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A configuration perspective of absorptive capacity in environmental management practice

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ABSTRACT

Environmental management is becoming a popular practice in many organisations. However, the transition from old to new practices does not come without any challenges. Numerous studies have argued that the process of adopting a new practice such as environmental management will depend on firms' absorptive capacity, i.e. the ability of firms to identify, acquire and transform external information and knowledge. However, absorptive capacity alone does not guarantee success. To deliver the intended outcomes, absorptive capacity works in conjunction with other internal and external factors. Based on a configuration perspective, this study used data from 107 manufacturing firms to identify an asymmetric role played by absorptive capacity with factors, such as firm size, decentralisation, customer engagement and global environmental awareness in supporting the practice of environmental management. This study contributes to the development of knowledge in environmental management literature and provides several practical recommendations.

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1. Introduction

In today's dynamic and competitive economy, firms are often required to practice environmental management. The movement toward practicing environmental management is motivated on the one hand by the pressure to meet the fast-changing customer demand for green products and on the other hand by the increasing importance of environmental and sustainability issues in many governments' agendas (Almeida and Melo 2017; Li, Tang, and Jiang 2019). This trend has been reinforced by the rising public awareness toward climate change, creating growing challenges for businesses (Saunila et al. 2019). Like other sectors, manufacturing firms are gradually being held responsible for producing environmentally friendly products and processes, as reflected by the burgeoning number of regulations in this area.

In response to the emerging trend of environmental management, numerous studies have been conducted to understand why and under what conditions do firms successfully practice environmental management. To this end, studies have proposed that absorptive capacity, i.e. the ability

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to identify, assimilate and transform externally available information and knowledge (Cohen and Levinthal 1990; Solano, Larrañeta, and Aguilar 2020), is essential for supporting environmental management practice. The aim of this study is to narrow the gap by conceptualising and empirically testing a configuration model that investigates the combination and (in)compatibilities of absorptive capacity with other internal and external factors in supporting the implementation of environmental management practice.

Based on a sample of 107 manufacturing firms in Malaysia, internal factors, such as having a large number of employees and a decentralised decision-making process, were examined to identify their contribution in absorbing external information and knowledge related to environmental management. Moreover, external factors, such as the change in customer demand and the recently growing global trend in environment and sustainability were also considered as factors that yield a high level of firms' commitment to environmental management. While previous studies have explored this research question, most of the understanding is based on the simplistic narrative of a linear relationship between the factors and the practice of environmental management. Still, research that examines the interrelation among those factors is scarce. However, absorptive capacity may have an asymmetrical relationship with other factors to determine the outcomes (Schmitt, Grawe, and Woodside 2017). Accordingly, studies are needed to uncover relevant configurations of factors that support environmental management practice.

This study employs the fuzzy-set qualitative comparative analysis (fsQCA) as it offers several advantages compared to the traditional methods (Ragin 2008). Firstly, fsQCA does not study the influence of factors on a particular outcome in isolation but rather analyses all factors holistically. As such, it captures causal conjunction where multiple factors might act in combination to influence a particular outcome (Schneider and Wagemann 2012). Secondly, it can account for potential equifinality, meaning a specific outcome can be achieved from several different configurations of factors (Kraus, Ribeiro-Soriano, and Schüssler 2018). Lastly, this method can deal with potential asymmetrical relationships where the factors producing a specific outcome might not lead to the absence of the same outcome (Douglas, Shepherd, and Prentice 2020). The contribution of this study to the literature of environmental management is twofold. First, we propose a configuration perspective, and by doing so, this study extends the concept of absorptive capacity by incorporating the roles of internal and external factors in determining the practice. This study argues that each factor can have positive as well as negative impacts on the practice of environmental management and simultaneously examines the impacts in relation to other factors. As a result, the finding clarifies the best mechanism through which firms can successfully implement environmental management. The second contribution is related to the strategy to implement environmental management. As the finding provides the opportunity to identify the configuration of factors that support environmental management practice, this study advances the practice of environmental management by offering several different paths (known as equifinality) to implement environmental management.

