Does the configuration of macro- and micro-institutional environments affect the effectiveness of green supply chain integration?

Abstract

Despite the importance of the general environment in affecting the effectiveness of green supply chain integration (GSCI), our understanding of the roles of different configurations of macro- and micro-institutional environments remains limited. Based on institutional theory and resource mobilization theory, this study examined the moderating effects of the configurations of macro- and micro-institutional environments on the GSCI-performance link employing both a configuration and a contingency perspective. Our findings from a longitudinal survey of 206 Chinese manufacturing firms provide empirical evidence for the coexistence and nature of macro- and micro-institutional environments and their moderating effect on the GSCI-performance link. Specifically, the results revealed that Chinese manufacturers can be clustered into three groups with different macro-micro institutional environments (i.e., cognizant, sensible and conscious manufacturers). Furthermore, the configuration of macro- and micro-institutional environments moderates the effect of green supplier integration on social performance, as well as the effects of green customer integration on financial, environmental and social performance. This study contributes to both the GSCI literature and practices.

Key words: institutional environment; green supply chain integration; configuration; institutional theory; moderating effect; stakeholder engagement

1 Introduction

With the escalation of environmental problems such as global warming, acid rain, energy shortage, and land desertification, customers become extremely sensitive to firms' environmental behaviours (Brulhart *et al.*, 2019; Stadtler & Lin, 2019). Implementing proper environmental strategies to reduce environmental pollution and provide environmentally friendly products is critical for manufacturers to obtain competitiveness and customer loyalty in the market (Yang *et al.*, 2019; Zhang *et al.*, 2019). Therefore, as a set of practices uncovering all phases of supply chain management which must comply with environmental protection requirements, green supply chain management (GSCM) become one of the key concept in reducing environment impact while increasing firms performances (Zhu et al., 2005) and can be broadly classified based on firms' boundary into intra‐ and inter‐organisational practices (Zhu et al., 2013). On the other hand, as an extension of GSCM, green supply chain integration (GSCI) has received increasing attention as a set of collaboration of supply chain members in both intra‐ and inter‐organisational processes. GSCI refers to effectively integrating environmental practices with supply chain partners to seamlessly link internal processes to external collaboration and achieve timely inter-firm communication and joint problem solving with supply chain partners to increase efficiency and reduce costs (Du *et al.*, 2018; Wolf, 2011; Wu, 2013; Zhao *et al.*, 2018). Many manufacturers such as Samsung and Huawei have integrated their suppliers and customer into activities of solving environmental issues (Zhang et al., 2019). However, not all manufacturers have obtained the expected benefits by engaging in GSCI (Feng & Wang, 2016).

Thus, there is a need to consider how contextual conditions may impact the implementation

and effectiveness of GSCI. Since the scope of firms' green practice is limited by environmental legislation, the effect of GSCI is inevitably influenced by the external legal environment. For example, in their study of Chinese manufactures, Zhu *et al*. (2017) noted that the heterogeneity of environmental regulatory policy awareness is associated with firms' environmental supply chain collaboration intensity. Similarly, in Zhang *et al*. (2019)'s research, social influences from the community such as partner reciprocity and social obligations are also found to enhance the ability of GSCI to generate performance. Moreover, Lo *et al*. (2018) argued that environmental expectations from customers press firms to comply more with GSCI. Taken together, this line of research focuses on the impact of the macro-institutional environment derived from legitimate regulation, communities, and customers on shaping firms' behaviours and decisions.

However, recent breakthroughs in institutional theory have shifted from focusing purely on the macro-level approach towards a more comprehensive and multilevel approach that explicitly incorporates the role of individuals (Schilke, 2018). Different from the macro-level approach that is often from a structural perspective or as the scope that defines business activities (Scott, 2013), the micro-level perspective focuses on the motivations, cognitions, backgrounds, and behaviours of individual actors within the environment (Lawrence *et al.*, 2011; Zilber, 2016). Analysis of the interdependence between an institution's environment and roles of individuals can better explain a firm's decision of acceptance versus resistance to the external environment (Tina *et al.*, 2002).

Extending these studies, we argue that a firm faces a specific combination of the macro (external)- and micro (internal)-institutional environment, and the combination of the

environment further impacts the effectiveness of the firm's GSCI. At the macro-level, operating in the economically and socially intertwined market, an organization inevitably faces pressures from government regulations, partner attention, and market requirements (Grewal and Dharwadkar, 2008). Although scholars have well acknowledge the macro-institutional environment and its shaping influences on organizations' behaviours (D'Aunno *et al.*, 1991; Greenwood *et al.*, 2011; Greve & Zhang, 2017; Schilke, 2018), they focused little on the micro-institutional environment. For example, Powell and Colyvas (2008) argued that existing studies overly emphasize macro-level issues and ignore the critical role of micro-level issues in organizations' behaviours and decision making. Micro-level issues could provide a more precise explanation of organizations' efforts or resistance to certain behaviours.

To fill the above gap, this study explores two research questions building on the perspective of the institutional theory. (1) What patterns coexist based on firms' perceptions of the macro-micro institutional environment? (2) Do the configurations of macro- and micro-institutional environment moderate the relationship between GSCI and performance? This study aimed to offer new insight into how the coexistent macro- and micro-institutional environments affect the effectiveness of organizations' GSCI. We argue that the institutional environment surrounding an organization can be classified into different groups. Furthermore, facing given coexistent macro- and micro-institutional environments, an organization's ability to access resources and intention in decision making is accordingly determined, ultimately enhancing or weakening the effectiveness of GSCI. In this way, this study redirects previous approaches to GSCI and the institutional environment by suggesting that managers should consider the coexistent macro- and micro-institutional environments when designing and

evaluating their GSCI.

2 Literature Review and Research Propositions *2.1 Green supply chain integration*

In response to increasingly strict environmental regulations, supply chain partners should collaborate with each other to meet environmental requirements (Chen *et al*., 2017; Dubey *et al.*, 2015; Feng *et al.*, 2018) to ultimately achieve sustainable improvement in performance (Cherrafi *et al*., 2018; Tachizawa *et al*., 2015). To gain more benefit from green supply chain collaboration, the focal firm must effectively and efficiently manage its internal and external processes via building an inter-organizational team, sharing information, and solving environmental problems jointly, which together signify GSCI (Wu, 2013).

Although researchers have increasingly recognized GSCI as a multi-dimensional concept (Dai *et al.*, 2015; Lo *et al.*, 2018; Wolf, 2011; Wong *et al.*, 2015; Wu, 2013), previous studies did not reach a consensus. For example, some scholars divided GSCI into internal and external GSCI (Yang *et al.*, 2013). Others broke GSCI into green stakeholder integration, green internal integration, and green supplier integration (Wolf, 2011; Wong *et al*., 2015). As suggested by the supply chain integration literature, we collapsed GSCI into three dimensions: green internal integration, green supplier integration, and green customer integration (Flynn *et al.*, 2010; Jajja *et al.*, 2018; Zhao *et al*., 2013).

2.2 Institutional theory

Since the publication of the seminal work by DiMaggio and Powell (1983), research on theory has focused on the impact of the institutional environment on shaping organizations' behaviours and decisions (D'Aunno, Sutton & Price, 1991; Greenwood *et al.*, 2011; Greve & Zhang, 2017; Schilke, 2018). These studies tended to emphasize the examination of

institutional environments from a macro-perspective. However, there are repeatedly calls for researchers to conduct analyses from both macro- and micro- institutional perspectives (Fiol & O'Connor, 2005; Peng & Luo, 2000; Schilke, 2018) and to identify the interdependence between an institution's environment and the roles of individuals (Dacin *et al.*, 2002). Specifically, scholars have shifted from focusing purely on the macro-level approach to a comprehensive and multilevel approach that explicitly incorporates the role of the individual (Schilke, 2018).

The driving reason behind this shift is that analysing the institutional environment from the micro-level perspective can provide a more precise explanation than the macro-level approach (Thornton & Ocasio, 2008). As a result, the motivations, cognitions, backgrounds, and behaviours of individual actors become another focus of institutional theory (Lawrence *et al.*, 2011; Zilber, 2016). Within the field of institutional theory, macro-level research is from a structural perspective, or from the scope that defines business activities (Scott, 2013). Micro-level research tends to focus on the perceptions, interpretations, and actions of individuals within the environment (Schilke, 2018).

2.2.1 The macro-institutional environment

To survive and grow, companies must establish and maintain legitimacy (Oliver, 1991). Particularly, as one of the most important providers of corporate legitimacy, government regulations can significantly facilitate the environmentally friendly practices of companies (Luo, Wang & Zhang, 2017). According to resource mobilization theory, firms can be motivated to adopt environmentally friendly practices because many of them are heavily dependent on the government for resources and the continuance of special privileges (Oliver,

1991). Thus, firms are sensitive to government regulations because they fear losing critical resources if they do not conform to regulations (Dacin *et al.*, 2007). Non-conformance with government regulations can also damage firms' legitimacy in the eyes of a broad range of stakeholders as well as their ability to obtain resources subsequently (Bartley & Child, 2011). In China, government regulations evidently override other forces in exerting coercive pressure on firms. In light of these, this study focuses on government force rather than the overall coercive pressure and measures it by assessing the influences of national and regional environmental conservation regulations (Dubey *et al.*, 2015; Zhu, Sarkis & Lai, 2013) and products that potentially conflict with laws (Vanalle *et al.*, 2017; Zhu *et al.*, 2013).

As a lens through which firms can view the adoption of environmentally friendly practices and sustainable development (Lee & Lounsbury, 2015), community logic originates through the commitment of an organization to the community, collective benefit, and reciprocity (Thornton *et al.*, 2012). The concept of community logic is a relatively new addition to the field of institutional theory, because research has typically focused on the logics of the family, religion, regulations, and markets (Thornton, 2004; Thornton and Ocasio, 1999). By contrast, community logic is defined as the social bonds and norms that are important amongst people and communities, and it also emphasizes the attribute of group membership, which enhances communities' ability to resolve problems (Ostrom and Ahn, 2003). In the context of environment management, external stakeholders include customers, suppliers, the media, and others (Thornton, 2004). With the increasing environmental awareness from customers and environmental scrutiny from the media and environmentalists in China (Tate *et al.*, 2011), firms may care more about the requirements from customers, the media and public. Thus, this

study focuses on community force rather than on the overall normative pressure and evaluates it by considering the influences of export standards (Vanalle *et al.*, 2017; Zhu *et al.*, 2013), foreign and domestic customers (Dubey *et al.*, 2015; Wu *et al.*, 2012), green image (Vanalle *et al.*, 2017; Wu *et al.*, 2012), the news media (Zhu *et al.*, 2013), and the public (Zhu *et al.*, 2013).

