

Stakeholder pressures and Chinese manufacturing firms' green supply chain management: a configuration approach

*Dr Ruoqi Geng (Gengr@Cardiff.ac.uk)
Cardiff Business School, Cardiff University*

*Dr Dai Jing
Nottingham University Business School China*

Abstract

Drawing upon stakeholder theory, this study applies a configuration approach to acquire a deep understanding of how the pressures of different stakeholder groups work together with Chinese manufacturers to promote the adoption of GSCM practices. We test the hypotheses by a configuration approach with 418 responses from Chinese manufacturing sector. In doing so, several statistic techniques were applied such as factor analysis, cluster analysis, ANOVA test to investigate the heterogeneity between stakeholder pressures and the adoption of GSCM practices. Our results suggest that varying stakeholders are related to varying levels of the adoption of GSCM practices for Chinese manufacturers. Specifically, the results from cluster analysis categories three Chinese manufacturers with respect to the level in responding to the stakeholder pressures: sensible, cognizant and conscious manufacturers. This research contributes to stakeholder theory at a more detailed level than before in the related literature. By doing so, this research represents an important step toward refining the stakeholder theory and the adoption of GSCM practice in manufacturing companies in emerging economies.

Keywords: green supply chain management, stakeholder theory, configuration approach

Introduction

As the global production base, China is currently the world's largest and fastest-growing emerging economy, exporting a wide variety of merchandise and accounting for 40% of the worldwide manufacturing outputs of different products (Zhu et al., 2011). However, China has paid a high price for environmental issues, equivalent to 8% of its annual gross domestic product (Zhu et al., 2010). Environmental issues have been observed to be a critical factor affecting the prosperity of Chinese manufacturing enterprises. As a result, promoting GSCM practices in China has attracted significant interest among researchers and practitioners (Zhu et al., 2017). Literature has suggested that the transition from supply chain management to

GSCM in China are the result of diverse demands from various stakeholders, including customers, supply chain partners, government and community (Geng et al., 2017b). However, recent research indicates even though stakeholders put pressures on Chinese manufacturers to adopt GSCM (Gualandris et al., 2015), manufacturers often do not conform to the expectations of their stakeholders. That is, our understanding of the heterogeneity between different stakeholder groups remains limited. Therefore, our research is designed to analyse this paradox: how does the heterogeneity in responding to stakeholders' pressures relate to their adoption of GSCM practices among Chinese manufacturers?

Harrison and Freeman (1999) highlighted the need to consider the differences of large stakeholder groups to finer-grained understanding of stakeholders. Furthermore, stakeholders are interrelated rather than independent of each other (Freeman, 1983). As regards, understanding the inherent stakeholder heterogeneity may allow managers to manage the pressure from stakeholders. Thus, the configuration approach is a proper tool to fulfil our research question. With a configuration perspective, this paper aims to investigate different patterns of Chinese firms' awareness of stakeholder pressures, and the patterns' relationship with adoption of different types of green supply chain management practices. By elaborating a survey instrument, we collected a sample with 418 responses from Chinese manufacturing Companies. Statistics techniques, such as cluster analysis and ANOVA test were conducted for fulfilling these purposes. The results showed that three patterns were identified based on firms' awareness of stakeholder pressure from five groups --customer, supplier, competitor, government and community, and namely sensible manufacturers, cognizant manufacturers and conscious manufacturers. Firms with high awareness of stakeholder pressures (i.e. sensible manufactures) always perform more efforts on green supply chain management practices, including green supplier integration and green customer cooperation. However, there is no significant difference between cognizant manufacturers and conscious manufacturers on adoption of green supply chain management practices.

Grounded on configuration approach, this paper contributes to existing green supply chain management literature by providing another perspective that highlights the importance of stakeholder pressures on the adoption of green supply chain management practices, and also provides a comprehensive view on different green supply chain management practices and their drivers empirically. This study also offers practitioners guidelines for promoting green supply chain management.

