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The Role of SME Suppliers in Implementing Sustainability

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Summary

This paper explores sustainability in supply network from a small and medium-sized enterprise (SME) perspective. The paper provides a literature review of sustainability in supply chains and networks and defines related concepts and approaches. Two pilot case studies have been conducted in France exploring how large manufacturing companies engage SME suppliers in sustainability initiatives and the barriers and drivers for SME suppliers in becoming involved in such initiatives. The results provide tentative support for previous studies that suggest that a mentoring approach rather than a control or monitoring approach is more effective in fully engaging SME suppliers in sustainability initiatives.

Keywords: Sustainability, SCM, SME, supplier relationships, barriers, drivers

1. Introduction

Sustainability is no longer purely within the company's domain but has been expanded to encompass all activities along its supply network (Halldorsson et al., 2009). Companies are held accountable for their suppliers' sustainability performance even if they do not have direct influence on them or if they are located in other continents (Andersen and Skjoett-Larsen, 2009). Moreover, companies cannot achieve their sustainability objectives and targets without involving their supply network counterparts; it is insufficient to focus internally on improving the environment while suppliers provide harmful materials (Rao and Holt, 2005). Adopting a supply network perspective enables a holistic view for assessing and evaluating the impact of business activities and decisions on sustainability. Supply network decisions and activities have considerable impact on sustainability through, for example, choosing a particular type of material, packaging design, transportation modes and supplier selection and development (Carter and Easton, 2011). Thus, initiatives for sustainability improvement need synergy and cooperation with suppliers (Darnall et al., 2008).

SMEs play an important economic role in many economies and are critical for enhancing or deteriorating sustainability in supply networks. Accordingly, large firms and governments direct their attention towards increasing SME firms' engagement in sustainability initiatives (Jenkins, 2009). This includes providing assistance to SMEs in terms of financial resources, capabilities, know-how and expertise. However, research suggests that such strategies and approaches need to be devised carefully to take into consideration the heterogeneous characteristics of SMEs since simply transferring sustainability practices developed by large firms to SMEs has been found inappropriate (Pedersen, 2009). In addition, the motivation of SMEs' engagement in sustainability as well as their barriers for not engaging may differ from those of larger firms. There is a paucity of research on the role of SME suppliers in

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implementing sustainability in supply networks and in understanding the approaches used by large firms for engaging their SME suppliers in sustainability initiatives.

This paper begins by providing a literature review on the role of SMEs in enhancing sustainability performance within supply networks and identifies barriers and drivers for engaging SMEs in sustainability initiatives. Following a methodology section, two pilot studies conducted in France are presented. The paper concludes with by outlining the next stage of the research project.

2. The Role of SME Suppliers in Sustainable Supply Networks

SMEs play a critical but frequently underestimated role in sustainable development. A large portion of environmental risks concern SMEs: it has been estimated that the contribution of SMEs to pollution is app. 70% (Hillary, 2004). Therefore, SME suppliers are major players when it comes to achieving sustainability within a firm's supply network.

The particular characteristics of SMEs need to be taken into account when seeking their engagement in sustainability initiatives. Generally, SMEs lack financial and technical resources, capabilities, expertise and know-how to deal with sustainability and environmental issues (Pedersen, 2009). They face a dilemma of adopting sustainability requirements posed by their larger customers and at the same time transferring these requirements to their own suppliers. As they lack resources, skills and bargaining power, SMEs face difficulties to engage and seek cooperation of their suppliers in implementing sustainability activities. Moore and Manring (2009) argue that SMEs can overcome these shortcomings and enhance their sustainability through networking or forming coalitions with other SMEs.

Another feature of SMEs concerns their internal capabilities and resources that lead to different policies, practices and approaches for adopting sustainability initiatives (Williamson et al., 2006). SMEs lack formal management structures, and the perceptions and values of the owner affect the way SMEs approach sustainability (Jenkins, 2009). These characteristics pose problems for transferring sustainability tools and approaches adopted by large firms to SMEs, requiring adaptation and tailoring (Ammenberg and Hjelm, 2003; Williamson et al., 2006). Merritt (1998) states that "*SMEs are not merely smaller versions of large companies. Their internal structures, processes and cultures are different and they operate in different socio-economic environments. Attempts to improve the environmental performance of SMEs must surely be based on the development of novel approaches to environmental management that are sensitive to their heterogeneous natures and operating contexts*". However, SMEs often have positive characteristics that foster the rate of sustainability adoption: they are flexible, adaptable, creative, innovative, and less hierarchical so the owner can more easily champion sustainability programmes and facilitate employees' commitment (Talbot et al., 2007). Moreover, communication is easier within SME firms and improvements can be easily noticed (Jenkins, 2009).

