GREENING SUPPLY CHAINS: COMPLIANCE AND MONITORING-ORIENTED PRACTICES VS. COOPERATIVE-ORIENTED PRACTICES

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ABSTRACT
Companies use a set of practices known as Green Supply Chain Practices (GSCPs) to eliminate or reduce environmental impacts and to encourage environmental innovations in their supply chains. These practices include compliance and monitoring-oriented or cooperative-oriented practices. This paper examines the extent to which firms implement GSCPs and the ways they interact with their suppliers on environmental issues. Given the scarce research in this area, a multiple-case study method consisting of three manufacturing firms was adopted. The paper provides a depth understanding by examining each case individually and then builds an understanding of the similarities and differences using cross-case analysis. The findings suggest that firms use GSCPs with more stress on compliance and monitoring-oriented practices and less on cooperative-oriented practices. Further discussion and implications of the findings are presented.

KEYWORDS
Green supply chain practices, Compliance, Cooperation, Green, Multiple case studies, Australia.

1. INTRODUCTION
There is a growing interest in the academic research to study the interaction among supply chain actors regarding environmental issues (Srivastava, 2007; Testa and Iraldo, 2010; Sarkis et al., 2011). Green supply chain management (GSCM) is the term used for this emerging area of research, with origins of the literature in both environment management and supply chain management. GSCM is “an organizational philosophy that helps organizations and their partners to achieve corporate profit and market-share objectives by reducing environmental risk and impacts while improving ecological efficiency” (Azvedo et al., 2011, p.850).

GSCM challenges the customary view that focuses on a firm’s internal efforts to reduce the impact on the natural environment (Srivastava, 2007; Sarkis et al., 2011). It expands the focus outside the borders of a firm, examining inter-firm dynamics of supply chain members (De Marchi, 2010). Some studies suggest that greening supply chains not only create an opportunity for cost savings, but also enhance the financial performance and competitiveness of the firms (Carter et al., 2000; Rao and Holt, 2005).

The greening process usually starts with large buyer corporations and moves to upstream suppliers and, to a lesser extent, to downstream customers (Remmen and Holgaard, 2004; Vachon, 2007). The process of greening a supply chain requires firms to use a set of practices known as Green Supply Chain Practices (GSCPs) (Vachon and Klassen, 2006; Gavronski et al., 2011). Both buyers and suppliers are involved in implementing these practices, with the aim to eliminate or reduce environmental impacts (Azvedo et al., 2011; Gavronski et al., 2011).

This paper focuses on green supply chain management and explores the extent to which buyer organisations implement such practices and the corresponding ways they interact with their suppliers. It begins with a literature review of green supply chain management with a focus on the two types of green supply chain practices. Next, the research method used for this paper is discussed, followed by the findings of three case studies. The paper ends with a discussion of findings and conclusions.
2. LITERATURE REVIEW

To define and conceptualise green supply chain practices, Vachon and Klassen (2006) adopted—in the absence of a clear framework for green supply chain practices—the internalisation/externalisation framework from strategic management literature. Externalisation occurs when firms decide to employ a market-based mechanism for their activities, whereas internalisation incorporates those activities that are within the existing business hierarchy. Corresponding to the externalisation aspect of the framework, Vachon and Klassen (2006) propose, in relation to the environmental issues in supply chains, the adoption of practices oriented towards compliance and monitoring. To control and monitor the environmental activities of their suppliers, buyers exercise either a market-based mechanism or an arm’s length approach (Min and Galle, 2001). Often these practices do not require buyers to commit substantial resources to environmental initiatives outside their operations (Vachon and Klassen, 2008; Gavronski et al., 2011).

Compliance and monitoring-oriented practices can be broken down into two sets of activities. The first set concerns the selection of suppliers and purchasing (Choi and Hartley, 1996; Bala et al., 2008). Supplier selection includes those practices that buyers impose to ensure they source from environmentally friendly suppliers (Rao and Holt, 2005). The second set concerns an ongoing assessment of suppliers, (Delmas and Montiel, 2009) and monitoring the environmental performance of suppliers after their selection (Carr and Pearson, 1999). Either buyers themselves, or a third-party organisation, audits the supplier for their compliance with a set of environmental criteria (Zhu and Sarkis, 2004). Audits and monitoring practices ensure that suppliers constantly check and improve their environmental performance (Gavronski et al., 2011).

