



Towards a sustainable fashion retail supply chain in Europe: Organisation and performance

M. de Brito, V. Carbone, C. Blanquart

► To cite this version:

M. de Brito, V. Carbone, C. Blanquart. Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. International Journal of Production Economics, 2008, Vol114,n2, p534-53. hal-00506351

HAL Id: hal-00506351

<https://hal.science/hal-00506351>

Submitted on 27 Jul 2010

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Author's Accepted Manuscript

Towards a sustainable fashion retail supply chain in Europe: Organisation and performance

Marisa P. de Brito, Valentina Carbone, Corinne Meunier Blanquart

PII: S0925-5273(08)00048-0
DOI: doi:10.1016/j.ijpe.2007.06.012
Reference: PROECO 3728

To appear in: *International Journal of Production Economics*

Received date: 31 August 2006
Revised date: 22 June 2007
Accepted date: 28 June 2007

Cite this article as: Marisa P. de Brito, Valentina Carbone and Corinne Meunier Blanquart, Towards a sustainable fashion retail supply chain in Europe: Organisation and performance, *International Journal of Production Economics* (2008), doi:10.1016/j.ijpe.2007.06.012

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



www.elsevier.com/locate/ijpe

Towards a sustainable fashion retail supply chain in Europe: Organisation and performance

Marisa P. de Brito*

OTB-Delft University of Technology, the Netherlands

Valentina Carbone

ESCE -Ecole Supérieure du Commerce Extérieur, Paris, France

ESCP-EAP – Ecole Supérieure du Commerce de Paris, France

Corinne Meunier Blanquart

INRETS- Institut National de Recherches sur les Transports et leur Sécurité, Lille, France

Abstract

Sustainability issues are particularly sensitive to the fashion supply chain, given current fierce competition, intensive resource use, and the exposure of penurious labour conditions in some regions.

In this paper we discuss how the sustainability movement is impacting the fashion retail supply chain organization and its performance. We carried out a study with stakeholders of the fashion industry and we report on their views. We elaborate on the challenges and conflicts of the different dimensions of sustainability, and we discuss how to leverage both the internal and external organisations in the European supply chain.

Keywords: Sustainable development; Supply chain management; Stakeholders' views; Organisation and performance; Fashion supply chain

1. Introduction

Since Brudtland's report in 1987, Sustainable Development (SD) and sustainability have progressively been incorporated in governmental policy and corporate strategy. Defined then as aiming to meet "the needs of the present generation without compromising ... future generations," it became the basic framework of United Nation's (UN) Agenda 21. The sustainable development framework has three

* Corresponding author: Department of Mobility Studies, OTB, Delft University of Technology, P.O. Box 5030, 2600 GA Delft, The Netherlands; Tel. +31(0)15 86302; Fax: +31(0)15 2783450; E-mail: m.p.debrito@tudelft.nl

dimensions: economy, environment and society. Accordingly, within the sustainable development framework, economic growth goes hand-in-hand with environmental and social consciousness.

The Agenda 21, first sketched in 1992, was reinforced in 2002 and it has set a pattern for action on sustainability issues, at global, national and more regional levels. For instance, it has led to trans-continental agreements such as the Kyoto Protocol on climate change and to the development of sustainability metrics along the three axes, such as the indicators proposed by the UN Commission for Sustainable Development.

The three axes of sustainable development are of particular sensitiveness for fashion retail supply chains. On the economic axis, the delocalisation of production to the Far East in the recent years, has inverted the economic growth of the clothing industry in Europe. On the environmental axis, the fashion supply chain makes a very intense use of chemicals such as for dyes, and it is very demanding with respect to land and water use (e.g. for cotton growth). Finally, on the social axis, brand names such as Levi-Strauss or Nike were hit by sweatshop scandals and the consumer is more aware about ethics in clothing production

In this paper we look into the fashion retail supply chain through the sustainability ‘augmenting lenses’. We provide an overview of sustainability issues, their drivers and their influence on decision-making and how sustainability is affecting (or is going to affect) the organisation of the supply chain. In more general terms, the link between traditional (financial) performance criteria and sustainability is under discussion. More specifically, we discuss whether or not sustainability can and is playing a role in improving supply chain performance in a context of sharp international competition. As it has been widely recognized in the Supply Chain Management (SCM) literature, Supply Chain (SC) performance cannot be just measured by financial ratios, neither simply by some logistics indicators such as cash-to-cash cycle time, lead time, on-time delivery or percentage of satisfying deliveries. It is affected by wider issues, deriving from both the internal organisation of each actor of the supply chain (intra organisational issues, such as the quality of product, human resources management), and from the quality of the relationship among the actors of the SC (inter-organisational issues, such as logistics and transport organisations). Moreover, there are new demands from end customers and other stakeholders that can affect the performance and therefore should be taken into account in its assessment (Mentzer et al., 2001; Al-Mudimigh et al., 2004).

Concerning the sources of this paper, besides the literature on sustainability and supply chain management, we make direct use of the views of stakeholders (see methodology section). This was done, according to an exploratory approach (Forza et al., 2002).

Next section describes the methodology. Section 3 deals with supply chain management and sustainability, and Section 4 presents the fashion supply chain stakeholders' views on sustainability. Thereafter, we analyse how sustainability is affecting and can further impact the organization and performance of the chain (Section 5). We provide an overall discussion in Section 6 followed by conclusions (Section 7).

2. Methodology and stakeholders' profile

As mentioned before, in this paper we make use of the views of fashion supply chain stakeholders. Our 'dialogue with stakeholders' was triangulated through the following steps: we first undertook informal discussions (in trade fairs, such as the Expofil and Première Vision in Paris, in September 2005) and went on company visits (manufacturers, retailers, recyclers, etc.). Furthermore we carried out 10 semi-structured interviews with recycling companies, certification agencies, designers and consultants. The inputs gathered during the first phase allowed us to build a stakeholder map, supply-chain based (see Figure 1).

INSERT FIGURE 1 ABOUT HERE

In stakeholder theory, it is not uncommon to include suppliers and other supply chain players as stakeholders (see Freeman et al., 2004; Phillips, 2003). We identified the following stakeholders as potential respondents: suppliers (fibers, machinery and chemicals), manufacturers (clothing and textiles, including technical textiles), retailers and fashion bureaus; post-consumer actors (e.g. operating in the second-hand market); service providers (software, consultants, press, and industry associations) and independent experts (e.g. scholars). We finally designed our questionnaire, tested it, and we administered it to stakeholders located or with branches in France and the UK even if with global operations.

The questionnaire was built with the aim of gathering input on the fashion supply chain challenges and trends, and on the influence that the external environment yields on the supply chain. Table 1 summarises the final structure and the content of the questionnaire. In this paper we focus essentially on the sustainability related matters. For results on the other issues, we refer to Carbone et al., (2007). For a review on the development of both the global fashion chain and with some focus on Europe, we refer to Lindner (2003) and to the recent article of Taplin (2006).

