Article:

Shi, V.G., Baldwin, J., Koh, S.C.L. et al. (1 more author) (2017) Fragmented institutional fields and their impact on manufacturing environmental practices. International Journal of Production Research, 56 (1-2). pp. 431-446. ISSN 0020-7543

https://doi.org/10.1080/00207543.2017.1353712

Fragmented institutional fields and their impact on manufacturing environmental practices

Abstract

In the extant literature, manufacturing environmental practices have been attributed to institutional pressures. This study extends this view by observing how different levels of the institutional field (national level versus regional market level) would have varied effects on manufacturing environmental practices. We empirically investigate, using structural equation modelling, how different types of the manufacturing environmental practices react differently to pressures from a fragmented institutional field. Two distinct types of manufacturing environmental practices occur at the administrative planning operation and technical core operation. Our results confirm such manufacturing environmental practices at different operations lead to different performance benefits—the administrative environmental planning benefit market growth, whereas the technical core environmental practice benefit the environment. National level pressures do not lead to manufacturing environmental practices. Instead, the findings show that institutional pressures at the regional market level influence both types of manufacturing environmental practices. In the contribution, our study has offered an empirical examination of a fragmented institutional field and the impact on two types of manufacturing environmental practices. Further, we also explicitly identified administrative environmental planning that lead to market growth and technical core environmental practices that create environmental improvement.

Keywords Manufacturing environmental practices, fragmented institutional field, administrative environmental planning, technical core environmental practice, performance benefit

1. Introduction

Studies of manufacturing organization and the natural environment have recognized the essential role of institutional mechanisms (DiMaggio and Powell, 1983; Scott, 2013), which provide stability and collective meaning in influencing the adoption and implementation of manufacturing environmentally practices (Hoffman, 2001). Scholars have initiated the discussion around how manufacturing organization respond to institutional pressures and whether these pressures do, in fact, encourage homogeneous organizational responses, which in turn create a condition of 'institutional isomorphism' (DiMaggio and Powell, 1983). For example, manufacturers in pollution intensive industries are likely to face the same regulatory framework, similar media attention, community concerns and changes in consumer preferences (Berrone and Gomez-Mejia, 2009). As increasing numbers of manufacturing organizations incorporate a common institutional element, environmental practice at the field level become homogeneous in structure, culture, and output (DiMaggio and Powell, 1983).

Subsequently, some scholars have questioned the early definitions of isomorphism by highlighting that manufacturing organization operate in institutional environments (Scott, 2013), that the intensity of the regulative, normative and cognitive institutional pressure varies between organizations and that organizations confront diverse cultural frames (Hoffman, 2001; Greenwood, 2008). Consequently, work within manufacturing organization and the natural environment domain has turned towards understanding the different organizational responses to the presence of increasingly diversified institutional logic within their field (Delmas and Montes-Sancho, 2010; Sarkis et al., 2010; González-Benito and González-Benito, 2006).

Our research extends this line of discussion by empirically examining the implementation of manufacturing environmental practices. We advocate that the institutional field of manufacturing organization in the emerging market context is not monolithic (Hoffman, 2001) and that different market and non-market institutional field pressures result in dissimilar manufacturing environmental practices (Delmas and Toffel, 2008). We propose the fragmented institutional field consists of both national level environmental policies set out by the central government that are often generic, non-specific and far removed from the focal organization and regional market pressures from customer concerns, which are more cooperative and associated with closely tied relationships.

In our study, we adopt accepted concept from González-Benito and González-Benito (2006) focus on the administrative environmental planning (AEPs), such as mandatory environmental training and report commitment for establishing organizational environmental policy and environmental objectives, but the system itself does not mitigate environmental damage (Banerjee et al., 2003; Paulraj, 2011; González-Benito and González-Benito, 2006), and the technical core environmental practices (TEPs), such as clean technology implementation and recycling, which imply changes in the production and operations systems (Rao, 2002; González-Benito and González-Benito, 2006). We elevate this discussion by observing how institutional fields are fragmented, and how AEPs and TEPs of the manufacturing organization react differently to fragmented institutional pressures.

We contribute to the manufacturing environmental management debate, by offering a deeper understanding of institutional theory within metal fabrication manufacturing sector in an emerging market. Specifically, we collected data from aluminium fabrication producers that operate in China. These aluminium fabrication producers face strong coercive pressures from national level environmental regulations that police the main polluters and promote resource consumers to adopt environmental responsible practices (Zhu et al., 2005; Zhu et al., 2012). Producers that do not comply with regulatory requirements can face penalties and, in the worst case, cease to operate (Zhu and Sarkis, 2007). The results of these mandates have shown varying degrees of success (Barratt and Choi, 2007). Given the differences in their structural investment in environmental technologies and policy planning processes and struggles in balancing market growth with greater environmental sustainability, aluminium fabrication producers in China can provide a rich context to study the environmental practices and institutional process (Sarkis, 2001).

We intend to understand how different types of manufacturing environmental practices respond to the fragmented institutional field and to what extent the performance outcome varies. In this regard, we adopt organizational decoupling theory (Meyer and Rowan, 1977). This is because manufacturing plant managers are likely to differ both in their interpretation of environmental issues and their perceptions of which management practices constitute legitimate responses (Bansal and Roth, 2000). Therefore, we question how different operations within the manufacturing organization make changes when reacting to fragmented institutional pressures. This would have implications for both practitioners about how to structure manufacturing environmental practices, and to policy makers about how rules and regulations would encourage diffusion of institutionally sanctioned environmental practices (Scott, 2013). In summary, our study focuses on these unresolved theoretical issues in the literature and proposes two research questions:

1) How do manufacturing environmental practices at different operations respond to the presence of institutional pressures?
2) What would be the performance benefit?

2. Background and theory

This study wishes to understand how manufacturing organizations operate in a fragmented institutional field where manufacturing organizations respond to diverse cultural frames (Hoffman, 2011). Institutional theory has its origin in sociology and political science (Scott, 2013), bus has since been applied in environmental management context, suggest overtime organizational environmental response might converge due to variety of institutional factors (DiMaggio and Powell, 1983; Hoffman, 1999). Although previous research has highlighted the importance of similar theoretical approach such as stakeholder theory in influencing manufacturing firm's environmental behaviours (Yu and Ramanathan, 2015; Zhu et al., 2012; Zhu et al., 2005; González-Benito and González-Benito, 2006), but there is little empirical study to link specific stakeholder pressures and their impact on organizational level environmental responses and performance benefit. Similarly, scholars adopting natural resource based view (Shi et al., 2012; Klassen and Whybark, 1999; Vachon and Klassen, 2007) examines the environmental behaviour of manufacturing firm to competitive and performance benefit, but offered little empirical explanation to organizational level response to diversified institutional pressures. The resource and capability perspectives often see that the implementation of manufacturing environmental practices through institutional pressures is a compliance based approach, and that symbolic practices do not lead to a real performance impact (Choi and Eboch, 1998).