Furthermore, 'market logic' refers to the economic efficiency, profitability, and self-interest of companies (York *et al.*, 2018). Under this logic, the maximization of profits tends to be the primary goal of companies, although they may serve social needs for their own benefit, such as improving resource efficiency (Thornton *et al.*, 2012). In terms of environmental practices, firms often learn from their established peers who initially make the decision to adopt such practices. The market logic components of self-interest and profitability can lead firms to view environmental practices as a market opportunity. Successful green practices may stem not only from rivals but also from other firms with similar characteristics such as industry, age, size, ownership, or geographic location (Guler *et al.*, 2002). Because China is shifting from a centrally planned to a market-based economy (Li & Zhang, 2007), the importance of imitation will be more remarkable for Chinese firms (Zaheer, 1995). Under the pressure from intense competition, firms are more likely to imitate successful green practices from rivals and industrial groups to gain competitive advantages (Dai *et al.*, 2015). Thus, this research focuses on market force from same-product producers, substitute-product producers, and industrial professional groups (Zhu & Geng, 2013; Wu *et al.*, 2012; Zhu *et al.*, 2013).

2.2.2 The micro-institutional environment

Despite its significant contributions to institutional theory in the management field, this

theory has tended to over-emphasize macro-level issues and ignore the importance of individual roles during the analysis of company behaviours and decision making (Powell & Colyvas, 2008) at the expense of understanding how individual actors cope with the environment. Understanding the roles of individuals could further explain the firm's decision of acceptance versus resistance to the external environment. Particularly, recent research on institutional theory has highlighted the role of executives' awareness of decision making in how people cope with macro-level institutions (Hallett, 2010; Papagiannakis & Lioukas, 2012). For example, Binder (2007) and Hallett (2010) found that pressures from macro-level institutions are 'inhibited' by individuals who make decisions through the lens of their unique experiences.

In this study, we consider executives' environmental awareness in addressing the puzzle of why firms vary in their adoption of environmental practices. Executives' environmental awareness refers to executives' attitudes towards environmental issues (Gadenne et al., 2009). Executives' environmental awareness refers to executives' attitudes towards environmental issues (Gadenne et al., 2009). Executives' environmental awareness is embedded in concept of organizational identity and have been recognised by institutionalists (Powell & Colyvas, 2008). We chose this particular focus because environmental awareness shapes executives' identity about what constitutes appropriate corporate behaviour and, thus, forms a fundamental basis for the intentionality behind the adoption of environmental practices (Schilke, 2018). Consequently, the context of the impact from executives' environmental awareness impact on the adoption of green supply chain integration represent the cognitive processes when an individual make a decision on behalf of his/her firm in the macro-micro institutional

environment (Schilke, 2018). Moreover, executives' environmental awareness is a core determination of actions, which represent a relevant antecedent of heterogeneity and resistance (Peng and Luo, 2000). As such, the environmental awareness of executives is critical to the organizations because they are social actors who are enabled to adopt environmental practices within the macro-institutional environment.

Executives' environmental awareness is typically categorized into two key dimensions: risk and benefit. Environmental risks may stem from negative environmental impacts, environmental awareness of customers, environmental regulations, and rivals (Cherrafi *et al.*, 2018; Drake *et al.*, 2016; Peng & Liu, 2016). This study measures it by assessing whether executives take the negative environmental impacts seriously (Qu *et al*., 2015), attach great importance to customers' attitudes (Dibrell *et al.*, 2011), are very clear of the influence of environmental regulations (Gadenne *et al.*, 2009) and are very clear of the 'best green practice' in their industry (Gadenne *et al.*, 2009; Qu *et al*., 2015). Firms may obtain benefits by conducting green practices, reducing pollutant emission, and introducing environmentally friendly products (Sundram *et al.*, 2018). As a result, we measure executives' awareness of environmental benefits by considering the perceived benefits of executives in implementing environmental initiatives, producing environmental products, reducing environmental impact, and improving environmental performance (Brammer *et al.*, 2012; Brammer *et al.*, 2012; Gadenne *et al.*, 2009).

2.3 Configurations of the macro-micro environment

The central assumption underlying this research is that firms are neither completely independent of nor completely governed by the macro- or micro-institutional environment.

Rather, firms often make decisions and take actions within a complex environment comprising the coexistence of multiple environmental forces (Thornton & Ocasio, 2008). The configuration approach supports our assumptions on the multidimensional phenomena of the coexistence of macro- and micro- institutional environments. Specifically, the configuration approach is a holistic approach that assumes organizational factors are interconnected (Miller, 1986). Moreover, the configuration approach aims to determine an ideal fit of multiple elements rather the pairwise relationships (Flynn *et al.*, 2010). In our research, we assume that firms face different and often incompatible expectations from both the macro- and micro-institutional environmental perspectives. The powerful actors in the macro-institutional environment include the government, community, and market, whilst the actors in the micro-institutional environment include executives who can invoke the support of macro-level actors as sources of power (Powell & Colyvas, 2008).

As mentioned previously, both macro- and micro-institutional environments can affect firms' GSCI. For example, firms with strong pressures from the macro-institutional environment often require support from the executives for superior achievement in the adoption of GSCI practices (Dibrell *et al.*, 2011). Therefore, executives must have strong environmental awareness of both risk and benefit configured to recognize GSCI as the best environmental practice by providing managerial commitment and attention (Peng & Liu, 2016). In this way, Fine and Hallett (2014) demonstrated that the environmental awareness of executives plays a key role in interpreting the force on the adoption of environmentally friendly practices within a macro-institutional environment. Therefore, managers with higher environmental awareness are more likely to support the GSCI practices with higher pressures from the

macro-institutional environment. By contrast, with lower pressures from the macro-institutional environment, executives with a lower level of environmental issues will be likely to focus more on practices with short-term economic returns rather than on environmental practices that often result in positive performances in the long run (Zhu, Sarkis & Geng, 2005). In summary, the macro-level influence on the adoption of GSCI is closely associated with a micro-level lens.

Moreover, different from macro-level institutional factors that portray the objective institutional environments of a firm, the micro-level executives' environmental awareness represents the firm's subjective perception of its institutional environments. Because subjective perceptions towards the same institutional environment vary from executive to executive due to their unique experience and values, decision makers may not respond in the same way within the same macro-institutional environment (Raffaelli & Glynn, 2014; Suddaby *et al.*, 2016). Instead, the micro-level perspective may provide a more precise influence on decision making and firm behaviours in addressing external institutional forces (Greve & Zhang, 2017; Thornton & Ocasio, 2008). Thus, the forces to facilitate the GSCI practices can be derived from powerful actors in the macro-institutional environment along with the invoking of those forces by decision makers in the micro-institutional environment. Therefore, the first proposition of this study is as follows:

Proposition 1: Firms can be clustered into various groups based on their perceptions of the coexistence of a macro-micro institutional environment.

2.4 Moderating role of the coexistent macro-micro environment

Macro- and micro-institutional factors jointly constitute the legitimacy environment surrounding a firm. According to resource mobilization theory, the macro-institutional

environment influences firms' capabilities of accessing to resources, while the micro-institutional environment affects firms' decision making (Schilke, 2018). The coexistence of the two environments is likely to affect the outcome of firms' GSCI practices. To expand our understanding of this issue, we developed the following contingency logic: the coexistent macro- and micro-environments influence the effects of firms' GSCI on generating performance.

As indicated by the resource mobilization theory, firms access and mobilize resources, which are vital for firms' survival and growth, through inter-firm relationships and networks in the forms of actor engagement, information sharing, strategic collaboration, and operational process coordination (Drummond *et al.*, 2018; Finch, Wagner, & Hynes, 2012; McGrath & O'Toole, 2013). Thus, it is necessary for firms to externally integrate with supply chain partners while at the same time, internally integrating different internal function units to collaboratively manage the flow of information, processes, and decisions related to the firm's green practices (Frohlich & Westbrook, 2001; Zhao *et al*., 2008). The macro-institutional situations depict the coercive constraints from government regulations, social norms among people and communities, and competitive forces from rivals and industrial groups (Dubey, Gunasekaran & Ali, 2015; Vanalle *et al.*, 2017). Thus, the macro-institutional environment determines to what extent a firm is allowed to integrate in the supply chain, and how much government support the firm can receive to implement integration, the general procedure for implementing integration, and possible market responses to the integration. These factors greatly affect a firm's costs and benefits in implementing green integration, ultimately influencing a firm's performance.

Furthermore, the environmental awareness of decision makers plays a key role in interpreting the force on the adoption of GSCI practices along with a macro-institutional environment (Fine & Hallett, 2014). Executives' micro-level environmental awareness represents the firm's subjective perception of the external institutional environments. Because subjective perceptions of the same institutional environment vary from executive to executive due to their unique experience and values, decision makers may not respond in the same way within the same macro-institutional environment (Raffaelli & Glynn, 2014; Suddaby *et al.*, 2016). Thus, the micro-level perspective may provide a more precise influence on decision making and firm behaviours in addressing environmental issues (Greve & Zhang, 2017; Thornton & Ocasio, 2008). An executive who perceives GSCI as beneficial is more likely to provide more managerial support and organizational resources to facilitate the firm's GSCI practices than an executive who perceives GSCI as risky. According to the resource mobilization theory, with more support and resources, the probability of GSCI success and performance is greater accordingly. Thus, the mechanism to facilitate GSCI practices can come from powerful actors in the macro-institutional environment along with the invoking of those forces by decision makers in the micro-institutional environment. The interplay of GSCI and the coexistent macro- and micro-environments may explain a firm's performance. Accordingly, we propose:

Proposition 2: The coexistent macro- and micro-institutional environments moderate the relationships between green internal integration and (a) financial, (b) operational, (c) environmental, and (d) social performance.

Proposition 3: The coexistent macro- and micro-institutional environments moderate the relationships between green supplier integration and (a) financial, (b) operational, (c) environmental, and (d) social performance.

Proposition 4: The coexistent macro- and micro-institutional environments moderate the

relationships between green customer integration and (a) financial, (b) operational, (c) environmental, and (d) social performance.

[INSERT FIGURE 1 ABOUT HERE]

3. Methods

3.1. Questionnaire design

We designed a questionnaire to collect survey data from Chinese manufacturers. For GSCI and firm performance, we initially developed the questionnaire in English based on the validated scales in previous studies. Next, the questionnaire was sent to two scholars and five executives who were responsible for environment management or supply chain management for validation. According to their feedback, we clarified the wordings of some items, changed the format of our questionnaire, re-sequenced some questions, and deleted some redundant items. We categorized GSCI into three dimensions: green internal integration, green supplier integration and green customer integration according to Vachon and Klassen (2008) and Wu (2013).