Cooperative-oriented practices correspond to the internalisation aspect of the internalisation/externalisation framework (Vachon and Klassen, 2006). These practices go beyond compliance and focus on cooperative activities between buyers and suppliers (Sinding, 2000; Sharfman et al., 2009). The joint efforts of buyers and suppliers to devise and develop environmental solutions characterises these cooperative practices (Simpson and Power, 2005; Vachon, 2007). Yarahmadi and Higgins (2012a) advance the argument that an incentive to cooperate with supply chain members is the sharing of valuable resources that each member alone does not possess. This incentive is competency-oriented as it assists members to obtain legitimacy from influential actors and to be aware of their social and regulatory obligations. Moreover, it is also compliance-oriented, because the actors must respond in a coordinated manner. For cooperative-oriented practices, firms must be involved directly and devote specific resources to address the environmental issues across the supply chain (Hines, 2001). Contrary to compliance practices, these practices are long-term investments. Therefore, it often takes a longer time for both buyers and suppliers to reap the benefits (Bowen et al., 2001).

From an analysis of three case studies of US assembly plants, Geffen and Rothenberg (2000) argue that cooperation with suppliers—supported by appropriate incentive systems—help the adoption and development of innovative environmental technologies whilst sustaining production quality and cost. They argue that a closer relationship enables suppliers to gain knowledge about the production processes of customers and as a result, they find solutions that better serve customer needs (Lamming and Hampson, 1996; Hines, 2001). Trust created through such partnership engenders suppliers to express their innovative ideas (Sharfman et al., 2009; Gold et al., 2010).

Compliance and monitoring-oriented and cooperative-oriented practices can be implemented concurrently, as they are not mutually exclusive (Vachon and Klassen, 2006). Nevertheless, firms may reduce the transaction costs associated with compliance and monitoring practices by building stronger relationships with their supply chain partners. Once a reasonable degree of trust is created, the act of monitoring suppliers may no longer be necessary (Zsidisin and Siferd, 2001).

3. RESEARCH GAP

There are several case studies and surveys that investigate the importance of green supply chain practices for environmental performance or competitiveness at either an organisational (Testa and Iraldo, 2010) or supply chain level (Rao and Holt, 2005; Azevedo et al., 2011). Nevertheless, scarce research was found in the pertinent literature (especially for Australian manufacturing firms) that explores and understands how buyer organisations use compliance and cooperative practices to green their supply chains. Therefore, two research
questions have been established, which focus on the need to better understand the extent of implementation and examples of green supply chain practices.

**Research question one:** Do firms use green compliance-oriented practices? Why and how do they implement these practices? And what do they achieve?

**Research question two:** Do firms use green cooperative-oriented practices? Why and how do they implement these practices? And what do they achieve?

4. METHODOLOGY

4.1 The Method

This research uses a qualitative case study approach to answer the research questions. Case study was deemed the most appropriate method, because it allows the study of a phenomenon under real and dynamic world conditions, especially when the boundaries between phenomenon and context are not evident (Maxwell, 1996; Yin, 2011). This methodology also helps to advance understanding on research areas in which theoretical insights are still under development, as the buyer-suppliers relations on environmental issues and the extent of execution of green supply chain practices.

Single case studies are advised if they represent rare and extreme events or are critical to meet all the conditions of the theory (Yin, 2011). Nevertheless, Yin (2011) argues that multiple case studies can be better than single cases, because they can create greater confidence in a study’s findings as well as allow greater generalization and improve the external validity of the analysis. Moreover, it is possible to control for similarities and differences with multiple case studies (Miles and Huberman, 1994; Yin, 2011). Therefore, it was decided to study three cases in this study. We, however, intend to carry on this research with more case studies as part of a larger study.

4.2 Sample

The setting for this study is manufacturing in Victoria, Australia. Manufacturing is the second largest contributor to the Victorian economy with over 16000 businesses. The decision to study manufacturing was made because manufacturing is vital for most countries and especially Australia and it accounts for a significant part of the world’s consumption of resources and generation of waste. Worldwide, the energy consumption of manufacturing industries grew by 61% from 1971 to 2004 and accounts for nearly a third of global energy usage. Manufacturing industries are also responsible for 36% of global carbon dioxide (CO₂) emissions (OECD, 2009). Manufacturing in Australia is a major contributor of greenhouse gas emissions (27.7% total emissions of Australian industry), ranking second to the agriculture industry, (Garnaut, 2008). According to Garnaut, the manufacturing industry’s total emissions were about 130 Mt CO₂-e in 2006. Contrastingly, they are among the largest green innovators (25% of all Australian industry) (Yarahmadi and Higgins, 2012b).