INSERT TABLE 1 ABOUT HERE

The sampling method was non-probabilistic. We used theoretical sampling (Strauss and Corbin, 2000), because gaining a deep understanding was for this research more important than probabilistic generalisability in itself. In addition, given the exploratory and descriptive character of the study, we opted for a relatively long survey with a relatively modest sample size. In this situation, guaranteeing a reasonable response rate was essential. We managed to do so by approaching many of the business contacts acquired by the research team throughout the first phase of the research field. In addition, we targeted other stakeholders aiming at covering expertise at different points in the supply chain. The questionnaire was sent by mail and e-mail to about 100 stakeholders and 48 responses were received (by mail, fax or email). This is a relatively high response rate given that academic surveys' response rates have been declining during the last years (Griffis, 2003). In Table 2 the profile of the respondents can be found showing various supply chain views on the one hand, and independent views on the other, namely 8 suppliers, 10 manufacturers, 5 retailers, 4 textile recycling actors, 12 service providers and 9 independent experts of the fashion supply chain. For a detailed description of the methodology, please see De Brito, 2007b.

INSERT TABLE 2 ABOUT HERE

3. Supply Chain Management and sustainability

In the end of last century, private consumption had quadruplicated when compared with the levels of the 'throw away' society in the sixties (World Watch Institute, 2004). International trade has intensified in the last decade and foreign direct investment alone has increased about 500% by 2000 relatively to the beginning of the nineties (Witherell and Maher, 2001). Globalisation trends, leading to an increasing reliance of companies on their suppliers and sub-suppliers (Welford, 2002), have made supply chains broader and more international. Consequently, in the UN's Agenda 21, sustainable development has also been translated into principles and guidelines for companies. From Agenda 21's perspective, companies can make a positive contribution towards sustainable development through sustainability-oriented initiatives. According to some, such as NGO's, corporations not only *can* make a difference, but they *should* be held responsible, and regulation has appeared on this. In Europe there has been a proliferation of legislation in the direction of extending producer responsibility, such as REACH (for chemicals use), WEEE (for electronics recycling) and the white paper on transport, addressing environmental concern and labour conditions' harmonization per sector. Besides, as defended by Smith (2003) sustainability initiatives are crucial for firms' strategies, specially the ones in sensitive business areas (intensive natural resource use, poor labour conditions, etc.), as is the case for the fashion industry.

Thus, to start with, corporations get involved with sustainability programs forced by *legislation* (see e.g. Ayres et. al, 1997), even when their attitude towards legislation varies a lot. Some firms show a cautious position toward legislation constraints (in terms of recycling, social working conditions, CO2 emissions, etc.), others prefer to be constantly updated about new rules at the European level, in order to be ready for change. Finally, some anticipate such legislative changes, in order to gain some competitive advantage from acting as first movers, and thus transforming a constraint into an opportunity (Martinet et Reynaud, 2004). Likewise, Stigler (1971) suggests that companies may go beyond legal obligation to then encourage regulators to set higher standards, thereby increasing competitors' costs and barriers to entry (Barrett, 1991). In the latter case they are impelled by the *competitive advantage* that sustainability might offer (Sarkis, 2003). Sustainability can be used as a springboard to reach environmental and socially conscious customers. For these reasons, sustainability is not likely to fade away and is becoming the flag of excellence in our decade, similarly to the quality movement of the eighties (Larson et al., 2000). A third driver is the *Corporate Responsibility* (CR) movement, which is grounded in stakeholder theory (Freeman, 1984): firms are to serve the needs of all those being affected or affecting the firm (their stakeholders), and not only maximise profit (for their shareholders). Corporate responsibility is about integrating social and environmental concerns into business strategy and operations. Accordingly, Wolff and Mauléon (2005) recommend the use of the 'sustainable management' concept in order to establish a direct link between the general principles and guidelines proposed by SD at a macro level and the corporate responsibility movement applied at the company level. Even if sustainability is not holistically integrated yet in logistics and supply chain management (Murphy and Poist, 2002), there are signs that this movement may introduce a new paradigm in supply chain management, which has so far evolved from managing a logistics *system* of functions (Forrester, 1958), a *network* through functional internal integration, and finally a *supply chain* through external integration (see e.g. Ganeshan, 1999; Baker, 2004). Such a new paradigm for SCM should be attained through extended integration of sustainability values, where the key-function is responsibility management (see e.g. De Brito, 2007a).

Having acknowledged the three main drivers (compliance with legislation, search for competitive advantage and corporate responsibility) behind a sustainable development orientation of a company and/or a supply chain, there is however the issue of the lack of clear guidelines or monitoring frameworks. While there are numerous lists of performance indicators and standards (see, for example, Global Reporting Initiative, International Organizations for Standardization's ISO 14301 and World Business Council for Sustainable Development), they provide little insight into how existing approaches are complementary or distinct. They do not propose accompanying measures for companies in order to revise their current performance indicators for more accurate sustainability measures (Veleva et al., 2001). The lack of clarity is accentuated by the proliferation of rating agencies, which adopt very different criteria to determine whether a company is good in following SD

principles: the type of product (alcohol, tobacco, etc.), focus (e.g. environmental performance or fair working conditions), the number of legal disputes with their employees or their stakeholders, and so on (Férone et al., 2001). In spite of the popularity of these ratings, as is the case of the Dow Jones Sustainability Index, its legitimacy, impartiality, and content validity are far from being unquestionable (Cerin and Dobers, 2001).

These shortcomings generate ambiguities about the pathways forward for companies. Besides any normative ('what should be done?') or instrumental ('which are the gains?') approach, the first ambiguity concerns the response which companies are giving to the numerous pressures deriving from the external environment. Some authors suggest a step-by-step approach, where companies should begin to adopt sustainability-oriented criteria in their decision-making processes (Sissel et al., 2005) before integrating models and methods for sustainability. Accordingly, we report on the views of fashion SC stakeholders on sustainability, and on which issues and criteria are taken into account in decision-making. Our presumption is that here is no single and optimal form of sustainable management, but a variety of strategies and dynamics, with various drivers.

4. Sustainability and the fashion retail chain

First we review the main challenges regarding sustainability in the fashion retail supply chain. Then, we specifically look at the views of stakeholders of the fashion retail supply chain on the three sustainability pillars.

