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Why do industrial companies show different posture towards supply networks sustainability? A multiple case studies analysis

by

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Why do industrial companies show different posture towards supply networks sustainability? A multiple case studies analysis.

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Abstract. This research aims at moving a step forward toward the understanding of why industrial companies show different postures toward sustainability in their supply networks. Specifically, the role played by external pressures (i.e., from government and market) and internal capabilities (i.e., organizational commitment, supply management capabilities, innovation power) in determining companies' attitude toward suppliers' sustainability is theoretically and empirically investigated. To achieve our objectives, a multiple case studies analysis was performed since it is particularly suited when new complex phenomena are approached. This paper contributes to former literature by proposing a new comprehensive model specifying the role played by sustainable supply chain management' (SSCM) antecedents in driving industrial companies' postures.

Keywords: supply network sustainability, SSCM, innovation power, supply management capabilities, government pressure, market pressure.

1. Introduction

The sustainability concept synthesizes the important relationship among economic growth, social equity and respect for the environment (Elkington, 1998). It was firstly applied within companies boundaries and more recently it was extended to the supply chain perspective. The Sustainable Supply Chain Management (SSCM) discipline was proposed as “the strategic, transparent integration and achievement of an organization’s social, environmental, and economic goals in the systematic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chain” (Carter and Rogers, 2008, p. 368). According to Seuring and Muller (2008), more than three hundred papers investigating SSCM issues were published in the last decades.

Although a significant amount of effort was spent by previous authors, relevant questions still remain: why companies operating in the same industry are likely to develop different strategies towards sustainability in their upstream networks? To what extent government and market forces will be able to guide sustainability throughout supply chains? Which is the role played by companies’ capabilities (i.e., organizational commitment, supply management capabilities, innovation power) in determining or influencing firms’ posture toward SSCM? (Koplin et al., 2007; Linton et al., 2007; Vermeulen and Seuring, 2009). It seems that different combinations of external pressures and internal capabilities can result in different companies’ behaviors, but it’s not yet clear how such antecedents specifically drive companies attitude toward supply network sustainability (e.g., van Bommel, 2011; Zhu et al., 2007).

This research investigates the reason why companies show different postures towards supply network sustainability. Specifically, this paper aims at shedding further light on the role played by external pressures and by firms’ capabilities in driving SSCM investments undertaken by industrial companies.

In this work the unit of analysis is the focal company, i.e., any firm operating within a supply chain system (Lazzarini et al., 2001). Moreover, the accent will be put on antecedents of firms’ investments towards supply network sustainability.

We relied on an inductive theory building approach (Eisenhardt and Graebner, 2007; Meredith, 1998): first, a systematic literature review was performed to identify relevant studies and define a preliminary conceptual framework. Then, a multiple case studies analysis involving ten industrial companies was performed to arrive at a more lucid and reliable picture of the phenomenon.

We can argue that this work makes at least three relevant contributions: first, the research simultaneously analyses the role of different antecedents in influencing sustainability strategies and SSCM investments by industrial firms. To the best of our knowledge none empirical works face these issues simultaneously. Second, the study clearly summarizes previous research and provide normative propositions for what concern the role of government and market pressures. Most importantly this paper sheds further light on the role played by firms' capabilities in driving sustainability strategies and SSCM investments. Thus, we can argue that this research represents a direct response to recent literature requests (van Bommel, 2011; Vermeulen and Seuring, 2009).

The article has been structured as follow. Section 2 describes the theoretical background, main literature gaps and our specific research questions. Section 3 is devoted to the research methodology. Section 4 presents our multiple case study analysis. Concluding, section 5 discusses a new comprehensive framework and summarizes main contributions and limitations.

2. Background

2.1 Literature review

Sustainability is an increasingly discussed topic within operations management and supply chain management contexts. According to frameworks proposed by former literature (Aragon-Correa and Sharma, 2003; Ateş et al., 2011; Carter and Rogers, 2008; Gavronski et al., 2011; Gold et al., 2010; Pagell and Wu, 2009; Seuring and Muller, 2008; van Bommel, 2011), to understand the supply chain sustainability phenomenon one has to focus on three main elements: strategies, investments and their triggers.

First, companies strategies for managing sustainability can be classified along a continuum that ranges from reactive to proactive behaviours (e.g., Maignan et al., 2002). At one end of the continuum, a reactive and accommodative posture is a response to changes in environmental and social regulations via defensive lobbying and investments. Specifically, reactive firms usually reject the social duties assigned by their stakeholders (Maignan et al., 2002) and counteract only when the lack of sustainability, internal or within their supply networks, shocks their profit or their ability to survive. At the other end of the continuum, proactive posture involves anticipating future regulations and social trends and developing socially and environmentally friendly supply chains covering employee welfare programs, conserving energy, reducing waste and recycling materials (Carter et al., 2000). According to

Carter and Rogers (2008), proactive companies should integrate sustainability into their business strategy by (1) differentiating the products and command higher price for them, (2) “managing” competitors by imposing a set of private regulations or by shaping the government rules, (3) cutting costs and helping the environment simultaneously, (4) improving the management of risk, (5) making systematic changes that will redefine competition in their market. While reactive strategies do not prescribe the adoption of any specific SSCM initiatives, proactive postures lead to a range of investments. First of all, companies can undertake internal investments (i.e., capital expenditures allocated to improve a companies’ sustainability footprint), aiming to develop and institutionalize activities such as design for the environment (DFE), internal management systems (e.g., ISO 14001, OHSAS 18001, SA 8000), and pollution prevention and control (i.e., reduction at the source and end-of-pipe technologies) (Corbett and Kirsch, 2001; Sarkis, 2001; Zhu et al., 2007). Consistently with literature (Gavronski et al., 2011; Lucas, 2010), these investments enable companies to build complex capabilities that in turn can support the implementation of supply networks’ sustainability. Indeed, in line with the path dependence logic (Dierickx and Cool, 1989) of the resource based view (RBV) theory of the firm (Barney, 1991), companies characterized by high level of internal investments towards sustainability will probably have mature environmental and social systems in place and will start to look at their supply network in search of opportunity to improve the sustainability of their suppliers. Next, there is a complex of SSCM mechanisms that can be carried out by companies to assess and improve environmental and social performance of supply networks. Supplier selection and monitoring based on management systems (Nawrocka et al., 2009; Stigzelius and Mark-Herbert, 2009) and codes of conduct (Jiang, 2009) should be implemented to ensure that environmental and social dimensions are managed properly throughout the supply network. Additionally, further significant improvements can be promoted by means of intensive collaborations with suppliers that can be involved in the development of life cycle assessments (LCA) and other similar initiatives (e.g., eco-design, design for maintenance, design for recycling) (Fava, 1997; Lamming and Hampson, 1996; Seuring, 2004). Such initiatives aim at developing new sustainable products and processes as well as at building up suppliers’ own capacity of handling sustainability issues.

Then, triggers for proactive strategies and SSCM investments can be seen as relevant antecedents that drive companies’ attitude toward supply chain sustainability. Specifically, four factors were identified by previous literature: government pressure, customers pressure, companies’ organizational commitment and firms’ resources and capabilities.

First, pressure exerted by governments relates to the role of these in controlling firms' environmental and social conduct through regulations and laws. Although the effect produced by such pressures is quite debated, no consensus is yet reached within literature. At a rather general level, Barnett and King (2008) suggest that prospective tightening of regulations might lead firms to set higher standards up front in order to be prepared for the future and avoid high readjustment costs. Accordingly, the empirical contribution by Zhu et al. (2007), indirectly supported by the results of a recent McKinsey survey (Bonini, 2008), points out that an area in which a large share of companies are taking action is responding to regulatory constraints or opportunities. Nevertheless, Dean and Brown (1995) argue that government regulation might even act as a barrier to the implementation of certain socially responsible activities, particularly if the regulation is not tailored to specific industries. On the same line of reasoning, previous contributions (Buysse and Verbeke, 2003; Stock and . 1998) argue that regulatory pressures are not able to motivate proactive behaviors and maintain that firms that are more involved with environmental supply management transcend basic compliance with regulations. This finding, that aligns with a recent empirical investigation by Fields and McGuinness (2011), suggest that key barriers to the development of sustainability strategies include the lack of government incentives. Accordingly, empirical studies (e.g., Carter and Carter, 1998; Carter and Jennings, 2004; Ehrgott et al., 2011; Sharfman et al., 2009) fail in finding a significant relationship between government's pressures and sustainability strategies and practices.

Second, market pressure refers to the role that social and environmental aspects such as workplace safety, working conditions, and CO₂ emissions characterizing production facilities play in customers buying decision (e.g., Christmann, 2004). Stakeholder theorists like Frooman (1999) argue that the more dependent the firm is on the resources provided by certain stakeholder, the more power that stakeholder has over the firm. In a similar vein, innovation management scholars (e.g., Green et al., 1998) argue that once customers become aware of the availability of an innovative feature (e.g., "green" products), they may no longer be willing to purchase any other product or service not containing the desired feature. Thus, all players in the market are required to adopt that innovation. Relying on these arguments, previous contributions (Ateş et al., 2011; Carter and Jennings, 2004; Ehrgott et al., 2011) provide empirical evidence of customers' influence on the adoption of SSCM by proactive companies.

