but not action (walk) environmental washing level. However, literature found that these corporate pressures on EMS can quickly reach “early maturity”, organizations tend to react and modify their processes accordingly. For example, usages of reverse logistics could be an end of environmental cycling processes, which could send a signal and response to the stakeholder pressures; thus enhancing the corporate environmental reputation and image. Although, at this stage, environmental management might not take place fully within the existing production process, however, with top management awareness and support the actual EMS process can take place. Top management support, especially in the early stage but not during the implementation of the EMS processes (Dubey et al., 2016) can make the difference by looking for a fit between the environmental innovation and external environment can moderate the relationship. When organizations face higher corporate environmental pressures, top management environmental awareness can be increased to respond and facilitate the processes, thus EMS can take the stronger path to diffuse into the organization processes. Thus, this study hypothesizes that:

Hypothesis H3: Environmental corporate reputation pressures strengthen the positive relationship between customer environmental pressures and EMS processes

The efficacy and the motivations to adopt EMS can be seen in the light of the extent to which an organization's internal capabilities or external pressures dominate the relationship. These differences in the internal process capabilities may explain subsequent variations in environmental performance.

2.1 Export versus domestic manufacturing: customer and corporate environmental reputation pressures

Although globalization and exports have dominated trade operations, there is limited empirical evidence on the relationships between environmental pressures and environmental management in export manufacturing operations.

This study takes a comparative approach between export and domestic manufacturers based on the resource-advantage theory (Hunt, 1997). In light of this theory, manufacturing exporters might have more access to resourceful advantages than domestic firms do, such as managerial capabilities, financial and human resources. These comparative analyses can highlight the several implications for managers on how to allocate resources to meet the increasing environmental demands from customers. One of the rationales could be that most domestic firms are small and medium-sized, they often have resources to meet all environmental requirements and have less interest in going beyond regulatory compliance (Aragón-Correa, Hurtado-Torres, Sharma, & García-Morales, 2008). While the exported processes are often accommodated with several environmental standards such as green labelling to reverse logistics of electronic waste (J. Chen & Liu, 2019; Christina W.Y. Wong, Lai, Lun, & Cheng, 2015). Literature refers to these environmental pressures as extended producer responsibility, which requires the exporters to develop logistics processes in place to handle from sources to waste collection before exporting to the buyer destinations (Christina W.Y. Wong et al., 2015; Zhao, Zhang, Feng, Zhao, & Zhang, 2019). Due to limited managerial and financial resources, these domestic firms might be less proactive in management and monitoring their environmental impacts (Aragón-Correa et al., 2008; Laari et al., 2016), thus might affect performance outcomes.

These manufacturing exporters have not always taken resource advantages due to the sizes of the firms (as exporters have many small and medium-sized manufacturers). These manufacturers can

accumulate tangible resources such as direct investment in preventive technologies and intangible social capital from joint environmental workshops with customers. For example, when European importers buy electronics products from China, they need to conduct a series of mandatory workshops with the producers to ensure environmental certifications like ISO14001 and environmental management practices. Consequently, these environmental workshops and joint planning enhance more skilled and trusted relationships, which eventually facilitate the implementation of the environmental management systems and lead to better environmental and business performances. These capabilities may complement a manufacturer's decision to invest in a more comprehensive EMS since the export-oriented firms can quickly adapt and align with EMS standards (Ann et al., 2006; Prakash & Potoski, 2006).

In summary, manufacturers when exporting to other countries might face more legislation, sustainable compliance but at the same time can accumulate valuable capital from environmental collaborations, direct investment in environmental management and technological capabilities to ensure a higher performance. Thus, this study proposes:

Hypothesis H4a. Export-oriented manufacturers face higher customer environmental pressure than domestic firms do.

Hypothesis H4b. Export-oriented manufacturers face higher environmental corporate reputation pressures than domestic firms do

Hypothesis H4c. Export-oriented manufacturers develop stronger capability in environmental management systems than domestic firms do

Hypothesis H4d. Manufacturers with export-oriented capabilities gained more sustainable performances than domestic firms do.