4.1 Challenges

Fashion supply chain is particularly sensitive to sustainability due to its inherent characteristics and some specific trends. The production process makes intense use of chemical products and natural resources (land and water), generating a high environmental impact. Furthermore, the search for lower cost production has led to a dramatic relocation of production sites towards the Far East (Bonacich et al 1994). In particular it practically resulted in the disappearance of traditional European industries, such as spinning and weaving. Such relocation has entailed loss of employment in the European textile and clothing industries. In the four-year period 1999-2002, employment in the European Union (EU) declined in fashion-related industries: 18% for clothing and 10% for textiles (Taplin, 2006; Lane and Probert, 2004). This had dramatic social impacts: in Europe, the industry employed a considerable number of low-skilled women that suddenly faced unemployment and who had no other skills to promptly get employed in other sectors. In the Far East countries, workers gained immediate employment in the sector, but in poor conditions (see Rosen, 2003).

There have been some attempts to revive production in Europe. For instance, France created competitive clusters ('pôles de compétitivité') on technical textiles as a national strategy for manufacturing competitiveness (see www.competitivite.gouv.fr). For those EU firms that sought to retain some domestic production, the focus was mainly on technological change, particularly increasing the use of just-in-time, quick response (such as Zara, see Ferdows et al., 2004) and more general applications of computer techniques in design, cutting and finishing. So, some added value activities (design and logistics) and specific market segments, such as technical textiles and *haute couture*, characterise the European production (see Taplin and Winterton, 1997). One challenge is to attract, and keep retraining high-skilled labour. Companies rely on their personnel's adaptability and their innovation capacity. This implies investing in training, retraining and good careers advice, aiming at developing transversal and managerial skills to manage sharp organisational adjustments (Férone et al., 2001). So, even in a context of production flexibility (as it is the case for the fashion industry), skill development plans for employees, managerial skills and transversal competencies development can contribute to consolidation. Investing in the skills of employees is part of a sustainable and responsible human resource management. This is not only beneficial in the longrun to the company, but it is also one of the numerous facets of the social pillar of sustainability (together with fair labour conditions, discrimination, gender issues and so on). Better-trained employees can more easily reposition themselves in the labour market if they are to lose their jobs. The 'employability' principle is actually a spearhead of the European Commission employment policy (European Commission, 2000).

As we discussed in the previous section, there is restrictive environmental legislation, especially in Europe. Issues that are forced by legislation coexist with voluntary initiatives. In 2002, PUMA launched the Top Winner Thrift: about five-hundred one-of-a-kind pair of trainers were made of recycled clothing, which would be sold together with its previous history and a password to register to an exclusive Top Winner Thrift Web-Community. This initiative had a clear image-consolidation strategy behind it, and it was accompanied by galleries exhibitions in London to attract mass attention. Some other companies show a more long-term and consistent sustainability strategy, such as Norm Thompson Outfitters (NTO), a catalogue retail, that has embedded sustainability principles for over more than a decade in the company's strategy. NTO's catalogues are of recycled paper and the company is aiming at a 100% organic cotton collection (Marshall and Brown, 2003). Thus, there are companies that exclusively include sustainability in their communication strategy (not affecting the daily and long term management of the company), while other companies really attempt to integrate stakeholders' expectations in managerial orientation and decisions (Oliver, 1991). The challenge is to do the latter, even if the initial trigger comes from outside of the organisation. Some sustainability-oriented initiatives are undeniably the result of the pressure put by Non-Governmental Organisations

(NGO)'s (see Tulder and Kolk, 2001). Many NGO's have targeted the fashion industry to fight for better work conditions and less environmental impact.

Clean Clothes (2006) is an example of a pan-European campaign, which has institutionalised a voluntary code of conduct based on the International Labour Organisation standards (see Hojensgard, 2005). Yet, sometimes those codes of conduct are of thin glass as implementation is not really checked in practice, and the code may be paradoxical in nature, given strategic decisions towards low-cost, which will likely dominate the daily practices in the shop-floor (Emmelhainz and Adams, 1999; Sum and Ngai, 2005). With trends in the fashion SC, such as price competition and the importance of responsiveness, the adoption of sustainable initiatives might be at risk. For example, relocation strategies make more difficult the control of working conditions in the offshore production sites; smaller size of deliveries deriving from shorter delivery times may increase the amount of transport, thus raising its environmental impact. This implies that the so-called sustainable initiatives should be analysed according to an integrated approach, which would consider the trade-off between the environmental, social and economic axis. This because an environmental positive effect deriving from a company initiative aiming also at improving competitiveness may hide a negative consequence onto the social axis, or vice-versa.

Even when players of the chain try to be consistent, it is very challenging to do it at a global level. Vermeulen and Ras (2006) mention the difficulties that two Dutch firms had while trying to green their global fashion supply chain. Peek & Cloppenburg, a clothing chain store could not go beyond Europe, as agents and factory tailors refused to give information or to cooperate. Van Bommel, a top-quality shoe producer, sourcing leather in Europe and India, met severe reluctance from the Indian supplier when tried to assess the suppliers' environmental performance. There seem to be regional differences on the view of corporate responsibility and sustainability, namely between Europe and Asia. Nonetheless we start witnessing that also countries in Asia are making efforts towards sustainability (Carter and Mol, 2006a). We come back to that in Section 6.

To wrap up, the fashion retail supply chain faces very demanding challenges along all three pillars of sustainability: economic, environmental and social.

4.2 Stakeholders' views

In the previous section we observed that the fashion supply chain is facing demanding challenges. In this section we first analyse how stakeholders view the division of responsibilities, i.e. who has been responsible for the past developments in the supply chain and who should take action in addressing the challenges.

To do so, we look into the responses stakeholders gave about the PAST (in particular events impacting the factor and inhibiting factors), and about the FUTURE (in particular tools to deal with challenges and breakthroughs). By cross-comparing the responses of each stakeholder we can observe two kinds of groups in terms of internalisation vs. externalisation of responsibilities: one group blames others (government, the media, and the consumer) with respect to past negative supply chain development and also attributes to them the responsibility to act or change behaviour in the future. We name this group as Group A. Another group, which we name Group B, shows a certain degree of internalisation of these responsibilities. Having ‘a certain degree of internalisation of these responsibilities,’ corresponds to admitting to share the responsibility for the past and/or future development of the chain. Summarising, Group A shows no degree of internalisation of responsibilities with stakeholders totally externalising responsibility both for past and future actions, while Group B shows a certain degree of internalisation of responsibility (either in the past, future or both).

In Section 3 we argued that the proliferation of standards and general principles for companies to implement sustainability is one of the main limitations for a consensual establishment of this new managerial orientation worldwide. It implies that there is not a unified view on sustainable development and business. It is therefore of interest to clarify what stakeholders perceive as being part of the three pillars of sustainability. Next we address this for the fashion retail supply chain: the stakeholders understanding of sustainability along the three pillars, economic, environmental, and social, and how that differs between Group A and B.

The view on the economic pillar is rather straightforward: it is viewed by both Groups A and B as essential for the development of the supply chain. This is not surprising, as profitability is a precondition, inherent to business principles. In any case, stakeholders did not only view profitability in itself as the core, but they stressed the long-term orientation of the economic development of the chain.