Because not all of the sampled firms are listed companies, it is difficult to collect objective performance data. Thus, we assessed performance using self-reported measures by requesting respondents to answer the questions relative to the industry's average for three reasons. First, the respondents who have worked in their firms for 6.02 years on average are knowledgeable about performance (Rai *et al.*, 2006). Second, using perceptual scales is conductive to acquiring the distinctiveness of environmental conditions, time horizon and industry, which facilitate inter-firm comparisons (Liu *et al.*, 2016). Finally, although the subjective measures exhibit some limitations, they have been found to be positively related to objective performance measures (Singh *et al.*, 2016). While supply chain management studies have

indicated that financial and operational indicators are important (Flynn *et al.*, 2010; Liu *et al.*, 2016), the triple bottom line literature has suggested that performance measures should also include environmental and social indicators (Hollos *et al.*, 2012; Wu and Pagell, 2011). Thus, we measured firm performance using financial, operational, environmental and social measures.

We developed new scales for the macro- and micro-institutional environments. First, we carefully defined each construct and generated preliminary measures according to the studies related to institutional theory (DiMaggio and Powell, 1983; Drake *et al.*, 2016; Luo *et al.*, 2017; Sarkis *et al.*, 2011; Zhu *et al.*, 2013) and green supply chain management (Cherrafi *et al.*, 2018; Dai *et al.*, 2015; Gadenne *et al.*, 2009; Sundram *et al.*, 2018). Second, we polished our definitions and items by consulting with two supply chain managers and four scholars in green supply chain management. According to their feedbacks, we revised the items with ambiguity. Third, we applied Q-sorting exercises to further refine items and assure face validity with another ten supply chain managers who were knowledgeable about the research domain. The average hit ratio of 87% suggested appropriate validity. Finally, we conducted exploratory factor analysis (EFA) to further purify the measures. EFA generated five factors as expected, and this procedure was performed iteratively to deleted items cross-loaded. We revalidated the EFA results applying confirmatory factor analysis (CFA) (see Table 2).

Firm size, firm age, industry type, and ownership type were selected as control variables (Feng *et al.*, 2019; Huo *et al.*, 2014; Liu *et al.*, 2016). We used the natural logarithm of the number of employees and number of years since its establishment to measure firm size and firm age, respectively. Industry type was measured using a dummy variable (highly polluting

firms = 1, others = 0). Two dummy variables were used to evaluate the ownership type. Specifically, ownership 1 and ownership 2 refer to state-owned and privately owned enterprises, respectively. Foreign-invested enterprises were classified into the baseline group. The items and their evaluations of reliability and validity are presented in Appendix A.

3.2. Data collection

We selected five representative provinces (Jiangsu, Guangdong, Shandong, Henan and Shaanxi) to collect the data. These five regions reflect different degrees of GSCI in China. Jiangsu and Guangdong are in the Yangtze River Delta and Pearl River Delta, respectively, reflecting a high degree of GSCI. Shandong and Henan are from the Bohai Sea and Middle China, respectively, reflecting the average degree of GSCI. Shaanxi lies in Western China, reflecting the low level of GSCI.

In the data collection process, we randomly chose 600 manufacturing firms from a list obtained from local governments in the above regions. An informant with the title of CEO, vice president or senior managers was identified in each selected firm for their sufficient knowledge on institutional pressures, environmental awareness, GSCI, and firm performance (Liu *et al*., 2016; Zhou *et al*., 2014). By soliciting their opinions, 284 of the selected manufacturers pledged to participate in the survey.

We collected data twice approximately 6 months apart. At time 1, we sent questionnaires with a cover letter explaining the research objectives to firms agreeing to engage in our survey. We asked about information related to firm characteristics, institutional pressures, environmental awareness and GSCI. In total, 261 questionnaires were returned, yielding a response rate of 43.5%. At time 2, we distributed questionnaires to the 261 respondents and

asked them to provide information about firm performance. In total, we received 206 valid questionnaires, yielding a response rate of 34.3%. Among the 206 respondents, 90.8% of them were middle managers or above. Furthermore, the average job duration in the current organization was 6.2 years. As a result, these respondents had the capability to provide the related information. The characteristics of the sampled firms are shown in Table 1.

[INSERT TABLE 1 ABOUT HERE]

We carried out several *t*-tests to compare the responding firms with the non-responding firms. There were no significant differences between these two groups related to major firm characteristics such as firm size ($t = 0.491$, $p = 0.624$), positions of respondents ($t = -0.569$, $p = 0.570$), and ownership structure ($t = 0.174$, $p = 0.862$). Furthermore, the follow-up contacts from several non-responding firms suggested that they were reluctant to return the questionnaire because of limited time or confidentiality considerations. Therefore, non-response bias was not a significant concern.

3.3. Measurement reliability and validity

The results of the absolute values of skewness (< 0.90) and kurtosis (< 1.20), Kaiser-Meyer-Olkin (KMO) (0.855) and the Bartlett test of sphericity (14258.56, $p < 0.001$) indicated our measures obeyed normal distribution and were satisfactory for hypotheses testing employing cluster analysis and structural equation modelling (Paulraj *et al*., 2008). As shown in Table 2, most of the inter-construct correlations (except for the correlation between ownership 1 and ownership 2) were lower than the threshold of 0.60. All the variance inflation factor values were less than 3.3 (all < 1.97) (Diamantopoulos and Siguaw, 2006). Thus, multi-collinearity was not serious.

The results in Appendix A revealed that the squared multiple correlations (R^2) ranged from 0.55 to 0.93, exceeding the critical value of 0.30 (Liu *et al*., 2016). The overall CFA loading items on their expected constructs were acceptable (χ^2/df = 3658.37/1937 = 1.89; RMSEA = 0.062; CFI = 0.95; NFI = 0.90; NNFI = 0.95; SRMR = 0.052), providing support for good unidimensionality. Cronbach's α and the composite reliability (CR) of all constructs were all greater than 0.70, suggesting adequate reliability. The factor loadings of all the items (all > 0.70) were higher than twice their standard errors. The average variance-extracted (AVE) values ranged from 0.57 to 0.87, exceeding the critical value of 0.50. Thus, convergent validity was ensured.

Finally, as depicted in Table 2, the square root of the AVE value of each construct was greater than the correlations between this construct and other constructs, providing support for discriminant validity. Moreover, we compared constrained models for all possible pairs of constructs with the unconstrained CFA model (O'Leary-Kelly and Vokurka, 1998). The constrained model fixed the correlation between the paired constructs to 1.0. This revealed that all chi-squared differences were significant ($p < 0.001$), providing further evidence for discriminant validity.

[INSERT TABLE 2 ABOUT HERE]

3.4. Common method bias and endogeneity

Although we collected data at two time points, the potential influence of common method bias (CMB) cannot be completely eliminated. To further alleviate the impact of CMB, we used distinct instructions for each construct and placed them into different parts of the questionnaire to mitigate the contextual impacts of answers (Zhao *et al*., 2011). Moreover, we chose social

desirability bias (Hays *et al*., 1989) as a method variance marker to assess the CMB, and the correlations in Table 2 suggested that CMB is not severe. Furthermore, we evaluated the potential CMB by comparing three models: the one-factor model, CFA model, and method model (Liu *et al*., 2016). The results showed that CMB is not a concern in this paper.

We addressed the issue of endogeneity in three ways. First, we designed a longitudinal survey to minimize the threats of the simultaneity issue of endogeneity (Guide and Ketokivi, 2015). Specifically, we collected the dependent variables six months after the data collection of the independent variable. Second, a meta-analysis of 42 empirical papers confirmed that the adoption of environmental practices triggers the performance changes but not vice versa (Geng, Mansouri & Aktas, 2017). Third, the Durbin-Wu-Hausman test was employed via Stata 14 for the existence of the endogeneity issue as suggested by Ketokivi and McIntosh (2017). Next, we applied augmented regressions for the residuals as additional independent variables and found that the estimated parameters were not statistically significantly different from zero. Therefore, we conclude the issue of endogeneity in our study.

4. Results

4.1 Configuration analysis of the macro-micro environment

To test the configuration effect, we followed a six-step procedure developed by Brusco *et al*. (2017). First, we followed a deductive approach for measurements from previous literature (see 3.1). Second, we ensured that all the variables were measured based on the same scales. Third, clustering analysis was performed to identify clusters to determine the difference among Chinese manufacturers in responding to the coexistence of a macro-micro institutional environment using both hierarchical and non-hierarchical methods. We used MATLAB to gain

full control of various parameters in the clustering algorithms (Maulik and Bandyopadhyay, 2002). Consequently, we applied hierarchical analysis using the 'ward linkage' method to identify the number of clusters. Fourth, we used the lower bound technique of the Calinski-Harabasz value to determine the number of clusters K (Steinley, 2003, 2006). The Calinski-Harabasz method assesses the average value between and within the cluster sum of squares; the larger the value is, the better is the quality of the clustering result (Caliński and Harabasz, 1974). The results showed that the best K value is 3.

Fifth, we applied the local optima of the number of clusters K and carried out the remainder of the analysis using local optima to ensure the internal consistency (Steinley, 2003, 2006). The local optima is the solution of an optimization problem within a neighbouring set of candidate solutions (Steinley, 2003). The reason of global optima are not searched is that they need an exhaustive search, which is normally computationally expensive when the data are large (Krishna and Murty, 1999). Finally, to examine whether these three clusters vary in the coexistence of the macro-micro institutional environment, as shown in Table 3, we applied multivariate analysis of variance (MANOVA). We further applied ANOVA with Scheffe's post-hoc analysis to evaluate the pairwise differences among these three clusters. The results indicate that Chinese manufacturers can be clustered into groups with differing macro-micro institutional environments, supporting proposition 1.

This study identifies three manufacturer clusters based on the configuration approach. As shown in Table 4, 49 companies comprise cluster 1, 80 companies comprise cluster 2, and 77 companies comprise cluster 3. The differences can be observed from Figure 2. Proposition 1 is strongly supported by the differences among the three clusters in the macro-micro institutional

environment observed. Moreover, Table 4 summarizes the post hoc analysis using Scheffe's tests. The result indicates that three clusters are significantly different from each other in five macro-micro institutional environment constructs, further supporting proposition 1.