2. The configuration perspective of absorptive capacity

This study argues that absorptive capacity is a key organisational capability that contributes towards the implementation of firm's environmental management practices. Absorptive capacity is an important element for firms to remain successful as it allows the firm to recognise external knowledge and transform it to commercial ends (Cohen and Levinthal 1990; Solano, Larrañeta, and Aguilar 2020). According to Xie et al. (2016), environmental management and absorptive capability are related. This is supported by previous studies that have asserted the adoption of environmental management practices in manufacturing firms. For example, studies found evidence that absorptive capacity influences the development of the green supply chain (Hong et al. 2019) and innovation that targets environmental and sustainability issues (Albort-Morant, Leal-Rodríguez, and De Marchi 2018). More specifically, studies (e.g. Arfi, Hikkerova, and Sahut 2018) show that the ability to gain access to external knowledge sources is the key to success in performing environmental-

related activities. The absence of absorptive capacity often makes it costlier to explore future opportunities created by environmental issues. Firms may miss the opportunities due to failure to play a role in assimilating and applying knowledge from the market (Najafi-Tavani, Sharifi, and Najafi-Tavani 2016). Compounding this effect, firms with a low level of absorptive capacity are at risk of losing encouragement to implement environmental management.

Based on the configuration perspective, this study examines the relationships among absorptive capacity, internal and external factors in influencing the practice of environmental management. The perspective was employed for several reasons. Firstly, similar to other efforts in implementing a management practice, the outcomes rarely result from a single factor. Factors that determine the practice rarely operate in isolation. For instance, firms' first-mover strategy in product development may have resulted from a combination of factors, including R&D capacity, human resources and innovation culture. Secondly, the same factor may have different or even opposing outcomes (Greckhamer et al. 2008). For instance, firms' benefits from absorptive capacity can only be capitalised on if firms develop strong networks with key external players. Unlike conventional perspective, which is usually used to analyse the relationship amongst the variables, the configuration perspective emphasises the effects of combining factors (instead of the independent effect of a single factor) and how, as a configuration, they relate to certain outcomes (El Sawy et al. 2010). This context-dependent effect has been overlooked but gained more attraction in recent years.

The following section discusses the interplay between absorptive capacity and internal/external factors in endorsing environmental management practice. This line of reasoning is coherent with the existing 'structural fit' or contingency theory. Figure 1 shows the hypothetical model of this study.

2.1. Firm size, absorptive capacity and the practice of environmental management

Firm size may affect the extent to which absorptive capacity can be used to translate external knowledge and information into environmental management practice. As the size of the firm increases, the number of opportunities to interact with external resources tends to increase. There is a chance that firm size may strengthen absorptive capacity because large firms may have slack resources (financial and employee) that can be used for turning knowledge into practice. Moreover, absorptive capacity is partially dependent on the level of knowledge within a firm's workforce as Cohen and Levinthal

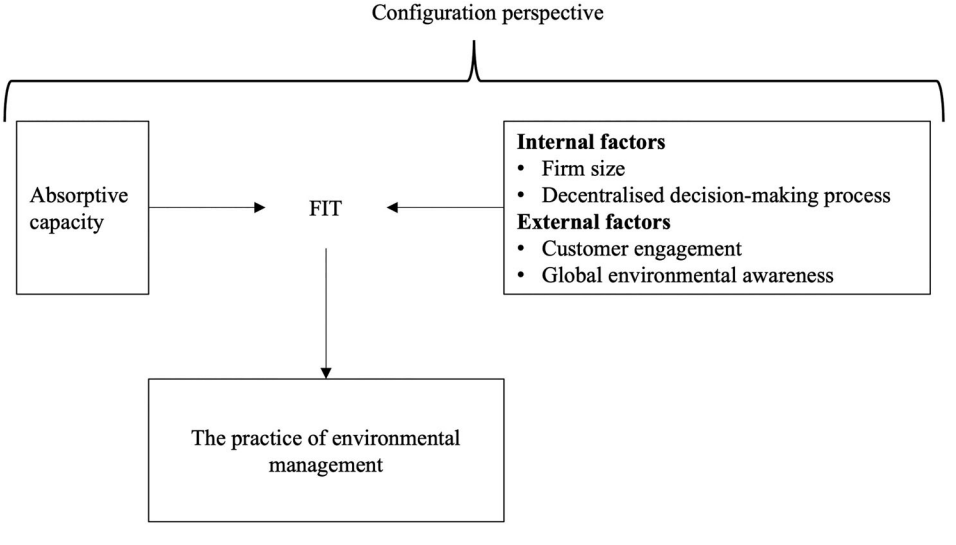

Figure 1 . The hypothetical model of the study.