Literature review

This study uses literature on stakeholder theory to help hypotheses development. We focus on how manufacturing responds to the pressures derived from a variety of stakeholders within the context of GSCM adoption. Previous studies highlight the notion that organisations often seek support from external stakeholders of a wide content in business management (Powell & DiMaggio, 2012; Surroca, Tribó, & Zahra, 2013). According to Freeman (2010, p. 46), stakeholders are defined as 'any group or individual who can affect or is affected by the achievement of the organization's objectives'. In this regard, stakeholders are able to affect the practices of organizations by exerting pressures on them. Specifically, stakeholders often exert pressures on an organisation through the evaluation of their own value system, current rules and laws, and social cognition (Powell & DiMaggio, 2012).

In terms of GSCM practices, previous research indicates stakeholder pressures lead to significant motivation for adoption in emerging economies (Geng et al., 2017b; Gualandris et al., 2015; Sarkis, Gonzalez-Torre, & Adenso-Diaz, 2010). However, despite the matter of such pressures, they appear to have different level of effect on the adoption GSCM practices. Specifically, some seem to matter more than others when the pressures originate from different stakeholder groups. For instance, Kassinis and Vafeas (2006) indicates the environments

practices for an organization are dependent upon various on the stakeholder group because of between-group heterogeneity. Similarly, Zhu et al. (2017) also highlights that the adoption of GSCM among some Chinese manufacturers are more dependent on some stakeholder group than on others.

The relationship between stakeholder pressures and the adoption of GSCM practices is rather a complex phenomenon. However, previous studies focus on draw conclusions on the causality between stakeholder pressures and the adoption of GSCM practices in the multidimensional phenomenon (Khidir ElTayeb, Zailani, & Jayaraman, 2010; Lee, 2008). In contrast, the configuration approach provides more detailed and comprehensive explanations for multidimensional phenomena in the multivariate combinations (Miller, 1986). With respect, the configuration approach assumes organizational elements are interrelated which provides a holistic view rather than piecemeal analysis (Vorhies & Morgan, 2003). Specifically, the propose of this approach is to determine an configuration of various elements and their relationships rather than the pairwise relationships (Flynn, Huo, & Zhao, 2010).

In this content, to yield superior adoption of GSCM practices, each stakeholder requires an ideal set of the level of pressures. Since different manufactures may have different level in responding to the various pressure of stakeholders, thus, various configurations of stakeholder pressures exist. These patterns of configurations can be described in terms of degree of pressure from stakeholders. The degree is the level or extent that manufactures responding to the stakeholder pressures.

Based on the above discussions, we posit the first hypothesis:

Hypothesis 1. Chinese manufacturers can be clustered into various groups regarding the different stakeholder pressures.

Stakeholder theory states that the pressures from stakeholders are important mechanisms to promote GSCM practices for Chinese manufacturing companies (Surroca et al., 2013). Therefore, in this study, we argue that Chinese manufacturing with higher levels of stakeholder pressures tend to have better adoption of GSCM practices. Specifically, a high level of stakeholder engagement is often considered a critical factor for successful adoption of environmental practices (Sarkis et al., 2010). Similarly, Huq, Chowdhury, and Klassen (2016) indicate that the high level of stakeholder engagement could create value for the focal company, thus, leading to broader value creation and performance increase. In emerging markets, stakeholders often push focal companies to provide transparent reports on their sustainability (Huq et al., 2016).

Specifically, the configuration between stakeholders are positively related to the adoption of GSCM practices. For example, the decision towards GSCM for small and medium sized (SMEs) manufacturers are usually affected by the requirements from customers (Sarkis et al., 2010). But, most SMEs lack human and financial resources with expertise on the adoption of GSCM practices (Geng et al., 2017a). Therefore, they require other stakeholders such as government support configured to adopt GSCM practices by providing information and knowledge sharing. Conversely, scholars highlighted the importance on exchanging in-depth knowledge with supply chain partners to attain superior adoption of GSCM with a dyadic perspective (Chen, Zhao, Lewis, & Squire, 2016; Hung, Chen, & Chung, 2014). Therefore, achieving the superior target in adopting higher level of GSCM practices involves complex coordination activities with various stakeholders (Gualandris et al., 2015; Harrison & Freeman, 1999).

Therefore, we posit the second hypothesis:

Hypothesis 2. The pressures from stakeholders for Chinese manufacturers are positively related to the adoption of GSCM, Specifically, manufacturers with higher stakeholders' pressures have better adoption of GSCM.