Vachon (2007) and Vachon and Klassen (2006) identify two approaches towards engaging suppliers in sustainability initiatives: monitoring/control and mentoring. The monitoring and control approach include auditing suppliers' environmental performance, sending out questionnaires (Rao, 2002), gathering information and reports on suppliers' environmental performance, inspecting suppliers' materials for environmental performance (Lee and Klassen, 2008), and stipulating that suppliers achieve environmental management system accreditation such as EMAS and ISO 14001 (Lamming and Hampson, 1996). The mentoring approach is based on collaboration and close relationships between customers and suppliers (Vachon and Klassen, 2006). This approach focuses on education and training for suppliers (Min and Galle, 2001), involving suppliers in product design to consider environmental requirements, and providing financial assistance for suppliers to improve the environmental

performance of their processes, equipment and materials (Rao, 2002); the mentoring approach relies on mutual problem solving, and knowledge and expertise sharing with suppliers.

Vachon and Klassen (2006) suggest that the monitoring/control approach requires less time and fewer resources but it does not enable or verify the suppliers' actual sustainability performance. In the worst cases this approach may create 'green-washing' behavior. The mentoring approach fosters sustainability and environmental innovation of suppliers and provides access for suppliers to the required resources to build their environmental capabilities. However, it requires customers to allocate resources and investment to improve their suppliers' environmental performance (Rao and Holt, 2005).

3. SME barriers and drivers for engaging in sustainability initiatives

Several barriers and drivers have been identified in the literature affecting SMEs engagement in sustainability initiatives. The barriers and drivers are grouped and classified into two categories as shown in Table 1. The first category is concerned with SMEs capabilities where style of management and organizational issues can foster or hinder SMEs' engagement in sustainability initiatives. Availability of financial resources has been cited frequently as a driver or barrier for SMEs' engagement. The second category can be considered as external to SMEs and is related to the supply network such as pressure from customers, government, responding to regulations and laws.

Table 1. Drivers & barriers for SMEs' engagement in environmental and sustainability initiatives

<i>Drivers/ Barriers - SME Capabilities</i>		<i>Drivers/Barriers-Supply Network</i>
Management & Organization	Financial Resources	---
<p><i>Drivers:</i></p> <ul style="list-style-type: none"> ▪ Commitment (Darnall et al., 2008) & environmental championing by top management (Lee, 2008; Lee and Klassen, 2008) ▪ Values and beliefs of the top management (Cambra-Fierro et al., 2008) ▪ Genuine concern & compassion of the management to the welfare of its employees (Baden et al., 2009) ▪ Existence of environmental awareness (Lee, 2008; Lee and Klassen, 2008; Wycherley, 1999) ▪ Response to stakeholders (Seuring and Müller, 2008) ▪ Teamwork & knowledge sharing between employees (Darnall et al., 2008) ▪ Skills & expertise (Darnall et al., 2008) ▪ Increasing staff motivation (Baden et al., 2009) <p><i>Barriers:</i></p> <ul style="list-style-type: none"> ▪ Lack of top management commitment (Min and Galle, 2001; Revell and Blackburn, 2007) ▪ Lack of management time (Hitchens et al., 2003; Simpson et al., 2004) 	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> ▪ Cost saving & economic benefits (Cambra-Fierro et al., 2008; Williamson et al., 2006; Wycherley, 1999) ▪ Availability of financial & technical resources (Lee, 2008; Lee and Klassen, 2008) ▪ Availability of infrastructure (Wycherley, 1999) ▪ Fear of reputation loss (Seuring and Müller, 2008) ▪ Complying with environmental standards for tendering purposes (Baden et al., 2009) ▪ Seeking competitive advantage & differentiation in the market (Baden et al., 2009) 	<p><i>Drivers:</i></p> <ul style="list-style-type: none"> ▪ Pressure from customers (Darnall et al., 2008; Lee, 2008; Lee and Klassen, 2008; Seuring and Müller, 2008; Williamson et al., 2006) ▪ Green supply chain practices of the customers (Lee, 2008; Lee and Klassen, 2008) ▪ Responding to regulations, laws & local authority pressure (Seuring and Müller, 2008; Williamson et al., 2006) ▪ Responding to environment & social pressure groups (Seuring and Müller, 2008) ▪ Trust in long-term relationship (Wycherley, 1999) <p><i>Barriers:</i></p> <ul style="list-style-type: none"> ▪ Lack of buyer & supplier awareness toward environment (Min and Galle, 2001) ▪ Lack of supply chain pressure