(1990) posit that the quality of the workforce is critical for firm's ability to comprehend and apply new knowledge. This linkage provides the explanation for the commonly found positive association between firms' size and absorptive capacity.

Moreover, it is argued that larger firms are more socially receptive to new ideas and challenges that could lead to stronger environmental responsiveness than smaller firms (Buffa, Franch, and Rizio 2018). According to Uhlaner et al. (2012), these firms are usually more stable in terms of resources (e.g. finances) and exploiting economies of scale, which makes them more likely to engage in environmental management. Hence, they are more motivated and have more resources to be invested as an effort to legitimise their environmental activities compared to smaller firms. Large firms usually attract more attention from the public, which leads them to deploy more resources to avoid and solve all possible conflicts with environmental issues. Although they may experience a lack of resources, firms can adjust their resources in response to the changes caused by implementing environmental management. Overall, we argue that firm size has been recognised as an important determinant factor for environmental management practices when absorptive capacity is considered (Forman and Jørgensen 2001; Darnall, Henriques, and Sadorsky 2010).

2.2. Decentralisation, absorptive capacity and the practice of environmental management

According to literature (López-Gamero et al. 2016; Soderstrom and Weber 2020), managing environmental issues successfully requires firms to have an appropriate decision-making process across different functional units. This is primarily due to environmental responsiveness involving all employees and units across the organisation (Miller 1987). From the literature, the decision-making process is often recognised as a tension between centralisation and decentralisation in the decision-making process (Baumgärtner, Dwertmann, and Bruch 2015; Perez-Valls, Cespedes-Lorente, and Moreno-Garcia 2016). In a highly centralised firm, the decision-making process takes place at upper managerial levels, with limited authority for lower-level employees. In contrast, decentralisation refers to a bottom-up organisational structure that tends to promote decision-making authority for lower-level employees (Martin, McKelvie, and Lumpkin 2016). For firms that are newly engaging in environmental strategy, providing discretion to employees is essential so that they can participate in the process (López-Gamero et al. 2016). If the decision-making authority is centralised, there is a possibility that the decisions are limited to top-management level employees and potentially made by personnels' that do not possess the relevant knowledge (Davis-Sramek, Germain, and Krotov 2015). Centralisation forces the practice of environmental management through policy, while decentralisation attempts the opposite. In fact, decentralisation will encourage individual to take actions which may have a massive when adopted by a large number of employees. The key to an effective decentralisation approach lies in communicating both the need for implementing environmental management as well as the strategies for implementing these management practices to have maximum impact.

In relation to the impact of absorptive capacity on environmental management practice, decentralisation increases access to external knowledge, while centralisation negatively influences intra-organisational knowledge sharing (Tsai 2002). Decentralisation will support collaboration for accessing and integrating newly acquired knowledge. Combining a decentralised decision-making process and absorptive capacity, firms are able to respond to changing technological, customer and market needs for green products faster.

2.3. Customer engagement, absorptive capacity and the practice of environmental management

Customers are known as the most important stakeholder for any business (Cao and Chen 2019) and also valuable sources of external information. This is due to customers' behaviour on products or

services directly affecting company sales (Cavallo et al. 2014; Wong, Chan, and So 2020). In this context, the growing concerns among customers towards environmentally friendly products and services must be addressed and cannot be underestimated (Clement et al. 2017). In most cases, customers tend to reflect on themselves and respond to their surroundings created by the cultural context that they experience (Chekima et al. 2016). For instance, there is an increasing demand for products with environmentally friendly characters, eco-labelled products (Vanclay et al. 2011) and carbon-labelled/low carbon emission products (Wong, Chan, and So 2020). With environmental issues resurfacing, customers are forced to put more pressure on firms to offer products that are produced with less negative impacts on the natural environment (Chekima et al. 2016; Yadav and Pathak 2017).