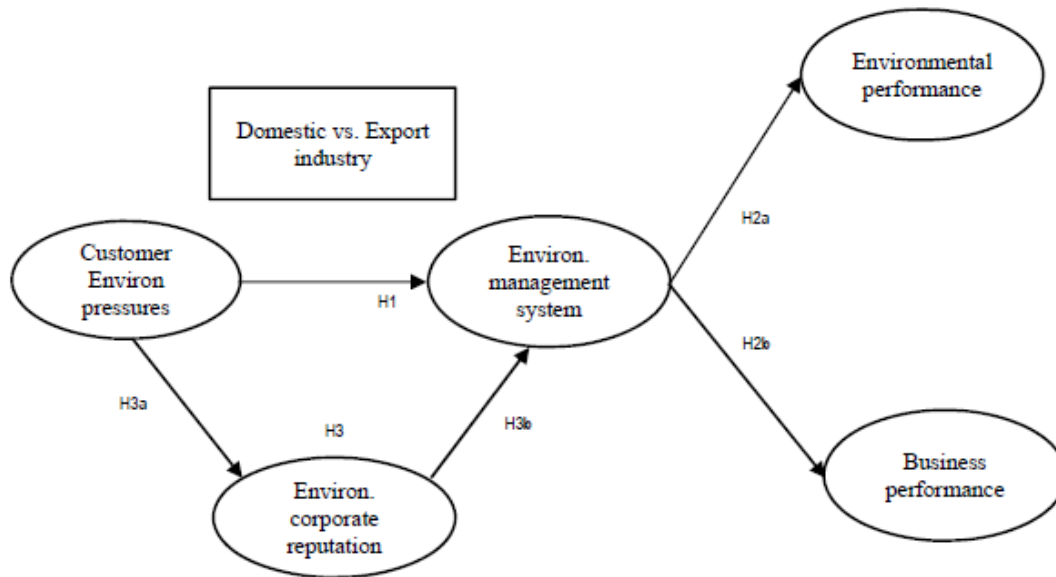


Figure 1 Research model

3. Research Methodology

This study employed a surveys questionnaire, targeting to director and manager of operations and production in manufacturing firms. The authors in this study participated in the fifth Global Manufacturing Research Group (GMRG), which consists of researchers in more than 14 countries during 2013/2014 across 21 manufacturing industry sectors (ISIC 20–39; US-ISIC 15–36) (Durach & Wiengarten, 2020). This study employed a subsample of 437 acceptable responses. These sample companies were selected due to the availability of the responses and the representation of business to business practices. The original English survey questionnaire was translated into the local language of each country using back-translation protocol to ensure consistency in the interpretation (Banville, Desrosiers, & Genet-Volet, 2000). This study focused on environmental expectations from manufacturers' buyers as businesses, not end consumers. The respondents were mid- or high-level managers, directors of operations and manufacturing functions. The subsample consists of manufacturers from in more than ten countries such as Australia, China, Croatia, Korea, Ireland, Hungary, Poland, Taiwan, the USA and Vietnam. To test whether means differences exist between the sample and the subsample, we employed Welch's t-test for the plant size and a chi-square difference test for the industry sectors. Due to unequal sample size and a non-homogeneity of variances assumption (Durach & Wiengarten, 2020), Welch's t-test supports for the null Hypothesis, which indicates no significant differences between the two samples ($p = 0.367$). The chi-square difference

test indicated no significant differences between samples ($\chi^2 = 37.021$; $p = 0.182$). The respondents can contact other functions, such as operations, production, marketing and finance for relevant information. The major approaches in data collection was mail and e-mailed surveys.