<ul style="list-style-type: none"> ▪ Culture & attitude toward environment and change (Hitchens et al., 2003; Revell and Blackburn, 2007; Wooi and Zailani, 2010; Wycherley, 1999) ▪ Lack of environmental awareness (Wooi and Zailani, 2010; Zhu et al., 2008) ▪ SMEs' perception that their impacts on environment is minimal (Simpson et al., 2004) ▪ SMEs are heterogeneous & operate in different contexts (Merritt, 1998) ▪ SME firm is family oriented (Wooi and Zailani, 2010) ▪ Prevalence of self-interest (Wycherley, 1999) ▪ Perception of no benefits from improving environmental performance (Merritt, 1998; Revell and Blackburn, 2007) ▪ Perception of environmental management as financial burden (Revell and Blackburn, 2007) ▪ Lack of human resources (Simpson et al., 2004) ▪ Lack of skills, know-how & technical expertise (Hitchens et al., 2003; Lee, 2008; Lee and Klassen, 2008; Revell and Blackburn, 2007; Wooi and Zailani, 2010) ▪ Shortage of information (Lee, 2008; Lee and Klassen, 2008; Wycherley, 1999) 	<ul style="list-style-type: none"> ▪ Developing competitive advantage by building a positive image in the market (Cambra-Fierro et al., 2008) <p><i>Barriers:</i></p> <ul style="list-style-type: none"> ▪ Lack of financial resources (Lee, 2008; Lee and Klassen, 2008; Simpson et al., 2004; Wooi and Zailani, 2010) ▪ High cost of environmental programs (Min and Galle, 2001; Seuring and Müller, 2008; Wycherley, 1999) ▪ Uneconomic benefits of recycling activities (Min and Galle, 2001) ▪ Unavailability of capital for investment in environmental initiatives (Hitchens et al., 2003) ▪ Existing investments & information systems which are costly to change (Wycherley, 1999) 	<p>(Revell and Blackburn, 2007)</p> <ul style="list-style-type: none"> ▪ Lack of bargaining power of SMEs (Zhu et al., 2008) ▪ Negative reaction from other actors in the supply chain (Wycherley, 1999) ▪ Mistrust & confidentiality between partners (Wycherley, 1999) ▪ Insufficient or missing communication in the supply chain (Seuring and Müller, 2008) ▪ Lack or loose of governmental regulations (Min and Galle, 2001; Wycherley, 1999) ▪ Improper communication between government & SMEs (Merritt, 1998) ▪ Lack of awareness of existing environmental regulations (Revell and Blackburn, 2007; Simpson et al., 2004) ▪ Lack of standards & auditing programs (Min and Galle, 2001)
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The literature review identified the main approaches for engaging suppliers in sustainability initiatives including barriers and drivers that face SME suppliers when engaging in such initiatives. However, there is a paucity of research on the role of SME suppliers in improving sustainability in supply networks and the approaches used by large companies for engaging their SME suppliers in sustainability initiatives. Thus, the following research questions are addressed in this research:

1. *How do large companies seek to engage SME suppliers in sustainability initiatives?*
2. *What are the main barriers and drivers that face SMEs when engaging in sustainability initiatives driven by large customers?*

4. Research Methodology

The research reported in this paper is part of a larger study that investigates the role of SMEs in implementing sustainable supply networks. Here we report on two pilot studies conducted in France that will lead to in-depth case studies. Two large, focal, companies were selected based on their reputation as industry leaders. The first company is an aircraft manufacturer and the second company operates in the heat, ventilation and air conditioning (HVAC) industry. In each case the large company was interviewed followed by interviews with SME suppliers selected based on snowball sampling; these SMEs were recommended by the focal firms based on their participation in the focal firm's sustainability/environmental initiatives launched.