Firms with strong customer engagement are able to detect the change in customer behaviours quicker than their competitors. If customers are concerned about environmental values, they are most likely to communicate with businesses with whom they are most socially connected. Hence, attitude towards environmentally conscious decisions among customers will lead businesses to justify the relevance of environmental management practices (Biswas and Roy 2015). Moreover, absorptive capacity allows firms to understand the needs of their external customer. Close relationships with external customers will facilitate the absorption of customer need knowledge. In this case, absorptive capacity and strong customer engagement are mutually important to help firms to commit to environmental management practice.

2.4. Global environmental awareness, absorptive capacity and the practice of environmental management

Global environmental awareness is considered to be important among the potential external drivers of environmental management (Delmas and Montes-Sancho 2011; Cavallo et al. 2014). The factor is related to the pressures from businesses to include environmental practices in their operation and production as a result of a global spread of awareness on environmental awareness (Zhu, Geng, and Sarkis 2016). This has led firms to realise an increasing amount of business risks due to environmental pressures. Manufacturing operators are traditionally known to have a high negative impact on the natural environment (López-Gamero et al. 2016). Since business operations are among the leading causes of negative environmental impacts, firms are pressured by several parties of stakeholders, policymakers and government institutions to address environmental issues (Aravind and Christmann 2011). Coercive and mandatory regulations were able to motivate firms into environmental efforts due to heavy fines, penalties or taxes being imposed for businesses that fail to comply (Zhu, Geng, and Sarkis 2016). This is supported by Delmas and Montes-Sancho (2011) who find the government as the driving force for environmental management initiatives. Furthermore, Wan et al. (2018) find that high policy intensity is a cause for the spread of global environmental awareness. These institutional pressures would force firms to adjust their strategy to accommodate more environmental management (Sharma, Pablo, and Vredenburg 1999; Chang and Chen 2013). While there is strong evidence of a relationship between global environmental awareness and the practice of environmental management, firms' absorptive capacity will strengthen the relationship. The global environmental awareness will pressure firms to absorb external knowledge. As global trends in environment and sustainability drive the development of new knowledge, new technology and new market, challenges are mounting for firms to implement environmental management practices.

3. Research method

This study adopted a configurational approach using fsQCA. This method has gained substantial attention from scholars in management, innovation and entrepreneurship (Kraus, Ribeiro-Soriano, and Schüssler 2018; Douglas, Shepherd, and Prentice 2020). It is based on a set-theoretical approach

where each case is conceptualised as a set consisting of different combinations of conditions (Ragin 2008). In contrast to traditional inferential statistics that assess the extent of the relationship (e.g. the net effects) between two variables, the fsQCA is designed to reveal the configurations or combinations of conditions that lead to the occurrence of an outcome (Schneider and Wagemann 2012). The fsQCA is suited for this study because it does not disaggregate the success factors of environmental management into independent factors such as absorptive capacity, internal and external factors. Instead, it considers environmental management practice as resulting from different configurations of absorptive capacity, internal and external factors. By facilitating configurational analysis, this method offers a pragmatic way to organise multiple cause–effect relationships into a single framework explaining variance in the practice of environmental management.

3.1. Sample and data collection

This study used an online survey to collect the data for this study. The full list of potential respondents was generated from the Federation of Malaysian Manufacturers. The database contains the contact details for all manufacturing companies registered in Malaysia. Malaysia was selected as the context of this study as the manufacturing sector has evolved over the recent years where topic such as environmental management has become an important issue (Ogbeibu et al. 2019). It is also belief that the emerging environmental problems have arisen as a result of a poorly regulated manufacturing activities (Shukla, Deshmukh, and Kanda 2009).

Prior to the survey, a pilot test was conducted, where the questionnaire was sent to three manufacturing firms in Malaysia. After receiving their feedback, the questionnaire was amended and later sent to two other manufacturers. The full survey was conducted in Malaysia from August 2019 and December 2019. Information was available for 1700 manufacturing companies from the directory of the Federation of Malaysian Manufacturers. The companies were contacted through phone before sending the questionnaire upon agreement of the respondent. Two trained interviewers were recruited to handle the phone calls in order to ensure that the respondents have clarity on how to respond to the questionnaire. This included explaining the research objective, the content of the online questionnaire and confirming the names and positions of the potential respondent. Besides that, certain details about the company were asked including number of workers, annual revenue and years of operation. To obtain a better response rate, follow-up steps were taken. Of these 1700, only 107 responded to the questionnaire, representing a 6.39% response rate.