The distribution of manufacturers in terms of sectors was: finished goods including machinery, automotive, appliances and electronics, foods, garment and textile, chemical; heavy industries including metal companies, companies, and chemical and plastic manufacturers. The average firm size in terms of the number of employees was 280. The majority of the sample were small and medium-sized manufacturers (85%). Global exporters (95%) and global importers (96%) of this sample represent the typical profile of manufacturing in this global manufacturing.

3.1. Measurement development and the research model

This study conducted a thorough literature review, incorporated feedback from global researchers from GRMG. The model includes an environmental management system (EMS), which focuses on the ability to monitor and control environmental activities, processes and demonstrate the environmental targets and the performances. The concept of Customer environmental pressures (CEP) refers to the usage of vendor certification, direct environmental investment and environmental collaboration (Carballo-Penela et al., 2018; Vachon & Klassen, 2006; Yalabik & Fairchild, 2011). The construct Environmental corporate reputation pressures (CEP) refers to the emphasis on environmental activities to enhance firms' reputation and corporate image (Ferrón-Vílchez, 2016; Quintana-García et al., 2020; Toms, 2002). Environmental performance (EVP) consists of the improvements made due to EMS adoption in regards to environmental emissions, environmental waste, resources such as water, electricity in the firms. Business performance refers to the improvement of market share, revenue and profit (Choi, Wu, Ellram, & Koka, 2002; H. Nguyen & Harrison, 2018). The study used a seven-point Likert Scale, where a value of 1 indicates "to no extent" or "unimportant" and a value of 7 indicates "completely" or "very important".

The reliability and validity of the derived research constructs were assessed. The internal consistency reliability was tested with Cronbach's alphas ranging from 0.74 to 0.91, which exceeds 0.60, the recommended threshold value (Hair, Black, Babin, & Anderson, 2010). Table 1 presents the correlations between research constructs and the Cronbach's alpha, factor loadings and means of each construct. Next, the confirmatory factor analysis produced five constructs, indicating the fit acceptance of the research model with the fit indices were χ^2 /df (degree of freedom) = 1.92, Comparative Fit

Index (CFI) =0.98, Normed Fit Index (NFI) =0.96, and Root Mean Square Error of Approximation (RMSEA) =0.04, indicating that the model was acceptable (Hu & Bentler, 1999). In the CFA model, Composite reliability (CR) and average variance extracted (AVE) exceeded the recommended standard of 0.7 and 0.5 for all constructs respectively (Fornell & Larcker, 1981), providing strong support for the unidimensionality and reliability of the research constructs. Further, the AVE is greater than the maximum shared variances (MSV) for all constructs, while the square roots of the AVE are higher than any covariance, providing further evidence for the model's convergent and discriminant validity.

Table 1 Means, estimates and reliability measures

Research construct items and measurements	Estimate	Mean	SD
Customer environ. pressures ... Main customers ...			
.. use green vendor certification (GVC) to certify this plant's quality and operations	0.69	3.71	1.61
.. expect that this plant implements GVC with the plant's suppliers	0.69	3.82	1.70
... have direct investments in this plant's environmental activities	0.77	2.97	1.42
.. expect that this plant makes direct investment in suppliers' green activities	0.74	3.14	1.62
.. hold joint green improvement work sessions regularly	0.78	3.05	1.66
.. expectation of joint environmental sessions with suppliers	0.81	3.02	1.53
Environmental Management System			
We control the environmental impact of our products and processes	0.85	4.56	1.51
We implement a systematic approach to setting environmental targets	0.89	4.53	1.53
We implement a systematic approach to achieving environmental targets	0.93	4.50	1.56
We demonstrate that environmental targets have been met	0.92	4.45	1.55
Environmental performance			
Reduction of emissions at of our facilities	0.89	4.36	1.63
Reduction of waste at our facilities	0.87	4.77	1.32
Reduction of water use in our facilities	0.83	4.36	1.52
Reduction of energy use in our facilities	0.81	4.51	1.54
Business performance			
Market share	0.75	4.32	1.13
Profitability	0.86	4.18	1.34
Total sales	0.87	4.22	1.44
Environ. corporate reputation pressures...			
To improve the plant's regulatory compliance	0.83	4.37	1.55
To improve the plant's image	0.76	4.34	1.77