Studies adopting an institutional theory have argued in the institutional environment, manufacturing organizations are motivated to adopt legitimate behaviours and react to three types of institutional pressures, namely: coercive, mimetic and normative (Suchman, 1995; DiMaggio and Powell, 1983). Recognizing these institutional pressures reduces the probability of failures (Scott, 2013). Institutional scholars have also applied decoupling theory to explain the organizational level adoption of quality initiatives (Choi and Eboch, 1998), environmental standard certification (Aravind and Christmann, 2011), environmental auditing (Darnall et al., 2009), and technology implementation (Barratt and Choi, 2007). Findings show, externally, manufacturing organizations can craft their environmental strategies to prioritize expectations from stakeholders' most influential concerns (Bansal and Roth, 2000; Buysse and Verbeke, 2003), engage in environmental activities symbolically to respond to regulatory pressures and increase their legitimacy (Delmas and Montes-Sancho, 2010; Meyer and Rowan, 1977), whilst internally, manufacturing organizations are motivated to innovate and make changes in the increasingly diversified social structures (Owen-Smith and Powell, 2008). This decoupling enables manufacturing organizations to obtain legitimacy by meeting government mandates, whilst facing capacity constraints in their local circumstances, such as access to resources and required expertise at the technical core operations (Bhakoo and Choi, 2013). Therefore, it would be worthwhile investigating if institutional pressures drive manufacturing organizations to adopt and implement environmental practices and to ascertain whether certain conditions associated with these institutional pressures enable manufacturing organizations to make a real impact (Pagell et al., 2013). In addition, we also set out to understand how performance benefits differ from varying types of manufacturing environmental practices. We propose that a fragmented institutional field consists of both national policy level - and regional market level pressures. Within the organizational level manufacturing environmental practices consist of administrative environmental planning and technical core environmental practices.

2.1 National level pressures on manufacturing environmental practices

National level pressure from the government is the most direct mechanism of institutional diffusion (Delmas, 2002; Jennings and Zandbergen, 1995). Central government set out national policies that are often generic, non-specific and far removed from the focal organization. Central government typically impose national level environmental policies, through fines, penalties, and exposure for any non-compliance (Banerjee et al., 2003). As a result, manufacturing organizations with reactive environmental practices would attach high importance to government regulations (Buysse and Verbeke, 2003), failure to comply with these national level policies can affect their growth and survival (Banerjee et al., 2003). In particular, manufacturing organizations located in regions with stringent environmental regulations (Delmas and Montes-Sancho, 2010), are likely to be ultra-sensitive to avoid infractions (Bansal, 2005).

Studies show that national governments impose uniform regulatory pressures to encourage manufacturing organizations to adopt manufacturing environmental practices (Zhu and Sarkis, 2007), that national systems determines how organizations address their environmental responsibilities (Paulraj et al., 2014). Sanctions are applied to organizations if they appear to be environmentally illegitimate. In the emerging economies, national governing bodies set policies to modernize (or become greener by improving their carbon footprint) their manufacturing base to temper environmental harm associated with rapid economic growth (Zhu et al., 2005). Manufacturing organizations that do not comply with national policies can face penalties and, in the worst cases, cease to operate (Zhu and Sarkis, 2007).

Studies that embrace the neo-institutional economic paradigm argue that national level policies can be overstated because regulatory penalties and sanctions neglect the informal means of control (King and Lenox, 2000). Coercive regulatory pressures are often counterproductive and may result in workarounds that may have a detrimental effect on the quality improvement programme (Barratt and Choi, 2007). In some circumstances, institutional forces between the regulative and normative aspects can work against each other. This is because in the frame of regulatory compliances, environmental protection is often lamented as a regulatory constraint, which is deemed an unproductive intrusion to the manufacturing organization (Hoffman, 2001). In addition, less successful regulatory guidance can also waste an manufacturing organization's resources on the wrong environmental initiatives (Martin and Kemper, 2012). Therefore, without adequate technical support, training, and organizational structure and infrastructure, manufacturing organizations are not ready to implement suitable environmental practices to respond to national level environmental pressures (Barratt and Choi, 2007).

Building from this literature, our research conceptualizes that the most direct forms of institutional pressures at the national level are from the state or central government, and are generic and non-specific (Banerjee et al., 2003; Delmas, 2002).

2.2 Regional market pressures on manufacturing environmental practices

Regional market pressures are more cooperative and associated with closely tied relationships to the focal manufacturing organization, and hence often represent more relational institutional pressures on environmental issues (Banerjee et al., 2003; Christmann, 2004; Bhakoo and Choi, 2013; Paulraj et al., 2014). These pressures are distinguishable from the state policies because of they are less formal and that they seek flexibility and economic efficiency (Hoffman, 2001; Meyer and Rowan, 1977; Delmas and Toffel, 2008; Ketokivi and Schroeder, 2004). Instead of unidirectional state policy pressures, recognition of regional market pressures offers opportunity to manufacturing organizations to sense and fit their environmental practices to the real issues that concern them (Sharfman et al., 2004; Henriques and Sadorsky, 1999).

The literature suggests that regional market pressures emerge in diverse forms (Hofer et al., 2012; Delmas and Montes-Sancho, 2010; Bansal and Clelland, 2004). Regional customers may exert closely tied relational pressure on manufacturing organizations to consider their environmental impact (Koh et al., 2012; King et al., 2005). Across different industries, from airframe manufacturer to consumer electronic producers are requiring close collaboration with their value chain partners (Paulraj et al., 2014). Study shows the regional customer expectations can influence manufacturing organizations to improve their environmental practices (Delmas and Tofel, 2004; Lamming and Hampson, 1996). According to Oliver (1991) the intensity of inter-organizational relationships is facilitated by transparency and visibility, whilst close regional market ties that exist between focal manufacturing organizations and their business partners can accelerate diffusion of institutional norms (Bhakoo and Choi, 2013). The frequency of these interactions and their resource dependencies increase interconnectedness amongst manufacturing organizations, as they share their environmental knowledge with each other (Bansal and Roth, 2000).

Building from this literature, our research conceptualizes that the regional market pressures are more cooperative and associated with closely tied relationships to the focal organization. We adopt the perspectives from the aforementioned studies, such as pressures involving regional market concerns and expectations on manufacturing organization's environmental activities (Banerjee et al., 2003; Bansal and Clelland, 2004)

2.3 Administrative environmental planning (AEPs)

In this paper, AEPs refer to compliance-based practices to obtain environmental legitimacy, which is delivered through manufacturing environmental policy commitment to the government mandate and regional market concern (Hunter and Bansal, 2007; King and Toffel, 2009; Zhu et al., 2012; González-Benito and González-Benito, 2006). For instance, activities that require employees to attend environmental awareness training to comply with a government's cleaner production policy, and to demonstrate environmental policy commitment for marketing purposes (Banerjee et al., 2003) are considered forms of AEPs.