To reduce sampling bias, this study took certain measures. Non-response bias issues were tested by comparing non-completed questionnaires with completed questionnaires to check for mean differences. Based on the results of the paired sample *t*-test, there were no significant differences between both data thus showing that there are no issues with non-response bias. Two steps were also taken to avoid common method bias. First, the data were gathered from more than one information source. Second, respondents are notified about guaranteed anonymity in their responses.

3.2. Measures

This study developed multi-item reflective measures using constructs adapted in previous studies and modified the items to fit in with our context. All variables were measured on a 7-point Likert-type scale from 1 (strongly disagree) to 7 (strongly agree).

The variable of environmental management was developed to measure firms' practice in environmental management on their primary activities. Instead of using specific activities as items to measure environmental management (Chan and Ma 2016; Trumpp and Guenther 2017), this study measures the implementation of environmental management on cross-functional activities as suggested by Porter's value chain concept. This ensures that all aspects of the firm activities

are covered. Respondents were asked to rate the practice of environmental management in the activities, such as inbound logistics, operations, outbound logistics, marketing, sales and services.

The variable of absorptive capacity was measured using four-item questions, which were adapted from García-Morales, Lloréns-Montes, and Verdú-Jover (2008). This variable measures the firm's ability to recognise new external opportunities and knowledge to undertake internal transformation (Pacheco, Alves, and Liboni 2018). A high value refers to a high degree of firms' absorptive capacity while a low value refers to a low degree of capability.

The variable of firm size was measured by the firm's number of full-time and part-time employees. Numerous studies involving antecedents of environmental management have included firm size as one of the determinants (e.g. Darnall, Henriques, and Sadorsky 2010). Compared to other studies which group the number of employees (Reyes-Rodríguez, Ulhøi, and Madsen 2016), this study decided to use the number of employees as a count variable. Hence, the natural logarithm of employees had to be used due to the potential skewered distribution (Darnall, Henriques, and Sadorsky 2010). In this variable, a high value represents a high number of employees while a low value refers to a low number of employees.

The variable of decentralisation was measured at firm levels describing the authority of decision-making process in organisations (Shafiee, Razminia, and Zeymaran 2016). This five-item was originally developed by Hage and Aiken (1967) and later on, adapted by Baumgärtner, Dwertmann, and Bruch (2015). A high value refers to a high degree of decentralisation while a low value refers to a low degree of decentralisation.

The variable of customers' engagement was adapted from Rindfleisch and Moorman (2001). This three-item scale captures the extent to which firms have a good relationship with various customers. This measure was used to replace the traditional method of 'frequency of contact' to measure the strength of social ties which only reflects opportunities compared to the rather motivation. A high value refers to a strong relationship between firms and their customer while a low value refers to a weak relationship.

The variable of global environmental awareness measures the extent to which the global market responds to environmental awareness issues. Since this construct proposes a new concept of environmental awareness, there were no existing scales that could be adopted. This 4-item scale was adapted from Jansen, Van Den, and Volberda (2006) and rephrased to suit with our context. A high value refers to a strong global pressure while a low value refers to a weak global pressure.

4. Findings

The first step in fsQCA is to calibrate the data for the different variables into fuzzy-set membership scores. Following best practice in fsQCA research (Hudson and Kühner 2013), the mean value of all variables was set except for firm size as the cross-over point, a value with one standard deviation below the mean as full non-membership, and a value with one standard deviation above the mean as full membership. Based on these three anchoring points, this study used the direct calibration method using fsQCA 3.0 software for data calibration. For firm size, the anchoring points of 49 and 250 were used to represent full non-membership and full membership, and the middle

Table 1. Calibration thresholds and correlations of the conditions.

	Conditions	Fully out	Cross-over point	Fully in	1	2	3	4	5	6
1	Absorptive capacity	4.01	5.20	6.38	1					
2	Decentralisation	1.14	2.40	3.66	0.09	1				
3	Firm size	49.00	150.00	250.00	0.08	0.11	1			
4	Consumer engagement	4.24	5.31	6.39	.31**	−0.07	0.07	1		
5	Global environmental awareness	3.34	4.54	5.75	.50**	0.16	.25**	.38**	1	
6	Environmental management	1.60	3.69	5.79	.20*	0.15	0.15	.19*	.38**	1

Number = 107, *$p < 0.05$; **$p < 0.01$ (two-tailed).

point between them (i.e. 150) to represent the cross-over point. It should be noted that the software excludes cases with a fuzzy-set membership score of 0.5. In line with previous fsQCA research (Fiss 2011), 0.001 was added to cases with a membership score of 0.5 to ensure all cases are included in the data analysis. The data calibration thresholds and correlations of the conditions are shown in Table 1.