Three manufacturing firms were selected. The firms were deliberately selected to contrast situations (see Table 1). The selection was based on some key criteria. Given that this research tends to explore the green supply chain practices, it was important to approach firms that have already proven to be environmentally aware and have provided evidence of commitment to adopt or develop environmental practices. The firms selected were also medium or large size manufacturers with the ability to influence their suppliers. Based on meeting with academic and industry experts and the analysis of secondary data sources (e.g., environmental award winners, companies attending pertinent conferences, etc.) three companies were selected; one from automotive, one from clothing and the other from machinery and equipment sector.
Table 1. Demographic of interviewed firms

<table>
<thead>
<tr>
<th>Sector</th>
<th>Firm B1</th>
<th>Firm B2</th>
<th>Firm B3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive</td>
<td></td>
<td>Clothing</td>
<td>Machinery and Equipment</td>
</tr>
<tr>
<td>Size (number of employees)</td>
<td>139</td>
<td>A few thousands</td>
<td>180</td>
</tr>
<tr>
<td>Presence of an environmental department</td>
<td>Yes, embedded in the quality function</td>
<td>No, but has risk an compliance department that handles environmental issues</td>
<td>Yes, consisted of 6 employees</td>
</tr>
<tr>
<td>Environmental management system (such as ISO 14001)</td>
<td>Yes, ISO 14001</td>
<td>No</td>
<td>Yes, ISO 14001</td>
</tr>
</tbody>
</table>

4.3 Data Collection and Analysis

Seven interviews were conducted across companies. The data were collected from senior managers with responsibilities related to the subject matter in their working environment, such as environmental managers purchasing managers, etc. A semi-structured interview method enabled the rich capture of data and provided a higher flexibility to explore additional issues raised by interviewees. To supplement interview data, other information sources such as buyer’s websites and sustainability reports—if present—were used. Although, these sources were not extensively used; they were a means of triangulating the interview data and provided insight and context into main issues. The analysis of interview data entailed a detailed case by case analysis followed by a cross-case examination to find similarities and differences across the cases as suggested by Yin (2011).

5. FINDINGS

5.1 Case Study – Buyer One (B1)

Firm B1 is an automotive part supplier that has been in business for a long time. B1 has a supplier-rating scheme, which is used to evaluate suppliers against certain criteria such as quality, price, delivery, and environmental systems. The quality system is mandatory within the automotive industry. Therefore, supply network has to be qualified to ISO/TS16949:2009. Cost is also important for B1 because they are committed to reducing the cost for car manufacture every year. Similarly, delivery is a major concern. If, a line at a car manufacturer stops because of a shortage of supply, hefty penalties are imposed. Hence, the delivery target is 100%. However, an environmental system is not mandatory for the suppliers of B1.

The preference for B1 is that its suppliers have ISO14001. If not, they should have an environmental policy or employ some environmental activities such as recycling. To control for the conformity of suppliers with desired criteria, B1 monitors suppliers regularly and checks the expiry date of their certificates. If a supplier fails to meet the requirements, B1 first considers the extent that the failure is affecting its business and operations. In one occasion, B1 had to stop dealing with a supplier because the supplier did not have adequate OH&S, environmental and quality systems and was not willing to take any action.

Firm B1 meets with its suppliers on a regular basis and if an opportunity for improvement emerges that could help either B1 or the supplier they will act upon that. B1 has asked its suppliers to provide improvements suggestions and ideas against three criteria: the environment, quality and safety. There has been some positive feedback from suppliers. Initiatives range from recycling activities to changing to more efficient air conditioning and better work practices. An example was a plastic supplier who needed B1’s support to obtain ISO14001 certification. B1 worked closely with this supplier and helped them to obtain the certificate. In this example, B1 acted as the best practice for the supplier, so that the supplier could adopt and develop its own version.
"Our advantage is we had already done it. So rather than [the supplier] having to go and hire somebody, start from zero and learn about the company and think about what’s best and how to implement it, someone like (Operations leader) who knew the company and the practices can easily come up with efficient path to get there without having to explore ten different options, because of his experience in our own company”.