The literature suggests that the widespread use of signaling is AEPs response to external stakeholders (Darnall et al., 2009). Signaling is important because environmental information from products and services are often unclear to external stakeholders; thus signaling helps manufacturing organizations to gain acceptance from society as a whole (King and Toffel, 2009). According to Hunter and Bansal (2007) manufacturing organizations build AEPs response strategically to earn environmental legitimacy, avert negative public attention, and dispel negative stereotypes and biases. For instance, manufacturing organizations voluntarily disclose environmental information to gain support from the government (Christmann and Taylor, 2001; Bansal and Clelland, 2004). This bold move may also be a rhetorical flag to other external stakeholders, showing that the manufacturing organization adopts a high environmental standard (Wijen, 2014) by which it is attempting to shape the institutional environment (Scott, 2013).

Despite these benefits, AEPs may not necessarily become truly operational (Ramus and Montiel, 2005). According to Aravind and Christmann (2011) organizations decouple environmental management system implementation from certification, because certification does not distinguish between low and high quality implementers. Therefore, outcomes from AEPs do vary considerably among its adopters.

2.4 Technical core environmental practices (TEPs)

In our research, TEPs refer to environmental activities oriented towards creating value through maximizing technical process and operational efficiency; for instance, manufacturing design processes for recycling valuable materials from its daily operation (Klassen and Whybark, 1999; Rao, 2002; Zhu et al., 2012; González-Benito and González-Benito, 2006). The TEPs provides a contrasting approach to the AEPs. Whilst we argue that the latter is purely for responding to the government and external stakeholders in order to respond to national and regional market pressures, the former is the operational realism that delivers real impact on environmental performance responding to the regional market pressures. To this end, our research assesses the institutional effect of the TEPs in the context of manufacturing organizations, and posits the beneficial impact of the TEPs.

Manufacturing organizations operate within robust technical environments (Scott, 2013), thus there are many TEPs that can be identified from manufacturing production processes. According to Sharma and Henriques (2005) integration of ecological design principles at the industrial technical core have allowed for easy disassembly, re-use and closing the resource loop. Additionally, TEPs focus on design, production and service processes that stimulate technological advances and build operational efficiencies, such as the industrial design team creating eco-efficient products and production processes that fit technically with the manufacturing organization (Ansari et al., 2010).

Rao (2002) has shown that a firm's environmental initiatives, such as optimizing production processes and implementing cleaner technologies, reduction of waste and emissions, and improved compliances can enhance their economic and environmental performance. The development of environmentally friendly products encompasses many activities from design for product disassembly, recycling and re-use, resource efficiency and reduction of hazardous materials covering the entire product lifecycle (González-Benito and González-Benito, 2006; Zhu et al., 2012). This creates knowledge, competencies and an organizational culture that fosters innovative environmental practices (Sarkis et al., 2010). These TEPs are instrumental for manufacturing organizations to respond to the fragmented institutional pressures.

In summary, our paper suggests that the institutional field is fragmented into national level pressure and regional market level pressure in the context of manufacturing environmental practices. Furthering the understanding of fragmented institutional field can address the critical issues about manufacturing organizations and the natural environment in the context of the ways in which manufacturing environmental practices are decoupled at the administrative planning and technical core operations to respond to these institutional pressures.

Therefore, our paper provides an original discourse to theoretically and empirically explain the fragmented institutional field in manufacturing environmental management and operations. Our empirical study is based on a unique cultural context of metal fabrication manufacturing organizations in China. We set the research scope in this fast growing emerging economy, in order to understand the dynamics of the fragmented institutional field on different types of manufacturing environmental practices and its performance benefit.

3. Hypotheses development

Following on from the theoretical building blocks set out in the previous sections, we propose a theoretical model (see Fig. 1) of a fragmented institutional field, two types of manufacturing environmental practices, and performance benefits. We have identified six constructs in which to measure the model (see Table 1). Two constructs are used for the fragmented institutional field: namely national level pressures on manufacturing environmental practices (F1) and regional market level pressures on manufacturing environmental practices (F2). Manufacturing environmental practices are measured by AEPs (F3) and TEPs

(F4). We have also adopted two constructs to measure performance benefits: namely market growth (F5) and environmental performance (F6).

Insert Figure 1 Here

Insert Table 1 Here

Fragmented institutional pressures can create different manufacturing operational responses. Constituents are likely to differ both in their interpretation of manufacturing organizational environmental issues, and in their perceptions of which management practices constitute legitimate responses (Hoffman, 2001; Bansal and Roth, 2000). Therefore manufacturing organizations may intentionally create structures that decouple their technical core operations from the national level policy pressures (Meyer and Rowan, 1977).

National level policy influence on manufacturing environmental practices can be a threat to a manufacturing organization that is not demonstrating sufficiently that they care about the natural environment. Nevertheless, environmental regulations are effective in mitigating against environmental issues. For instance, the Toxic Release Inventory (TRI) in the United States, a policy that regulates toxic waste and emissions, sets a standardized environmental practice that organizations must undertake to remain within the law (Sharma and Henriques, 2005). Similarly, the European Union has banned the sale of 320 agricultural chemicals since 2003, thus affecting the export of pesticides and many agricultural products to which those pesticides are applied (Lawrence, 2011).

Responding to national policy pressure, manufacturing organizations that are compliant with environmental regulations can benefit from better access to resources than failing to meet the environmental regulations (Bansal and Clelland, 2004). Such compliance helps manufacturing organizations signal to the national governing body that manufacturers are taking decisive action against environmental issues (Rao and Holt, 2005; Darnall et al., 2008), thereby, the number of inspections is reduced by both internal and external stakeholders (Meyer and Rowan, 1977). For example, in response to the national cleaner production policy in China, it is mandatory that manufacturing organizations are required to form an internal audit team to evaluate environmental impact from production activities (Hicks and Dietmar, 2007). As a result of conforming to such national level environmental policy, manufacturers can take advantage of government support such as subsidies and claim environmental technology expenses as an operational cost (ibid).

Manufacturing organizations delegate responsibilities to their administrative environmental planning that then devise strategies that offset transgressions and remain legitimate to regulators and other salient stakeholders. The administrative environmental planning aim is to improve the appropriateness of its environmental actions within established institutional norms (Hoffman, 2001; Buysse and Verbeke, 2003; Roome and Wijen, 2006; Sharma and Henriques, 2005; Bansal and Roth, 2000; Frooman, 1999). As such, AEPs such as an environmental policy commitment to government and market, act as a buffering function to exclude external interference, and ensure compliance with national level environmental demand so that their technical core can focus on efficiency maximization (Delmas and Toffel, 2008; Darnall et al., 2009; King and Toffel, 2009; Hunter and Bansal, 2007). Consequently, we propose our first hypothesis as follows:

Hypothesis 1. National level policy pressures on manufacturing environmental practices have a direct impact on AEPs.

National level 'cast iron' environmental rules are often inflexible in addressing specific geographic, cultural, socio-political, and economic contexts (Meyer and Rowan, 1977; Ostrom, 2012; Wijen, 2014). Manufacturing organizations are not merely conforming to national level environmental policies, they are also adapting to local conditions. The regional market pressures are more cooperative and associated with closely tied relationships as they represent more visible concerns about environmental degradation (Christmann, 2004; Banerjee et al., 2003). According to Bansal and Roth (2000), the regional customers been instrumental in inducing organizational environmental responsibility, and found that auto manufacturers adopt emission control systems to avoid damaging relationships with regional market.