Method

The empirical setting in our study includes the stakeholder pressures and the adoption of GSCM practices by manufacturers in China. We randomly distributed 2000 questionnaires to manufacturing companies located in 11 industrial parks in the selected four regions based on the email addresses provided by the Sanjintong¹ database. A total of 440 questionnaires were returned with 418 being usable. Non-response bias can be considered a threat to the results when responses are the same as those of the people who declined to participate in the survey (Collis & Hussey, 2013). Therefore, we tested for non-response bias by comparing the responses of early and late respondents. A comparison of early and late respondents in terms of supplier advice and GSI practices indicated no significant difference. The results provide us with confidence that non-response bias is not a concern in our study. The issue of common method bias is likely to occur with single respondents in a survey study (Guide & Ketokivi, 2015). We took several procedural steps during the design stage based on the suggestions by (Podsakoff, MacKenzie, & Podsakoff, 2012). Moreover, we applied a Harmann's single factor test to check common method bias. This test uses confirmatory factor analysis for a post-hoc statistical analysis, the test did not identify any significant problems in the data set.

Data analysis

To test our propositions, as shown in Figure 1, four phases are applied for data analysis.

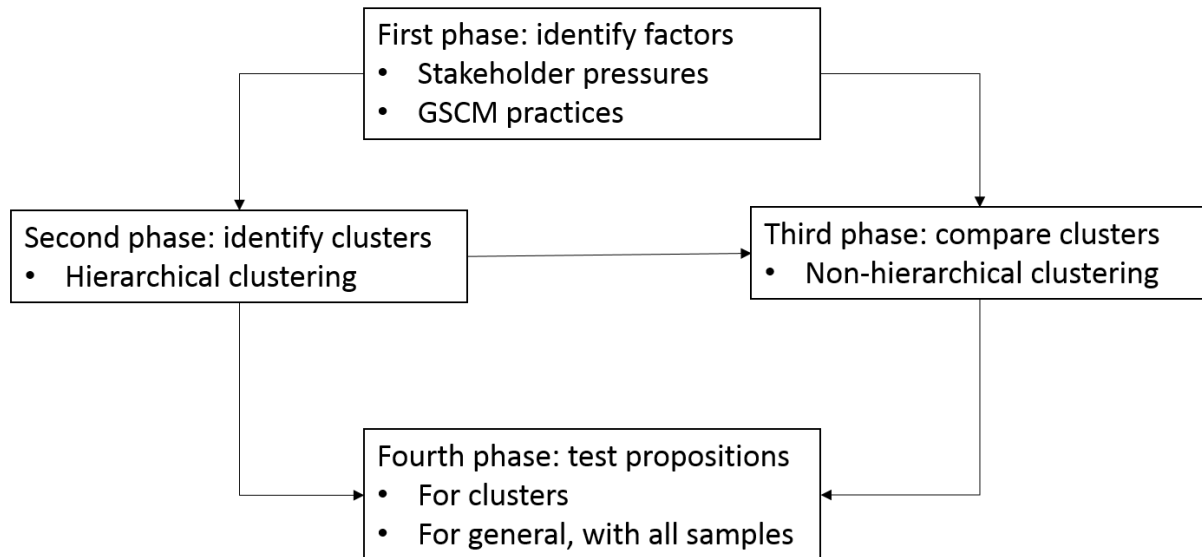


Figure 1. Four phases of data analysis

The first phase is to identify both stakeholder pressures and GSCM practices factors. Previous studies developed and confirmed five factors for stakeholders and two GSCM factors. Thus, this study applied confirmatory factor analysis rather than exploration factor analysis to confirm the theoretical dimensions of constructs. The second phase is to identify clusters to determine the difference for Chinese manufactures in responding to different stakeholder pressures. For this propose, a clustering analysis is performed by using both hierarchical and non-hierarchical methods. The third phase is to identify the differences among clusters. Therefore, after the hierarchical clustering, the non-hierarchical clustering, in this study, K-means are used. To examine if these three clusters are varying in stakeholder pressures, as can be seen from Table 1, this study applies a multivariate analysis of variance (MANOVA).