Third, companies' organizational commitment represents the extent to which top management, middle management and employees push for increased effort towards

sustainability. Previous contributions point out that such commitment towards environmental and social issues represent an important antecedent to proactive stances (e.g., Ateş et al., 2011; Bowen et al., 2001; Gavronski et al., 2011; Lambert et al., 1998). First, according to Gavronski et al. (2011), “top management commitment refers to the emphasis top-level managers place on the development of capabilities, i.e., their willingness to prioritize a specific set of resources inside the organization”. Top management commitment is a key capability in the development of consistent and sustainable programs for cultivating relationship with suppliers (Chen and Paulraj, 2004a). Moreover, literature adopting the RBV perspective provide empirical evidences regarding the positive and significant link between proactive environmental strategies and this specific organizational capability (Ateş et al., 2011; Gavronski et al., 2011; Pagell and Wu, 2009). Moreover, middle management, that is the link between top management and employees, can be seen as “champions” in the organization and represent important motivators for sustainable supply management projects (Carter and Dresner, 2001). Finally, employees themselves can likely play an important role in incorporating sustainability initiatives within the daily management of the supply network (Carter and Jennings, 2004).

Last, two more factors are introduced by other contributions to understand why companies show different attitudes toward sustainability in their supply networks: supply management capabilities (Bowen et al., 2001) and the innovation power (van Bommel, 2011). They are related to the important role that has been recently recognized in supply networks’ literature to cooperation and experimental learning (Cousins et al., 2006; Hofstede, 2006). The importance of these approaches can also be found in the theoretical framework of supply chain management research proposed by Chen and Paulraj (2004b) and in the theoretical framework of SSCM designed by Carter and Rogers (2008). Supply management capabilities are made up of bundles of skills and resources that are developed through a more strategic supply approach. According to Bowen et al. (2001), main supply management capabilities are: detailed purchasing policies and procedures, technical skills of purchasing personnel, liaison between purchasing and other functions, and partnership approach with suppliers. Such elements relates to the presence of key organizational resources such as (1) formal approaches to the selection and the empowerment of suppliers, (2) shared-vision on how priorities should be balanced (3) appropriate levels and types of industrial experiences and knowledge, (4) willing/ability to motivate suppliers and manage risks/revenues in high dependency relationships, and (5) implement cross-functional team working (Gold et al., 2010). Then, innovation power is defined as the ability to continuously transform knowledge

and ideas into new products, processes and systems for the benefit of the firm and its stakeholders (Lawson and Samson, 2001). According to former literature (Rohrbeck and Gemünden, 2011), companies' innovation power relates to their capabilities of foresight. The corporate foresight can be understood as "an overarching futures orientation of an organization and is, therefore, considered a part of strategic (innovation) management orientation of an organization" (von der Gracht et al., 2010, p. 381). In general, there are two different situations where corporate foresight can contribute to the innovation process: before the idea is born and when the idea is already established. In the first situation, it's applied as a concept to inspire and create new ideas for innovation: as previous literature (Von Reibnitz, 1988) indicates, corporate foresight provides comprehensive insight into the future development of the environment, which in turn induces ideas for new products and services. In the second situation, corporate foresight can help to assess either the commercial and technological validity of the innovation. In this sense, it can help to assess either the commercial and technological viability and adjust or abandon the innovation process (Rohrbeck and Gemünden, 2011). To be greatly innovative, companies should develop an open foresight that is characterized by transparency, methodological hybridity, context orientation and participation, and it is set to diffuse into the company's decision-making and blend into it instead of just preparing it (Daheim and Uerz, 2008). In line with the RBV perspective, these capabilities cannot be easily bought, as they are tacit, socially complex and rare. They must be built over time from skills and resources the firm has at its disposal: according to the literature (e.g., Calantone et al., 2002; Hult et al., 2003), companies' capabilities in terms of both supply management and innovation can be only build upon a strong learning orientation as an intangible organizational resource. In the sustainability management context, firms competing in the same industry (and thus facing broadly similar environmental and social pressures, threats and opportunities) appear in practice to follow different and diverging strategies (e.g., Aragon-Correa and Sharma, 2003; Maignan et al., 2002). A possible explanation of this is that they differ in their set of capabilities: in line with the report by Bonini (2008), previous works propose the lack of right capabilities and skills as one of the most relevant barriers that prevent companies from capturing potential value from sustainability initiatives (Gold et al., 2010; van Bommel, 2011)

2.2 Literature gaps and our research questions

Research that have studied the role of SSCM determinants during the last decades is shown by Table 1. It summarizes the methodology of the identified papers, their focus and, most importantly, the antecedents they investigate.

Study	Methodology	Perspective	Government pressure	Market pressure	Organizational commitment	Supply management capabilities	Innovation power
Carter and Carter (1998)	Survey	Environmental Purchasing	X	X	-	Partially	-
Bowen et al. (2001)	Survey	Green supply management	-	-	-	X	-
Carter and Jennings (2004)	Survey	Purchasing social responsibility	X	X	X	-	-
Zhu et al. (2007)	Survey	Green supply chain management	X	X	X	-	-
Carter and Roger (2008)	Literature review	Sustainable supply chain management	-	-	-	Partially	-
Kovács (2008)	Case studies	Corporate responsibility in supply chain	-	Partially	-	-	-
Seuring and Muller (2008)	Literature review	Sustainable supply chain management	X	X	Partially	-	-
Pagell and Wu (2009)	Case studies	Sustainable supply chain management	-	-	X	-	X
Sharfman et al. (2009)	Pilot cases and Survey	Proactive environmental management	X	-	X	Partially	-
Gold et al. (2010)	Literature review	Sustainable supply chain management	-	-	-	X	-
Ateş et al. (2011)	Survey	Proactive environmental strategies	-	X	X	-	-
Ehrgott et al. (2011)	Survey	Sustainable supplier selection	X	X	X	-	-
Gavronski et al. (2011)	Survey	Green supply management	-	-	X	X	-
van Bommel (2011)	Literature review	Sustainable supply chain management	X	X	X	-	X

Table 1. Literature on SSCM's determinants

Despite the efforts put in place by previous authors, literature is not without gaps.

First, we identify a lack of works that evaluate the role of SSCM determinants simultaneously. Indeed, as shown by table 1, none study has concurrently considered all the elements that can drive and influence companies' posture towards supply chain sustainability. Thus, it is not completely clear yet why companies operating in similar industries are likely to develop different strategies towards sustainability in their upstream networks. (e.g., Koplin et al., 2007; Linton et al., 2007; Vermeulen and Seuring, 2009)

Then, for what concern external pressures (i.e., those by governments and customers), literature lacks of a full consensus. Indeed, is not exhaustively clear yet how legislations can influence companies' sustainability strategies and investments (e.g., an incentive to be proactive vs a determinant of reactive investments). Moreover, although market stimulus seems to play a significant role in leading sustainability, further investigation would allow to understand in which way companies' behaviors and investments are actually driven by customers (e.g., proactively vs reactively). Third, one of the most relevant gaps regards the scarce understanding and empirical evidence that concerns the role played by companies' capabilities. Considering supply management capabilities, only five works have studied their effect in driving companies' postures. Moreover, supply management capabilities are mainly investigated separately and independently one to the others: for instance, Carter and Carter (1998) and Carter and Rogers (2008) exclusively studied the role played by companies' ability in coordinating with suppliers, while Sharfman et al. (2009) has only considered the role of trust in supporting collaborative environmental management in supply chains. For what concern the innovation power, only two works (Pagell and Wu, 2009; van Bommel, 2011) have considered its role in leading SSCM investments. These contributions mainly rely on arguments coming from the strategic management field (e.g., Aragon-Correa and Sharma, 2003; Christmann, 2000) and scarcely discuss how the presence of innovation capability can influence the extent to which a company is involved into SSCM. Finally, the vast majority of works focus on the environmental dimension of the triple bottom line while the effects of the previously mentioned antecedents on the development of social supply chain programs has been till now somehow neglected (Seuring and Muller, 2008).

Thus, the purpose of this work it to shed further light on the role played by external pressures and by firms' capabilities in driving SSCM investments. The scope of our investigation can be summarized and articulated in the following research questions:

- Why do industrial companies show a different posture towards supply network sustainability?

- How do sustainability antecedents specifically drive companies' posture? What is the role of supply management capability and innovation power?

3. Methodology

3.1 Research design

A systematic literature review and a multiple case study analysis were applied to obtain a robust set of findings, characterized by both internal (i.e., causality) and external (i.e., generalizability) validity (Scandura and Williams, 2000).