Manufacturing organizations adopt AEPs to communicate with regional markets about their environmental policies and commitment (Bansal and Clelland, 2004). According to Hunter and Bansal (2007), environmental policy communication is of particular importance for assessing an organization's environmental legitimacy, because external stakeholders may lack access to information about a manufacturers' environmental performance. Environmental practices are not easily visible to all stakeholders and other business partners that have non-existing strong strong tie relationships (Christmann, 2004). Therefore, managers adopt AEPs such as environmental communication strategies, and policy commitment to respond to institutional pressure from the regional market. With this logic, we formulate the second hypothesis as follows:

Hypothesis 2. Regional market pressures on manufacturing environmental practices have a direct impact on AEPs.

Manufacturing organizations also adopt TEPs to address resource security and sustainability concerns from the regional market (Koh et al., 2008; Vachon and Klassen, 2007). Regional market pressure such as customers in strong tie collaborative relationships may expect for greater visibility can provoke manufacturing organizations to develop environmental efficiency solutions at the technical core operations. Therefore, managers adopt cleaner technology processes, optimize processes to reduce waste and recycle valuable materials from daily operations (Rao, 2002; Zhu and Sarkis, 2004; Sarkis et al., 2010; Klassen and Whybark, 1999), to respond to regional market pressure for greater social and environmental obligations than merely achieving production goals (Linton et al., 2007; Bansal and Clelland, 2004; Delmas and Montes-Sancho, 2010). Thus, we posit our third hypothesis as follows:

Hypothesis 3. Regional market pressures on manufacturing environmental practices have a direct impact on TEPs.

Different types of manufacturing environmental practices can lead to diverging performance benefit (Walker and Wan, 2012). Our research distinguishes between the policy oriented AEPs and substantive relationship oriented TEPs. Manufacturing organizations engage in AEPs to gain legitimacy benefits from the government and the external market, such as the demonstration of management policies to guard against environmentally destructive activities (Klassen and Vachon, 2003; Darnall et al., 2008). AEPs help manufacturing organizations to sense market shift, create product and services offerings to environmentally sensitive customers, to posture a 'green' image and promote green marketing campaigns to enable growth. It has been identified that manufacturing organizations that demonstrate commitment to the natural environment are likely to increase market share (Menguc and Ozanne, 2005), through environmental protection and responsive marketing, leading to economic reward and growth. We thus propose our fourth hypothesis as follows:

Hypothesis 4. AEPs have a direct impact on market growth.

Manufacturing product and process development play a critical role in determining manufacturing environmental impacts (Johansson and Lindhqvist, 2005; Hagelaar and Van der Vorst, 2001). According to Johansson (2002) the supply chain, ranging from acquiring materials to manufacturing, use, and final disposal, should minimize environmental impact. In our study, TEPs include all stages of product development and manufacturing processes which strive for products and services that make the lowest environmental impact throughout its value chains. Previous literature has suggested that TEPs can connect to the local conditions and can form closer relationships with customers which can bring real environmental benefits (Müller et al., 2009; Halme et al., 2012; Ostrom, 2009). Manufacturers' closed-loop philosophy, in restricting the consumption of environmentally damaging raw materials to reduce environmental toxicity and waste (Zhu and Sarkis, 2004), is seen as an important TEPs. Whilst resource efficiency in production and operations determines the energy and waste to be managed, re-use of scrap and second hand materials also form part of the innovative TEPs. This leads to the minimization of pollution, re-use of materials and recycling initiatives at the technical core operations not only in the same sector but across different sectors. These combinations of TEPs are fundamental for resource efficiency which, in turn, lead to savings in raw materials, water, and energy usage across the supply chain. We thus present our fifth and final hypothesis as follows:

Hypothesis 5. TEPs have a direct impact on environmental performance.

4. Research design

4.1 The study sample

The empirical part for this study was conducted via hypotheses testing. The five hypotheses above were tested using structural equation modelling from data collected via a mail questionnaire survey of aluminium fabrication manufacturers in China. The identification of a single sector at a national level, which is similar to the approach taken by Sarkis et al. (2010), enables this research to isolate country specific and industry specific factors that may influence manufacturing environmental practices. Using data taken from a pre-survey analysis, the Chinese aluminium fabrication sector was found to be highly with a majority of small firms (less than 50 employees) without any underlying environmental treatment facility. However, our focus will be on larger manufacturing organizations as these attract more attention, are more exposed to external pressures and have a bigger impact on the natural environment, and they will naturally be more willing to improve their environmental performance. As a result, they will also allocate more resources to address environmental responsibility issues than smaller manufacturers. Environmental practices at the technical core operations require considerable resources, especially commitment from top management and a long term view (Delmas, 2002). Larger manufacturing organizations and market leaders are more likely to have resource and organizational flexibility to implement environmental practices (Hofer et al., 2012).

The organization database for this study was created based on the following criteria:

(1) Revenue over 20 million RMB;

(2) Organizations that had over 100 employees (from the Chinese Statistic Bureau classification on C3351 for aluminium fabrication and C3340 for non-ferrous metal fabrication).

This has resulted in a total population size of 391 manufacturing organizations, accounting for just over 60 percent of the entire aluminium fabrication sector in China. These 391 organizations make up our sampling basis for this research. The potential participants, within each manufacturing organization, were identified based on a contact list generated from supporting manufacturing organizations as well as the Chinese non-ferrous standard organization and a number of senior editors of top industrial journals, who were also very kind to help with the circulation of our survey. We were able to collect contact information for all 391 organizations. Data included telephone numbers, addresses and email addresses.

All 391 organizations were then contacted by phone to determine the most appropriate person to direct the survey, i.e., either senior managers or directors in the company and who were knowledgeable about environmental programmes. A final total of 108 organizations participated in the survey, resulting in a 27.6% response rate. This high response rate is due to the use of pre-notification, assurance of confidentiality and good contacts within leading firms. All the 108 participating organizations replied with multiple responses from their key informants, this provided a total of 320 responses. This is an average of, approximately, 3 responses per organization.

4.2 Measures

The measures used for the constructs in our research model appear in Appendix A. We conducted an extensive and critical literature review of environmental management, organizations and their natural environment, green supply chain management, institutional theory and strategic management. We then categorized our literature into three areas of environmental research involving institutional field level environmental pressures, manufacturing environmental practices and performance benefit. We studied the environmental management literature at the manufacturing plant facilities. We compiled a survey form (Likert type scale 1-5) by combining a conceptual construct established from earlier studies and our external expert panel for content validation to ensure the items were representative for defining our conceptual construct.