Note: $\chi^2 = 261.53$; $df = 136$; $\chi^2/df = 1.92$; $CFI = 0.985$; $NFI = 0.962$; $RMSEA = 0.04$; $RMSEA = \text{Root Mean Square Error of Approximation}$, $NFI = \text{Norm-fit Index}$, $CFI = \text{Comparative Fit Index}$. The scale format for each of these measures was 1=strongly disagree to 7=strongly agree. SD = Standard Deviation

This study conducted an exploratory factor analysis (EFA) with five factors where the first factor (CC) explained about 28% of the total variance of the sample data (see Appendix 1). When designing the questionnaire the research team from GMRG carefully consider the proximal separation of questions to avoid common method bias (MacKenzie & Podsakoff, 2012).

Table 2 Research construct validity and correlations

Research constructs	CR	AVE	MSV	ASV	ECP	CEP	EMS	BUV	EVP
Environ. corporate reputation pressures (CRP)	0.81	0.68	0.35	0.16	0.824				
Customer environ. pressures (CEP)	0.89	0.58	0.35	0.16	0.59**	0.759			
Environ. Management system (EMS)	0.94	0.81	0.46	0.19	0.38**	0.38**	0.899		
Business perf. (BUV)	0.87	0.69	0.01	0.01	0.053*	0.064*	0.109*	0.829	
Environ. perf. (EVP)	0.91	0.73	0.46	0.18	0.364**	0.36**	0.68**	0.059*	0.854

Note: Off diagonal components represent correlations between constructs. Diagonal components (bold) indicate the square root of the average variance extracted (AVE) between the constructs and their measures. ** Correlation is significant at 0.01 and * 0.05.

3.2. Results and the hypotheses

This study employed a structural equation model to test the relationships and hypotheses. Table 3 displays the constructs' significances and hypothesized relationships. What is prominent from the results of our model is, first of all, that customer environmental pressures have a strong effects on both EMS and environmental corporate reputation pressures. The results supported H1 and H3a. That meant CEP directly influences EMS but the same time creates more pressures for being legitimate and environmental friendly image. Next, environmental corporate reputation pressures were strongly related to EMS implementation, that is being legitimate and highly environmental compliant can also have positive and real effects in EMS implementation. The empirical results confirm that higher efforts in EMS can lead to sustainable performances, mostly in environmental benefits and to a lesser extent, business measures, such as market share and profits.

Table 3 Results of the hypothesis testing

Research impacts		Estimate	S.E.	C.R.	P	Hypotheses
Customer environ. pressures (CEP)	---> EMS	0.287	0.064	4.500	***	H1 -Accepted
Environ. Management system (EMS)	---> Environ. perf.	0.756	0.049	15.494	***	H2a -Accepted
Environ. Management system (EMS)	---> Business perf.	0.072	0.030	2.435	0.015	H2b -Accepted
Customer environ. pressures (CEP)	---> CRP	0.784	0.067	11.763	***	H3a -Accepted
Environ. corporate reputation pressures (CRP)	---> EMS	0.197	0.049	4.043	***	H3b -Accepted

Note: $\chi^2/df = 1.77$; NFI = 0.965; CFI = 0.982; RMSEA = 0.035 *** Correlation is significant at 0.001