Firms in cluster 1 have the lowest perception of all five macro-micro institutional environment constructs; thus, we characterized them as cognizant manufacturers. Firms in cluster 2 have the highest perception in government logic, community logic, market logic and executives' awareness of environmental benefit. We characterized these firms as sensible manufacturers. For cluster 3, firms have the highest mean value in the executives' awareness of environmental risk. We characterized them as conscious manufacturers.

[INSERT TABLE 3 and 4 ABOUT HERE]

4.2 Analysis of the moderating effect

We examined the moderating role of the macro-micro environment by creating a three-cluster model (Cao and Zhang, 2011; Wong *et al*., 2011). These three clusters were formed according to the configuration analysis results of the macro-micro environment. Next, we performed multi-cluster and structural path analyses to explore whether and how GSCI-performance links vary under distinct configurations of the macro-micro environment (see Table 5).

[INSERT TABLE 5 ABOUT HERE]

We found an insignificant difference in χ^2 statistics ($\Delta\chi^2$ = 68.54, Δdf = 60, $p > 0.1$) between the baseline model and model specifying equal factor loadings, indicating invariant factor loadings of the model under the three configurations of macro-micro environment. We also found insignificant difference in χ^2 statistics ($\Delta\chi^2$ = 87.07, Δdf = 74, $p > 0.1$) between

Model 2 and Model 3 (specifying equal factor loadings and measurement errors). This insignificant result suggests equivalent measurement errors across the three clusters. Similarly, we compared Model 3 with Model 4 (specifying equal factor loadings, measurement errors and structural paths). The significant difference in χ^2 statistics ($\Delta\chi^2 = 34.32$, $\Delta df = 24$, $p < 0.1$) revealed different structural paths across the three clusters.

To identify the specific structural paths that are different across the three clusters, we compared Model 3 with a model in which a certain structural path was assigned as invariant across clusters. The green internal integration–financial performance link is invariant in terms of its strength across the three clusters ($\Delta\chi^2 = 0.40$, $p > 0.1$), although it is significant in cluster 2 ($\beta = 0.19$, $p < 0.1$). Thus, proposition 2a is not supported. Furthermore, the path from green internal integration to operational performance ($\Delta\chi^2 = 0.40$, $p > 0.1$), as well as the path from green internal integration to environmental performance ($\Delta\chi^2 = 0.11$, $p > 0.1$), is found to have insignificant χ^2 differences, indicating the absence of a moderating effect, not supporting proposition 2b and proposition 2c. The relationship between green internal integration and social performance was only significant in cluster 1 ($\beta = 0.31$, $p < 0.05$). The χ^2 difference test indicated invariance of the relationship across the three clusters ($\Delta\chi^2 = 3.12$, $p > 0.1$), not supporting proposition 2d.

The relationship between green supplier integration and financial performance was only significant in cluster 3 ($\beta = 0.31$, $p < 0.05$). The insignificant difference in the χ^2 statistics ($\Delta\chi^2 = 1.47$, $p > 0.1$) does not support proposition 3a. The green supplier integration–operational performance link was only significant in cluster 3 ($\beta = 0.50$, $p < 0.001$). The insignificant difference in the χ^2 statistics ($\Delta\chi^2 = 4.24$, $p > 0.1$) provides evidence for not supporting

proposition 3b. The link between green internal integration and environmental performance was only significant in cluster 2 ($\beta = 0.28$, $p < 0.05$). Similarly, an insignificant χ^2 difference ($\Delta\chi^2 = 3.12$, $p > 0.1$) does not support proposition 3c. The link between green supplier integration and social performance was significant in clusters 2 ($\beta = 0.41$, $p < 0.01$) and 3 ($\beta = 0.27$, $p < 0.05$) but was insignificant in cluster 1. A significant difference in the χ^2 statistics ($\Delta\chi^2 = 6.48$, $p < 0.05$) indicates variance of the path across the three clusters. These results suggest that the green supplier integration–social performance link is influenced by the macro-micro environment, which provides support for proposition 3d.

The green customer integration–financial performance link is significant in clusters 1 ($\beta = 0.43$, $p < 0.01$) and 3 ($\beta = 0.25$, $p < 0.1$) but is insignificant in cluster 2. The significant difference in the χ^2 statistics ($\Delta\chi^2 = 4.69$, $p < 0.1$) suggests variant paths across the three clusters, supporting proposition 4a. Furthermore, the green customer integration–operational performance relationship was only significant in cluster 1 ($\beta = 0.35$, $p < 0.05$). The insignificant difference in the χ^2 statistics ($\Delta\chi^2 = 2.85$, $p > 0.1$) provides evidence for not supporting proposition 4b. The link between green customer integration and environmental performance was significant in clusters 1 ($\beta = 0.42$, $p < 0.05$) and 3 ($\beta = 0.43$, $p < 0.01$) but was insignificant in cluster 2. The significant χ^2 difference ($\Delta\chi^2 = 5.48$, $p < 0.1$) supports proposition 4c. The relationship between green customer integration and social performance was only significant in cluster 1 ($\beta = 0.46$, $p < 0.01$). The χ^2 difference test reveals variance of the relationship across the three clusters ($\Delta\chi^2 = 7.10$, $p < 0.05$), supporting proposition 4d. We present the standardized structural paths across the three clusters in Figure 2.

[INSERT FIGURE 2 ABOUT HERE]

5. Conclusion and Discussion

In the configuration approach, the cognizant manufacturers in cluster 1 have the lowest value in all five factors of the macro- and micro-institutional environments. Most of the firms were small and medium sized, with lower values in responding to the institutional influences of the environmental management practices. The cause may be that most small- and medium-sized manufacturers lack human resources with expertise in environmental management practices (Lee, 2008). It is difficult for them to make an effort in managerial changes to respond to external environmental pressures (Zhu *et al*., 2008b). Foreign-owned firms are the largest group in this cluster, followed by private manufacturers. The conventional view is that foreign-owned firms often have higher-than-average value in response to the influences of the macro- and micro- institutional environments. The reason is that foreign-owned firms often follow environmental management in their home country (Zhu *et al*., 2017). By contrast, our study showed that cognizant manufacturers, the largest number represented in the foreign-owned firm categories, tend to have the lowest values in responding to all the factors in the macro- and micro-institutional environments.

For cluster 2, sensible manufacturers have the highest mean value in the government logic, community logic, market logic, and executives' awareness of environmental benefit. Sensible manufacturers are generally small in size. This may be because macro-level pressures from the government, community and market logic often hold much influences on small firms in terms of acceptable environmental performance (Zhu *et al*., 2008b). Moreover, one of the interesting findings for sensible manufacturers is that they are largely foreign-owned but seems to have much higher value in response to the macro- and micro-institutional environments than

cognizant manufacturers. This indicates that foreign-owned firms may be subject to greater institutional oversight from a wide range of macro-institutional environments in China.

The third cluster, conscious manufacturers, responds to the macro-institutional environment to a lesser extent than the sensible manufacturers in the second cluster. Most of these firms are large and foreign-owned companies, large in terms of the number of employees. In this way, when the perceived influences from the macro-institutional environment are very intense, they may use the advantage of their large size to find ways within that field to resolve the influences (Surroca *et al*., 2013). Moreover, executives of the conscious manufacturers seem to have the highest awareness of environmental benefit. Moreover, sensible and conscious manufacturers have the highest value in response to government logic. This indicates that the Chinese government plays a more important role in driving firms' interests in environmental management.

From the contingency perspective, the configuration of macro- and micro-institutional environments moderates the effect of green supplier integration on social performance, as well as the effects of green customer integration on financial, environmental and social performance. Specifically, the impact of green supplier integration on social performance was significantly higher in clusters 2 and 3 than in cluster 1. The impacts of green customer integration on financial and social performance were significantly higher in cluster 1 than in cluster 2. The impact of green customer integration on environmental performance was significantly higher in clusters 1 and 3 than in cluster 2. These significant moderating effects provide evidence for the coexistent macro- and micro-institutional environments that affects the effectiveness of green supplier and customer integration.

For green internal integration, its impacts of financial, operational and environmental performance are all insignificant ($p > 0.1$). In addition, these effects are not affected by the configuration of macro- and micro-institutional environments. These results indicate that green internal integration may affect financial, operational and environmental performance indirectly (Zhao *et al.*, 2011). Interestingly, the impact of green internal integration on social performance is only significant for cognizant manufacturers ($p < 0.05$). This suggests that green internal integration is more likely to enhance social performance when manufacturers face lower level of macro- and micro-institutional environments.

For green supplier integration, its impacts on financial ($p < 0.05$) and operational ($p < 0.001$) performance are strongest for conscious manufacturers, while its impacts on environmental ($p < 0.05$) and social ($p < 0.01$) performance are strongest for sensible manufacturers. These results suggest that green supplier integration is more likely to enhance financial and operational performance when manufacturers face moderate level of macro-institutional environment and have higher level of executives' awareness of environmental risks. Green supplier integration is more likely to enhance environmental and social performance when manufacturers face higher level of macro- and micro-institutional environments.

For green customer integration, its impacts on financial ($p < 0.01$), operational ($p < 0.05$) and social ($p < 0.01$) performance are strongest for cognizant manufacturers. Moreover, the impact of green customer integration on environmental performance is similar for cognizant and conscious manufacturers and stronger than sensible manufacturers. These results suggest that green customer integration is more likely to enhance firm performance when manufacturers face lower level of macro- and micro-institutional environments.

Moreover, the ideal profiles of firm performances in different supply chain integrations have distinct clusters of macro- and micro-institutional environments. This result suggests that the supply chain integrations should be adapted to the degree of macro- and micro-institutional environments. In particular, for green customers' integration, cognizant manufacturers tend to have the lowest value in all five factors of the macro- and micro-institutional environments in the ideal profile with financial, environment and social performance. Moreover, for firms in the second cluster, sensible manufacturers which respond to the macro-institutional environment to a highest level, the ideal profile is only associated between social performance with green supplier integration. This finding indicates that resource demanding is one of the key characteristics of the co-existence of the macro- and micro-institutional environments that need to be considered with any other resource demanding activities. By contrast, for firms in the conscious manufacturers cluster that respond to the macro-institutional environment to a medium level, the relationship between green customers' integration and environment performance is highest among all three clusters. This result supports the argument that firms have limited resources and the response to the macro- and micro-institutional environments hinders firms' capabilities to deploy resources to the green supply chain integration. This result also circles back to the resource mobilization theory that although firms in the sensible manufacturers cluster deploy majority of their resources and capabilities to comply the macro-institutional environment, they are lack of such resources and capabilities to invest to green supply chain integration which also demand heavily.