4.3 Common method variance bias assessment

We assess the discriminant validity of the construct by examining the degree of collinearity (John and Reve, 1982). Tabachnick and Fidell (2007) provide a guideline for assessing the significance of bivariate correlation with values of 0.90 or higher indicating significant collinearity. In this research, the issue of collinearity does not exist in the sample since all the bivariate correlations are below the threshold value of 0.80. We also adopt techniques suggested by Paulraj (2011) to examine the common method variance (CMV) by using confirmatory factor analysis to assess the potential CMV. Common method bias is an issue if a single factor accounts for all indicators. On the other hand, a worse fit for a single factor model suggests that CMV does not pose a serious threat (ibid). We assess indicators for six theoretical constructs. The fit for a single factor was considerably worse than the six factor model. Thus, this suggests that CMV does not create a problem in our data set. To assess inter-rater reliability and agreement, we computed the mean of item-level inter-rater correlations and within-group inter-rater reliabilities Rwg (James et al., 1993). The recommended level using the mean response of the firm is allowed when the Rwg coefficients of agreement is higher than 0.7 (LeBreton and Senter, 2007). As shown in Table 2, all the inter-rater agreement and reliability indicators of all constructs ranged between 0.78 – 0.90, which exceeds the thresholds recommended (Hair et al., 2006).

Insert Table 2 Here

4.4 Measure validation

We apply a confirmatory model to the dataset using the maximum likelihood approach in AMOS Version 22. The confirmatory model demonstrates that the multi-item scales adequately capture their respective constructs. The test score shows excellent model fit: The Chi-squared test with 120 degrees of freedom is 181.855 (Chi-square to the degrees of freedom = 1.515), IFI = 0.937, TLI = 0.917, CFI = 0.935, and RMSEA = 0.069.

Next, we examined the indicator loadings on their designated constructs to support convergent validity, a rule of thumb requires that all standardized factor loadings should be at least significant, and with the value greater than 0.5 and ideally 0.70 or higher (Hair et al., 2006). The result shows all items had a significant loading range from > 0.57 to > 0.96 (see Table 3).

We then assess the construct reliability by using Cronbach's alpha with a recommended level of 0.70 required (Byrne, 2001). Table 2 shows that except for market growth with a Cronbach's alpha value of 0.652, which indicates relatively weak reliability, all other constructs achieved reliability with an alpha value exceeding 0.70.

To evaluate the convergent validity, we compute the average variance extracted (AVE) for each construct, five of which exceed the recommended level of 0.5 (Fornell and Larcker, 1981), with the market growth construct achieving an AVE value of 0.488. We recognize this limitation, but considering that similar previous research (i.e., Sarkis et al., 2010) reported a construct with an AVE value of 0.437, the market growth construct remains unchanged in this study.

To test for the discriminant validity, a common approach is to compare the AVE for each construct with the squared correlation between any two constructs in the model (Fornell and Larcker, 1981). If the AVE for each construct is larger than the squared correlation between any two constructs (i.e. the variance shared between them), then discriminant validity is confirmed. We present the means, standard deviations, and correlations of the constructs in Table 3.

Insert Table 3 Here

4.5 Result of the relationship model

We adopted the structural equation modelling technique to empirically test our conceptual model theorised in this paper. This technique has quantitatively demonstrated the extent to which our five hypotheses are valid against empirical data. The causal relationships were translated into a series of structural equations in AMOS for each endogenous variable. We tested our hypotheses using the maximum likelihood approach. The fit indices suggest a satisfactory model fit: the Chi-squared test with 130 degrees of freedom is 183.578 (Chi-square to the degrees of freedom = 1.404), IFI = 0.943, TLI = 0.931, CFI = 0.941, and RMSEA = 0.061. Our results, shown in Fig 2, support the hypotheses, with the exception of H1.

Insert Figure 2 Here

5. Discussions and implications

5.1 Discussion

Traditionally, scholars adopt institutional isomorphism to explain the homogeneity of manufacturing environmental practices. They argue that organizations exhibit similar manufacturing environmental practices to reduce uncertainty and establish their legitimacy (DiMaggio and Powell, 1983). We posit the conditions of a fragmented institutional field, which interacts dynamically with different types of manufacturing environmental practices (Besharov and Smith, 2014; Fligstein and McAdam, 2011; Scott, 2013). This is because a competing institutional field can carry out negotiations over the issue of interpretation compared with an isomorphic dialogue (Hoffman, 1999). In particular, this study argues that the fragmented institutional field defines a manufacturing organization's environmental legitimacy in different ways, where the national level policies focus on the compliance to a rigid government mandate, whilst regional markets may concern themselves with the manufacturing flexibility and operational efficiency. To empirically examine this fragmented explanation of institutional field and two different types of manufacturing environmental practices, the environmental practices of aluminium fabrication facilities in China were surveyed.

The findings of this study indicate that AEPs were significantly related to regional market level pressures (H2). Our finding for H2 is consistent with the argument that the manufacturing organization adopts AEPs to gain legitimacy to regional market level pressures so that they avoid bad publicity. Our findings also indicate that AEPs have a positive impact on market performance (H4), such as benefit to growth and sales increase. In particular, AEPs can be strategically deployed to establish trusting relationships within the regional market. They help manufacturing organizations to sense and enable communication to regional markets about environmental concerns (Delmas and Toffel, 2008). Thereby, manufacturing organizations can attract and retain better partners, customers, and employees than poor performers (Berrone and Gomez-Mejia, 2009; Buysse and Verbeke, 2003; Sharma and Henriques, 2005). Our research demonstrates manufacturing organizations located in the emerging economies adopt AEPs as a result of institutional pressures from the regional market. Achieving environmental legitimacy helps manufacturing organizations to gain better access to resources (DiMaggio and Powell, 1983) and as a result, AEPs have benefited these manufacturing organizations with improved market performance.

The study shows the TEPs were significantly related to regional market level pressures (H3). We contribute to the view that regional market level pressures on environmentally friendly products, production processes and services are among the most important drivers on TEPs, such as the adoption of technologies and production processes to improve resource efficiency (Menguc and Ozanne, 2005; Buysse and Verbeke, 2003). In the emerging economy, environmental issues have become a vital concern to business investors (Sarkis et al., 2010). Regional customers expect manufacturing organizations to improve their environmental responsiveness, in particular when they outsource entire manufacturing processes. Thus, regional market level pressures catalyse manufacturing organizations to improve their processing technologies to be environmentally efficient. We also found TEPs have a significant impact on environmental performance benefit (H5). Our findings indicate that TEPs play an important role in minimizing environmental impact throughout the entire value chains. Our finding also supports the view that organizations that develop tacit knowledge to invest in proactive pollution prevention technologies can reduce waste generated from products and production processes (Klassen and Whybark, 1999; Ateş et al., 2012), and transform the developed technologies into environmental leadership as a source of competitive advantage rather than as a response to regulatory level pressures (Buysse and Verbeke, 2003).

Our findings support our argument that the economic growth along with environmental protection might create a fragmented environmental policy at the national policy level and efficiency objectives at the regional market level. In the case of the Ministry of Environmental Protection (MEP) in China has introduced plans to establish a ‘green GDP’ number, to include environmental costs in its calculations of the growth of the Chinese economy. The programs, of which MEP is just one, have been met with a largely negative reaction at the regional market level, where there is more concern with improving growth and creating new jobs. (EIU, 2012). Thereby the plans have weakened national level policy enforcement. Thus, instead of the response to the policy level mandate, manufacturing organizations’ AEPs might be more inclined to comply with regional level market pressure for better access to resources.