4.1 Analysis of necessity

After the data calibration, analysis of necessity was conducted to assess whether any of the individual causal conditions (i.e. absorptive capacity, decentralisation, firm size, consumer engagement, and global environmental awareness) is a necessary condition for the presence of a high level of environmental management practice, Table 2 shows the results from necessity analysis including both the presence and absence (∼) of all individual conditions. Previous research suggests a consistency threshold of equal or above 0.8 to establish the causal necessity of a condition (Ragin 2008). As shown in the table, all consistency scores for the presence or absence of individual conditions were below the threshold of 0.8. As such, none of the causal conditions are necessary for the presence of a high level of environmental management practice.

4.2 Analysis of sufficiency

The analysis of sufficiency was conducted to identify the combinations or configurations of causal conditions that are sufficient to produce the presence of high level of environmental management practice. The sufficiency analysis was performed using a truth table consisting of 32 possible configurations, calculated as 2^5 where 5 equals the number of causal conditions included in the study. This study applied a frequency threshold of 2.0. The frequency threshold leads to 95% of cases in the sample being used in the analysis. The proportion of cases retained is much higher than the 80% recommended by Ragin (2008). In the next step, a consistency threshold of equal or above 0.8 was applied to identify the configurations that are sufficient to produce the outcome, namely the practice of environmental management (Ragin 2008).

Recent research on fsQCA best practices suggests that a proportional reduction in inconsistency (PRI) score below 0.5 indicates inconsistency, and higher thresholds (0.65–0.70) are preferable (Douglas, Shepherd, and Prentice 2020; Greckhamer et al. 2018). In line with previous research (Greckhamer 2016), we applied a threshold of PRI $\geq$ 0.65 to identify configurations leading to high environmental management. The PRI scores of the identified configurations range from 0.68 to 0.76, except for one configuration that has a PRI score of 0.60. We retained this configuration based on the consideration that it is higher than the 0.5 level, and our further robustness check indicates there is no contradictory configuration between the presence and absence of the outcome (see discussions in the Robustness checks section).

Table 2. Analysis of necessary conditions for high environmental management.

Conditions	Consistency	Coverage
Absorptive capacity	0.65	0.66
∼Absorptive capacity	0.48	0.55
Decentralisation	0.57	0.65
∼Decentralisation	0.54	0.55
Firm size	0.53	0.66
∼Firm size	0.60	0.57
Consumer engagement	0.68	0.67
∼Consumer engagement	0.45	0.52
Global environmental awareness	0.70	0.71
∼ Global environmental awareness	0.43	0.49

Note: ∼ indicates the absence of the condition.

Table 3. Configurations for the presence of high environmental management.

Causal conditions	A1	A2	A3	A4
Absorptive capacity		●	○	●
Internal factors				
Decentralisation	●		○	●
Firm size	○	○	●	●
External factors				
Consumer engagement	●	●	●	○
Global environmental awareness	●	●	●	●
Consistency	0.83	0.82	0.81	0.86
Raw coverage	0.24	0.28	0.10	0.15
Unique coverage	0.04	0.08	0.03	0.07
Overall solution consistency	0.82			
Overall solution coverage	0.43			

Note: ● (○) represents the presence (absence) of the condition.

Table 3 shows the results from sufficiency analysis for configurations that are sufficient to produce the presence of a high level of environmental management practice. The results uncover four configurations (A1 to A4) for the presence of high environmental management. The overall solution consistency, which refers to the extent to which the configurations are consistent in leading to the outcome, is 0.81, above the threshold of 0.75 (Ragin 2008). The overall solution coverage is 0.45, indicating a substantial proportion of the outcome is explained by the four configurations (Schneider and Wagemann 2012).