We firstly applied a systematic literature review (Tranfield et al., 2003) based on strategies and pre-planned methods that limit bias and random error (Cook et al., 1997). The main outcomes of this step will be a preliminary conceptual model and its operationalization within a questionnaire. Such comprehensive review has allowed to identify and (re)use constructs, research protocols and main methodologies that have been previously used, ensuring the reliability of research instruments (see section 3.2). Ecological/Environmental, social/ethical and logistics/operations management journals represent the population of relevant contributions to be included in the review. The search for interesting publications is mainly conducted as a structured keyword search. Major databases are used to search for related articles, such as those provided by major publishers, Elsevier (www.sciencedirect.com), Emerald (www.emeraldinsight.com), Wiley (www.wiley.com) or library services (e.g., Ebsco www.ebsco.com , Jstor www.jstor.org). The keywords that are used can be categorized into three groups: sustainable/environmental/social; supply chains/supply networks; drive/management/implementation. Different combinations of these four groups of keywords are used to search for literature published in the years 1997-2011. After a first quick content check, identified articles were in-or excluded from the analysis. Reading the included papers, cited references were used as secondary source. At the end, almost 75 articles were identified and analyzed. Main literature's contributions were summarized in the previous section.

Then, the second step has been an in-depth analysis of companies' sustainability strategy and SSCM initiatives, and the reason why such investments were undertaken. Case study analysis offers the possibility to develop within case analysis as well as cross cases analysis, giving the possibility to build a robust response to our research questions. As suggested by Eisenhardt and Graebner (2007), the case study research was chosen as it is an appropriate research approach to describe and explore new phenomena or to build new operations management theories. Moreover, case study research was selected because of the ability of cases data to

offers insight into complex social processes that other kind of data cannot easily reveal (Eisenhardt and Graebner, 2007). Multiple case studies will be performed in order to gather a comprehensive and multi-perspective view. Multiple cases typically provide a stronger base for theory building and enable comparisons that clarify whether an emergent finding is simply idiosyncratic to a single case or consistently replicated by several cases (Yin, 2009). Suggestion for the number of cases to use in multiple case study research vary, but Eisenhardt (1989) suggests seven cases as the maximum that a person can mentally process. Yin (2009) is more circumspect with regards to hard numbers and instead suggest that data should be collected until saturation. We stopped to 10 cases because we were near or at a saturation point and were also reaching the limits of the amount of data that could be processed by one study.

Multiple cases were selected from a population of Italian manufacturing firms by relying on the Aida data base (www.aida.bvdep.com). Two selection criteria were used. First of all, the analysis were focused on manufacturing sectors (i.e., ATECO 26: manufacture of computers and electronic products, optical, medical electrical equipment, apparatus for measuring and watches; 27: manufacture of electrical appliances and electrical equipment for non-domestic; 28: Manufacture of machinery and equipment not classified elsewhere; 29: Manufacture of motor vehicles, trailers and semi-trailers). Supply chains within these industries directly and indirectly relate to economic wealth creation as well as are responsible of impacts on the natural and human environment along all stages of the products' life cycle (Warren et al., 2001). This result found additional empirical evidence in a recent survey (Brickman and Ungerman, 2008) that points out that for consumer goods makers, high-tech players, and other manufacturers, between 40 and 60 percent of a company's carbon footprint resides upstream in their supply chain (i.e., from raw materials, transport, and packaging to the energy consumed in manufacturing processes). For these reasons industrial supply chains were considered of interest. Then, the second selection criterion was the organizational size. There is evidence suggesting that the adoption of sustainable practices is more likely in larger firms (e.g., Pagell et al., 2004). However, Sharma and Henriques (2005) note that "small firms can potentially create competitive niches via disruptive innovations in more sustainable product designs or business models" (p.175). Moreover, the recent study by Ciliberti et al. (2008) points out that also SMEs are strongly committed toward diffusing sustainability throughout their supply networks. Our aim was to obtain an heterogeneous sample that can allow to control for organizational size effects. In selecting multiple cases, the "polar types" sampling approach was preferred (Eisenhardt and Graebner, 2007). Extreme cases (e.g., companies

adopting a reactive strategy vs. proactive firms) were identified by means of public information (i.e., companies web-site) and preliminary calls. This sampling approach leads to very clear pattern recognition of the central variables, relationships, and logic of the studied phenomenon.

Multiple case studies have accommodated a rich variety of data and triangulation was used to ensure research reliability by obtaining the same piece of information from different sources: semi-structured interviews, internal documents and publicly available information (McCutcheon and Meredith, 1993). The sources of evidence and the list of the analyzed documents are reported in table 2. Semi-structured interviews were based on a quantitative questionnaire operationalized during the literature review step. The questionnaire is composed of items taken from the literature and partially adapted for the scope of our research (see table A1 in appendix). Items were measured using a five-point likert scale. In order to properly investigate our research questions and to perform quantitative comparisons between companies, we built different constructs by considering loadings and indications provided by previous researchers (see table A1 in appendix). This procedure is consistent with previous works (von der Gracht et al., 2010). In order to limit bias characterizing interview data (e.g., the ones caused by retrospective sensemaking) and pursue a multi-perspective view of the phenomenon, when possible more than one informants for each selected company were interviewed. Specifically, our protocol called for interviews with managers of different functions and operating in different hierarchical levels.

Firm	Informants and their role	Analyzed documents
A	Purchasing director; Logistics Manager	Sustainable development statement (2011)
B	Purchasing director; Senior Buyer	Environment obligation statement (2010)
C	Purchasing director	Suppliers' questionnaire (2010)
D	Purchasing director	Corporate governance code (2011)
E	Purchasing director; Senior Buyer	Code of Ethics (2011)
F	Strategic sourcing manager; Technical Affair manager	Sustainability reports (2010); code of ethics (2010).
G	Purchasing manager; HR director	Sustainability reports (2011)
H	Sustainability director; Supply chain director	Sustainability reports (2011); Sustainability performance indexes (2010)
I	Procurement manager; Logistics Manager	Sustainability reports (2009); Key Performance Indicators report (2010); suppliers' code of conduct (2011)
J	Purchasing Director; R&D manager	Energy saving brochure (2010)

Table 2. *Source of evidence*

3.2 The sample

According to the procedure discussed before, we were able to quantitatively analyze companies' general profiles, sustainability strategies, SSCM investments and, most importantly, the reason why they are behaving in a certain way. Table A2 and A3 in appendix summarizes all the relevant information that will be used for the cross-case synthesis.

To analyze the collected data, we conducted first an in-depth analysis of single cases. Single cases are useful to describe companies' attitude and investments as well as main motivators to sustainability. A short description of the cases composing our sample is reported below.

Company A

Company A is an Italian company that produces different types of industrial cranes (i.e., spreading from light-duty to heavy-duty cranes). Since it provides machinery and technology for customers' manufacturing processes, the company can be classified as a "process" firm (Spens and Bask, 2002). It is part of a group of companies with a global presence that largely sells his product outside Europe (i.e., 40 % of revenues comes from U.S.A) to customers that mainly operate in the construction industry. The company is compliant with the *Italian legislation on social responsibility*¹. However, neither management systems (e.g., ISO 14001, OHSAS18001) nor code of ethics are adopted. Furthermore, the firm shows a very scarce level of SSCM investments (see table A3 in appendix): it only asks its suppliers to be *ROhS compliant*² and it has in place a collaboration with a world-level chemical company for the development of an hybrid painting systems that use water-soluble epoxy bases, which allow almost total elimination of solvent emissions. According to its purchasing manager "such initiatives represent the direct response to government laws on one side (i.e., the case of *RohS*) and the reaction to explicit request by customers that are looking for green products on the other".

Company B

Company B is an Italian manufacturer that produces weaving systems, loom browser and healed frames solutions. It is part of a group of 6 companies and mainly sells his products in the Chinese textile market. As in the previous case, neither management systems nor formally written code of ethics have been implemented within companies boundaries. Moreover, scarce SSCM investments were deployed: the company is developing a suppliers' code of

¹ Italian legislation on social responsibility: "DECRETO LEGISLATIVO del 9 Aprile 2008, n. 81", http://www.lavoro.gov.it/NR/rdonlyres/0D78BF49-8227-45BA-854F-064DE686809A/0/20080409_Dlgs_81.pdf

² ROhS: "Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment", <http://www.bis.gov.uk/assets/nmo/docs/rohs/support-literature/nmo-rohs-leaflet-in-blue-and-updated-final.pdf>

conduct and an audit plan with the aim to guarantee the respect of minimum requirements in terms of quality, environmental emissions and working conditions by its direct suppliers. Furthermore, firm B is collaborating with a small group of strategic suppliers (i.e., mainly product-related vendors) to reduce packaging, harmful substances and waste along production and logistics processes. For what concerns supply processes, the motivator of such initiatives is the threat that future legislation could impact companies' reliability. With regards to collaborations, re-engineering practices are mainly carried out to improve efficiency: the senior manager has highlighted that their involvement with SSCM is a collateral effect of the global market competitive pressure that calls for cheaper solutions. "In this sense", said the senior buyer, "our products and services reflect both our concerns for the environmental and social impacts of our business as well as our pursuit of economic values".