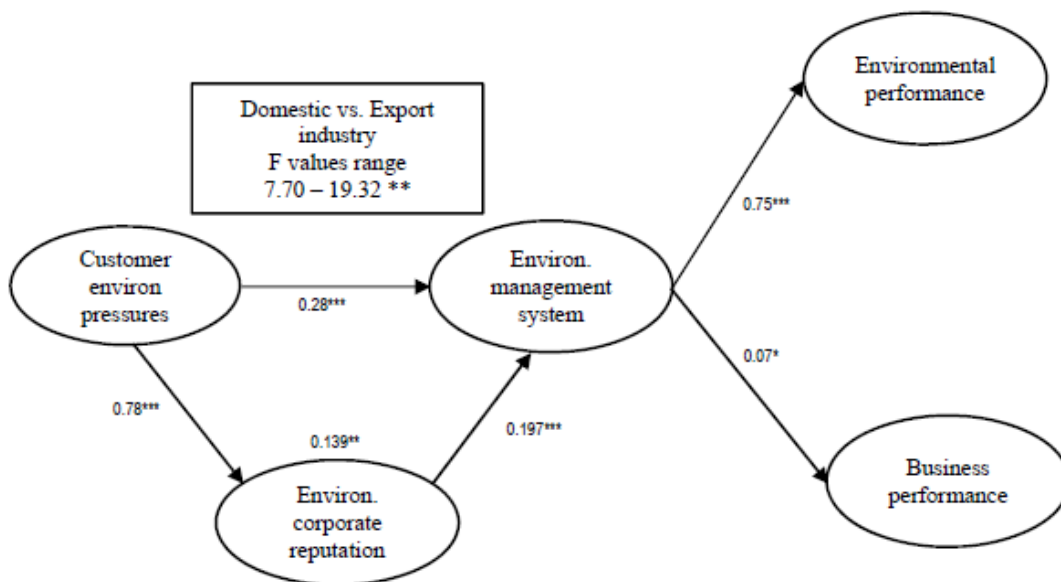


Figure 2 Research findings

3.3. Mediating roles of environmental corporate reputation pressures

In the proposed conceptual model, CEP is mediating the effects of the CEP on EMS processes. Structural equation models with bootstrapping procedures (Mallinckrodt, Abraham, Wei, & Russell, 2006) were used to test for such mediation effects. This method provides several advantages over the previous common technique proposed by (Baron & Kenny, 1986). This study employed 1,000 bootstrap samples with 95 per cent bias-corrected confidence intervals in AMOS procedures. This technique can handle the normal distribution assumption and test large and small samples sizes, which were not well addressed in the previous approach (Hayes, 2009). Table 4 indicated the outcomes, which show the direct effects with and without a mediator. The test of the indirect effects between the customer environmental pressure (CEP) → corporate reputation pressures (CRP) → EMS was significant ($\beta = 0.149$, $p = 0.002$). In addition, the direct effects between customer environmental pressure and EMS was also significant ($\beta = 0.258$, $p = 0.001$). Thus, H3 should be accepted or partially accepted. That is, higher customer environmental pressure was associated with higher environmental corporate reputation pressures, in turn, corporate reputation pressure was related with higher EMS implementation.

Table 4 Results of the mediating role of Environmental corporate reputation pressures

Mediating factor - Corp. reputation pressures	Direct with mediator	Indirect	Mediation
Customer environ. pressures (CEP) to EMS	0.258**	0.149**	Partial

Note: ** significant at 0.01

3.4. The impact of Exports

Hypothesis H4a, H4b, and H4c suggested that CEP will be stronger with different emphases of CEP and EMS, based on the degree of export volumes among manufacturers. This study explores the differences with the analysis of variance (ANOVA) procedure. ANOVA provides a pattern of practices that can distinguish the performance implications among manufacturers in these two major groups, including 25% domestic and 75% export manufacturers. The factor scores of each construct were derived from the CFA methods in the above sections. These factor scores represent composite variables, which give information about an individual's placement on the constructs with a mean of 0 (DiStefano, Zhu, & Mindrila, 2009). The value in bold indicates the highest attainments for that factor/construct. Table 5 confirms a significant difference among these groups on both customer

environmental (CEP) (Scores = 0.121 vs. -0.297, F value = 19.32, p <0.000) and environmental corporate pressures (CEP) (Scores =0.134 vs. -0.329, F value = 13.84, p <0.000). Thus, H4a and H4b were accepted is accepted. For the EMS, exporters maintained just above the average level whereas domestics attained well below average (Scores = 0.088 vs. -0.216, F value = 7.70, p <0.006). Thus H4c was also accepted. Figure 3 highlights the differences among these factors for the two groups.