To our surprise, the national level policy pressure for manufacturing environmental practices has no impact on AEPs (H1). One possible explanation could be due to the data being collected from a single country and a single industrial sector. Manufacturing organizations in the same country and industry are likely to be facing the same or very similar national level pressures. Also, we have adopted ‘perceived’ national level pressure instead of ‘actual’ national level pressure. Non-significant national level policy pressures on AEPs is contrast to finding from earlier studies, scholars found the export market environmental regulations can encourage manufacturing organizations to implement proactive environmental practices (Zhu et al., 2005), and greater institutional regulatory pressure encourages organizations to adopt a more comprehensive environmental management system (Darnall et al., 2008).

5.2 Theoretical implications

There are three theoretical implications of this research for the study of the fragmented institutional field and the impact on manufacturing environmental practices. Firstly, this study builds upon the earlier work of the institutional field (e.g., Scott, 1987; Meyer and Rowan, 1977; Barratt and Choi, 2007). Our study has extended their construct by suggesting conditions of a fragmented institutional field which consists of national level policy pressures and regional level market pressures. Such an extension has improved the understanding of the fragmented institutional field, as manufacturing organizations energize environmental practices as a result of national policy and regional market levels becoming more aligned. This would lead to employment of both AEPs for legitimacy reasons and TEPs for efficiency reasons.

Secondly, we analyze decoupling theory within the manufacturing organizations and offer an alternative view to the traditional explanation of manufacturing environmental practices which converge into the form of institutional isomorphism (DiMaggio and Power, 1983). We enrich the basic argument in this stream by suggesting that decoupled manufacturing environmental practices consist of AEPs and TEPs. Therefore, we push the boundary of existing knowledge by distinguishing the fragmented view from the homogeneous prediction of institutional theory.

Thirdly, to our knowledge, there are no studies that have empirically examined the condition of a fragmented institutional field and the impact on different types of manufacturing environmental practices in an emerging economy context. For example, although Zhu and Sarkis (2004) have examined the institutional pressure on the adoption of green supply chain practices, their model was not built with perspective of different operations of manufacturing environmental practices. Similarly, Jiang (2009) has studied the compliance of the supplier code of conduct between multi-national firms and textile suppliers based in China. Their study primarily focused on the inter-organizational governance structures through a transaction cost economic perspective. As a result, these studies did not directly examine the differences in the fragmented institutional field, such as national level policy and regional market pressures on different operations of manufacturing environmental practices. Furthermore, other studies have attempted to examine different types of manufacturing environmental practices, for example, distinguishing between pollution prevention and pollution control technologies (Klassen and Whybark, 1999) and environmental monitoring and environmental collaborations (Vachon, 2007). Their studies did not, however, consider how fragmented institutional pressures would impact on these different types of manufacturing environmental practices.

6. Conclusions

We have assessed the fragmented institutional field and manufacturing environmental practices located in an emerging economy, as manufacturing organizations exist within an active technology oriented environment (Scott, 2013). Our study has further extended the work of Bhakoo and Choi (2013) in understanding the institutional field. Their research adopted case methods to examine the institutional effect on adoption of information systems in the healthcare supply chain. Our study has offered an empirical examination of a fragmented institutional field and the impact on manufacturing environmental practices. Further, we have also explicitly identified AEPs that lead to market growth and TEPs that create environmental improvement.

This study has some limitations. Our design did not incorporate competitive pressures (Hofer et al., 2012), and differences between early and late adopters of different manufacturing environmental practices (Delmas and Montes-Sancho, 2010). Early and late environmental actions are found to be shaped by different institutional pressures (Delmas and Montes-Sancho, 2010). Early starters of voluntary environmental certification are likely to experience greater stakeholder scrutiny to make credible environmental improvement claims which enable more visibility, and they are more likely to undertake substantive environmental activities because of 'real' needs. In contrast, late adopters are more likely to experience more radical organizational transformation, avoiding the cost of changes by adopting symbolic acts (Delmas and Montes-Sancho, 2010).

Although we have identified conditions of fragmented institutional pressure and the impact on manufacturing environmental practices, our research did not cover the environmental performance improvement impact on profitability (Russo and Fouts, 1997), and the transformation process (Bhakoo and Choi, 2013). Questions remain, for instance, how do manufacturing organizations internalize environmental values? When do exogenous institutional pressures transform to endogenous motivations? What factors prohibit endogenous drivers to hit the TEPs? We recommend that these questions might be of interest for future research into the relationship between manufacturing organizations and the natural environment. Therefore, future research needs to look into interactions at the institutional field level, such as adopting complementary theories to understand drivers of adopting environmentally responsible practices.

Appendix A. Survey (Likert-type scale 1-5)

National level pressure for environmental practices		Composite reliability: 0.764
Nation1	Regulation by government agencies has greatly influenced our firm's environmental strategy.	(Banerjee et al., 2003)
Nation2	Environmental policies can affect the continued growth of our firm.	(Banerjee et al., 2003)
Nation3	Stricter environmental regulation is a major reason why our firm is concerned about its impact on the natural environment.	(Banerjee et al., 2003; Bansal, 2005)
Regional market level pressure for environmental practices		Composite reliability: 0.885
Cust1	Our major customer expects environmental friendly product	(Banerjee et al., 2003)
Cust2	The market is very concerned about environmental destruction	(Banerjee et al., 2003; Delmas and Toffel, 2008)
Cust3	Information of pollution activities is visible to our business partners	(Banerjee et al., 2003; Delmas and Toffel, 2008; Bansal, 2005)
Cust4	Customers expect to share knowledge of environmental practices	(Banerjee et al., 2003)
Market growth		Composite reliability: 0.652
ECO1	We perceive our company have improved market share	(Rao, 2002; Rao and Holt, 2005)
ECO2	We perceive our company have increased sales	(Rao, 2002; Rao and Holt, 2005)
Technical core environmental practices		Composite reliability: 0.892
TCO1	We optimize entire lifecycle processes to reduce solid waste and emissions	(Rao, 2002; Zhu and Sarkis, 2004; Zhu et al., 2012; González-Benito and González-Benito, 2006)
TCO2	We use cleaner technology processes to make savings in energy, water, and waste	(Rao, 2002; Zhu and Sarkis, 2004; Zhu et al., 2012; González-Benito and González-Benito, 2006)
TCO3	We use internal recycling of materials within the production process	(Rao, 2002; Zhu and Sarkis, 2004; Zhu et al., 2012; González-Benito and González-Benito, 2006)
Administration environmental planning		Composite reliability: 0.766
Admin1	We highlight environmental policy commitment for marketing purposes	(Banerjee et al., 2003; Bansal and Clelland, 2004)
Admin2	We make ask every employee attend environmental awareness training for compliance with the government mandate	(Banerjee et al., 2003; González-Benito and González-Benito, 2006)
Admin3	We have a clear policy statement urging environmental awareness in every area of operations	(Banerjee et al., 2003; Bansal and Clelland, 2004; Zhu et al., 2012; González-Benito and González-Benito, 2006)

Environmental performance		Composite reliability: 0.859
ENVI1	We perceive our company have reduced Air emissions	(Rao, 2002; Zhu and Sarkis, 2004; Zhu and Sarkis, 2007)
ENVI2	We perceive our company have reduced waste water discharges to receiving water bodies	(Rao, 2002; Zhu and Sarkis, 2004; Zhu and Sarkis, 2007)
ENVI3	We perceive our company have reduced disposal of hazardous materials	(Rao, 2002; Zhu and Sarkis, 2004; Zhu and Sarkis, 2007)

References

Ansari SM, Fiss PC and Zajac EJ. (2010) Made to fit: How practices vary as they diffuse. Academy of Management Review 35: 67-92.