Stakeholders’ view on the environmental pillar is directed to different issues such as improvement of resource use (water, chemicals, energy, raw materials), which gather the highest stakeholders consensus. Waste, transportation and consumers’ health are also taken into account, even if less than expected. Apart from these specific areas, stakeholders from Groups A and B put emphasis on all the issues that weight on costs and they stress that environmental and health and safety legislation is much stricter in Europe than in the Far East (on waste, packaging, or quality). Decisions concerning environmental impact in the supply chain are therefore cost and legislation driven, and stakeholders expect that current pressure will reinforce action. Stakeholders’ expectations support the so-called ‘Porter Hypothesis’ about the positive effect of environmental regulations on the innovation capability

of firms (see Porter and van der Linde, 1995). However, the beneficial effect of stringent environmental regulations for firms is still a point of controversy in the literature (see Ambec and Barla, 2006).

On the social pillar, press has often stressed the uneven salary conditions between Europe and Asian producers and the burden that welfare institutions are facing in Europe, as hindering the competitiveness of the European fashion industry (e.g. Amalou, 2003 in *Le Monde*). Though several stakeholders make allusion to this, there is a split on their attitude towards it, as follows: Group A, considers that there is a need for labour cost reduction in Europe and to denounce the behaviour of companies, whose production sites are closed down or relocated in developing countries, and which don't seem to care about the shortening of hundreds of thousands of lives in sweat shops, where wage and labour standard violations are common (Chakraborty et al. 2004). The other group, Group B, calls for 'sustainable human resource management' (see Section 3), especially for some market segments, such as *haute couture*, technical textile, and new material products. In these segments, transversal and managerial training, skill development plans, set up of partnerships between training centres and companies, are considered as important critical success factors.

When asked about breakthroughs for the future of the fashion chain, Group A has almost exclusively the economic pillar (and competitiveness) as the guideline. The predominant attitude excludes other type of performance measures, e.g. no one mentioned that a cleaner or greener supply chain would be a breakthrough though they were conscious of the importance of the environmental pillar (which is by the way imposed by legislation). This group has also the tendency to blame or put the responsibility on the government ('which should, or not, legislate this and that aspect'), on the media ('which, should stop favouring retail outlet and consumer rights and start putting the big picture into perspective'), or the consumers themselves ('who should get away from consumerism and pursue a more environmentally-friendly way of life'). Then there is another group of stakeholders, Group B, which shows a certain degree of internalisation of these responsibilities, by stressing the need to communicate to the consumer the value of national brands and specially to create incentives for reducing the ecological footprint.

We have looked into the potential factors contributing to the different attitudes of Groups A and B. Given the specific set of stakeholders, any analysis with this respect has an exploratory character alone, and cannot be taken as conclusive. We grouped stakeholders according to their role in the supply chain, as follows: suppliers, manufacturers, retailers, post-consumption actors (e.g. recyclers) service providers and independent experts (e.g. academic experts). There are actors that belong more clearly to Group A or Group B. For instance, recyclers would tentatively rather fit in Group A, while independent experts would fit in Group B. This is not surprising as recyclers are often marginalized

and kept aside from the power games of the retail supply chain, while independent experts are able to keep distance and look upon the responsibility as intrinsic to the supply chain. Yet, in the majority of answers, per actor types in the supply chain, mixed signs could be read. Therefore, the type of actor and its role in the supply chain does not seem to be the discriminating factor between the two groups. The inherent discriminating factor is the attitude or vision of the state-of-affairs and the proposed way to overcome obstacles. There are several studies addressing the factors contributing to different attitudes towards e.g. change and ultimately linked with different strategies. Porter's (1985) diamond model on competitiveness touches upon factors such as the government, competition, and the role of adjacent industries, which were not explicitly included in this research. See also Capron (2002), for a rather exhaustive discussion of different attitudes towards sustainability in large European companies. The identification of the root factors contributing to different attitudes would call for a broader study with a large sample, properly designed with this objective in mind.

In conclusion, there are basically two groups of stakeholders: Group A is of stakeholders that resign, try to survive, and at the same time blame others (government, media, and consumers) for their fate; and Group B are the ones that strive for improvement and for creative responses. While the first group has the economic pillar as basically the only guideline, the second group shows a certain degree of internalisation of sustainability responsibilities. Table 3 summarises the view and attitudes of stakeholders on the pillars of sustainability.

INSERT TABLE 3 ABOUT HERE

5. The impact of sustainability on the fashion supply chain organisation and performance

Here we make a link between sustainability and the fashion SC organisation and performance. Besides improved customer service and cost optimisation, the effective management of both the internal organisation of each company and the external organisation of the entire SC, affects SC performance. Well performing companies are those who effectively manage internal and external relationships (between functions and organisations), through improved coordination. The following section deals with the current and potential impact of sustainability issues on the internal organisation of a company, while the second one is concerned with changes in the external organisation of the SC due to the rising importance of sustainability.

As we observed in Section 4, there are two kinds of groups of stakeholders: the ones who simply attempt economic survival, and the others who endeavour improvement and broader responsibility. Our subsequent discussion makes use of the views of the second group of stakeholders, i.e. the ones that strive more prominently for improvement and creative responses. Once we have summarised the

stakeholders' views, we discuss their perceptions in the light of the literature and current business trends. We put forward our own analysis of the impact of sustainability on the fashion supply chain organisation and performance.

5.1 Sustainability and the internal organization

The stakeholders view differentiation, clean outputs, recycling and social fairness as the keys for sustainable internal organization along to the economic, environmental and social pillars (see stakeholders' views at Table 4). Sustainable human resource management is also mentioned, but exclusively with regard to some market segments.

INSERT TABLE 4 ABOUT HERE

Given that the European fashion supply chain cannot compete anymore on cost, in order to sustain its competitive advantage over the low cost production countries, European companies can adopt either a differentiation or a focus strategy (see Porter (1985). Stakeholders give more emphasis to the first option, through *process* and/or *product innovation*. The textile industry has benefited much more from technological development than the clothing industry, where machines seemed for long to have stagnated through time (OECD, 2004). However, we are witnessing the appearance of new technologies such as sonic welding, automated knitting or ink-jet printing on textiles, which can revolutionize production (Sarma, 2004). Body scanners lay the way for customized apparel and advanced software is easing the work of designers, who can better explore new ideas and new materials. Nano-technologies are leading to the appearance of the so-called smart clothes, which self-clean thanks to impregnated enzymes or perform other functions due to nested electronics. Innovations offer some opportunities to focus on specific market segments and stakeholders specifically highlighted the markets for technical textiles, i.e. specialized textiles for functions with high technical and quality requirements. Technical textiles characteristics can include resistance to heat, impact, bacteria and so on, depending on the function needs (mind firemen, military or medical uniforms, just to mention a few).