For performance implications, manufacturing exporters gained significant higher improvements than domestics one in environmental measures such as waste and energy reductions (Scores = 0.069 vs. -0.170, F value = 3.87, p <0.05) but not significant on business performances (Scores = 0.003 vs. -0.007, F value = 0.02, p = 0.882). Figure 4 visualizes the significant differences for environmental performances but not business measures. Literature also found limited financial improvements from several green activities including internal green supply chain practices (Agyabeng-Mensah et al., 2020).

Table 5 Mean differences between export-domestic manufacturers

Research constructs	Domestic	Export	F	Sig.
Environ. Management system (EMS)	-.216	.088	7.70	.006
Customer environ. pressures (CEP)	-.297	.121	19.32	.000
Environ. corporate reputation press. (CRP)	-.329	.134	13.84	.000
Environ. perf.	-.170	.069	3.87	.050
Business perf.	-.007	.003	.02	.882

Note: ** significant at 0.01, the highest values in bold.

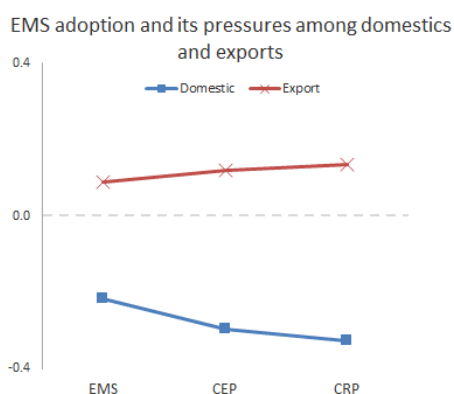


Figure 3 EMS and CEP and CEP pressures.

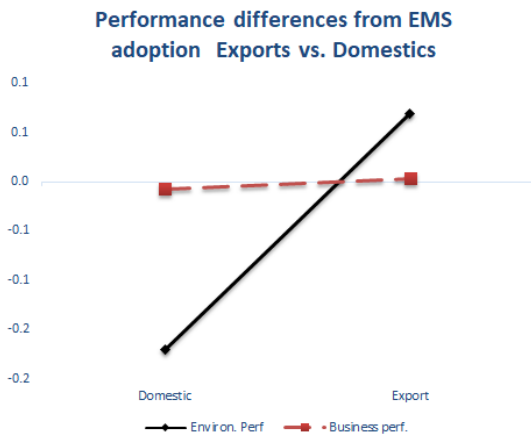


Figure 4 Performance differences among export and domestic manufacturers.

4. Discussion and managerial implications

This study empirically tested the research model where Customer environmental pressures (CEP) and environmental corporate reputation pressures (CRP) have a joint linkage, which eventually affects the environmental management system (EMS) and manufacturer's sustainable performances. This study found that manufacturers' environmental corporate reputation pressures (CRP) can be an important catalyst to absorb CEP and further enhance EMS processes. The dual effects of these environmental pressures can be observed in accumulation through enhancing firms' environmental corporate image and reputation. Finally, this study found that export contexts enhance both customer and corporate environmental reputation pressures on EMS implementation and their associated performance implications.

The results from this empirical study (Table 3 and Table 5) confirmed that customer pressures through environmental direct investment, environmental collaboration and environmental vendor certification lead to a firm's sustainable performances, including environmental and business measures. Furthermore, findings in Table 4 show that this relationship can be stronger if manufacturers convert environmental corporate reputation pressures into improvement environmental management processes. A more systematic approach in highlighting the environmental target and methodologies to attain these goals to external stakeholders can significantly improve market shares and revenues, thus enhancing financial positioning. This confirmed the need for more strategic partnerships and collaboration with customers to co-opt environmental pressure (J. Chen & Liu, 2019; Venkatesh, Zhang, Deakins, & Mani, 2020) to enhance the environmental performance improvements in manufacturing firms (Zhu, Sarkis, & Lai, 2012).