We now examine Table 3 in more detail. The configuration A1 implies that a decentralisation decision-making process in combination with consumer engagement and global environmental awareness is sufficient for producing a high level of environmental management practice when firm size is absent. Moreover, absorptive capacity is irrelevant in this configuration. Configuration A2 suggests that the joint presence of absorptive capacity, consumer engagement and global environmental awareness produce a high level of environmental management practice when firm size is absent. The decentralisation decision-making process is irrelevant in this configuration. Configuration A3 indicates that the presence of firm size, consumer engagement, and global environmental awareness are sufficient when both absorptive capacity and decentralisation are absent. Finally, configuration A4 demonstrates that the joint presence of all conditions except for absent consumer engagement can lead to a high level of environmental management practice.

4.3. Robustness checks

In line with previous fsQCA research (Douglas, Shepherd, and Prentice 2020), we then performed robustness checks by examining conditions leading to the absence of the outcome, as well as

Table 4. Configurations for the absence of high environmental management.

Causal conditions	B1	B2	B3
Absorptive capacity		○	○
Internal factors			
Decentralisation		○	○
Firm size	○	○	○
External factors			
Consumer engagement	○		○
Global environmental awareness	○	○	
Consistency	0.80	0.86	0.86
Raw coverage	0.42	0.35	0.31
Unique coverage	0.08	0.06	0.02
Overall solution consistency	0.78		
Overall solution coverage	0.55		

Note: ● (○) represents the presence (absence) of the condition.

adjusting the thresholds for sufficiency analysis. We first performed the analysis of sufficiency to identify the conditions for the absence of environmental management practice. The results are shown in Table 4. As shown in the table, four configurations (B1 to B4) are sufficient for the absence of high environmental management. The overall solution consistency is above the threshold of 0.75 with an overall solution coverage of 0.55. The configurations B1 to B4 are all distinct from configurations A1 to A4 identified in our main analysis, suggesting no contradictory solutions in our results (Ragin 2008). The analysis also reveals that a single presence of decentralisation without any configuration with other factors contributes to the low level of environmental management practice.

As the next step, we performed another set of sufficiency analysis by changing the frequency threshold from two to three cases. In other words, the configurations with less than three empirical cases were removed. The new frequency threshold leads to 85% of retained cases, which is above 80% as recommended by Ragin (2008). The results show that three configurations are sufficient to produce the presence of environmental management with a solution coverage of 0.43 and a solution consistency of 0.81. More importantly, the three configurations are identical to those (i.e. A1, A2, and A4) identified from our main results shown in Table 3. Taken together, the results from robustness checks provide further support for our main findings.

5. Discussion

This study tests a configuration model in supporting manufacturing firms to practice environmental management. While the main result of this study reveals that the combination of factors was present, there are several interesting findings related to the role of particular factors. First, each factor in this study is found to be relevant in the context of practising environmental management. Following the extant literature that has endorsed the importance of internal and external factors in environmental management (Menguc, Auh, and Ozanne 2010), this study argue that a high level of environmental management practice can be explained through a combination of factors. The factors, namely absorptive capacity, decentralisation and firm size, have been tested in previous research (López-Gamero et al. 2016; Uhlaner et al. 2012) and it has been seen in this study that they have a positive direct influence towards environmental management. This study found that absorptive capacity and internal factors can independently influence the practice of environmental management considering that the external factors are present (the configuration A1, A2 and A3 from Table 3).

This finding has led to the important role of external factors such as global environmental awareness and customer are critical. The findings show that in all configurations (Configuration A1, A2, A3, A4), global environmental awareness is consistently present. It may be that due to the growing concerns of environmental issues around the world, firms are forced to consider the need to practice environmental management in their operation (Sivamoorthy, Nalini, and Kumar 2013). The finding also shows that customers have a power to influence firms' commitment to implement environmental management practice. As presented in configurations A1 to A3, firms with strong engagement with customers produce a high level of environmental management practice. Overall, this finding highlights external pressure such as global trends and customers' preferences as a vital component in ensuring the practice of environmental management.

The finding also confirms that the combination of absorptive capacity and the internal factors was proven to be effective in supporting the implementation of environmental management practices (configuration A4). Hence, the findings prove that the existence of these factors benefits manufacturing firms' environmental practices and the absence of them prevents the manufacturing firms from achieving strong environmental practices.