Company C

Company C manufactures cabs, driver units, bodywork components and cabs heating and air conditioning systems for track loaders, wheel loaders, dozers, mini-excavators and excavators and tractor. It has production plants in Italy, France as well as in East Europe, South America and China. It sells all around the world and mainly to automotive OEM. It has adopted internal management systems (i.e., ISO 9001:vision 2000; ISO 14001), has developed a suppliers self-assessment questionnaire and is spending considerable effort in auditing suppliers. It is also collaborating with suppliers for improving logistics performance and developing recycling loops. However, scarce effort was putted in collaborating with upstream partners to develop more sustainable products: the company operates Make To Order, and its products are usually designed by customers (i.e., automotive OEM). The company is developing their own sustainable supply process because final markets are increasingly asking for business characterized by reduced environmental impacts and social equity. Further, operating in the automotive industry, the company must prevent any possible supply disruption: "we are forced to empower our supply process, reducing the risk that suppliers will not be compliant with future requirements settled by government and downstream partners", the purchasing director said.

Company D

Company D is the Italian factory of a well-known group that holds a global leading position as producer of cutting machine tools and energy solutions. Company D covers the group's first line of business (i.e., manufacturing cutting machine). The group has 12 factories located in Europe and Asia, buying and selling all around the world. Nowadays, the group has

developed a particular business model in which suppliers are also seen as potential customers: the purchasing director declares that the organization “is committed to purchase goods, for instance electronics parts for our ultrasonic laser machines, only from those OEMs that in turn are actually buying, or can be willing to buy, their technologies and solutions”. As a consequence of that, the company is not willing to develop partnerships or increase business with specific suppliers: “if we strongly depend on suppliers and something goes wrong, then we lose not just a source of goods but, most importantly, a source of revenues”. The company focuses on internal management systems and investments toward solar energy, while the supply chain perspective is largely disregarded. Its purchasing director declares that the stand-alone SSCM investment implemented in the last three years regards an initiatives of packaging reduction that has been mainly conducted for economic reasons (i.e., reduce shipments and disposals costs).

Company E

Company E produces pneumatic components and equipment for the industrial automation. It is part of a group with a global presence that includes four corporate divisions: automation (i.e., the one here analysed), large size machine tools, textile machinery and general manufacturing (i.e., from hot brass pressing/forging to plastic injection moulding). The company mainly sources within European boundaries (see table A2 in appendix), while most of its revenues comes from large-size firms operating in north America. The firm is strongly committed towards sustainability: the top management is motivated by a genuine concern towards social responsibility and deploy resources for continuously improving the company’s environmental footprint and employees’ health and satisfaction. For instance, it has adopted management systems such as ISO 9001, ISO 14001 and OHSAS 18001, it has developed a code of ethics and have pushed it throughout the supply network with the aims to avoiding business relationships with suppliers that do not respect human rights and the environment. Nevertheless, the company has faced many problems in managing SSCM initiatives: with regards to the supply process, it was not able to effectively motivate its suppliers towards sustainability, especially when cultural and communicational barriers are in place (i.e., in managing Chinese suppliers). On the other side, collaborations towards sustainability quickly came to the end because of unfruitful results: its senior buyer was quite sad describing that “recent initiatives of packaging reduction and new components developments involving suppliers have been abandoned because of scarce results in terms of both environmental improvements and economic returns”.

Company F

Company F is one of the European leading manufacturers and distributors of major domestic appliances (e.g., washing machines, dryers, dishwashers, fridges, freezers, cookers, hoods, ovens and hobs). It is the leader in markets such as Italy, the UK and Russia. The company has 14 production facilities all around the world (in Italy, Poland, the UK, Russia and Turkey). In this study we analyse the Italian facility, headquarter of the group. The firm has built a business model in which the “social responsibility is not only a duty towards future generations, but it is also the main avenue to inspire confidence and credibility in the stakeholders and to create value and competitive edge in a medium and long-term perspective”. The company is moving toward supply network sustainability in various ways: it is increasingly focused on human capital and professional development (e.g., 80% of employees contract are of infinitive duration; training activities for a total of approximately 8,000 hours, only in 2010), it seeks to strengthen its ties with the territories where it operates (e.g., 44% of suppliers are from Italy), it privileges transparent dialogue with suppliers (e.g., in 2011, 221 Self assessments of Suppliers of Direct Materials, 600 formal audits, 80% of suppliers at least certified ISO 9001) and collaborates with them toward sustainability (e.g., in 2010 a Supplier Collaboration Portal was implemented; an award for best sustainable innovations by suppliers was launched each year since 2010, in 2011 a new polyurethane foam proposed by the supplier that has won the 2010 sustainable innovation competition was adopted by the company’s top class refrigerators since the new material was characterized by an high thermal insulation and can be utilized in reduced quantities, allowing for reduced environmental impacts and logistics savings).

Company G

Company G is the Italian leading facility of a group that is nowadays global specialist in energy management. Starting from its roots in the iron and steel industry, heavy machinery, and ship building, in the last decades the group moved into electricity and automation management (i.e., it produces network connectivity systems, power and energy monitoring systems, circuit breakers, telemetry systems, etc.). Although the group has a worldwide presence (e.g., it sources and sells in western Europe, Asia, Africa and north America), company G mainly operates within Europe (i.e., 90% of purchases come from European suppliers, 70% of revenues are from European customers). Since 2006, every year a sustainability report is published and the company has been promoting the principle of the

*United Nations Global compact*³ within its organization and with its suppliers. Specifically, the firm is undertaking different initiatives: renewable energy investments (e.g., avoiding 4,000 tons of CO2 emissions into the air each year), employees' well-being programs (e.g., 19% decline in frequency of lost time accidents during the last two years), internal management systems (see table A2 in appendix), administration of annual surveys investigating suppliers' sustainability, actions to prescribe commitment and reduce supply network environmental and social impacts (e.g., in 2011 60% of purchases are from suppliers who signed the global compact, 100% of strategic suppliers embraces *ISO 26000 guidelines*⁴). According to what stated by its HR director, the company "is proactively responding to the rising of customers awareness toward sustainability and, operating in the Energy industry, is personally committed toward reducing negative impacts of their business as well as to positively contribute to the world's CO2 emissions reduction".

Company H

The Company H is the Mediterranean representative of a group formed by 8 regional subsidiaries (i.e., Northern Europe, Central Europe, Mediterranean, North America, South America, India & Africa, North Asia, South Asia) that is global leader in power and automation technologies (i.e., switchgear, circuit breakers, cables, power transmission and distribution grids, generators, drives, etc.). The company sells its products to worldwide leaders operating in the utilities sector, in the automotive industry as well as in the nautical market. "With regards to our sustainability strategy", said the sustainability director, "we work to ensure that sustainability considerations and values are understood, implemented, measured and communicated across our entire value chain ... our strategy then results in specific investments such as: code of conduct sent to 50 % of our total suppliers in 2009, a series of pilot audits of various suppliers undertaking hazardous work in high-risk countries was carried out by a third party company in 2010, numerous face-to-face training with vendors in 2011, on-line training developed and available for primary vendors during 2012". In 1996, the company has obtained a certification for its LCA methodology. Discussing with its supply chain director, it seems that the company has changed the focus of its actions from the procurement of standardized inputs to joint-value creation methodologies since almost

³ Un Global compact: "a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption", <http://www.unglobalcompact.org/>.

⁴ ISO 26000 guidelines: "social responsibility" http://www.iso.org/iso/iso_catalogue/management_and_leadership_standards/social_responsibility/sr_discoverin_g_iso26000.htm

twenty years. This conversion has allowed the company to effectively deploy its strategy: the supply chain manager has pointed out that “when excessive over-time, poor waste disposal practices or lack of protective equipment for workers were identified, the majority of vendors were willing to develop corrective action plans since they trust our organization”.

Company I

Company I is part of a group of companies with a global presence and organized in four divisions (i.e., automation, building technologies, customers products and Energy). Firm I, situated in the center of Italy, is mainly active in the areas of information and communications, home automation, and medical systems. The company strongly embraces sustainability through its business strategy: according to its supply chain manager “environmental and social issues are at the center of the daily discussion. Furthermore, we’re investing resources in pioneering projects and technologies that promote the well-being of people worldwide while minimizing environmental impact. For example, we’re developing healthcare solutions that make high-quality individualized patient care available at affordable prices; and we’re providing intelligent infrastructure solutions that are helping transform the world’s metropolises into sustainable cities”. The company is also committed in boosting industrial productivity substantially with innovative technologies jointly developed with key upstream partners. Accordingly, the company seems to have significantly invested toward supply network sustainability (see table A3 in appendix): e.g., 123 corporate responsibility suppliers’ self-assessments and 120 supplier quality audits with a sustainability module were carried out in 2009, 50 suppliers with energy-intensive production processes were integrated in a new energy efficiency program in 2010, a suppliers sustainability award was launched in 2010. “Sustainability in our supply network”, said the procurement manager, “can be further developed and implemented only because we have continuously improved our relevant procurement methods, we have shared our knowledge with suppliers, and we have intensively relied on cross-functional cooperation with our company. For, instance, managing suppliers’ sustainability increases the demands on the competencies and skills of our people involved in supply chain management”.