Product innovation can also be targeted to specific consumer markets, such as to ethnic minorities, which are actually increasing with people's migration or to the ecologically conscious customer (eco-fashion). The use of new resources such as organic cotton can be an instrument for product innovation, which is attractive for 'green' customers. Patagonia was one of the first companies to have 100% certified organic cotton products in the beginning of the nineties. Nowadays, the sales turnover of organic cotton is on the increase: it could triple the levels of 2006 by the end of 2008 and pass from 900 million to 2,6 billion dollar (Organic Exchange 2006 Conference, www.organicexchange.org).

About twenty main French brands are to launch out, during 2007, collections of products made out of 100% organic cotton, deriving from equitable trade, following the initiative of the association Max Havelaar. The objective is to ensure a minimum purchasing price to Western and Central African producers, under the engagement of the set up of an organic production. La Redoute, a French-based mail order company will offer an entire collection of equitable textiles and clothing in the new catalogue (www.laredoute.fr/). Such initiatives represent a first step towards the creation of sustainable textile global supply chains. Worldwide, retailers and main producers are becoming more engaged with biological textile production. Nike, Marks & Spencer, CO-OP, Timberland and Walmart, among others, already sell organic cotton. Reebok, C&A, H&M, Target and Next have just entered this segment. Organically grown fibres, including cotton, are actively promoted by pro-sustainability organisations. Organic Exchange is one of such non-profit organisations minding both the environmental impact of fibre grown and the quality of life of the farmers. More than thirty retailers have adopted a 'biological program', thanks to the existence of more than thousand providers of organic fibres. An international working group, composed of OTA (USA), Soil Association (UK), Organic Cotton Association (Japan) and IMO (Switzerland), announced recently the upcoming publication of common regulations on this, which will be named 'Global Organic Textile Standards' (GOTS, www.global-standard.org/). Innovations should be accompanied by a communication strategy, specially in the business-to-consumer context. Labels can be a means for this. For instance, the European eco-label ensures: resistance to shrinkage during washing and drying; colour preservation during washing and friction, and colour solidity to light exposure; reduction of pollution of water and air during fibre production; and limitation in the use of dangerous substances for the environment and the consumer health. In sum, it communicates innovation hand-in-hand with a message of quality, environmental-friendliness, and consumers' safety.

Cleaning the outputs and increasing *recycling* are viewed as the way to boost environmental performance. This is actually the focus of legislation. i.e. reduction of CO₂ emissions and the setting of recycling targets. Technological investments are more predominant in clean production technologies while recycling technologies seem to be lagging behind. Charities have a prominent role regarding the reuse and recycling of textiles and clothing. In the UK there are more than 6,000 charity shops selling second-hand textiles and clothing. Donators, often customers themselves, can bring clothing and textiles directly to the shops. In addition, every week, about 2 million households can make use of textile banks or door-to-door collections to donate end-of-use clothes and textiles. Every year, about 15 million of sacks with textiles (and other materials) are collected from households in the U.K. Salvation Army is the largest operator of textile banks (about 1,700) in exclusive partnership with Kettering Textiles, a processor of second-hand clothing and recyclable textiles. Charity shops have a very good image in the UK, with almost the consensual view being that charity shops are a good mechanism to facilitate the reuse of unwanted items. Nonetheless, from the estimated 35 kg of

clothing and textiles that UK consumers purchase annually on average, about 75% goes to landfill (see Waste Watch, 2006; Association of Charity Shops, www.charityshops.org.uk/; Kettering Textiles, www.kettex.com). Rreuse, a European network of associations and companies with activities in re-use and recycling, has called for end-of-use producer responsibility for clothing and textiles. This could be implemented through a tax paid by producers and importers, which would be invested on sorting technologies for second-hand clothing and textile (Rreuse, 2005). Such a tax-scheme is for the first time in place in France as from November 17, 2006. Textile processing at the end-of-use is largely taken in charge by some charities, with Emmaüs at the head, a Rreuse member. Producers and/or importers of textiles and clothing, shoes and household linen will pay the ‘Emmaüs tax’. In which degree funds gathered through this or similar recycling taxes are going to be invested in recycling technologies remains to be seen.

Against such background, the prominent role played by innovation and technology development requires better skilled people leading to the reinforcement of the ‘made-in nationally’ brands. *Creativity* and *versatility* are some of the skills, which stakeholders consider as critical success factors for the European SC. Such skills also increase the employability of workers. Accordingly, higher internal integration between functions is needed in order to develop the required innovation for a sustainable oriented production model. First, *multidisciplinary teams* (ecological experts, economists, lawyers, etc.) have to be set up to deal in an integrated way with the sustainability issue, at the corporate level. Second, in the case of new product development, *cross functional teams* are at the core of the concurrent engineering model, defined as “a systematic approach to the integrated concurrent design and manufacture of products, including [...] all the elements of the product life-cycle from conception through disposal, including quality, cost, scheduling and user requirements” (Sohlenius, 1992). Upstream and a downstream task are overlapped to minimize time-to-market and communication reduces the negative effect of rework (Loch and Terwiesch, 1998). Such a model is currently replacing the sequential one, which is not suitable for short time to market products, such as fashion clothing (Choi, 2007).

In the fashion SC, the product development stage is the point at which it is possible to address a number of factors: the flexibility of delivery issues to match consumer demands; the size of batches to be processed to reduce risks, stock outs, and end-of-season markdowns; to bring design and colouring decisions closer to the point of sale; to introduce more environmentally sound products; to reduce the total cost impact of product development. To address these issues, product cross functional teams are appropriate, bringing people with different areas of expertise together, possibly including representatives from the retailer, the clothing manufacturer, the textile supplier, the dyer/printer and the yarn and fibre manufacturers (Bhamra et al., 1998).

Increasing internal integration (and external integration), in order to develop innovation, may allow taking into account sustainable principles and leading to differentiation and, to a minor extent, to a focus strategy in the European fashion SC (see Figure 2). Likewise, a recent study in the U.S., identifies differentiation as the major way for retailers to profit from the increasing number of customers which are striving for personalised value (IBM, 2004).

INSERT FIGURE 2 ABOUT HERE

A vivid example of investing heavily in this type of strategy is the fresh announcement of Marks and Spencer of dedicating \$450 million during the next five years to become greener. *Creative* and *innovative* solutions include using recycled plastic bottles, which Marks & Spencer has from its food chain, as raw material for their polyester clothing. This shows a high degree of *versatility* and it can only be achieved with high levels of *internal coordination* between *cross-functional* and *multidisciplinary teams*, sometimes across distinct supply chains. “We believe this is another way of *differentiating* ourselves,” were the words of Stuart Rose, Marks and Spencer’s Chief Executive (CBC News, 2007).

5.2 Sustainability and the external organisation

In this section, we discuss the current and potential implications of sustainable logistics solutions for the inter-organisational issues along the fashion supply chain. We would like to remark first, however, that if the internal organisation of companies is oriented towards higher sustainability, this is not neutral for the external organisation and the network of actors implied in the same supply chain.