Out of ten SMEs contacted, one SME supplier of the aircraft manufacturer (hereafter ACM) and three SME suppliers of the HVAC company (hereafter HVAC) agreed to

participate in the study. As SMEs usually do not have a formal position for environmental or sustainability management, the responsibility for environmental and sustainability can be found under functions such as purchasing and SCM. At ACM, two interviews were conducted with the supply chain manager and environmental manager. At HVAC, the group SCM responsible for green SCM was interviewed. Other interviewees with SMEs involved managers of sales, environment, technical and project.

Semi-structured interviews were conducted face-to-face, digitally recorded and with average interview duration of one hour. Other sources of information included company reports and presentation material. The interviews were transcribed and coded, relating data to the main research themes. A cross-case comparison matrix has been built in order to show similarities and differences between companies in terms of barriers, drivers that face SMEs engagement in sustainability initiatives and sustainability practices of the interviewed companies. Coding results are shown in Appendix A.

5. Results and Discussion

This section describes the two pilot studies that involved two large companies and their SME suppliers. The section also provides the results of the interviews and findings in relation to the research questions.

5.1 Pilot Studies

The first case involved an aircraft manufacturer (ACM) which has multiple plants and a wide supply base that stretches over several continents. The plant where interviews took place fabricates composite materials used in the interior and exterior parts of the aircraft. The company has a central department responsible for environmental management and certifying plants with ISO 14001. The SME supplier interviewed has a long-term relationship with ACM and provides thermosetting and thermoplastic materials used for insulation. A corporate department has overall environmental responsibility and two representatives in each plant are responsible for managing environmental and health and safety issues.

In the second case, the focal company (HVAC) operates in different European countries; recently its business model has been subjected to change to focus more on renewable energy such as solar energy. Four years ago the company launched a sustainability programme to address the three pillars of sustainability (social, environment and economic) within its plants. The company is ISO 14001 certified and is gradually implementing audits for evaluating suppliers' sustainability performance. Thus, sustainability and environment issues are major priorities. Three SME suppliers agreed to participate in the study. One SME provides plastic parts and control panels for boilers. There is no formal department for environmental management, environmental activities are monitored by the production manager, and the company has no ISO 14001 certificate. The second SME supplies front panels and mechanical boiler parts and also has no ISO 14001 certification. The third SME supplies thermostat items and boiler displays. An environmental head is responsible for maintaining ISO 14001 certification and controlling environmental activities. The three SME suppliers have long-term relationships with HVAC company and cooperated in projects such as product design and development.

The findings from the two cases show different approaches adopted by the large companies towards involving SME suppliers in environmental sustainability initiatives. The interviewees in the focal and SME companies cited a variety of barriers and drivers for engaging in sustainability initiatives.

5.2 Engaging SMEs in sustainability initiatives

Aircraft industry has been subjected to pressure from customers for manufacturing more environmentally-friendly aircrafts with less fuel consumption and CO₂ emission. ACM launched several initiatives and projects to meet these customer requirements. For example it uses composite materials in the body of the aircrafts to reduce their weights and accordingly reduce fuel consumption and CO₂ emission. Another project is going on for improving aircraft engine efficiency. Currently, ACM is engaged with improving its painting process to be free of Chromate materials.

ACM has a code of conduct which guides internal employee behavior and also external parties including suppliers. However, this has not been translated into improving its suppliers' sustainability performance. For example, the company's current efforts have been focused on certifying its plants with ISO 14001 and achieving internal environmental improvements such as reduction in water, gas and electricity consumption, optimizing the logistics network through changing transport routes and avoiding empty freights. ACM stipulates that suppliers be ISO 14001 certified; this is monitored as part of supplier audits or during the process of supplier selection. There is no formal evaluation of suppliers' sustainability and environmental performance. Moreover, there is no strategy or plans for developing suppliers' sustainability performance or providing funds, education or training. Thus, there is little pressure from ACM on suppliers for improving their sustainability/environmental performance. As indicated by the interviewed SME supplier, the main priority is to focus on operations performance, especially cost reduction and on time deliveries.

In the second case, there were many sustainability/environmental initiatives launched by HVAC. Some initiatives were internal and related to e.g. water reduction and electricity and plant insulation to reduce energy consumption. Other initiatives involved suppliers such as modifying components design to comply with eco-design requirements and using reusable packaging materials. In cooperation with suppliers, the company launched a project for optimizing its transport network by increasing the loading factor in trucks and applying intermodal solutions to have direct deliveries from suppliers to reduce cost and CO₂ emissions. To achieve that, the company built a website for exchanging inventory and materials information with suppliers in order to organize materials replenishment and transportation. In some cases, suppliers were engaged in redesigning components to improve loading factor in trucks; in new product development, suppliers were involved in materials selection to avoid using hazardous materials.