Company J

Company J is an individual firm that designs and manufactures modular and air cooled equipment for heating and air conditioning water systems, using a proprietary-owned technology. It’s a well-known brand that operates in Europe and north America and sells its product to both businesses and private customers. The firm is dedicated to dynamic

progression in research, development and promotion of innovative, safe, environmentally-friendly, and energy-efficient products, through the commitment and caring of its employees and partners. Such values have been consolidated and shared in a clear message to upstream organizations: the company is developing suppliers self-assessment questionnaires that consider the well-being of employees, the respect for the environment and the capacity of partners to propose innovative solutions. Most of its suppliers are ISO-14001 certified and a new vendor rating methodology that takes into account suppliers' environmental performance is going to be adopted in the daily management of the supply base. Company J is also dealing with co-design initiatives that aim at (1) reducing the presence of harmful substances within final products, (2) reducing emissions and inefficiency of its solutions during the utilization steps. Although the company shows to be quite proactive in the management of environmental and social issues in their supply network, its R&D management argues that "sustainability initiatives, especially collaboration and involvement of suppliers during the product developments phases, are motivated by the growing interest that final users and business partners demonstrate to green products as well as social impacts of industrial firms". "However", continued the purchasing director, "our open-mindedness, our frequent interactions with partners, as well as the liaison among our internal departments have represented three essential factors for the development of our sustainability strategy and its deployment upstream in the supply chain".

4. Analysis and research propositions

Cross case analysis helps us to understand why industrial companies show different attitude toward supply network sustainability and how each specific combination of antecedents have contributed to define a peculiar SSCM posture. It serves as a form of replication, where the role of all SSCM's antecedent is analyzed in different settings: it is concerned with identifying patterns across the various organizations.

Specifically, we primarily investigate the relationship between sustainability strategies and SSCM investments. Then, we focus on each specific antecedent trying to shed further light on the direct and/or indirect effect it might have on SSCM investments. As a result, we derive a set of research propositions.

4.1 Reactive vs. proactive postures

As shown by figure 1a, we found that certain companies declare to be quite proactive in their strategy (e.g., F, G, H and I) while certain others point out that they are mostly coping with

sustainability issues (e.g., A, B and D). Then, figure 1b shows a clear pattern: sustainable supply processes (e.g., rating and monitoring practices) and collaborations toward sustainability (e.g., LCA involving suppliers) are usually undertaken jointly by industrial companies. Specifically, accordingly to what stated by the most of our informants “the evaluation of suppliers environmental and social performance is usually a first important step that is undertaken to enable for a strong cooperation with vendors”. Furthermore, by comparing the distributions shown by figure 1a and figure 1b, we found that SSCM investments are quite proportional to the degree of proactiveness that characterizes companies’ sustainability strategies. Indeed, companies that simply cope with sustainability have scarcely relied on SSCM investments (e.g., companies A, B and D), certain others are developing environmental and social initiatives to achieve a “sufficient” level of performance, both internally and in their upstream network (e.g., firm C, E and J), while the ones that declare to be proactive are looking at supply network sustainability as a new opportunity and continuously try to reduce environmental and social impacts involving suppliers (e.g., F, G, H and I). Thus, we can state the following research proposition:

RP1. The more proactive the sustainability strategy is, the higher the SSCM investment becomes.

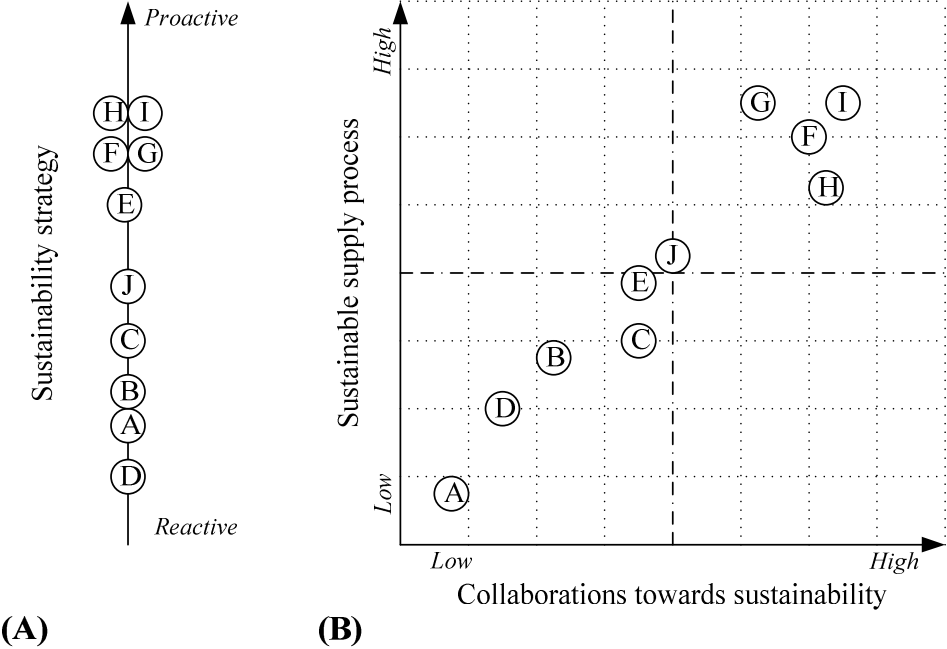


Figure 1. Companies’ sustainability proactiveness and SSCM investments

A final consideration concerns the difference between environmental and social investments: it seems that environmental initiatives (i.e., aiming to reduce harmful substances and CO2

emissions) has a high priority for industrial companies. Nevertheless, consistently with the literature (Elkington, 1994), informants have highlighted that the adoption of new and less polluting operations is also undertaken to indirectly improve employees health and safety.

4.2 Government pressure

Quite interestingly, as revealed by figure 2, companies showing a low level of SSCM investments are the ones who perceive high government pressure.

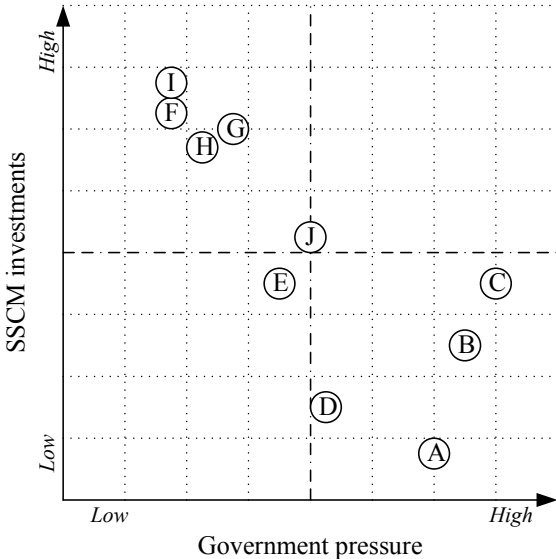


Figure 2. Cases distribution in terms of SSCM investments and government pressure

Legislations play a major role for companies that have poorly invested in sustainable initiatives involving suppliers (e.g., firms A, B and C). Conversely, companies that largely rely on SSCM and are trying to push sustainability throughout their supply networks (e.g., firms F, G, H I) declare that legislations do not represent a relevant motivator (see table A3 in appendix). We found a simple explanation for that: regulations are not tailored to specific industries and scarcely consider the supply chain perspective. In this sense, the sustainability director of company H stated that “regulations simply define minimum levels of social and environmental performance that should characterize any generic company ... however they are actually disregarding the life cycle perspective of industrial products and the important rule that each company can play in influencing the behavior of upstream organizations”. Concluding, we can argue that government pressure mainly relate to reactive postures (e.g., company A has improved its supply process only after that regulations imposed the adoption of safer electrical components). Thus, our second research proposition states that:

RP2. There is a positive direct effect of government pressure on (reactive) SSCM investments.

4.3 Market pressure

Figure 3 shows that customers and downstream partners awareness towards sustainability lead to both proactive postures and reactive investments.

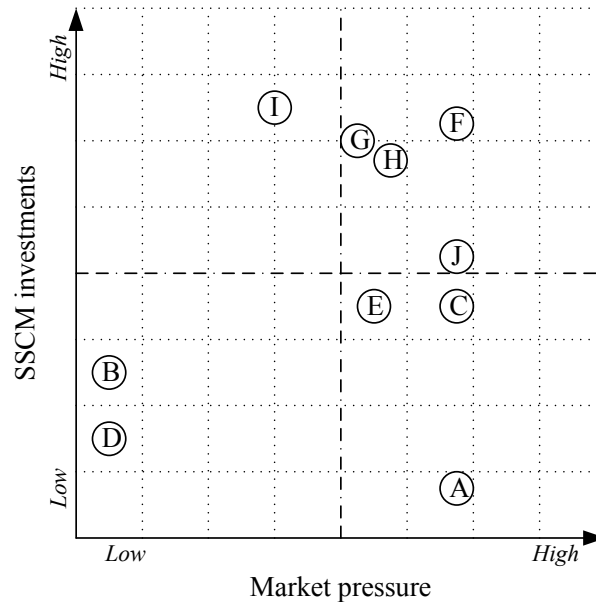


Figure 3. Cases distribution in terms of SSCM investments and market stimulus

On the one hand, the emergence of “green consumers” (Elkington, 1994) is seen as a great business opportunity that must be exploited. Accordingly, companies F and H, that pursue a proactive strategy and largely invest in SSCM, see sustainability as a way to differentiate their products and penetrate new market niches. Specifically, company F suggested that market pressures will mainly influence cooperative efforts and sustainable purchasing practices rather than internal investments toward sustainability. Indeed, as stated by its technical affair manager, “since final customers are asking for more sustainable product, we are pushed to select sustainable suppliers and involve them into our new product development: our solutions cannot be truly defined sustainable whether components are not designed and produced in a sustainable way”. On the other hand, market pressures can also cause higher investments by itself as an immediate response to customer requirements, indicative of a reactive approach. For instance, major customers of company C (i.e., automotive OEMs) are asking for more detailed information on the products made by the firm. This pressure was directly resulted in a reactive investments aiming to evaluate environmental and social performance of major suppliers in order to produce the required information.