Thus, the recognition of the importance of innovation fosters the development of partnerships, as well as between the actors of the chain and with some professional organizations, broadening of the ‘space’ or ‘sphere’ of coordination. In France, an industrial and innovation network in the textile and clothing sector, R2ITH, was created with the support of the French Institute for Textiles and Clothing (IFTH). This network is particularly active in the field of new materials, nano-technologies, new weaving methods and the development of partnerships upstream and downstream along the chain. The set up of sustainable strategies needs to deal with new actors and/or to broaden the geographical scale of the supply chain. Yamana, a French-based non-profit organisation (see www.yamana-mvd.org) seeks to further the development of the competences and know-how of companies, taking into account stakeholders’ needs and public authorities perspectives, without replacing one or the other and by reinforcing the responsibilities of each actor. Yamana is a networking platform as it organizes joint events, projects and initiatives, under the program ‘Fibre citizen’ (social and environmental quality applied to the retailing fashion and textile supply chain), which is being developed in several European

countries and in other countries such as Morocco. Partnering is seen as one of the retailing companies' mega-trends for the next decade, where companies' leadership will mainly depend on how well they are connected (IBM, 2004). In the U.K., the British Standards initiative (BSI) has launched in 2006 a Community of Practice (CoP) service on Ethical Fashion. Membership annual contributions range from none up to about 5,000 GBP depending on companies' turnover. The rationale behind this initiative is providing a platform where people with common interests on ethical fashion can exchange knowledge by sharing experiences, problems and insights facilitating co-investments and collaboration. BSI plays a moderating role and its services include an annual conference, marketing, consensus-building and project management (see BSI, 2006). Beyond partnerships and collaboration, the change of the relationships along the supply chain can also imply more control. An increasingly higher number of international brands, which outsource most of their production, is imposing social and environmental audits onto their sub-contractors. In France, most of the retailers have created a joint organization, 'Initiative Clause Sociale,' (ICS) to deal with this issue (see www.ics-asso.org)

In terms of supply chain activities, sustainable oriented initiatives also concern the logistics and transport function within each company and along the entire supply chain. Few supply chains are as notorious as the fashion supply chain for having such an unpredictable demand. This constitutes a real challenge for all the actors, as the consequences of unpredictable demand are high costs of stock out, markdown and increasing inventory carrying costs. These risks are mainly borne by retailers (Brägger, 2004). Coping with the fashion risk has become a central issue, and, as we will see, supply chain integration, is a valuable starting point to tackle it. Next, we start with the view on sustainable logistics by stakeholders in the fashion chain. Thereafter, we reflect on the strategic role that sustainable transport and logistics solutions can play in effectively coordinate the multiple actors involved in the production and distribution of a product, given that of the main concern in SCM is the optimisation of relationships and connections among all the actors and activities.

A sound agreement (among stakeholders) exists on the peculiar characteristics of what can be defined as a sustainable logistics and transport solution. It is grounded on the optimisation of the physical flows. Stakeholders clarify that *flow management optimisation* is achieved via *flow consolidation*, load factor optimisation, the increasing adoption of *resource sharing solutions* and, even if to a minor extent, via a stronger use of the so-called *clean transport modes* (rail, maritime and inland waterways). Carrefour initiated a pilot project in 2002 aiming at testing barge transportation. This project allowed a modal shift from road to river of 30% of the textile flows, through a container line from the Port of Le Havre to the Port of Gennevilliers (close to the Parisian region). A similar initiative was carried out between Fos, Marseille and Lyon. In this case, barge transport took about 3000 trucks out of the roads, representing a reduction of CO2 emissions of about 130 tonnes and a cost reduction of 6% (see www.carrefour.com).

Regarding the social issue, the stakeholders consider the concern for consumer health and security as a prerequisite for a sustainable logistics solution. This can be achieved through track and tracing, calling for *information sharing* along the chain in order to make it reliable and visible. This strongly applies to the organic fibres chains and organic standards, where traceability is a must to assure that fibres respect chemical-free and other high demands. Certified retailers selling organic cotton products, such as Indigo or Saf, explicitly advertise the ‘traceability’ function in their websites, among others, to reassure that their products do not contain genetically modified cotton, which consumers often associate with health-hazard (see www.indigoclothing.com and www.saftag.com).

INSERT TABLE 5 ABOUT HERE

From the economic, environmental and social issues mentioned by the stakeholders, we observe no conflict between social and economic issues (see Table 5). This because the identified ‘social’ issues are limited to consumer’s health and increasing *information sharing* is both beneficial to improve logistics integration and security. The same consideration concerns the compatibility between the economic and the environmental issues: *intermodal transport solutions* and the use of *clean transport modes* contribute to the set up of logistics integration along the chain, from a physical and technical point of view (Lambert, 2001), which is, in turn, based on effective *Information and Communication Technology (ICT)*. Furthermore, some workers are the beneficiaries of ICT innovation and subsequent changes in the supply chain, as this creates niches for skilled logistical tasks.

Flow management optimisation and flow consolidation represent two of the major future challenges for the European SC and a likely key for competitiveness, especially in a context where the increasing growth of transport costs can favour the European fashion SC, as higher transport costs could erode Chinese product competitiveness. The emphasis on flow management optimisation and flow consolidation leads to the search for a higher control of the entire supply chain both from the upstream stages downward until retailers, and vice-versa, with an optimisation concern. Thus, *logistics integration* becomes a coordination activity and an inter-organisational lever acquiring a strategic dimension that each actor of the SC aims at managing and controlling. As an example, the mounting power of retailers in Fashion SC during the 1990’ (Gereffi, 1996) is also based on their control of distribution logistics (Fernie, 1997). The need for logistics integration is even higher if one takes into account the strong level of internationalisation of the SC and more in particular, the widening of the sourcing markets beyond the Mediterranean Basin with a severe reorientation towards the Asiatic markets.

If inside each company, *flow management optimisation* and *consolidation* seem to be current trends, which are presumed to continue also in the future, the pursuit for higher flow consolidation is also a concern at the SC level. This requires the set up of specific production planning methods and techniques, which are compatible with warehousing centralisation and the increasing use of European (or regional) distribution centres. *Clean transport modes* (maritime, rail and inland waterways) can be used to link such centralised distribution centres backwards to plants and downward to final destinations. It can be argued, then, that flow consolidation encourages the use of clean transport modes. It allows, in particular, the development of maritime transport, which is also being marked by some supply side innovations, such as the astonishing increase of vessel size (mega vessels) and the new high speed shipping line connections between China and Europe. The use of containers, in turn, may diminish the use of individual packaging for products, which are definitely more expensive and have a higher negative environmental impact. Other positive cost effects deriving from flow consolidation are: vehicle load factor improving, delivery trip optimisation and subsequent reduction of the number of trips, reduction of fuel consumption and improvement of energy efficiency, lower dependence from road transport in fuel price increasing periods.