HVAC plays an important role in fostering its SME suppliers' sustainability performance. For example, designing some components to reflect eco-design requirements and optimize components transportation was achieved by close collaboration with SME suppliers. Also, there were joint coordination efforts between the three SME suppliers on issues such as transportation and packaging design. The SME supplier supplying boiler displays, launched initiatives for improving its sustainability performance, conducted carbon footprint analysis of its plant and was in the process of including sustainability/environmental criteria in its supplier selection and evaluation process. The company aimed to cascade sustainability requirements further into its supply network.

5.3 Barrier & drivers

Interviewees identified many drivers for engaging in sustainability initiatives. The main drivers for ACM were to comply with regulations and fulfill its customer request for building green aircrafts with less fuel consumption and CO₂ emission. HVAC identified that the main drivers were reaping economic benefits, cost reduction and achieving differentiation in the market by being green. Other drivers identified by SME suppliers included exploiting

sustainability for marketing purposes, responding to supply network pressure, improving working conditions, and finding solutions for environmental problems.

6. Conclusion

This study aimed to explore the approaches used by large companies for engaging their SME suppliers in sustainability initiatives through pilot studies in France that involved two large firms and selected SME suppliers. The results from the pilot studies appear to resemble both the collaborative mentoring approach (HVAC) and the monitoring and control approach (ACM). The literature and our findings suggest that engaging SMEs in sustainability initiatives is complex and requires careful consideration to capture SMEs' patterns, behavior and attitudes toward adoption of sustainability initiatives. As Baden et al. (2009) argue, the main driver for SMEs engagement in sustainability activities is not external pressure but internal drivers based on moral and ethical values.

A variety of barriers and drivers for engaging SME suppliers in sustainability initiatives were identified through the interviews. All the barriers and drivers raised by the interviewees were also identified in the literature review. However, interviewees stressed that the availability of know-how, owners' beliefs and the prevailing culture at SMEs were the most important barriers or drivers for their engagement in sustainability initiatives. This emphasizes the importance of taking into consideration the heterogeneous characteristics of SMEs when seeking their engagement in sustainability initiatives.

Several research avenues emerge from this study which was confined to two pilot studies where one was even limited to one SME supplier. Conducting multiple case studies that involve companies from different industries may reveal more pros and cons of the mentoring and control approaches used by large firms when they engage their SME suppliers in sustainability initiatives. The role of SME firms in engaging their suppliers or conveying sustainability requirements to their supply networks remains largely unexplored. Therefore, the following research questions have been developed and will be investigated in a larger research study that involves multiple case studies:

- *How do SME firms engage their suppliers in sustainability initiatives?*
- *How do sustainability initiatives launched by large companies spread to SME suppliers and the supply network?*

7. References

- Ammenberg, J. and Hjelm, O. (2003). "Tracing Business and Environmental Effects of Environmental Management Systems – a Study of Networking Small and Medium- Sized Enterprises Using a Joint Environmental Management Systems". *Business Strategy and the Environment*, 12, pp. 163-174.
- Andersen, M. and Skjoett-Larsen, T. (2009). "Corporate social responsibility in global supply chains". *Supply Chain Management: An International Journal*, Vol. 14 No. 2, pp. 75- 86.
- Baden, D.A., Harwood, I.A. and Woodward, D.G. (2009). "The effect of buyer pressure on suppliers in SMEs to demonstrate CSR practices: An added incentive or counter productive?". *European Management Journal*, 27, pp. 429-441.
- Cambra-Fierro, J., Hart, S. and Polo-Redondo, Y. (2008). "Environmental Respect: Ethics or Simply Business? A Study in the Small and Medium Enterprise (SME) Context". *Journal of Business Ethics*, 82: pp. 645-656.