5.1 Theoretical implications

Our study contributes to the extant literature in three ways. First, it extends institutional

theory research by showing that the micro-institutional environment is integral to the institutional framework. By proposing two micro-institutional environment dimensions, executives' awareness of environmental risk and environmental benefit, this study suggests that the micro-institutional environment forms the fundamental basis for the intentionality behind the adoption of environmental practices by shaping executives' views about the macro-institutional environment. As such, our research enriches the development of institutional theory by explicating the critical role of micro-institutional environment and providing a comprehensive approach to frame and analyse the institutional environment.

Second, this study enriches extant research on institutional framework by providing different patterns of the coexistence of macro- and micro-institutional factors. Macro-elements depict the objective institutional environment surrounding a firm that determines the firm's legitimacy, behaviour norm, and resource accessibility (Greve & Man Zhang, 2017; Oliver, 1991). Micro-elements, in contrast, reflect a firm's internal perception, belief, and attitude towards the external institutional environment. Because subjective perceptions are likely to vary, even toward the same environment, due to personal characteristics and experiences (Raffaelli & Glynn, 2014; Suddaby, Viale & Gendron, 2016), the combination of macro- and micro-institutional factors may form different patterns. We found that the cognizant manufacturers in the first cluster have the lowest value for all five factors of the macro- and micro-institutional environments. Sensible manufacturers, in general, have the highest mean value of the other two clusters to the government logic, community logic, market logic, and executives' awareness of environmental benefit. Conscious manufacturers respond to the macro-institutional environment to a lesser extent than sensible manufacturers but have the

highest executives' awareness of environmental risk.

Third, this study enriches the extant research on GSCI by showing that clusters of the macro- and micro-institutional environment moderate the relationship between firms' GSCI and performance, recasting the previous contingency views towards supply chain integration (e.g., Devaraj *et al*., 2007; Flynn et al., 2010). We found that cognizant manufacturers in the first cluster are good at generating performance (financial, operational, environmental, and social) through green customer and internal integration. Cognizant manufacturers have the lowest values in all five factors of the macro- and micro-institutional environments. Thus, these firms have relatively fewer institutional pressures and maintain a neutral attitude towards the external environment. In turn, these low-level institutional pressures provide firms with a comfortable business environment in which to build a close relationship with customers to acquire accurate demand information, reduce product design and production time, and decrease the inventory level, aiming to better serve the market (Flynn et al., 2010). By contrast, we found that, for sensible manufacturers in the second cluster, the promoting effects of green supplier integration are more prominent. These firms tend to seek external help and resources to increase own legitimacy and operation capability. Integration with suppliers provides them with valuable opportunities to accurately express their needs, accelerate resources and information acquisition, and conduct joint actions to increase the quality of their products and customer service. Overall, these findings provide more nuance and boundary conditions into the GSCI literature: green integration practices (i.e., supplier, customer, internal) must match diverse institutional constraints (both macro and micro) to support performance generation.

5.2 Managerial implications

This study also engenders important implications for managers regarding the choice of GSCI under different institutional environments. Firms conducting GSCI must choose the dimension of integration and allocate resources to facilitate its implementation. Our findings highlight the coexistence of macro- and micro-institutional factors and their moderating effects on influencing the effectiveness of different dimensions of GSCI. If manufacturers encounter low external institutional forces and perceive the environment as neither risky nor beneficial, they may want to maintain close relationships with customers. With strong information sharing and interactions with customer, manufacturers can achieve high profits, increase operation efficiency, and reduce energy and waste by timely capturing market demands, properly designing cooperation procedure, and accurately making resource allocation. Managers should also consider the use of internal integration. When internal functional units coordinate smoothly under fewer constraints, firms can respond to external partners and market flexibly, reducing resources and energy waste.

Moreover, when macro-institutional forces from government, community, and market and executives' awareness of environmental benefit are all high, firms are encouraged to emphasize on supplier integration and internal integration. Facing severe external constraints, managers should not hesitate but view suppliers as important sources and strategic partners to obtain resources and support to cope with external institutional pressures and gain legitimacy to conduct product or service design to capture the market that they perceive as having huge profit potential. Moreover, an unfriendly external environment indicates fierce competitiveness and high uncertainty, internal integration should also be strengthened to increase the information processing capability and responsiveness of firms to remain in the market and

achieve superior economic gains.

Finally, our results implied the importance of manufacturers to simultaneously establish green supplier and customer integration in the case of a medium level of macro-institutional pressures and a high perception of environmental risk from executives. A moderate level of macro-forces indicates the coexistence of both challenges and opportunities in the market. To survive and gain profits, manufacturers should interact closely with customers to increase the understanding of demands while at the same time, working collaboratively with suppliers to achieve synergetic effects on the supply side of serving customers.

5.3 Limitations and future research

First, based on 206 survey datasets from manufacturers in China, we obtained three clusters of the coexistent macro-micro institutional environment. Because five dimensions exist from both macro- and micro-institutional perspectives, more clusters can exist and exert diverse effects on the effectiveness of firms' GSCI practices. Repeated analysis of a larger sample of data is necessary.

Second, this study focuses on the coexistent macro-micro institutional environment as the determined circumstances and explores their moderating effects on the links between firms' GSCI and performance. Because the coexistent macro-micro institutional environment possesses this ability, how to change the institutional forces becomes critical for firms. Future research may investigate such strategies, such as how to increase macro legitimacy by contracture design and social activities and how to alter executives' perceptions of environmental risks/benefits via special training.

Third, our findings are limited to manufacturers in China. Although environmental issues

are significant in China, its unique culture, political, and market institutions are likely to differ from developed economies and other emerging economies. To examine the generalizability of our findings and conduct cross-culture comparisons, additional research on other economies and industries is needed.

Finally, although we used longitudinal data to document the effects of institutional factors, all the performance indicators are measured by perceptive survey data. To better capture firms' performance and reflect differences among different firms, objective data from multiple sources are necessary.

References:

Bartley, T. & Child, C. 2011. Movements, markets and fields: The effects of anti-sweatshop campaigns on US firms, 1993-2000. Social Forces, 90(2), 425-451.

Binder, A. 2007. For love and money: Organizations' creative responses to multiple environmental logics. Theory and Society, 36(6), 547-571.

Brammer, S., Hoejmose, S. & Marchant, K. 2012. Environmental Management in SME s in the UK: Practices, Pressures and Perceived Benefits. Business Strategy and the Environment, 21(7), 423-434.

Brulhart, F., Gherra, S., & Quelin, B. V. (2019). Do stakeholder orientation and environmental proactivity impact firm profitability? Journal of Business Ethics, 158(1), 25-46.

Cao, M., Zhang, Q. (2011). Supply chain collaboration: Impact on collaborative advantage and firm performance. Journal Operations Management, 29(3), 163-180.

Cao, Q., Dowlatshahi, S. (2005). The impact of alignment between virtual enterprise and information technology on business performance in an agile manufacturing environment. Journal of Operations Management, 23(5), 531-550.

Chen, L., Zhao, X., Tang, O., Price, L., Zhang, S., Zhu, W. (2017). Supply chain collaboration for sustainability: A literature review and future research agenda. International Journal of Production Economics, 194, 73-87.

Cherrafi, A., Garza-Reyes, J. A., Kumar, V., Mishra, N., Ghobadian, A., Elfezazi, S. (2018). Lean, green practices and process innovation: A model for green supply chain performance. International Journal of Production Economics, 206, 79-92.

D'Aunno, T., Sutton, R.I. & Price, R.H. (1991). Isomorphism and external support in conflicting

institutional environments: A study of drug abuse treatment units. Academy of Management Journal, 34(3), 636-661.

Dacin, M.T., Oliver, C. & Roy, J.P. (2007). The legitimacy of strategic alliances: An institutional perspective. Strategic Management Journal, 28(2), 169-187.

Dai, J., Cantor, D. E., Montabon, F. L. (2015). How environmental management competitive pressure affects a focal firm's environmental innovation activities: A green supply chain perspective. Journal of Business Logistics, 36(3), 242-259.

Diamantopoulos, A., Siguaw, J.A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. British Journal of Management, 17(4), 263-282.

Dibrell, C., Craig, J.B. & Hansen, E.N. (2011). How managerial attitudes toward the natural environment affect market orientation and innovation. Journal of Business Research, 64(4), 401-407.

DiMaggio, P., Powell, W. W. (1983). The iron cage revisited: Collective rationality and institutional isomorphism in organizational fields. American Sociological Review, 48(2), 147-160.

Drake, D.F., Kleindorfer, P.R. & Van Wassenhove, L.N. (2016). Technology choice and capacity portfolios under emissions regulation. Production and Operations Management, 25(6), 1006-1025.

Du, L.Z., Zhang, Z.L., Feng, T.W. (2018). Linking green customer and supplier integration with green innovation performance: The role of internal integration. Business Strategy and the Environment, 27(8), 1583-1595.

Dubey, R., Gunasekaran, A. & Ali, S.S. (2015). Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for

green supply chain. International Journal of Production Economics, 160, 120-132.

Feng, T., Huang, Y., Avgerinos, E. (2018). When marketing and manufacturing departments integrate: The influences of market newness and competitive intensity. Industrial Marketing Management, 75, 218-231.

Feng, T., Wang, D. (2016). The influence of environmental management systems on financial performance: A moderated-mediation analysis. Journal of Business Ethics, 135(2), 265-278.

Feng, T., Wang, D., Lawton, A., Luo, B.N. (2019). Customer orientation and firm performance: The joint moderating effects of ethical leadership and competitive intensity. Journal of Business Research, 100, 111-121.

Fiol, C.M. & O'Connor, E.J. (2005). Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. Organization science, 16(1):19-32.

Flynn, B.B., Huo, B. & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. Journal of Operations Management, 28(1):58-71.

Gadenne, D.L., Kennedy, J. & McKeiver, C. (2009). An empirical study of environmental awareness and practices in SMEs. Journal of Business Ethics, 84(1), 45-63.

Greenwood, R., Raynard, M., Kodeih, F., Micelotta, E.R. & Lounsbury, M. (2011). Institutional complexity and organizational responses. Academy of Management annals, 5(1), 317-371.

Greve, H.R. & Zhang, C.M. (2017). Institutional logics and power sources: Merger and acquisition decisions. Academy of Management Journal, 60(2), 671-694.

Guler, I., Guillén, M.F. & Macpherson, J.M. (2002). Global competition, institutions, and the diffusion of organizational practices: The international spread of ISO 9000 quality certificates. Administrative science quarterly, 47(2), 207-232.

Hallett, T. (2010). The myth incarnate: Recoupling processes, turmoil, and inhabited institutions in an urban elementary school. American Sociological Review, 75(1), 52-74.