(Procurement manager)

Cooperation with suppliers has produced some mixed results concerning innovation. In some cases, suppliers propose new ideas, and in other cases, it is B1 that invites them to provide environmental solutions. However, most of the ideas for improvement that were proposed by suppliers relate to improvement in their own plant than them helping B1. Firm B1 trusts it suppliers because they know that suppliers have the knowledge of the product.

"We understand our own business, but we don’t necessarily understand the specific requirements of the products that we buy. So if we buy plastic parts as we did in the case of (…), we understand we want the part to be a certain size and consistent and that sort of thing. But the specific of how they make it is their specialty, not ours”.

(Procurement manager)

5.2 Case Study – Buyer Two (B2)

Firm B2 is a manufacturer of cloth. The company has hundreds of stores worldwide. It has a few thousands employees in Australia, which also includes employees in the retail sector. The company does not have an environmental department. However, it has a “risk and compliance department” that handles environmental issues. The major members of the supply network of B2 are overseas; A majority of participants are in China and some in Bangladesh and other Asian countries. This was apparently due to the lower cost of materials, which gives B2 a competitive advantage.

As part of the vendor agreement that each supplier must sign, one of the B2’s rules of trade is that suppliers do not harm the environment or at least do everything in their power to avoid it. To check for the compliance of the current suppliers, the company conducts audits twice a year and examines suppliers against ethical, environmental and quality requirements. B2’s expectation is in line with ISO standards ISO9001, ISO14001 and ISO18001 for quality, environmental, and health and safety issues, respectively. Nevertheless, since certification is difficult for all companies to obtain—as it was stated by the operations manager—B2 evaluates the suppliers only on the critical elements of those standards. The audits are conducted without notice: either by an internal team from B2 or a third party. Furthermore, the company prefers to source from suppliers that already have systems in place for managing environmental impact in preference to companies that do not meet the basic criteria.

If the company finds a gap in the environmental performance of its suppliers, it will issue a corrective action and a period to amend it. Depending on the extent of the non-compliance, the company goes back and reassesses the supplier. It is not only the environmental factors that suppliers are assessed for, but social factors as well. While environmental non-compliance of suppliers creates concerns for B2 and consequently results in demanding corrective actions, some social factors such as slave labour, bribery and corruption are not forgivable and result in termination of the relationship.

"When it comes to slave labour, bribery and corruption, those are the ones that if we identify that: there’s no business at all. With the other ones, on the other side of that, if the company shows no safety for the workers or completely lacks in general safety or serious environmental issues then we move away from the company”.

(Group compliance manager)

B2 raises the awareness of suppliers about its expectations through two or three seminars per year, where all of the suppliers come together (in China) for a day. At this seminar B2 explains to the suppliers how they are assessed and how they obtain their scores. Firm B2 has discouraged its suppliers to source material from suspicious regions. As far as cooperation is concerned, there wasn’t enough evidence to show B2 had developed environmental innovations by working with the suppliers, except some incremental innovations around packaging.

"We try and package efficiently so we don’t have excess cardboard in the cartons. We just want enough packaging to make sure the garment or the item of sale comes in the correct manner. Sometimes, you open the carton and there’s a carton inside a carton inside a carton, so we eliminate all excess, which is, in a sense, environmentally friendly”.

(Production manager)
The production manager believes the low involvement rate of suppliers is due to the way suppliers think they should serve the customer (in this case B2). Suppliers are not in the habit of recommending environmental innovative ideas. However, they may sometimes propose some non-environmental solutions that are welcomed by B2.

“We are not experts at everything we start doing. So usually when we find the supplier, if they are used to doing something more so than us, we will take everything, all suggestions on board”. (Production manager)

5.3 Case Study – Buyer Three (B3)

Firm B3 is a manufacturer of water-related equipment and has about 180 employees; B3 is certified to ISO 9001 and ISO14001 and sources its materials and products both locally and from overseas. Its final products are exported to many countries around the world. Firm B3 has an environmental policy that strongly emphasises the continuous improvement of its environmental performance. The company has adopted a proactive approach towards the environment since 2006 and has consequently won some environmental awards.

Due to the emphasis on reducing the waste, B3 places a strong focus on the packaging of incoming materials and parts. As part of the supplier agreement, B3 states that all packaging must be recycled paper, wood paper, and cardboard; and there should not be any polystyrene. Firm B3 has not incorporated environmental requirements in tenders or contracts and does not officially audit suppliers on environmental criteria. B3 doesn’t ask suppliers to provide any environmental management system such as ISO14001. Their audit of suppliers is purely quality driven.