- Carter, C. and Easton, P. (2011). "Sustainable supply chain management: evolution and future directions". *International Journal of Physical Distribution & Logistics Management*, Vol 41 No.1, pp. 46-62.
- Darnall, N., Jolley, G. and Handfield, R. (2008). "Environmental Management Systems and Green Supply Chain management: Complements for Sustainability?". *Business Strategy and the Environment*, 18, pp. 30-45.
- Halldorsson, A., Kotzab, H., and Skjott-Larsen, T. (2009). "Supply chain management on the crossroad to sustainability: a blessing or a curse?". *Logist. Res.* 1:83-94.
- Hillary, R. (2004). "Environmental management systems and the smaller enterprise". *Journal of Cleaner Production*, 12, pp. 561 -569.
- Hitchens, D., Clausen, J., Trainor, M., Keil, M. and Thankappan, S. (2003). "Competitiveness, Environmental Performance and Management of SMEs". Greenleaf Publishing, pp. 45-57.
- Jenkins, H. (2009). "A 'business opportunity' model of corporate social responsibility for small- and medium-sized enterprises". *Business Ethics: A European Review*, vol 18 No. 1 pp.21-36.
- Lamming, R.C. and Hampson, J.P. (1996). "The Environment as a Supply Chain Management Issue". *British Journal of Management*, Vol 7, (special issue), S45 – S62.
- Lee, S. (2008). "Drivers for the participation of small and medium-sized suppliers in green supply chain initiatives". *Supply Chain Management: An International Journal*, Vol 13, No 3, pp. 185-198.
- Lee, S. and Klassen R.D. (2008). "Drivers and Enablers That Foster Environmental Management Capabilities in Small – and Medium-Sized Suppliers in Supply Chains". *Journal of Production and Operations Management*, 17 (6), pp. 573 – 586.
- Merritt, J. (1998). "EM into SME won't go? Attitude, Awareness and Practices in the London Borough of Croydon". *Business Strategy and the Environment*, 7, pp. 90-100.
- Min, H. and Galle, W.P. (2001). "Green purchasing practices of US firms". *International Journal of Operations & Production Management*, Vol. 21 No. 9, pp. 1222-1238.
- Moore, S. B. and Manring, S. L. (2009). "Strategy development in small and medium sized enterprises for sustainability and increased value creation". *Journal of Cleaner Production*, 17, pp. 276-282.
- Pedersen, E. (2009). "The many and the few: rounding up the SMEs that manage CSR in the supply chain". *Supply Chain Management: An International Journal*, Vol 14, No 2, pp. 109 -116.
- Rao, P. (2002). "Greening the supply chain: a new initiative in South East Asia". *International Journal of Operations & Production Management*, Vol. 22 No. 6, pp. 632 – 655.
- Rao, P. and Holt, D. (2005). "Do green supply chains lead to competitiveness and economic performance?". *International Journal of Operations & Production Management*, Vol. 25 No. 9, pp. 898-916.
- Revell, A. and Blackburn, R. (2007). "The Business Case for Sustainability? An Examination of Small Firms in the UK's Construction and Restaurant Sectors". *Business Strategy and the Environment*, 16, pp. 404-420.
- Seuring, S. and Müller, M. (2008). "From a literature review to a conceptual framework for sustainable supply chain management". *Journal of Cleaner Production*, 16, pp. 1688-1710.
- Simpson, M., Taylor, N. and Barker, K. (2004). "Environmental Responsibility in SMEs: Does it Deliver Competitive Advantage?". *Business Strategy and the Environment*, 13, pp. 156-171.
- Talbot, S., Lefebvre, E. and Lefebvre, L. (2007). "Closed-loop supply chain activities and derived benefits in manufacturing SMEs". *Journal of Manufacturing Technology Management*, Vol. 18 No. 6, pp. 627-658.
- Vachon, S. (2007). "Green supply chain practices and the selection of environmental technologies". *International Journal of Production Research*, vol 45, No 18-19, pp. 4357-4379.
- Vachon, S. and Klassen, R. (2006). "Extending green practices across the supply chain – The impact of upstream and downstream integration". *International Journal of Operations & Production Management*, Vol. 26 No. 7, pp. 795-821.
- Williamson, D., Lynch-Wood, G. and Ramsay, J. (2006). "Drivers of Environmental Behaviour in Manufacturing SMEs and the Implications for CSR". *Journal of Business Ethics*, 67, pp. 317 – 330.
- Wooi, G. and Zailani, S. (2010). "Green Supply Chain Initiatives: Investigation on the Barriers in the Context of SMEs in Malaysia". *International Business Management*, 4 (1), pp. 20-27.

Wycherley, I. (1999). “Greening supply chains: the case of the body shop international”. *Business Strategy and the Ethics*, 8, pp. 120-127.