This study enhances the environmental literature by extending usual definitions of customer pressures on coercive and normative aspects (Kauppi & Hannibal, 2017; Seles, de Sousa Jabbour, Jabbour, & Dangelico, 2016; Zhu & Sarkis, 2007) by adding the pressures from customer involvement of environmental vendor certification, green workshop improvements, and environmental direct investment. When customers require and expect manufacturers to apply environmental vendor certification, i.e ISO 14001 certification, this indicates an integration of environmental concerns into a firm's strategy. The joint environmental collaboration between buyers and manufacturers can enhance directly and indirectly the operations and sustainable performances.

Second, the empirical findings from this study facilitate a better understanding of the environmental dilemmas between “substantive” and the “symbolic” EMS implementations. Literature often condemns that the adoption of EMS and certified systems like an ISO 14001 standard could not significantly reduce the environmental wastes and energy resources (Y. Chen & Chen, 2019; King, Burgess, Ijomah, & McMahon, 2006). Many authors argue that only the “real” EMS implementation, such as ISO 14001 or EMAS scheme, can offer expected benefits on environmental performance (Daddi, Testa, Frey, & Iraldo, 2016b). The empirical results from 437 manufacturers (Table 3) confirm a positive influence of customer environmental pressures on CEP. These conclusions are well aligned to previous findings in consumer theory (N. Nguyen & Leblanc, 2001,) and brand management literature (Shamma & Hassan, 2009) that customers' pressures are important antecedents for corporate reputation. The findings from this study (Table 3) show that the pressures to enhance environmental corporate image lead to more investment and emphasis on EMS processes. Since one of the major goals of EMS processes is to demonstrate the environmental commitment, targets and approach to attain them (Nath & Ramanathan, 2016; Christina W.Y. Wong et al., 2015). The variability in EMS implementation stages and commitment of environmental goals explain the linkages between enhancing environmental corporate image/reputation and EMS implementations. This results might suggest a cumulative approach from these dual pressures. Initially, due to customer pressures on achieving green status, firms can develop an EMS to attain corporate reputation through legitimization, demonstrating the company's compliance. These corporate pressures and the above environmental pressures lead to the need to review these EMS processes in light of actual process improvements and performance implications. The findings (Table 4) indicate the mediating role of environmental corporate pressures as a mean to accumulate and absorb customer environmental pressures in enhancing EMS processes. The interacting effects between customer environmental and corporate reputation pressures significantly improve EMS, eventually enhance sustainable performances.

Third, while literature often finds mixed results from environmental pressures and their EMS implementation and sustainable performance (Albort-Morant, Leal-Millán, & Cepeda-Carrión, 2016; Gualandris & Kalchschmidt, 2014; Huang, Hu, Liu, Yu, & Yu, 2016; Tchokogué, Nollet, Merminod, Paché, & Goupil, 2018), this study explores the phenomenon by examining different patterns of the customer environmental and corporate reputation pressures and performance implications among export and domestic manufacturers. The motivation for this analysis was the need for a better context in supply chain resources allocation for sustainable development goals (Zimon, Tyan, & Sroufe, 2020). The global export and outsourcing trends for the last 3 decades have influenced green supply chains management practices (Wu, Ding, & Chen, 2012; Zhu, Sarkis, & Lai, 2007). The results from 437 manufacturers provide empirical evidence that the business contexts around export manufacturing can be a useful asset for sustainable performances. This study does not look at which set of the contexts lead to better EMS and performances, however, it provides a pattern or classification on which these pressures and EMS processes can be more effective. The results from ANOVA analyses (Table 5 and Figure 3) confirmed that export-oriented manufacturing creates more chances for manufacturers to learn about what is required in the markets (from buyers' perspectives). These results have shown that exported manufacturers tend to have intense dual pressures from customers and corporate reputation in the field of environmental management. The largest difference among the two groups was the environmental corporate pressures -CEP (values in bold in Table 5 and Figure 4). This finding implies that the need to demonstrate corporate commitments and environmental regulations become critical for export operations. Perhaps, enhancing environmental images can guarantee business contracts (Hoejmose, Roehrich, & Grosvold, 2014; Toms, 2002).