“We’ve actually just done a new project where we import (...) from Thailand. We’ve been over there 3 times and it’s been discussed because they wanted to package it with polystyrene but we want everything to be recyclable... So, if we ask for more packaging, it’s going to be included in our piece price. We pay for it. We pay for the part to go from them to us”. (Quality manager)

Regarding cooperation with suppliers, there has been few times where B3 has worked with suppliers to develop some type of environmental innovations. At the time this research was conducted B3 was working closely with one of its suppliers to improve the energy efficiency of one of its main products. In another example that was mentioned, B3 suggested a supplier should remove and replace polystyrene caps used in an incoming part with recyclable cardboard. The supplier did so and as a result B3 sends the cardboard to a recycling company and gets $20 a tonne back. B3 relies on the knowledge and expertise of its supplier.

“(The supplier) would have more knowledge than we have. They are the experts; we just know what we want as a final result”. (Quality manager)

B3 is also holding seminars for its suppliers, although the focus is more on price and quality issues, the quality manager stated that next time they want to stress the importance of environmental innovations as well. B3 would like to show the best practices to its supplier and if suppliers require assistance they will be willing to help. However, it is the supplier’s task to fund and provide resources.

6. DISCUSSION AND CONCLUSION

A comparison of three case studies suggests that there are some similarities and some differences in the way purchasers implement GSCPs. In all three cases, buyers are implementing types of compliance and monitoring practices. For B1 and B2, practices constitute a formal process that affects the assessment and evaluation of suppliers along with other requirements. Even though environmental criteria are part of the suppliers’ rating, they are stated as preferences not mandatory requirements. All three buyers indicate that—when it comes to making a decision about whether or not to select or continue working with a supplier—they have less flexibility for price, quality and delivery in comparison to environmental qualifications of suppliers.

Regardless of the industry sector, all three cases demonstrate cooperation with suppliers on environmental innovations. However, we were not able to see many examples of such practices. The main reason for this could be that environmental issues are perceived as new areas for collaboration but are not historical suppliers’ measures. Another reason could be that environmental innovations are costly and the payback period of such investments is often longer than other business investments. Therefore, those firms who have access to limited fund prefer to invest it on joint initiatives that result in more immediate returns.
Firm B1, which constitutes best practice within its own industry has been conducting and supporting environmental initiatives for a period. B2 raised the environment requirement with its suppliers just one and a half years ago; B3 is also in the early stages of engagement with suppliers in relation to these requirements.

In implementing green compliance and monitoring-oriented practices, the three cases treat all of their suppliers in the same way. Contrastingly, for cooperative-oriented practices, buyers prefer to work with those suppliers who are keen and a major part of their business. One possible justification for such an approach is that compliance practices are less expensive to implement, while safeguarding buyers from the risk of breaching regulatory requirements due to the poor environmental performance of their suppliers. On the other hand, cooperative arrangements would not generate successful outcomes, unless participants dedicated resources and were willing to share their knowledge and capabilities, which in fact is not easy to handle.

When asking buyers about the impact of their practices on suppliers, it was seen that those compliance practices are to avoid risks and are not actually demanding more than legal requirements, which the majority of suppliers have already been able to achieve in spite of the pressure from buyers. These practices, at their maximum potential, have enforced suppliers to generate incremental innovations. For instance, B3 has enforced suppliers to change their packaging, in the same way that B1 and B2 have carried out similar actions. Whereas, cooperative-oriented practices exhibit more breakthrough and systematic changes as in the case of B1’s supplier, the partnership lead to the obtaining of ISO14001. Likewise, the cooperation between B2 and a supplier provided the opportunity to produce a more efficient product.

In conclusion, the two research questions raised earlier were answered by analysing these three firms. Buyers use both compliance and monitoring-oriented and cooperative-oriented practices to some degree. However, the results suggest that there is more emphasis on compliance practices and firms are in the early stages of incorporating environmental expectations into their supplier selection procedures. Cooperative practices are not yet well established and there were only limited occasional cooperation with suppliers on small environmental improvement projects. Further research could study how buyers and suppliers can move beyond compliance to cooperative practices and become more innovative in their supply chains with benefits to all supply chain members.

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