Aravind D and Christmann P. (2011) Decoupling of standard implementation from certification: does quality of ISO 14001 implementation affect facilities' environmental performance? Business Ethics Quarterly 21.

Ateş MA, Bloemhof J, Van Raaij EM, et al. (2012) Proactive environmental strategy in a supply chain context: the mediating role of investments. International Journal of Production Research 50: 1079-1095.

Banerjee SB, Iyer ES and Kashyap RK. (2003) Corporate Environmentalism: Antecedents and Influence of Industry Type. Journal of Marketing 67: 106-122.

Bansal P. (2005) Evolving sustainability: A longitudinal study of corporate sustainable Development. Strategic Management Journal 26: 197-218.

Bansal P and Clelland I. (2004) Talking trash: Legitimacy, impression management and the unsystematic risk of the natural environment. Academy of Management Journal 47: 93-103.

Bansal P and Roth K. (2000) Why companies go green: A model of ecological responsiveness. Academy of Management Journal 13: 717-736.

Barratt M and Choi T. (2007) Mandated RFID and Institutional Responses: Cases of Decentralized Business Units. Production and Operations Management 16: 569-585.

Berrone P and Gomez-Mejia LR. (2009) Environmental performance and executive compensation: An integrated agency-institutional perspective. Academy of Management Journal 52: 103-126.

Besharov ML and Smith WK. (2014) Multiple institutional logics in organizations: Explaining their varied nature and implications. Academy of Management Review 39: 364-381.

Bhakoo V and Choi T. (2013) The iron cage exposed: Institutional pressures and heterogeneity across the healthcare supply chain. Journal of Operations Management 31: 432-449.

Buysse K and Verbeke A. (2003) Proactive environmental strategies: a stakeholder management perspective. Strategic Management Journal 24: 453-470.

Byrne BM. (2001) Structural equation modeling with AMOS: Basic concepts, applications and programming, Mahwah, New Jersey: Lawrence Erlbaum Associates.

Choi TY and Eboch K. (1998) The TQM paradox: relations among TQM practices, plant performance, and customer satisfaction. Journal of Operations Management 17: 59-75.

Christmann P. (2004) Multinational Companies and the Natural Environment: Determinants of Global Environmental Policy Standardization. The Academy of Management Journal 47: 747-760.

Christmann P and Taylor G. (2001) Globalization and the Environment: Determinants of Firm Self-Regulation in China. Journal of International Business Studies 32: 439-458.

Darnall N, Henriques I and Sadorsky P. (2008) Do environmental management systems improve business performance in an international setting? Journal of International Management 14: 364-376.

Darnall N, Seol I and Sarkis J. (2009) Perceived stakeholder influences and organizations' use of environmental audits. Accounting Organizations and Society 34: 170-187.
Delmas M and Tofel MW. (2004) Stakeholders and environmental management practices: An institutional framework. Business strategy and the environment 13: 209-222.
Delmas MA. (2002) The diffusion of environmental management standards in Europe and in the United States: An institutional perspective. Policy Sciences 35: 91-119.
Delmas MA and Montes-Sancho MJ. (2010) Voluntary agreements to improve environmental quality: symbolic and substantive cooperation. Strategic Management Journal 31: 575-601.
Delmas MA and Toffel MW. (2008) Organizational responses to environmental demands: Opening the black box. Strategic Management Journal 29: 1027-1055.
DiMaggio PJ and Powell WW. (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review: 147-160.
EIU. (2012) Organising an investment: Environmental law. 1 February 2012 ed.: Economist Intelligence Unit - Country Commerce.
Fligstein N and McAdam D. (2011) Toward a general theory of strategic action fields*. Sociological theory 29: 1-26.
Fornell C and Larcker DF. (1981) Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research: 39-50.
Frooman J. (1999) Stakeholder influence strategies. Academy of Management Review 24: 191-205.
González-Benito J and González-Benito Ó. (2006) A review of determinant factors of environmental proactivity. Business strategy and the environment 15: 87-102.
Greenwood R. (2008) The SAGE Handbook of Organizational Institutionalism: Sage Publications Ltd.
Hagelaar G and Van der Vorst JGAJ. (2001) Environmental supply chain management: using life cycle assessment to structure supply chains. The International Food and Agribusiness Management Review 4: 399-412.
Hair JF, Tatham RL, Anderson RE, et al. (2006) Multivariate data analysis: Pearson Prentice Hall Upper Saddle River, NJ.
Halme M, Lindeman S and Linna P. (2012) Innovation for inclusive business: Intrapreneurial bricolage in multinational corporations. Journal of Management Studies 49: 743-784.
Henriques I and Sadorsky P. (1999) The relationship between environmental commitment and managerial perceptions of stakeholder importance. Academy of Management Journal 42: 87-99.
Hicks C and Dietmar R. (2007) Improving cleaner production through the application of environmental management tools in China. Journal of Cleaner Production 15: 395-408.
Hofer C, Cantor DE and Dai J. (2012) The competitive determinants of a firm's environmental management activities: Evidence from US manufacturing industries. Journal of Operations Management 30: 69-84.
Hoffman AJ. (1999) Institutional evolution and change: Environmentalism and the US chemical industry. Academy of Management Journal 42: 351-371.
Hoffman AJ. (2011) Talking past each other? Cultural framing of skeptical and convinced logics in the climate change debate. Organization and Environment 24: 3-33.
Hoffman JA. (2001) Linking Organizational and Field-Level Analyses, The Diffusion of Corporate Environmental Practice Organization and Environment 14: 133-156.
Hunter T and Bansal P. (2007) How standard is standardized MNC global environmental communication? Journal of Business Ethics 71: 135-147.
James LR, Demaree RG and Wolf G. (1993) rwg: An assessment of within-group interrater agreement. Journal of Applied Psychology 78: 306.