The study provides practical and valuable guidance to operations managers and opens up a dual approach in developing environmental management systems. The dual approach can be achieved for environmental solutions when manufacturing firms can leverage opportunities from customer environmental requirements to build up corporate environmental image and meet regulations. Proactively looking for customers' knowledge and expectation on environmental demand can push up the environmental management plan within manufacturing firms. Learning from customers has always been a key to sustainable development. Joint workshops and environmental solution sessions with customers can be practical to enhance the firm's position and reputation in green development. The results from this study suggest that manufacturing firms can systematically demonstrate the environmental commitments, set appropriate targets in light of customers' expectations can enhance sustainable performance, especially the environmental measures like waste and energy reductions.

To be green or not green? For domestic manufacturers, this question can even be more challenged since they often lack resources and managerial capabilities. The results from this study suggest that being in export manufacturing markets can help manufacturers develop a stronger EMS and be well-positioned under various types of pressures. These findings also imply seeking for the export market might not be the only choice for being green, but proactively searching and learning from “green” customers whereas their expectations and environmental requirements can be an opportunity to enhance corporate environmental image and reputation. Further research on supplying for multinational corporations and foreign direct investment (FDI) firms might be a solution for many domestic manufacturers to become stronger in green positioning. Future studies could emphasize how social capital created from customers’ environmental collaboration can send a signal for green readiness and the interaction with process changes to gain more “substantive” improvements. Meeting environmental regulations and satisfying customer environmental requirements are important as well as an appropriate thing to do since they are often not a choice, but are imposed on the manufacturing firms by the realities of a circular economy.

5. Conclusions

This paper has presented novel findings on how environmental corporate reputation pressures can influence the implementation of EMS considering different facets of their performance: innovative capabilities, market competitiveness and reputation. For academics, the paper highlights new possible ways of understanding the role of voluntary management systems in relation to the different driving forces that originate from the institutional pressures. In other words, our work shows that it is not enough to study the direct effects of environmental strategies on the different performances discussed in this paper, such as innovation, competitiveness and reputation, to understand the dynamics by which this effects take place.

6. References

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7. Appendix

Research items/ factors	Customer environ pressures	EMS	Environ. perf.	Business perf.	Environ. Corporate reputation	
Cust. expectation of joint environmental sessions with suppliers	.869					
Cust. expectation of joint environmental sessions with this plant	.832					
Cust. expect a direct environmental investment in suppliers' activities	.825					
Cust. have a direct investment in this firms' environmental activities	.788					
Cust. expect to use environmental certification with the plant's suppliers	.744					
Cust. expect of environmental certification program in this firm	.733					
Control environmental impact of our products and processes		.878				
Systematic approach to setting environmental targets		.852				
Systematic approach to achieving environmental targets		.770				
Demonstrate achievement of environmental targets		.736				
reduction of level of water usage in the firms			.875			
Reduction waste at our plants			.862			
Reduction energy use in our plants			.861			
Reduction emissions at of the firms			.842			
Improvement of total sales				.896		
Improvement of profitability				.882		
Improvement of market share				.845		
To improve the firms' image					.825	
To improve the firms' regulatory compliance					.813	
	% of Variance	29.6	18.3	12.4	8.7	5.5
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.870				
	Sig.	0.000				
	Extraction Method: Principal Component Analysis					

Appendix 1 Exploratory factor analysis