Therefore, the following research propositions can be stated:

RP3a. There is a positive indirect effect of market forces on SSCM investments through a more proactive strategy;

RP3b. There is a positive direct effect of market forces on (reactive) SSCM investments.

However, some companies in our sample are not exposed to market stimulus (i.e., firms B and D). These two cases are quite idiosyncratic: company B sells its products to emerging countries where customers seems to disregard sustainability issues, while company D have developed a particular business model in which main customers are also main suppliers. Hence, consistently with literature (Emmelhainz and Adams, 1999; Kovács, 2008; Zhu and Sarkis, 2006), our analysis suggests that market-driven sustainability is not equally present in every industrial sector: whereas it has been observed in the automotive industry (e.g., company C) or consumer goods (e.g., company F), this seems to be less the case who manufacturer special machinery and equipment (e.g., company B, D and I), signifying that B2C more than B2B, and “product” companies more than “process” firms are particularly exposed to this kind of pressure.

4.4 Organizational commitment

The genuine personal motivation that top management, middle managers and employees maintain towards social equity and respect for the environment appears to be a relevant driver of SSCM (see figure 4).

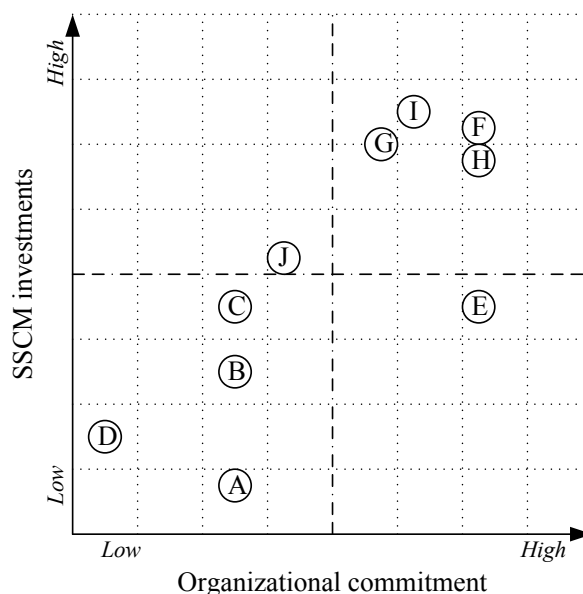


Figure 4. Cases distribution in terms of SSCM investments and organizational commitment.

First, the ethical responsibility characterizing top management, i.e. its willingness to transact a business in a manner expected and viewed by society as being fair and responsible, even

though not legally required (e.g., Carroll, 1999), appears to be critical in the deployment of proactive strategies and supply network sustainability. For instance, in the case of company I, a relevant amount of resources is made easily available for the development and the implementation of proactive investments since the major responsible for such resources (i.e., the company's board of directors) believes in the importance of being environmental and social sustainable. In the same vein, the head of the sustainability department of the company H states that cross functional coordination and external collaborations toward sustainability were become easier when such initiatives have been endorsed from the top. Conversely, the absence of commitment by top-level managers represents a relevant barrier for the development of proactive strategies and their deployment throughout the supply network (i.e., see the case of company D).

Second, a relevant facilitator is represented by workers who are committed toward sustainability. In our sample, companies that show a proactive posture toward SSCM have strongly invested in developing shared-vision throughout the organization. For instance, companies F has been managing an employees' performance management system that offers almost twenty different training programs per year since the last decade (note that 30% of such programs focus on sustainability-related issues). Furthermore, in company J, fair-minded collaboration among management, employees and employee representatives play a central role. The company also declares to spend about € 500 Euro each year per employee for developing training courses as well as socialization activities. In other words, it seems that when ethical goals are pushed top-down in the organization, the intra-organizational diffusion of SSCM is more likely to happen when human resources are trained to understand the environmental and social consequences of their actions as well as the benefits of being sustainable. Such diffusion in turn seems to be essential for effectively deploying SSCM investments. Furthermore, it seems that when there is organizational commitment, it is highly unlikely that SSCM investments are not guided by proactive approaches.

In line with the above arguments, we propose the following proposition:

RP4. There is a positive indirect effect of organizational commitment on SSCM investments through a more proactive strategy.

4.5 Supply management capabilities and the innovation power

By considering government pressure, market stimulus and organizational commitment, one can expect company E more active than company J (see table A3). In the same way one should wonder why company E shows a lower proactiveness with respect to company I, or

why company C have invested more than company A. The sustainability phenomenon can be better understood by considering companies' innovation power and supply management capabilities. Figure 5 shows the distribution of cases according to this two dimensions and can allow to shed further light on the reasons why firms show different attitudes towards supply networks sustainability.

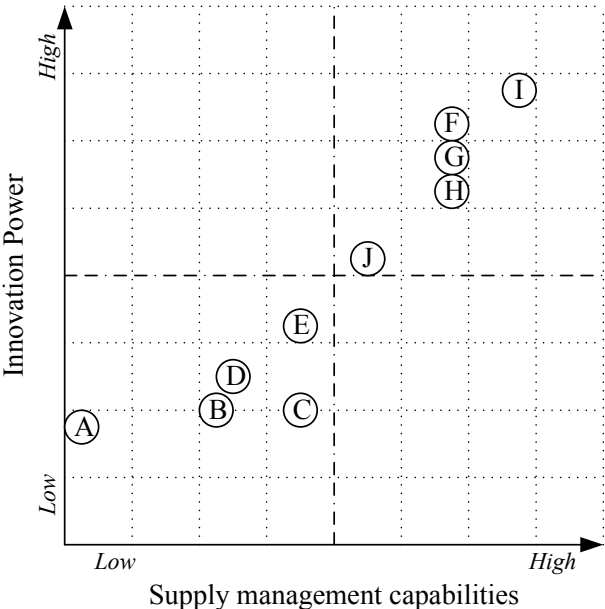


Figure 5. Cases distribution in terms of innovation power and supply management capabilities

Focusing on innovation power, company E seems to be partially deficient with respect to companies I and J. First, its management doesn't believe in the importance of knowledge sharing with external stakeholders (e.g., suppliers) to effectively innovate. Furthermore, the firm has developed a "follower" strategy and a "technology push" approach (Ortt and Smits, 2006): it mainly innovates by leveraging re-engineering practices and internal R&D programs. Conversely, company J gets a more open foresight, believing that future changes can be anticipated and shaped through continuous interactions and open dialogs with external parties. In the same way, company I is used to develop multi-scenario analyses involving key suppliers and continuously tries to figure out new market opportunities through collaborations. We identify an interesting example: the most common reasons to use questionnaires or codes of conduct in the supply chain are: (1) evaluating partners' sustainability performance, (2) proscribing unsustainable behaviors. Differently, firm I is strongly relying on such instruments as a way to collect innovative ideas from upstream partners: thanks to the company's open-mindedness, a monitoring tool (i.e., the sustainability questionnaire) was become an external knowledge management instrument that

have also led to fruitful collaborations towards supply network sustainability and to inter-organizational learning. In this sense, companies's ability to continuously innovate seems to represent a needed condition for the development of proactive sustainability strategies and the deployment of SSCM.

Accordingly, our research propositions states that:

RP5. There is a positive indirect effect of innovation power on SSCM investments through a more proactive strategy.

Considering supply management capabilities, firm E has not invested in restructuring its supply base and doesn't implement asset-specific investments with its key suppliers. The lack of such initiatives, that mainly relates to the absence of partnership approaches, doesn't allow to align goals and build trust throughout the supply network. According to former literature (Jiang, 2009; Pedersen and Andersen, 2006; Roberts, 2003), these two are essential prerequisites for prescribing vendors' commitment and for properly managing collaborations towards sustainability. As a result, although company E is characterized by a high commitment, the lack of such mechanisms of governance was resulted in a strong reduction of SSCM investments during time (e.g., look at the single case analysis). Differently, within company J, sourcing strategies use total cost of ownership approaches and focus on joint-value creation methodologies, relationships and supplier networks in a long-term perspective. For instance, the procurement function of company J is actually rewarded on value creation: its performance is not simply measured on purchase costs reduction and purchasing managers has the incentive to build up value added relationships with suppliers that can potentially lead to fruitful innovations. Furthermore, in company J there is a regular liaison between procurement and the R&D department that brings a range of specialist perspective to bear on environmental and social problems. Hence, supply management capabilities of company J constitute a genuine facilitator and enabler of its SSCM investments.