Zhu, Q., Sarkis, J., Lai, K. and Geng, Y. (2008). “The role of Organizational Size in the Adoption of Green Supply Chain Management Practices in China”. *Corporate Social Responsibility and Environmental Management*, 15, pp. 322-337.

Appendix A. Cross-cases comparison of the companies

Coding of cases findings

<i>Company</i>	<i>Barriers</i>	<i>Drivers</i>	<i>Sustainability Practices</i>
<p>Aircraft Manufacturer – (ACM)</p> <p><i>(Interviewees: Supply Chain Manager, Environmental Head)</i></p>	<ul style="list-style-type: none"> ▪ Financial resources ▪ First priority is on solving operations problems ▪ Mentality & attitude ▪ Regulations ▪ Cost 	<ul style="list-style-type: none"> ▪ Image & reputation ▪ Meeting the customers need for green aircraft ▪ Complying with governmental laws & regulations ▪ Complying with tendering conditions 	<ul style="list-style-type: none"> ▪ Code of conduct ▪ Environmental department well established – ISO 14001 certification ▪ ISO 14001 is included in suppliers qualifications but it is not mandatory ▪ Concern with CO2 emission – building green aircraft using fiber glass materials ▪ Improving engine efficiency ▪ Complying with regulations – REACH ▪ Changing painting process to be free of Chromate material ▪ Projects for optimizing transport network ▪ Recycling of packaging
<p>HVAC Company (HVAC)</p> <p><i>(Interviewee: Group Supply Chain Manager)</i></p>	<ul style="list-style-type: none"> ▪ Changing the machines ▪ Convincing the teams & management 	<ul style="list-style-type: none"> ▪ Make a differentiation by being sustainable & green ▪ Economical benefits - cost reduction ▪ Marketing ▪ Meeting regulations 	<ul style="list-style-type: none"> ▪ ISO 14001 certified ▪ Launched a sustainability program to address economic, environment & social issues ▪ Include environmental criteria in suppliers audit & selection ▪ Use intermodal solution for direct delivery from suppliers ▪ Optimize trucks loads by redesigning some components ▪ Involve suppliers in R&D for choosing right materials & components design ▪ Sharing of its information on inventory level with suppliers via internet
<p>ACM – SME Supplier1</p> <p><i>(Interviewee: Director of Aerostructures and Systems)</i></p>	<ul style="list-style-type: none"> ▪ Cost ▪ Finding solutions to environmental problems ▪ Culture 	<ul style="list-style-type: none"> ▪ Cost ▪ Finding solutions to environmental problems 	<ul style="list-style-type: none"> ▪ Energy consumption ▪ Waste minimization

<p>HVAC – SME Supplier 1</p> <p><i>(Interviewee: Project Manager)</i></p>	<ul style="list-style-type: none"> ▪ Time constraint ▪ knowledge 	<ul style="list-style-type: none"> ▪ Complying with regulations ▪ Cost reduction 	<ul style="list-style-type: none"> ▪ Waste minimization ▪ Raw materials consumption reduction ▪ No ISO 14001 certificate ▪ Ask suppliers for their materials to be compatible with REACH
<p>HVAC – SME Supplier 2</p> <p><i>(Interviewee: Sales Manager)</i></p>	<ul style="list-style-type: none"> ▪ Cost ▪ Human resources ▪ Training ▪ Culture 	<ul style="list-style-type: none"> ▪ Economic benefits ▪ Better working conditions 	<ul style="list-style-type: none"> ▪ No ISO 14001 certificate ▪ Energy consumption ▪ Reusable packaging materials ▪ Ask suppliers for their materials to be compatible with REACH
<p>HVAC – SME Supplier 3</p> <p><i>(Interviewees: Sales Executive and Environmental Head)</i></p>	<ul style="list-style-type: none"> ▪ Know-how 	<ul style="list-style-type: none"> ▪ Marketing tool ▪ Supply chain pressure 	<ul style="list-style-type: none"> ▪ Eco-design in designing products ▪ Conducted carbon footprint analysis ▪ Sustainability requirements are going to be included in audits & used as a criteria for suppliers selection ▪ Improving waste management ▪ Ask suppliers for their materials to be compatible with eco-design principles ▪ Use reusable packaging materials ▪ Optimize deliveries to customers to reduce cost & CO2 emission