Hays, R. D., Hayashi, T., Stewart, A. L. (1989). A five-item measure of socially desirable response set. Educational and Psychological Measurement, 49(3), 629-636.

Hollos, D., Blome, C., Foerstl, K. (2012). Does sustainable supplier co-operation affect performance? Examining implications for the triple bottom line. International Journal of Production Research, 50(11), 2968-2986.

Jajja, M. S. S., Chatha, K. A., Farooq, S. (2018). Impact of supply chain risk on agility performance: Mediating role of supply chain integration. International Journal of Production Economics, 205, 118-138.

Lawrence, T., Suddaby, R. & Leca, B. (2011). Institutional work: Refocusing institutional studies of organization. Journal of Management Inquiry, 20(1), 52-58.

Li, H. & Zhang, Y. (2007). The role of managers' political networking and functional experience in new venture performance: Evidence from China's transition economy. Strategic Management Journal, 28(8), 791-804.

Liu, H., Wei, S., Ke, W., Wei, K. K., Hua, Z. (2016). The configuration between supply chain integration and information technology competency: A resource orchestration perspective. Journal of Operations Management, 44, 13-29.

Lo, S. M., Zhang, S., Wang, Z., Zhao, X. (2018). The impact of relationship quality and supplier development on green supply chain integration: A mediation and moderation analysis. Journal of Cleaner Production, 202, 524-535.

Luo, J., Chong, A. Y. L., Ngai, E. W., Liu, M. J. (2015). Reprint of “Green Supply Chain Collaboration

implementation in China: The mediating role of guanxi". Transportation Research Part E: Logistics and Transportation Review, 74, 37-49.

Luo, X.R., Wang, D. & Zhang, J. (2017). Whose call to answer: Institutional complexity and firms' CSR reporting. Academy of Management Journal, 60(1), 321-344.

Miller, D. (1986). Configurations of strategy and structure: Towards a synthesis. Strategic Management Journal, 7(3), 233-249.

O'Leary-Kelly, S.W., Vokurka, R.J. (1998). The empirical assessment of construct validity. Journal of Operations Management, 16(4), 387-405.

Oliver, C. (1991). Strategic responses to institutional processes. Academy of Management Review, 16(1), 145-179.

Papagiannakis, G. & Lioukas, S. (2012). Values, attitudes and perceptions of managers as predictors of corporate environmental responsiveness. Journal of Environmental Management, 100, 41-51.

Paulraj, A., Lado, A.A., Chen, I.J. (2008). Inter-organizational communication as a relational competency: Antecedents and performance outcomes in collaborative buyer-supplier relationships. Journal of Operations Management, 26(1), 45-64.

Peng, M.W. & Luo, Y. (2000). Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. Academy of management journal, 43(3), 486-501.

Peng, X. & Liu, Y. (2016). Behind eco-innovation: Managerial environmental awareness and external resource acquisition. Journal of Cleaner Production, 139:347-360.

Powell, W.W. & Colyvas, J.A. (2008). Microfoundations of institutional theory. The Sage handbook of Organizational Institutionalism, 276, 298.

Qu, Y., Liu, Y., Nayak, R.R. & Li, M. (2015). Sustainable development of eco-industrial parks in China:

effects of managers' environmental awareness on the relationships between practice and performance. Journal of Cleaner Production, 87, 328-338.

Raffaelli, R. & Glynn, M.A. (2014). Turnkey or tailored? Relational pluralism, institutional complexity, and the organizational adoption of more or less customized practices. Academy of Management Journal, 57(2), 541-562.

Rai, A., Patnayakuni, R., Seth, N. (2006). Firm performance impacts of digitally enabled supply chain integration capabilities. MIS Quarterly, 30(2), 225-246.

Schilke, O. 2018. A micro-institutional inquiry into resistance to environmental pressures. Academy of Management Journal, 61(4), 1431-1466.

Scott, W.R. (2013). Institutions and organizations: Ideas, interests, and identities. Sage Publications.

Singh, S., Darwish, T. K., Potočnik, K. (2016). Measuring organizational performance: A case for subjective measures. British Journal of Management, 27(1), 214-224.

Stadtler, L., & Lin, H. (2019). Leveraging partnerships for environmental change: The interplay between the partnership mechanism and the targeted stakeholder group. Journal of Business Ethics, 154(3), 869-891.

Suddaby, R., Viale, T. & Gendron, Y. (2016). Reflexivity: The role of embedded social position and entrepreneurial social skill in processes of field level change. Research in Organizational Behavior, 36, 225-245.

Sundram, V.P.K., Rajagopal, P., Bahrin, A.S. & Subramaniam, G. (2018). The role of supply chain integration on green practices and performance in a supply chain context: A conceptual approach to future research. International Journal of Supply Chain Management, 7(1), 95-104.

Tachizawa, E. M., Gimenez, C., Sierra, V. (2015). Green supply chain management approaches:

Drivers and performance implications. International Journal of Operations & Production Management, 35(11), 1546-1566.

Tate, W.L., Dooley, K.J. & Ellram, L.M. (2011). Transaction cost and institutional drivers of supplier adoption of environmental practices. Journal of Business Logistics, 32(1), 6-16.

Thornton, P.H. & Ocasio, W. (2008). Institutional logics. The Sage handbook of organizational institutionalism, 840, 99-128.

Thornton, P.H., Ocasio, W. & Lounsbury, M. (2012). The institutional logics perspective: A new approach to culture, structure, and process. Oxford University Press on Demand.

Tina Dacin, M., Goodstein, J. & Richard Scott, W. (2002). Institutional theory and institutional change: Introduction to the special research forum. Academy of Management Journal, 45(1), 45-56.

Vachon, S., Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. International Journal of Production Economics, 111(2), 299-315.

Van de Vijver, F., Leung, K. (1997). Methods and Data Analysis for Cross-cultural Research. Sage Publications, Inc.

Vanalle, R.M., Ganga, G.M.D., Godinho Filho, M. & Lucato, W.C. (2017). Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. Journal of Cleaner Production, 151, 250-259.

Wolf, J. (2011). Sustainable supply chain management integration: A qualitative analysis of the German manufacturing industry. Journal of Business Ethics, 102(2), 221-235.

Wong, C. Y., Boon-Itt, S., Wong, C. W. (2011). The contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. Journal of

Operations Management, 29(6), 604-615.

Wu, G. C. (2013). The influence of green supply chain integration and environmental uncertainty on green innovation in Taiwan’s IT industry. Supply Chain Management: An International Journal, 18(5), 539-552.

Wu, G.-C., Ding, J.-H. & Chen, P.-S. (2012). The effects of GSCM drivers and institutional pressures on GSCM practices in Taiwan's textile and apparel industry. International Journal of Production Economics, 135(2), 618-636.

Wu, Z., Pagell, M. (2011). Balancing priorities: Decision-making in sustainable supply chain management. Journal of Operations Management, 29(6), 577-590.

Yang, C. S., Lu, C. S., Haider, J. J., Marlow, P. B. (2013). The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan. Transportation Research Part E: Logistics and Transportation Review, 55, 55-73.

Yang, D., Jiang, W., Zhao, W. (2019). Proactive environmental strategy, innovation capability, and stakeholder integration capability: A mediation analysis. Business Strategy and the Environment, 28(8), 1534-1547.

York, J.G., Vedula, S. & Lenox, M.J. (2018). It's not easy building green: The impact of public policy, private actors, and regional logics on voluntary standards adoption. Academy of Management Journal, 61(4), 1492-1523.

Zaheer, S. (1995). Overcoming the liability of foreignness. Academy of Management journal, 38(2):341-363.

Zhang, M.H., Tse, Y.K., Jing, D., Chan, H.K. (2019). Examining green supply chain management and financial performance: Roles of social control and environmental dynamism. IEEE Transactions

on Engineering Management, 66(1), 20-34.

Zhang, Q., Pan, J., Jiang, Y., Feng, T. (2019). The impact of green supplier integration on firm performance: The mediating role of social capital accumulation. Journal of Purchasing and Supply Management. https://doi.org/10.1016/j.pursup.2019.100579

Zhao, L., Huo, B., Sun, L., Zhao, X. (2013). The impact of supply chain risk on supply chain integration and company performance: A global investigation. Supply Chain Management: An International Journal, 18(2), 115-131.

Zhao, X., Huo, B., Selen, W., Yeung, J. H.Y. (2011). The impact of internal integration and relationship commitment on external integration. Journal of Operations Management, 29(1-2), 17-32.

Zhao, Y., Feng, T., Shi, H. (2018). External involvement and green product innovation: The moderating role of environmental uncertainty. Business Strategy and the Environment, 27(8), 1167-1180.

Zhou, K. Z., Zhang, Q., Sheng, S., Xie, E., Bao, Y. (2014). Are relational ties always good for knowledge acquisition? Buyer–supplier exchanges in China. Journal of Operations Management, 32(3), 88-98.

Zhu, Q. & Geng, Y. (2013). Drivers and barriers of extended supply chain practices for energy saving and emission reduction among Chinese manufacturers. Journal of Cleaner Production, 40:6-12.

Zhu, Q., Qu, Y., Geng, Y., Fujita, T. (2017). A comparison of regulatory awareness and green supply chain management practices among Chinese and Japanese manufacturers. Business Strategy and the Environment, 26(1), 18-30.

Zhu, Q., Sarkis, J, Lai, K.H. (2017). Regulatory policy awareness and environmental supply chain cooperation in China: A regulatory-exchange-theoretic perspective. IEEE Transactions on Engineering Management, 65(1), 46-58.

Zhu, Q., Sarkis, J. & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. International Journal of Operations & Production Management, 25(5), 449-468.

Zhu, Q., Sarkis, J. & Lai, K.-h. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. Journal of Purchasing and Supply Management, 19(2), 106-117.

Zhu, Q., Sarkis, J., Lai, K. H. (2018). Regulatory policy awareness and environmental supply chain cooperation in China: A regulatory-exchange-theoretic perspective. IEEE Transactions on Engineering Management, 65(1), 46-58.

Zilber, T.B. (2016). How institutional logics matter: A bottom-up exploration. How Institutions Matter! Emerald Group Publishing Limited.