By analyzing supply management capabilities, one can also better understand why companies A and C show diverging behaviors. The main lack of capabilities that characterizes company A relates to the absence of formal plans, procedures and priorities that would facilitate the introduction of sustainability in the supply process. Being not able to accurately evaluate suppliers business performance and lacking a clear guidance on how priorities may be balanced, company A finds it difficult to develop a sustainable supply processes. Furthermore, being not able to identify sustainable suppliers, it cannot start collaborations with them in order to reduce environmental and social impacts of products and processes. On

the contrary, company C has got clear procedures and vendor rating programs and, as a consequence, was able to easily translate external stimulus into concrete actions toward supply network sustainability (e.g., see single case analysis).

Concluding, we can state our last proposition:

RP6. There is a positive direct effect of supply management capabilities on SSCM investments.

5. Discussion and conclusion

5.1 Proposed theoretical model

So far, literature on SSCM initiatives is not completely able to explain why SSCM initiatives have been taken off by some companies, while their application remains limited for others that operate in similar industries and face the same potential benefits. Aiming to provide a more clear picture of SSCM’s antecedents and their role in influencing companies posture towards supply network sustainability, we propose the comprehensive framework shown by figure 6.

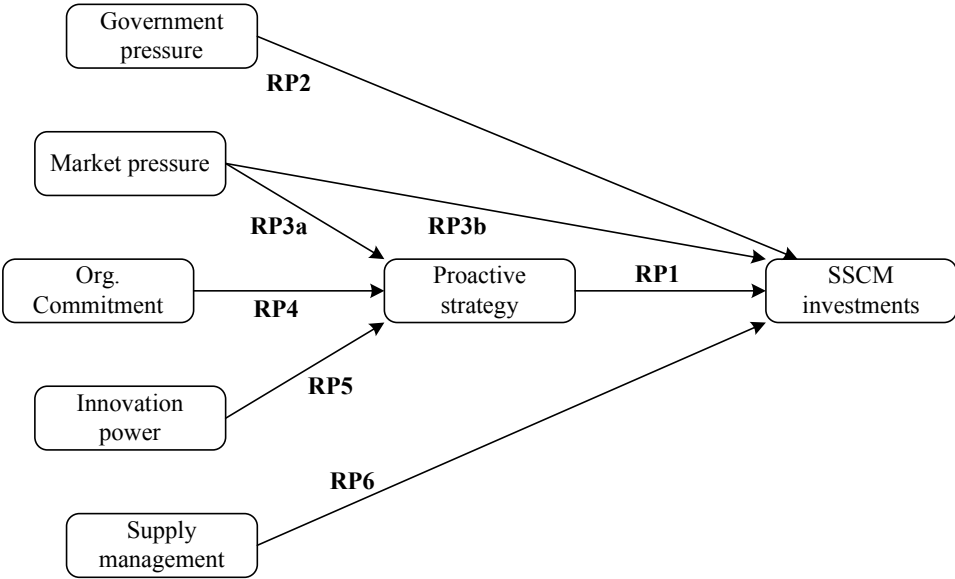


Figure 6. A new model describing the role of antecedents in driving SSCM investments.

The model allows us to understand how the considered antecedents influence SSCM investments both directly and indirectly through proactive strategy. We will consider first the direct effects on SSCM investments and then indirect ones.

Considering the direct impacts on SSCM investments, the model demonstrates that SSCM investments start as a consequence of proactive strategies as well as in response to external

pressures from governments and customers. Importantly, our framework shows a direct positive effect of supply management capabilities on SSCM investments.

In line with environmental literature (e.g., Ateş et al., 2011; Bowen et al., 2001), we found that companies showing proactive strategies largely deploy investments towards supply network sustainability. On the contrary, legislations seem to mainly account for initiatives that are undertaken when the lack of sustainability in the supply network might shock firms' profits and ability to survive. Buysse and Verbeke (2003) arrive at a similar conclusion when they segment their sample of European companies into three groups (i.e., environmentally leading, environmentally proactive, and environmentally reactive companies): government pressure is significant only for the reactive cluster. Then, market pressure can cause higher SSCM investments by itself as an immediate response to customer requirements (e.g., Ateş et al., 2011; Ehr Gott et al., 2011). For instance, according to literature on socially responsible purchasing (Carter and Jennings, 2004), companies shape their supplier management policies in order to provide a consistent social report to their customers. Further, Zhu and Sarkis (2007) state that often customers encourage companies to make (reactive) green supply chain management investments. Next, we argue that investments towards supply network sustainability are higher when companies' supply management capabilities are higher. Such capabilities "crucially define the status-quo of what is feasible for companies when intending to conceive and implement sustainable sourcing strategies" (Gold et al., 2010). They facilitate the deployment of both proactive and reactive investments by building essential prerequisite such as: (1) formal procedures to integrate sustainability within the supply process (e.g., Noci, 1997), (2) good understanding of potential consequences of buying decisions in terms of environmental and social impacts (Carter and Carter, 1998), (3) supply network visibility and trust to support inter-firm knowledge transfer and learning processes in core areas such as product/process development or design (Gavronski et al., 2011; Vachon and Klassen, 2008). The difference between internal investments on sustainability and SSCM investments is that there must be a collective governance, giving each partner incentives to focus on the network. In this sense, such capabilities prepare the ground for profitable interactions by allowing companies to prescribe suppliers' commitment towards sustainability (Jiang, 2009; Simpson et al., 2007).

In synthesis, companies show different postures towards supply network sustainability for three main reasons: (1) they focus on different strategies, (2) they operate in different sectors, facing a different pressure from government and customers, (3) they hold different supply

management capabilities and thus show different abilities in translating strategies and external incentives into SSCM investments.

Considering the indirect effects on SSCM investments, the proposed model allows us also to explore the roles that customer pressure, organizational commitment and innovation power have in driving firms' sustainability strategy and indirectly SSCM investments.

First, in our sample, companies who declare to be greatly proactive in their sustainability strategy identify their-self with the customer that sets high sustainability requirements and is willing to pay a premium price for sustainable products. Accordingly, previous literature demonstrates that growing customers awareness of corporate social conduct doesn't stop only to firms' manufacturing activities (Deephouse and Heugens, 2009) and it leads companies to manage environmental and social issues going far beyond basic compliance with regulations (Ehrgott et al., 2011). Customer awareness seems to be always less limited to the knowledge of a firm's product but extend to its social behavior, thus leading firms towards the adoption of proactive sustainability strategies (González-Benito and González-Benito, 2006). Second, the link between organizational commitment and environmental strategies has been investigated in several studies (Aragon-Correa and Sharma, 2003; Daily and Huang, 2001; Drumwright, 1994; Gavronski et al., 2011; Lee and Rhee, 2007) and our research offers additional insights to extend such result for what concerns social programs. The intention and willingness of managers and employees to be engaged in environmental and social management and to improve companies' sustainability footprint represents a relevant antecedent of proactive sustainability strategies. When there is organizational commitment, SSCM investments are greatly guided by a proactive posture that strongly relates to the self-esteem that people within the organization (e.g., management and employees) derive from operating responsibly. The presence of commitment in turn enables for a correct deployment of internal resources such as capital equipment, skill of individual employees, finance and so on. Such resources appear to be critical for cultivating relationship with suppliers (Chen and Paulraj, 2004a) and for the development of proactive environmental and social programs (Ehrgott et al., 2011; Gavronski et al., 2011). Third, the model shows a positive direct effect of innovation power on the proactivity of companies sustainability strategies. According to our analysis, it seems that an organization with an open foresight is facilitated in the development of proactive strategies in three ways (van Bommel, 2011; von der Gracht et al., 2010). First, by having state-of-art technology and holding the capacity to build and market a technological breakthrough, the company is more likely to be committed to leveraging sustainability to innovate; second, the organization is not likely to miss the opportunities

created by emerging market demand because it has the knowledge and ability to understand and anticipate customer needs; third, an innovative organization is likely to learn how to move towards sustainability not only by leveraging their internal resources but also by relying on valuable interactions with important stakeholders (e.g., suppliers). The innovation power can also be seen as a complementary asset to the development of proactive environmental strategies: innovative firms have been shown to be leaders in sustainability (Christmann, 2000). As suggested by Pagell and Wu (2009) and Gavronski et al. (2011), the capability to manage innovation and external knowledge acts as a trigger to proactive strategies and then results in high investments towards a more sustainable supply chain.

5.2 Research implications and further developments

This research investigates the reasons why companies show different postures towards supply network sustainability. Specifically, in this work we focused on antecedents that can determine and drive companies' sustainability strategies and SSCM investments.