Table 1
Descriptive statistics and MANOVA results for stakeholders' pressures

Factors	Mean	SD	F	Significance of statistic, p	Mean		
					Cluster1 (N=224)	Cluster2 (N=103)	Cluster3 (N=91)
Suppliers' advice	3.8672	.59827	4.898	.000	3.9342	3.7136	3.8764
Customers' requirements	3.9608	.52285	7.833	.000	4.0473	3.8117	3.9165
Competitors' actions	3.9242	.59203	10.282	.000	4.0357	3.7314	3.8681
Community pressure	3.9707	.52304	2.574	.000	4.0145	3.8738	3.9725
Government regulations	3.9981	.54284	3.965	.000	4.0545	3.8738	4.0000
Model	Test		F	Significance of statistic, p			
Pillai's Trace			2.688	.000			
Wilks' Lambda			2.717	.000			

The fourth phase is to examine relationships between stakeholder pressures and the adoption of GSCM practices for each of the manufacturing clusters. By doing so, we further apply postdoc analysis to evaluate the pairwise differences between clusters. The results are shown in Table 3.

Discussions and conclusion

Our study investigated the relationship between stakeholder pressures and the adoption of GSCM practices for Chinese manufacturing companies. Our study clustered Chinese manufacturers regardless of their variations in responding to the stakeholders' pressures. We applied empirical taxonomy to examine the differences between stakeholder pressures as well as the adoption of GSCM practices. By doing so, three clusters have been identified, namely sensible manufacturers, cognizant manufacturers and conscious manufacturers.

For the first cluster, sensible manufacturers, suppliers' advice, in general, have the lowest value compared to other pressures. The organisational characteristics of the respondent show that sensible manufacturers are larger in term of size. This may be due to the fact that external pressures often hold large firms to higher standards in terms of acceptable environmental performance (Zhu et al., 2008b). Moreover, the adoption of GSCM practices for Chinese manufacturing companies are often resulted from their larger suppliers' successful experience (Zhu et al., 2008b).

In terms of the second cluster, cognizant manufacturers have the lowest value in responding to the stakeholder pressures among the three clusters. Looking at organisational characteristics of cognizant manufacturers shows that the majority firms are small and medium. Similar to previous literature, small and medium firms have lower awareness in responding to the pressures from stakeholders and the adoption of the GSCM practices. One of the reasons may be that most of the small- and medium-sized manufacturers lack the human and resources with expertise on adopting GSCM practices (Lee, 2008). In this regard, it is hard for them to make an effort in terms of managerial changes to respond to the environmental pressures from stakeholders (Zhu et al., 2008b). Joint-ventures are the largest group in this cluster, followed by private manufacturers.

The third cluster, conscious manufacturers, respond to stakeholder pressure to a lesser extent compared to sensible manufacturers in the first cluster. Organisational characteristics show that the majority firms are medium-sized and belong to private companies. This implies that medium and private companies are increasingly aware and respond to stakeholder pressure on

GSCM practices. Specifically, conscious manufacturers seem to have the highest value in responding to the government regulations. This may imply that medium-sized companies possibly have fewer resources and capabilities, so they are likely to be initiated to employ environmental practices due to government regulations. This result indicates that the government is playing a more important role driving SMEs to be interested in GSCM practices. Our result confirms the importance of government in diffusing GSCM practices for medium-sized companies.

This research has several limitations, which can be resolved in future research. Firstly, the hypotheses were tested using cross-sectional data that do not allow us to track the dynamic changes in stakeholder pressure. Future research may use longitudinal data to extend our understanding of the effect between stakeholder pressure and the adoption of GSCM practices. In respect, a longitudinal study could explore stakeholder pressure to GSCM practices at various stages. Second, the analysis of this study was based on a single respondent survey. In reality, the strategic decisions towards GSCM of a manufacturing company, such as GCC and GSI typically involve partners from the sides of both customers and suppliers. Thus, collecting dyadic data from different sides of the supply chain may provide strong empirical evidence for the green collaboration and help reduce common method bias. Third, we clustered the samples into three manufacturer groups. Although we applied MATLAB to gain full control of various parameters in clustering algorithms, having a larger sample size would be helpful for exploring the relationships between stakeholder pressure and the adoption of GSCM practices. Finally, the survey conducted in China may limit the generalisability of this study. As China has complex institutional mechanisms, such as *guanxi*, a Chinese culture-specific notion that plays a critical role in firms' business decisions and behaviour (Yen et al., 2011). Therefore, the findings of this study should be extended to other emerging economies with caution.

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