Moreover, the study provides an interesting finding for further theoretical debate. As it is shown in Table 4, decentralisation alone without other factors can lead to the decline in the practice of environmental management. The underlying rationale of the finding is related to the characteristic of the organisation where decisions are made 'locally' at the functional level. This leads to the risk of

unintended consequences due to the decisions which are made based on the interest of each functional group and may not be relevant to other groups (Davis-Sramek, Germain, and Krotov 2015) Hence, in absence of strong external pressure or other factors to practice environmental management, firms with decentralised decision-making process are most likely to focus on other strategies and provide less focus on environmental management agenda.

6. Conclusion

This study aims to explore how the configuration of absorptive capacity and factors, such as firm size, decentralisation, customer engagement and global environmental awareness, influence the implementation of environmental management practices. The study contributes to the development of theory by examining the impact of absorptive capacity and other factors in environmental management. This study also found that the most effective force to drive the practice is by considering external factors such as pressure from global environmental awareness or customers.

The contribution of this paper is threefold. First, the finding provides a deep understanding of how firms should improve their environmental management by implementing suitable strategies to harness their absorptive capacity. The result could provide a reference to organisational decision makers in order to prepare their response to external pressure and challenging customer demand. Having a high level of absorptive capacity will help firms to not only absorb external information and knowledge but also implement environmental management. Second, this study displays that besides absorptive capacity, firm size and decentralisation hold equal importance in ensuring the practice of environmental management. With regard to firm size, previous literature confirms our findings where Gonzalez-Benito and Gonzalez-Benito (2005) associate large firms with flexibility of resource allocation, thus motivating firms to practice a higher level of environmental management. Furthermore, since environmental responsiveness requires a joint effort involving all employees and units in a firm, distribution of decision-making is critical to ensure their participation (Perez-Valls, Cespedes-Lorente, and Moreno-Garcia 2016). Decentralised organisations are also associated with broad participation in decision-making thus providing a greater predisposition towards high environmental management practice (López-Gamero et al. 2016). Third, this study found that environmental global awareness is the most consistent factor in configurations to achieve high environmental management compared to other factors. In practice, it concludes that a firm's strategic choice to practice environmental management has to be driven by strong external factors and demands such as global environmental awareness.

Besides several contributions, this study has certain limitations. First, the method of fsQCA adopted in this study is not widely used especially in the domain of environmental management where most studies have relied on multiple regression analysis. Thus, seeking other studies to compare findings can be challenging. Second, the sample consists of manufacturing firms in Malaysia. Further research is needed to replicate this study using different geographical and industry samples. Third, our study only includes a limited number of factors to represent organisational capabilities. It would be interesting if future research on antecedents of environmental management could explore other firm-level constructs that have not been used in this study.

Notes on Contributor

Dr Danny Soetanto works for University of South Australia and Lancaster University Management School. Danny received his PhD from Delft University of Technology with a dissertation topic on the intersection between entrepreneurship, network and economic geography. His research interests are broadly within the area of entrepreneurship and innovation, including academic spin-offs, incubation, social networks and innovation.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix . Survey items (7-point Likert scale)

Environmental management
To what extent has your firm engaged in voluntary environmental activities with:

– Operations
– Inbound logistics
– Outbound logistics
– Marketing and sales
– Services

Firm size
How many workers are employed in this firm?

Decentralisation

Little action could be taken here until a supervisor approved a decision
Even small matters had to be referred to someone higher up for a final answer
Employees had to ask their boss before they did almost anything
Any person who wanted to make their own decisions was quickly discouraged here
Any decision employees made had to have their manager's approval

Absorptive capacity

Our firm had the necessary skills to implement the newly acquired knowledge
Our firm had the competences to transform the newly acquired knowledge
Our firm had the competences to use the newly acquired knowledge
Our firm had a clear division of roles and responsibilities for acquiring new knowledge

Customer's engagement

We shared close social relations with our customers
Our relationship with customers could have been defined as "mutually gratifying"
We expected to maintain close relationships with customers far into the future

Global environmental awareness

There were intense changes in environmental awareness in our local market
Our clients were gradually asking for more eco-products/eco-services
Consumers were increasingly willing to pay for eco-products/eco-services even at an additional cost
Each year, more and more eco-products/eco-services were offered in our market