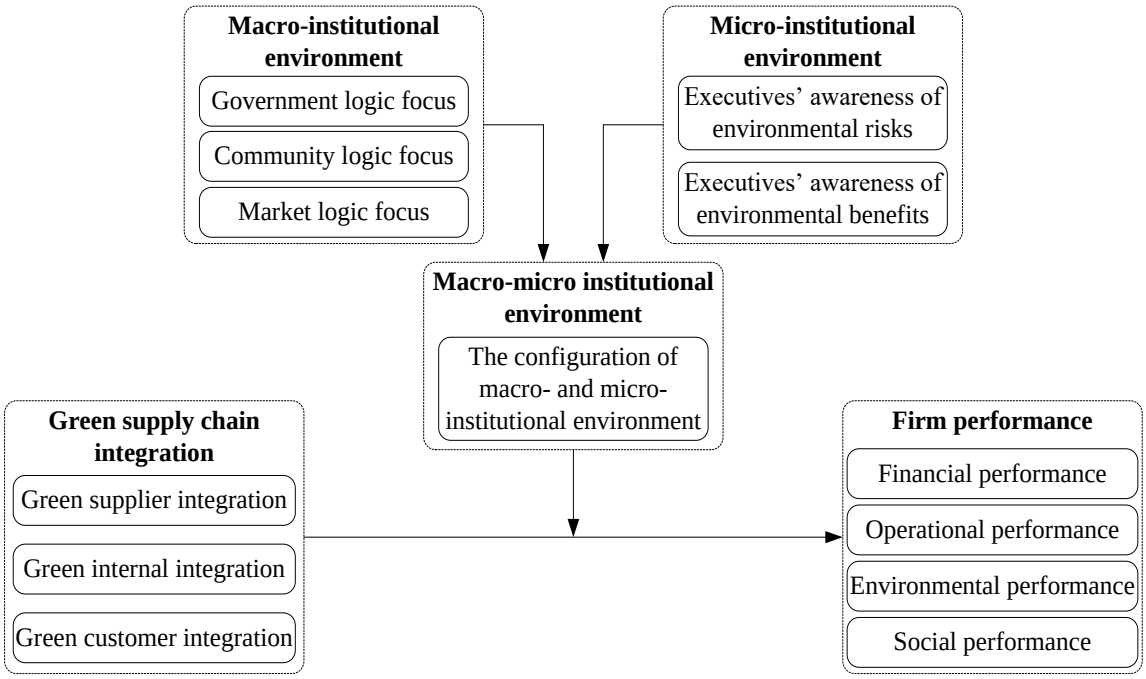

Figure 1 Conceptual Model

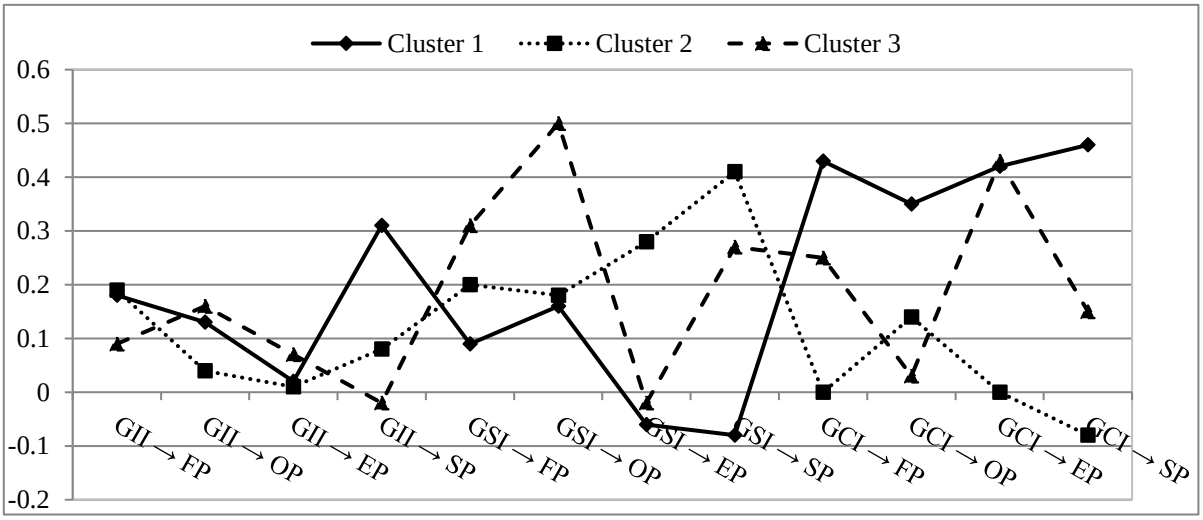

Figure 2 Plot of standardized paths across clusters

Table 1 Sample characteristics (N = 206)

Characteristics of samples	Frequency	Percentage (%)
Positions of respondents		
President/CEO/Vice president	20	9.7
Senior managers	57	27.7
Middle-level managers	125	60.7
Low-level managers	4	1.9
Industry		
Chemical and pharmaceutical	21	10.2
Rubber, plastics and non-metallic mineral	27	13.1
Metal	14	6.8
Machinery	18	8.7
Transport	22	10.7
Electrical machinery and equipment	30	14.6
Communication and computers related	45	21.8
Instruments and related	8	3.9
Others manufacturing	21	10.2
Number of employees		
< 100	30	14.6
100-299	34	16.5
300-999	34	16.5
1000-1999	27	13.1
2,000-4999	37	18.0
> 5000	44	21.3
Ownership		
State-owned	83	40.3
Privately-owned	76	36.9
Foreign-invested	47	22.8

Table 2 Means, standard deviations, and correlations ($N = 206$)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. GL	5.04	1.35	**0.89**	0.25***	0.29***	0.35***	0.19**	0.10	0.33***	0.15*	0.05	0.01	0.16*	0.30***	-0.05	0.00	0.00	-0.01	-0.05
2. CL	5.06	1.23	0.24***	**0.80**	0.33***	0.31***	0.25***	0.34***	0.17*	0.20**	0.15*	0.11	0.11	0.12	-0.15*	-0.03	0.02	-0.10	0.03
3. ML	4.89	1.23	0.29***	0.33***	**0.85**	0.28***	0.35***	0.37***	0.47***	0.37***	0.34***	0.18*	0.21**	0.22**	-0.17*	-0.14	0.04	-0.21**	0.15*
4. EAER	4.94	1.19	0.35***	0.31***	0.28***	**0.90**	0.39***	0.46***	0.34***	0.24***	0.13	0.24***	0.29***	0.25***	-0.12	-0.04	0.03	-0.16*	0.04
5. EAEB	4.89	1.33	0.19**	0.25***	0.35***	0.39***	**0.93**	0.43***	0.30***	0.22**	0.31***	0.27***	0.28***	0.17*	-0.16*	0.00	0.06	-0.15*	0.06
6. GII	4.98	1.15	0.10	0.35***	0.37***	0.46***	0.43***	**0.88**	0.39***	0.36***	0.33***	0.20**	0.28***	0.19**	-0.15*	-0.05	0.12	-0.09	0.15*
7. GSI	4.87	1.18	0.33***	0.17*	0.47***	0.34***	0.30***	0.39***	**0.90**	0.46***	0.33***	0.23***	0.33***	0.33***	-0.07	-0.05	0.09	-0.05	0.08
8. GCI	5.24	1.17	0.16*	0.19**	0.37***	0.24***	0.21**	0.35***	0.46***	**0.83**	0.37***	0.33***	0.32***	0.22**	-0.11	-0.10	0.06	-0.03	0.06
9. FP	5.32	1.11	0.05	0.15*	0.34***	0.13	0.31***	0.33***	0.33***	0.37***	**0.86**	0.48***	0.44***	0.36***	-0.07	-0.04	0.21**	-0.07	0.14*
10. OP	5.25	1.06	0.01	0.11	0.18**	0.24***	0.27***	0.19**	0.23***	0.33***	0.48***	**0.88**	0.31***	0.40***	-0.04	-0.08	0.05	-0.03	0.05
11. EP	5.28	1.06	0.17*	0.10	0.22**	0.29***	0.28***	0.27***	0.33***	0.32***	0.44***	0.31***	**0.88**	0.40***	-0.12	-0.09	0.11	-0.09	0.18*
12. SP	5.22	0.98	0.30***	0.12	0.22**	0.25***	0.17*	0.18**	0.33***	0.22**	0.36***	0.40***	0.40***	**0.88**	-0.03	-0.06	0.11	-0.04	0.13
13. Firm size	-	-	-0.04	-0.16*	-0.17*	-0.12	-0.16*	-0.15*	-0.06	-0.11	-0.07	-0.04	-0.11	-0.03	-	0.43***	-0.08	0.29***	-0.39***
14. Firm age	-	-	0.01	-0.04	-0.13	-0.04	0.00	-0.05	-0.04	-0.09	-0.04	-0.08	-0.08	-0.06	0.43***	-	-0.11	0.31***	-0.26***
15. Industry type	-	-	-0.01	0.02	0.04	0.03	0.06	0.12	0.09	0.06	0.21**	0.05	0.10	0.10	-0.08	-0.11	-	-0.04	0.12
16. Ownership 1	-	-	-0.02	-0.10	-0.21**	-0.16*	-0.15*	-0.09	-0.06	-0.04	-0.07	-0.03	-0.10	-0.04	0.28***	0.30***	-0.03	-	-0.63***
17. Ownership 2	-	-	-0.05	0.03	0.15*	0.04	0.06	0.15*	0.08	0.06	0.14*	0.05	0.17*	0.12	-0.39***	-0.26***	0.12	-0.63***	-
18. Social desirability bias	3.84	0.95	-0.08	0.07	-0.05	-0.01	-0.01	0.06	-0.04	-0.08	-0.01	-0.05	-0.12	-0.04	-0.05	-0.10	0.04	0.07	0.03

Note: *Note:* GL: Government logic; CL: community logic; ML: Market logic; EAER: executives' awareness of environmental risks; EAEB: executives' awareness of environmental benefits; GII: green internal integration; GSI: green supplier integration; GCI: green customer integration; FP: financial performance; OP: operational performance; EP: environmental performance; SP: social performance; The diagonal elements (i.e., bold values) are the square roots of AVEs. Unadjusted correlations appear below the diagonal; correlations adjusted for the common method appear above the diagonal. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (two-tailed test).