Sustainable logistics solutions can first affect the generalised transport cost for the company. The generalised transport cost comprises all monetary costs, but also non-monetary costs, such as time, reliability, comfort, security. However, if the development of a SCM approach is based on technical and physical management components (centralised distribution centres, *intermodal transport solutions*, delivery trip optimisation, etc.) it is also based on behavioural components, such as organisational culture, effective *relationship management*, connecting *information sharing* (Lambert, 2001). In other words, SCM relies on effective coordination between the actors. If the optimisation concern in SCM deals with logistics costs and times, it also tries to take into account relationship management. Global time to market reduction, from product conception and development until product sales, calls for better coordination among the actors of the SC, as it is proposed by SCM. Better coordination is achieved through different tools: CPFR (collaborative planning, forecasting and replenishment), sharing resource use, both in transport and warehousing, joint routing and scheduling deliveries, and so on.

Thus, logistics integration along the SC requires an improvement of relationship management between the actors. Such improved coordination entails higher performance in itself, as it favours cost and uncertainty reduction (Carbone and Meunier, 2006). It permits risk and benefit sharing. Interactions and stronger relationships also favour the emergence of resource sharing, relating to transport equipment, warehousing sites, which can play a positive effect on sustainability, optimising resource use, energy efficiency, CO₂ emissions, and so on. This enforces our view on performance pointed out earlier in the introduction: besides financial criteria, other criteria, such as the quality of the

coordination between the actors, stand as major factors leading to improved SCM. As an example, responsiveness (quick time-to-market, and delivery-time constraints of the fashion SC) may hardly be compatible with the current performances of *clean transport modes*, in particular of *intermodal transport solutions*, where the terminal transit time is often very long or unpredictable (e.g. railway based modal solution). Nevertheless, effective *relationship management* can be a lever for improving the SC reliability and responsiveness, through effective management of the time factor, in response to the rising concern for shorter throughput times (Taplin and Winterton, 1997). At the operational level, methods exist to support the timing of decisions on what to buy, what to move and what to make, not only inside each company, but among companies along the SC. 'Supply chain planning' allows flow management decisions through more than one link in the chain. Other fields where effective *relationship management* may help in reducing lead time can be the set up of risk-reward sharing contracts, the electronic integration of key suppliers to retailers, and the agreement on shorter order fulfilment times which could be beneficial for fashion retailers in order to cope with the high level of uncertainty of demand. This is due to the fact that overstocks and markdown present a much bigger problem to the retailers, mainly caused by the poor forecast accuracy due to long lead times (Brägger, 2004).

To sum up, sustainable logistics and transport solutions seems to be part of a dynamic process towards sustainability. They can first optimise cost, through flow consolidation and the use of clean transport modes, thus lowering the environmental impact of the activity. Several authors consider the reduction of the environmental impacts of transport as the largest 'building site' of logistics (Schmidt, 2005). Second, sustainable logistics solutions favour new coordination strategies between partners along the SC; they affect actors' interaction modes, relying on information technology tools and fostering long terms and risk (and gain) sharing relationships (Figure 3). This, in turn, paves the way to innovative logistics strategies, initiating a 'virtual' cycle. It is worth underlying that such a dynamic process towards sustainability implies that optimisation strategies based on generic resources in terms of information and communication technologies evolve towards 'specific communication strategies' among the actors, thus leading to new coordination modes. This means that the adoption of sustainable logistics solutions needs dramatic organisational changes at the level of the SC, in order to be compatible with the current critical success factors of the fashion chain, such as responsiveness as it is proposed by the abundant literature on Quick Response (QR) (e.g. Ferdows et al. 2004).

INSERT ABOUT HERE FIGURE 3

A vivid example of a company that is leveraging its external (and internal) organisation in order to pursue sustainable objectives is the French Group KINDY, positioned in the sock and underwear segments of the garment sector. After a few years (2002-2003) centred on internal integration

improvement (via the development of biological textile products and the commercialisation of Max Havelaar labelled products), KINDY is favouring the *logistics integration* of its SC. The company has improved *ICT connections* with its suppliers (EDI), has optimised the fill-rate of its vehicles, is recycling carton packages and is moving onto *resource sharing* initiatives with suppliers and customers, specially in the field of waste collection. Through a more *effective coordination* with the other actors of the SC, they are both *reducing* their production *costs* (lower energy consumption, lower procurement costs) and increasing their *responsiveness* to the market changing needs (see www.kindy.com/)

6. Discussion

The main focus of the previous section was the relationship between sustainable strategies and the internal and external organisation.

As far as the *internal organisation* is concerned, the means for achieving product and/or process innovation is by making strong use of the recent technological developments and high-skilled labour. Multi-disciplinary teams are needed to consolidate functions, which represent the fundamentals of the concurrent engineering, a key for successful product and process innovation. As far as the *external organisation* is considered, better management of relationship refers to the SC inter-organisational links, which need to be effectively managed for a sustainable logistics and transport solution. The main characteristics for a sustainable logistics solution, as proposed by fashion stakeholders (flow consolidation, load factor optimisation, resource sharing initiatives and a stronger use of clean transport modes), rely on logistics integration along the supply chain and information sharing. So, the sustainable orientation of companies in the fashion SC seems to be better achieved via the adoption of the SCM model, with respect to internal and external integration, through improved relationship and ICT management.

There are however some additional challenges to be faced by companies striving to leverage both the internal and external organisations, hand-in-hand with sustainability goals. It is clear that the European industry cannot compete with low-cost countries on price, so it has to innovate, either along a differentiation strategy or through focusing on specific markets such as technical textiles or green markets. Apart from the cost of innovation, which has been mentioned by the stakeholders as one of the main barriers for reaching new market segments, other factors can be put forward. First, there is some awareness about e.g. recycling, but currently the demand for eco-fashion (green and organic products) is low. This indicates that the consumer is relatively environmentally aware and expects the producer to take responsibility but does not seem open to change its behaviour (or putting it in other

way, he or she is not willing to personally accept certain consequences/costs). Furthermore, there are other counter-trends, such as: fashion is becoming a leisure activity, especially among the youth, who seek novelty and look for cheap fashion, which they rapidly dispose after purchase. Such 'demand volatility' is a phenomenon escalating to younger and younger ages, as one witnesses the rise of the child as a consumer in the fashion market (see Cook, 2004). Managing a volatile demand is not easy, especially for traditional textile and clothing small and medium enterprises (SMEs), which are less capable of investing in ICT, suffering more likely from information asymmetry and lacking the most updated competencies to forecast demand in a complex and dynamic context. This may worsen the competitiveness of these SMEs. Second, the degree of differentiation that technologies can offer and how long-term that strategy would prove successful depend on how footloose technologies are. In fact, modern technology is becoming rapidly available in the Far East. For instance, the gap with more technological advanced regions is getting smaller as foreign investment brings to the Far East billions of dollars of modern technology, including clean production technologies (ISDD, 2004). Due to the high costs involved, size is more of a barrier for technological investment than international borders. Given the tradition of SMEs in some European countries such as in France (Stengg, 2001), rapid technological innovation may actually represent a threat for competitiveness in Europe.