Jennings PD and Zandbergen PA. (1995) Ecologically Sustainable Organizations - an Institutional Approach. Academy of Management Review 20: 1015-1052.
Jiang B. (2009) The effects of interorganizational governance on supplier's compliance with SCC: An empirical examination of compliant and non-compliant suppliers. Journal of Operations Management 27: 267-280.
Johansson G. (2002) Success factors for integration of ecodesign in product development: A review of the state of the art. Environmental Management and Health 13: 98-107.
Johansson TB and Lindhqvist T. (2005) Management and policy for sustainable consumption and production. Journal of Cleaner Production 13: 967-969.
John G and Reve T. (1982) The Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels. Journal of Marketing Research 19: 517-524.
Ketokivi MA and Schroeder RG. (2004) Strategic, structural contingency and institutional explanations in the adoption of innvovation manufacturing practices. Journal of Operations Management 22: 63-89.
King AA and Lenox MJ. (2000) Industry self-regulation without sanctions: the chemical industry's responsible care program. Academy of Management Journal 43: 698-716.
King AA, Lenox MJ and Terlaak A. (2005) The strategic use of decentralized institutions: Exploring certification with the ISO 14001 management standard. Academy of Management Journal 48: 1091-1106.
King AA and Toffel MW. (2009) Self-regulatory institutions for solving environmental problems: perspectives and contributions from the management literature. Governance for the environment: New perspectives: 98-115.
Klassen RD and Vachon S. (2003) Collaboration and evaluation in the supply chain: the impact on plant-level environmental investment. Production and Operations Management 12: 336.
Klassen RD and Whybark DC. (1999) The impact of environmental technologies on manufacturing performance. Academy of Management Journal 42: 599-615.
Koh S, Gunasekaran A and Rajkumar D. (2008) ERP II: The involvement, benefits and impediments of collaborative information sharing. International Journal of Production Economics 113: 245-268.
Koh SCL, Genovese A, Acquaye AA, et al. (2012) Decarbonising product supply chains: design and development of an integrated evidence-based decision support system – the supply chain environmental analysis tool (SCEnAT). International Journal of Production Research 51: 2092-2109.
Lamming RC and Hampson J. (1996) The environment as a supply chain management issue. British Journal of Management 7: 45-62.
Lawrence P. (2011) Industry Special: Asia's paper companies face 'green' trade barriers. China Daily. Hong Kong, 29.
LeBreton JM and Senter JL. (2007) Answers to 20 questions about interrater reliability and interrater agreement. Organizational Research Methods.
Linton JD, Klassen R and Jayaraman V. (2007) Sustainable supply chains: an introduction. Journal of Operations Management 25: 1075-1082.
Martin R and Kemper A. (2012) Saving The Planet: A Tale Of Two Strategies. Harvard Business Review 90: 48-56.
Menguc B and Ozanne LK. (2005) Challenges of the "green imperative": a natural resource-based approach to the environmental orientation-business performance relationship. Journal of Business Research 58: 430-438.
Meyer JW and Rowan B. (1977) Institutionalized organizations: Formal structure as myth and ceremony. American Journal of Sociology 83: 340.

Müller P, Kebir N, Stark R, et al. (2009) PSS layer method–application to microenergy systems. Introduction to product/service-system design. Springer, 3-30.

Oliver C. (1991) Strategic Responses to Institutional Processes. The Academy of Management Review 16: 145-179.

Ostrom E. (2009) Understanding institutional diversity: Princeton university press.

Ostrom E. (2012) Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales? Economic Theory 49: 353-369.

Owen-Smith J and Powell WW. (2008) Networks and institutions. The Sage handbook of organizational institutionalism: 596-623.

Pagell M, Wiengarten F and Fynes B. (2013) Institutional effects and the decision to make environmental investments. International Journal of Production Research 51: 427-446.

Paulraj A. (2011) Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. Journal of Supply Chain Management 47: 19-37.

Paulraj A, Jayaraman V and Blome C. (2014) Complementarity effect of governance mechanisms on environmental collaboration: does it exist? International Journal of Production Research 52: 6989-7006.

Ramus CA and Montiel I. (2005) When are corporate environmental policies a form of greenwashing? Business & Society 44: 377-414.

Rao P. (2002) Greening the supply chain: a new initiative in South East Asia. International Journal of Operations & Production Management 22: 632-655.

Rao P and Holt D. (2005) Do green supply chains lead to competitiveness and economic performance? International Journal of Operations & Production Management 25: 898-916.

Roome N and Wijen F. (2006) Stakeholder power and organizational learning in corporate environmental management. Organization Studies 27: 235-263.

Russo MV and Fouts PA. (1997) A Resource-based Perspective on Corporate Environmental Performance and Profitability. Academy of Management Journal 40: 534-559.

Sarkis J. (2001) Manufacturing's role in corporate environmental sustainability-Concerns for the new millennium. International Journal of Operations & Production Management 21: 666-686.

Sarkis J, Gonzalez-Torre P and Adenso-Diaz B. (2010) Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. Journal of Operations Management 28: 163-176.

Scott WR. (1987) The adolescence of institutional theory. Administrative Science Quarterly: 493-511.

Scott WR. (2013) Institutions and organizations: Sage.

Sharfman MP, Shaft TM and Tihanyi L. (2004) A model of the global and institutional antecedents of high-level corporate environmental performance. Business & Society 43: 6-36.

Sharma S and Henriques I. (2005) Stakeholder influences on sustainability practices in the Canadian forest products industry. Strategic Management Journal 26: 159-180.

Shi VG, Koh SL, Baldwin J, et al. (2012) Natural resource based green supply chain management. Supply Chain Management: An International Journal 17: 54-67.

Suchman MC. (1995) Managing legitimacy: Strategic and institutional approaches. Academy of Management Review 20: 571-610.

Tabachnick BG and Fidell LS. (2007) Using multivariate statistics, Boston, Mass. ; London: Pearson/Allyn & Bacon.

Vachon S. (2007) Green supply chain practices and the selection of environmental technologies. International Journal of Production Research 45: 4357-4379.

Vachon S and Klassen RD. (2007) Supply chain management and environmental technologies: the role of integration. International Journal of Production Research 45: 401-423.
Walker K and Wan F. (2012) The harm of symbolic actions and green-washing: Corporate actions and communications on environmental performance and their financial implications. Journal of Business Ethics 109: 227-242.
Wijen F. (2014) Means versus Ends in Opaque Institutional Fields: Trading off Compliance and Achievement in Sustainability Standard Adoption. Academy of Management Review: amr. 2012.0218.
Yu W and Ramanathan R. (2015) An empirical examination of stakeholder pressures, green operations practices and environmental performance. International journal of production research 53: 6390-6407.
Zhu Q and Sarkis J. (2007) The moderating effects of institutional pressures on emergent green supply chain practices and performance. International Journal of Production Research 45: 4333-4355.
Zhu Q, Sarkis J and Geng Y. (2005) Green supply chain management in china: pressures, practices and performance. International Journal of Operations & Production Management 25: 449-468.
Zhu Q, Sarkis J and Lai K-h. (2012) Examining the effects of green supply chain management practices and their mediations on performance improvements. International journal of production research 50: 1377-1394.
Zhu QH and Sarkis J. (2004) Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. Journal of Operations Management 22: 265-289.