Table 3 Descriptive statistics and MANOVA results

Factors	Mean	SD	F value	P value	Mean		
					Cluster1	Cluster2	Cluster3
GL	5.044	1.3529	4.898	0.000	3.453	5.635	5.441
CL	5.057	1.2255	7.833	0.000	4.641	5.971	4.371
ML	4.889	1.2331	10.282	0.000	4.388	5.611	4.459
EAEB	4.943	1.1914	2.574	0.000	3.944	5.590	4.906
EAER	4.887	1.3322	3.965	0.000	4.184	4.411	5.940
Model	Test		F	P value			
	Pillai's Trace		2.688	0.000			
	Wilks' Lambda		2.717	0.000			

Table 4 Analysis of variance and organizational characteristics of each cluster

	C1		C2	C3		F
GL	2, 3		1, 3	1, 2		57.842***
CL	2		1,3	2		175.267***
ML	2		1,3	2		186.480***
EAEB	2, 3		1, 3	1, 2		8.664***
EAER	2, 3		1, 3	1, 2		8.715***
Position	Cluster 1 (n = 49)		Cluster 2 (n = 80)	Cluster 3 (n = 77)		
CEO	5	10.2	6	7.5	9	11.7
High	12	24.5	21	26.3	24	31.2
Mid	32	65.3	52	65.0	41	53.2
Low	0	0	1	1.3	3	3.9
Ownership						
state-owned	5	10.2	6	7.5	9	11.7
Private	12	24.5	21	26.3	24	31.2
foreign	32	65.3	52	65.0	41	53.2
Size						
1-299	14	28.6	26	33.6	24	31.2
300-1999	14	28.6	22	26.3	25	32.5
Above 2000	21	42.8	23	40.1	28	36.3

Numbers in parentheses indicate the cluster(s) from which that cluster is significantly different at *p < 0.05. **p < 0.01. *** p < 0.001 according to the Scheffe comparison procedure.

Table 5 Results of multi-cluster analysis

Models	χ^2	*df*	NNFI	CFI	Nested models	$\Delta\chi^2$	Δdf	Significant level	Cluster 1 (*n* = 49)	Cluster 2 (*n* = 80)	Cluster 3 (*n* = 77)
1. Base line model	4322.98	1862	0.91	0.92							
2. Equal loadings	4391.52	1922	0.91	0.91	2-1	68.54	60	0.210			
3. Equal loadings, measurement errors	4478.59	1996	0.89	0.90	3-2	87.07	74	0.142			
4. Equal loadings, measurement errors structural paths	4512.91	2020	0.89	0.89	4-3	34.32	24	0.079†			
5a. GII → FP	4478.99	1998	0.89	0.89	3-5a	0.40	2	0.819	0.18	0.19†	0.09
5b. GII → OP	4478.99	1998	0.89	0.89	3-5b	0.40	2	0.819	0.13	0.04	0.16
5c. GII → EP	4478.70	1998	0.89	0.89	3-5c	0.11	2	0.946	0.02	0.01	0.07
5d. GII → SP	4481.71	1998	0.89	0.89	3-5d	3.12	2	0.210	0.31*	0.08	-0.02
5e. GSI → FP	4480.06	1998	0.89	0.89	3-5e	1.47	2	0.480	0.09	0.20	0.31*
5f. GSI → OP	4482.83	1998	0.89	0.89	3-5f	4.24	2	0.120	0.16	0.18	0.50***
5g. GSI → EP	4481.71	1998	0.89	0.89	3-5g	3.12	2	0.210	-0.06	0.28*	-0.02
5h. GSI → SP	4485.07	1998	0.89	0.89	3-5h	6.48	2	0.039*	-0.08 (2, 3)	0.41** (1)	0.27* (1)
5i. GCI → FP	4483.28	1998	0.89	0.89	3-5i	4.69	2	0.096†	0.43** (2)	0.00 (1)	0.25†
5j. GCI → OP	4481.44	1998	0.89	0.89	3-5j	2.85	2	0.241	0.35*	0.14	0.03
5k. GCI → EP	4484.07	1998	0.89	0.89	3-5k	5.48	2	0.065†	0.42* (2)	0.00 (1, 3)	0.43** (2)
5l. GCI → SP	4485.69	1998	0.89	0.89	3-5l	7.10	2	0.029*	0.46** (2)	-0.08 (1)	0.15

Numbers in parentheses indicate the cluster(s) from which that cluster is significantly different at $p < 0.05$; † $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Appendix A. Measurements Reliability and Validity

Construct	Factor loadings	Standardized loadings	SE	*t*-value	R^2 [b]	Cronbach's α	CR	AVE
Government logic						0.95	0.95	0.80
National environmental regulations (waste emission, cleaner production etc.)	1.27	0.90	0.20	16.41	0.80			
National resource saving and conservation regulations	1.37	0.93	0.13	17.56	0.87			
Regional environmental regulations (waste emissions, cleaner production etc.)	1.32	0.89	0.20	16.30	0.80			
Regional resource saving and conservation regulations	1.37	0.90	0.19	16.59	0.81			
Products potentially conflict with laws (circular economy, EPR, EHS etc.)	1.28	0.85	0.28	15.01	0.72			
Community logic						0.94	0.93	0.64
Export standards	1.12	0.75	0.44	12.32	0.56			
Sales to foreign customers	1.17	0.75	0.44	12.44	0.56			
Environmental requirements from domestic customers	1.34	0.90	0.19	16.40	0.81			
Environmental awareness of domestic customers	1.27	0.90	0.20	16.33	0.80			
Establishing company's green image	1.17	0.85	028	14.87	0.72			
The news media follows our industry closely	1.01	0.76	0.42	12.78	0.58			
Public environmental awareness (community, NGO etc.)	1.19	0.85	0.27	15.11	0.73			
Market logic						0.88	0.89	0.73
Green strategy of same product producers	1.03	0.76	0.43	12.39	0.57			
Green strategy of substitute product producers	1.27	0.94	0.11	17.11	0.89			
Industrial professional group activities	1.20	0.85	0.27	14.70	0.73			
Executives' awareness of environmental risks						0.94	0.94	0.80
Our executives take the negative environmental impacts seriously	1.09	0.83	0.30	14.59	0.70			
Our executives are very clear how environmental regulations affects us	1.19	0.91	0.17	16.83	0.83			
Our executives are very clear what represents 'best green practice' in our industry	1.12	0.91	0.18	16.74	0.82			

Our executives attach great importance to customers' attitudes toward environmental products	1.23	0.93	0.13	17.47	0.87			
Executives' awareness of environmental benefits						0.96	0.96	0.87
Our executives think implementing environmental initiatives can benefit to our company	1.25	0.91	0.16	17.05	0.84			
Our executives think there is significant commercial benefit to our company in producing environmental products	1.25	0.90	0.19	16.66	0.81			
Our executives think reducing our environmental impact can have significant cost benefits	1.38	0.94	0.12	17.91	0.88			
Our executives think improving environmental performance usually improves production efficiency	1.35	0.97	0.07	18.85	0.93			
Green internal integration						0.95	0.95	0.77
Achieving environmental goals collectively	1.05	0.85	0.28	14.97	0.72			
Developing a mutual understanding of responsibilities regarding environmental performance	1.05	0.80	0.35	13.84	0.65			
Working together to reduce environmental impact of our activities	1.10	0.90	0.20	16.44	0.80			
Conducting joint planning to anticipate and resolve environmental-related problems	1.19	0.92	0.15	17.30	0.85			
Making joint decisions about ways to reduce the environmental impact of our products/services	1.22	0.92	0.15	17.24	0.85			
Accumulating and sharing environmental knowledge	1.12	0.87	0.25	15.60	0.75			
Green supplier integration						0.96	0.96	0.80
Achieving environmental goals collectively	1.15	0.90	0.19	16.67	0.81			
Developing a mutual understanding of responsibilities regarding environmental performance	1.13	0.88	0.22	16.07	0.78			
Working together to reduce environmental impact of our activities	1.11	0.83	0.32	14.42	0.68			
Conducting joint planning to anticipate and resolve environmental-related problems	1.22	0.94	0.12	17.89	0.88			
Making joint decisions about ways to reduce the environmental impact of our products/services	1.18	0.92	0.15	17.38	0.85			

Accumulating and sharing environmental knowledge	1.15	0.91	0.18	16.77	0.82			
Green customer integration						0.93	0.93	0.68
Achieving environmental goals collectively	1.01	0.74	0.45	12.21	0.55			
Developing a mutual understanding of responsibilities regarding environmental performance	1.19	0.85	0.28	14.93	0.72			
Working together to reduce environmental impact of our activities	1.17	0.86	0.27	15.08	0.73			
Conducting joint planning to anticipate and resolve environmental-related problems	1.25	0.91	0.18	16.61	0.82			
Making joint decisions about ways to reduce the environmental impact of our products/services	1.13	0.82	0.33	14.06	0.67			
Accumulating and sharing environmental knowledge	1.04	0.78	0.40	12.99	0.60			
Financial performance						0.93	0.93	0.74
Increase in return on investment	0.99	0.80	0.36	13.65	0.64			
Increase in market share	0.95	0.82	0.33	14.18	0.67			
Growth in profit	1.14	0.92	0.15	17.11	0.85			
Increase in return on sales	1.13	0.91	0.17	16.71	0.83			
Growth in sales	0.99	0.84	0.30	14.57	0.70			
Operational performance						0.95	0.95	0.77
Decrease in scrap rate	0.87	0.76	0.43	12.61	0.57			
Improve in product quality	0.97	0.88	0.23	15.85	0.77			
Reduction of lead time	1.13	0.89	0.21	16.25	0.79			
Improve in flexibility of processes	1.11	0.90	0.19	16.61	0.81			
Improve in capacity utilization	1.07	0.92	0.16	17.13	0.84			
Improve in customer satisfaction	1.05	0.90	0.19	16.57	0.81			
Environmental performance						0.95	0.95	0.78
Reduction of wastes and emissions (air emission, waste water, and solid wastes)	1.03	0.89	0.21	16.07	0.79			
Reduction of environmental impacts of our products/service	1.03	0.87	0.24	15.71	0.76			

Decrease of consumption for hazardous/harmful/toxic materials	1.03	0.90	0.18	16.64	0.82			
Decrease of frequency for environmental accidents	1.00	0.88	0.23	15.76	0.77			
Reduction of energy and materials consumption	1.06	0.88	0.23	15.87	0.77			
Social performance						0.91	0.91	0.77
Improve in public image	0.98	0.90	0.19	16.10	0.81			
Improve in relations with stakeholders	0.93	0.91	0.17	16.50	0.83			
Improve in brand image	0.90	0.82	0.32	14.11	0.68			
Social desirability bias [a]						0.87	0.87	0.57
I am always courteous even to people who are disagreeable (reversed item)	0.94	0.78	0.39	12.70	0.61			
There have been occasions when I took advantage of someone	0.93	0.77	0.40	12.43	0.60			
I sometimes try to get even rather than forgive and forget	0.76	0.73	0.47	11.43	0.53			
I sometimes feel resentful when I don't get my way	0.80	0.73	0.46	11.60	0.54			
No matter who I am talking to, I am always a good listener (reversed item)	1.00	0.77	0.41	12.36	0.59			

Note: [a] Variable used as method variance marker.

[b] R^2: squared multiple correlation.