First, we understood that industrial companies can approach supply network sustainability as a consequence of the introduction of new legislations. However, this pressure and the threat of their future tightening seem to be able to stimulate only reactive investments towards the reduction of suppliers' environmental and social impacts. On the contrary, high SSCM investments are observed when companies face customers that care about firms' social behaviour: market stimulus represents a relevant antecedent of both proactive postures and reactive investments toward supply network sustainability. Then, the extent to which an industrial company is engaged into SSCM investments greatly relates to its organizational commitment toward sustainability. The genuine concern for the environment and society by management and employees appears to be a top motivator and a relevant prerequisite: the presence of commitment is observed to foster the availability of key internal resources (e.g. capital equipment, skill, finance) that enable for proactive postures towards supply network sustainability. Finally, the major result of our research regards the role played by innovation power and supply management capabilities. Indeed, without considering these two elements one cannot completely explain why companies that feel similar external pressure and are equally committed towards sustainability show in practice different attitudes. First, industrial companies that continuously try to anticipate the change and are characterized by context orientation and participation appear in practice to be more prone and, at the same time, more capable to develop proactive sustainability strategies. Second, companies that want to translate proactive strategies into SSCM investments have to change the mind of their

procurement function (e.g., from a focus on products and suppliers to a focus on relationships, from a focus on price and savings to a focus on total cost of ownership and value creation) and find better means to push suppliers towards the improvement of their environmental and social performance. Thus, the presence of internal resources such as good technical skills and formal approaches in selecting suppliers and in coordinating with them is relevant to turn sustainability intentions into SSCM investments.

Concluding, we can argue that this work provides interesting contributions for both academicians and practitioners. First, this research constitutes a direct response to the specific request highlighted by Vermeulen and Seuring (2009) and by van Bommel (2011) to formulate and test theories and models for understanding the reason why companies show different postures towards supply network sustainability. Our framework is built upon literature and theories that come from different fields (e.g., operations management, strategic management and innovation management), it considers both environmental and social issues, and it is developed through multiple case studies. Additionally, our work provides a clear map of the most relevant variables that should be taken into account when investigating sustainability strategies and investments within supply chains. Hence, we can argue that future works could leverage on our framework as a guidance for further investigation and theory testing. From the practitioners' perspective, this research can be considered significant for two main reasons. First of all, the research provides support during the companies' decision-making process that concerns SSCM investments. For instance, the knowledge generated by this research could allow managers to discard in advance SSCM strategies that would be harmful for their company (e.g., because of lacks of capabilities). Secondly, we offer detailed information, useful examples and original insights that can guide practitioners in identifying which resources and actions have to be developed to properly pursue supply network sustainability targets.

Finally, we would like to highlight some limitations and perspectives. Our model suggests a linear process, therefore it is simplifying reality. Different short-cuts and loops will be found in practice. For instance, a loop might exist between companies capabilities and SSCM investments: the adoption of SSCM initiatives can lead to improved innovation and supply management capabilities. Furthermore, the relationship between sustainability strategies and SSCM investments might be mediated by internal investments (e.g., environmental management systems, code of ethics) necessary to build preliminary resources for an effective implementation of SSCM (e.g., Gavronski et al., 2011). Thus, for future research, we suggest

longitudinal studies that could shed more light on the causality of the effects as hypothesised and supported by this study.

Although we can argue that our results can be generalized (i.e., our sample is composed by small and big firms that operate in different industrial sectors and that manage local and global networks), future studies should replicate and extend this analysis in different industries and in different countries to further understand the phenomenon. Furthermore, future works should focus on the investigation of the role played by contingent factors (e.g., exogenous complexity and uncertainty) in influencing the effect exerted by external pressures and internal capabilities on SSCM investments (e.g., Aragon-Correa and Sharma, 2003; Sharfman et al., 2009).

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Appendix.

Table A1. Variables and measures

Variable	Items (measured on a 5-point likert scale)	Loadings	Reference
<i>How much do you agree with the following sentences? (1: strongly disagree; 5: strongly agree)</i>			
Proactive strategy	Going beyond basic compliance with laws and regulations on sustainability issues	<i>items' mean</i>	(Bowen et al., 2001)
	We effectively and proactively manage environmental and social risks		
<i>Indicate the effort put into implementing the following action programs in the last three years (1: none; 5: high)</i>			
Sustainable supply process	Development/adoption of questionnaires or code of conducts in order to monitor suppliers' compliance	<i>items' mean</i>	(Gavronski et al., 2011)
	Requiring suppliers' environmental and social certifications (e.g., ISO 14001, OHSAS18001, SA 8000)		
	Development/adoption of scoring systems to rank suppliers on their environmental and social performance		
	Development of audits to evaluate the sustainability of suppliers' plants		
Collaborations toward sustainability	Working together with suppliers to reduce social and environmental impacts of our activities (e.g., BPR, TQM, etc.)	<i>items' mean</i>	(Gavronski et al., 2011)
	Collaborations with suppliers to evaluate and reduce social/environmental impacts of products along their life-cycle (e.g., LCA, co-design etc.)		
	Conducting joint planning to anticipate and resolve sustainability related problems		
<i>How much do you agree with the following sentences? (1: strongly disagree; 5: strongly agree)</i>			
Government pressure	Our interest toward sustainability is motivated by environmental and social laws and legislations already in force	0.91	(Ehrgott et al., 2011)
	The sustainability implementation in our supply network is mainly motivated by the threats that future laws might disrupt our business	0.94	
	Laws and legislation on social and environmental issues will become more strict whether our sectors do not autonomously increase its sustainability standards and performance	0.91	
Market Pressure	Requirement by our customers to reduce environmental and social impacts of our products and processes	2.52	(Ateş et al., 2011)
	Customers request detailed information to assure our compliance	2.60	
	Pressure to meet environmental and social requirements set by our main customers	2.57	
Org. commitment	Commitment of top management for environmental and social management and policies	3.46	(Ateş et al., 2011)
	Support for environmental and social initiatives from mid-level managers and employees	3.42	
Innovation power	Future changes can be anticipated/shaped by means of interactions	0.60	(von der Gracht et al., 2010)
	Relevant collaboration with important stakeholders (in and outside) take place to anticipate changes and innovate effectively	0.10	
	Open dialogue (with focus on the communication and discussion process) take place continuously, does not end when hard objective of a project have been achieved	0.20	
	Frequent development of analysis aiming to anticipate changes and innovate effectively (e.g., innovation ideas, scenarios, etc.)	0.10	

Variable	Items (measured on a 5-point likert scale)	Loadings	Reference
<i>Please, rate how competent purchasing currently is at the following elements (1:scarce; 5:high)</i>			
Supply management capabilities	Detailed purchasing policies and procedures	<i>items' mean</i>	(Bowen et al., 2001)
	High technical skills of purchasing personnel		
	Liaison between purchasing and other functions		
	Partnership approach with suppliers		

Table A2. Company profiles

Firm	Year of foundation	Firm size	Group size	ATECO	Final market	Purchases		% of local sourcing ¹	Adopted standards
						% of Raw materials	% of Sub-assemblies		
A	1955	450	1763	29	B2C; B2B (process firm)	60	40	70	ISO 9001
B	2000	545	4500	28	B2B (process firm)	20	80	80	ISO 9001
C	1966	648	1360	29	B2B (product firm)	30	70	40	ISO 9001; ISO 14001
D	1870	283	5445	28	B2B (process firm)	10	90	80	ISO 9001
E	1964	383	2700	28	B2B (product firm)	40	60	60	ISO 9001; ISO 14001; OHSAS 18001
F	1975	1000	16177	27	B2C	10	90	30	ISO 900; ISO 14001; OHSAS 18001; SA 8000
G	1836	700	126481	27	B2B	5	95	60	ISO 9001; ISO 14001; OHSAS 18001
H	1988	7624	130000	27	B2B	20	80	45	ISO 9001; ISO 14001; OHSAS 18001
I	1899	2439	360000	26	B2C; B2B	5	95	65	ISO 900; ISO 14001; OHSAS 18001
J	1956	220	-	28	B2C; B2B (process firm)	25	75	60	ISO 9001; ISO 14001

¹ % of local sourcing measured as the % of supplies from Italian vendors

Table A3. *Quantitative data about companies*
 (Note: values are normalized while their means are not)

	<i>Proactive Strategy</i>	<i>Sustainable supply process</i>	<i>Collaborations toward sustainability</i>	<i>SSCM Investments*</i>	<i>Government pressure</i>	<i>Market pressure</i>	<i>Org. Commitment</i>	<i>Supply management capabilities</i>	<i>Innovation power</i>
A	-1.18	-1.54	-1.59	-1.58	1.02	0.83	-0.72	-1.90	-1.15
B	-0.90	-0.63	-0.82	-0.73	1.30	-1.72	-0.72	-0.81	-0.97
C	-0.55	-0.45	-0.31	-0.39	1.56	0.83	-0.72	-0.27	-1.06
D	-1.53	-1.36	-1.07	-1.23	0.22	-1.73	-1.79	-0.81	-0.88
E	0.47	-0.09	-0.31	-0.20	-0.33	0.20	1.08	-0.27	-0.35
F	0.79	1.00	0.97	0.99	-1.13	0.83	1.08	0.81	1.17
G	0.82	1.18	0.72	0.96	-0.60	0.18	0.36	0.81	0.99
H	1.14	0.63	1.23	0.93	-0.86	0.22	1.08	0.81	0.72
I	1.14	1.18	1.23	1.21	-1.13	-0.44	0.72	1.36	1.35
J	-0.20	0.09	-0.05	0.02	-0.05	0.84	-0.36	0.27	0.19
Mean	3.30	3.13	3.07	3.10	3.07	2.57	3.50	4.13	3.39
Std. Dev.	1.50	1.38	1.30	1.33	1.24	0.52	1.39	0.46	1.12

* calculated as the average of sustainable supply process and collaborations towards sustainability