Thus, technology alone is not likely to be enough for differentiated production in Europe, not even clean technologies: for instance, environmental governance in China seems to be in transition and new relations between state, civil society and market are taking place (Carter and Mol, 2006b). The state council has been enforcing green practices by closing down heavily polluters, there is legislation promoting clean production, and more and more textile factories initiated certification processes, such as the Oeko-tex 100 and the ISO 14000 (ISDD, 2004). China has also its own environmental label, which is in use since 1994. The Chinese environmental label is getting international acceptance as is shown by the agreement between Australia and China to certify each other's green label (Chuan, 2005). How sustainable along the three pillars, the fashion supply chain will be, globally and particularly in Europe, depends of the developments in Asia, and on the synergies between the West and Asia. Asian countries are becoming more aware of the importance of the environmental pillar and its importance for competitiveness. Countries like China are also aware that they need to use their own patents for chemicals and are investing in research, and Asian countries are starting to push their own brands in domestic and Western markets (see e.g. Crampton, 2000 and Tam et al., 2005). This can lead to more independence from Europe, damaging further the economic pillar of the chain in Europe. At the same time, Western countries (like the U.S.) are minding sourcing in Asia as a springboard to step in Asian domestic markets. Thus, though there are challenges, there are also opportunities, and the future depends a lot of the 'individual' developments in Europe (innovation, etc.) and Asia (environmental and social pillars), but also of any synergies constructed between the two.

Therefore, it is not our intention to propose any causal or general normative link between sustainability and the leveraging of the organisation. Some principles shaping the SCM approach (namely the optimisation as the primary concern, which still characterises many SCM strategies) might not favour the development of a sustainable orientation along the fashion SC. Trends such as the increasing need for responsiveness, call for higher flexibility, both at the industrial site and at the distribution level, which may require, on the one hand, the set up of unstable and short term job positions, and on the other side, may favour the use of transport solutions with a high negative environmental impact (air freight transportation, small size express deliveries in congested cities, to mention just a few). On the other hand, the link between sustainability and SCM can also be looked upon the other way around: the set up of joint sustainable logistics initiatives, such as resource sharing, horizontal cooperation between competitors within the same supply chain, could be beneficial for SCM performance, as they can be considered as a pilot activity, i.e. initiating cooperation and favouring new cooperative initiatives. A sustainable logistics initiative can play the role of a pilot activity as it has a peculiar strength point: it allows overcoming one of the main reasons for the failure of SCM initiatives, which is risk and gain sharing (Whipple and Frankel, 2000). When the major aim of cooperation is, for example, to reduce CO2 emissions or to optimise load factor, in order to comply with new regulation or to reduce the delivery cost, the possibility for developing a successful collaboration becomes higher. Though there are studies showing e.g. an economic and environmental win-win situation, tension between different objectives or different parties in the chain may arise. Success stories are often found when sustainable principles and continuous improvement are embedded in production leading to waste reduction, better raw materials usage and product recovery, and increasing energy efficiency, ultimately reducing costs as a whole (see Ron, 1998; Allwood et al., 2006).

In managerial terms, when companies launch new sustainability oriented activities, conflicts may arise among the different actors implied in the same SC. Whilst a private organisation may have as its objective the minimisation of facility and transport costs (subject to meeting customer service constraints), the question can be asked whether a recognition of a need to pursue a sustainability agenda leads to a different overall vision, and by implication to an extension of this list of costs accepted by managers and shareholders. If so, the organisational structure of the SC is supposed to be revised, due to the fact that any project aiming at improving sustainability calls for an integrated analysis of the three pillars. What may appear as an environmentally friendly initiative (e.g. the use of organic fibres) has to be read in the light of other strategic choices (e.g. relocation of production), which may counterbalance the positive effects in terms of the environmental orientation of the company, via a dubious position in terms of human resource policy. Overall, it is the very representation of the company and its performance which are under question: the company is not only

an organisation pursuing particular interests, but it is supposed, from now on, to take into account the sustainability interest.

7. Conclusions and further research

Sustainability is a rather sensitive issue for the fashion supply chain due to its inherent characteristics (high resource use) and due to accentuated delocalisation of manufacturing to low cost countries leading simultaneously to: sourcing in countries with lenient environmental and social concerns; and to the disappearance of manufacturing in some regions, like in Europe, in spite of its previous economic strength. Because of such sensitiveness of the fashion SC to sustainability and current sharp competition, the pursuit of sustainable principles, represents at the same time a constraint and an opportunity for the actors of the chain and implies considerable changes at the organizational level both inside each company and along the supply chain. The question of the compatibility between sustainability and economic growth is still one of the main concerns in the sustainability literature. Keeping such a question in mind, we have first analysed the main attitudes of the fashion retail SC towards sustainability, then we have discussed how the implementation of sustainability in a supply chain context relates with leveraging the internal and external organisation.

With regard to the first point, we were able to clearly identify two clusters of spitted attitudes: Group A is of the stakeholders that resign, try to survive, blame others, and have a ‘palliative’ attitude towards sustainability; and Group B is of stakeholders who strive for improvement, for creative responses, and for internalisation of sustainability responsibilities, having a more ‘integrated’ approach. There is a multitude of factors possibly contributing for these different attitudes, and it is certainly a relevant area for further research. Larger samples are likely to allow higher level of cluster granularity, i.e. leading to the identification of more groups, with a variety of grades of responsibility. Future research can be designed taken into account potential factors already exposed in recent literature, such as competition, government support, adjacent industries, cultural and political boundaries, and so on (see e.g. Capron, 2002, and Chang and Chen, 2004). Furthermore, we analysed the suggestions and views of Group B in the light of real examples on approaches, initiatives and tools that textile and clothing companies are employing to deal with the emerging in the field of sustainability. Companies in the search for new strategies can benefit from such a critical overview, which included: eco-labels and standards, environmental and social audits, partnering, communities of practice, fair trade, and clean transport modes.

During the analysis, we introduced some of the new actors entering the fashion retail SC (e.g. moderators of communities of practice), we discussed about activities gaining renewed importance (e.g. recycling, intermodal transport) and we put forward new needs relating to sustainability. We

therefore argue that taking into account sustainability issues leads to the broadening of the ‘space’ or ‘sphere’ of coordination. Sustainable strategies imply to interact with new actors (rating agencies, recycling institutions, public bodies, etc.), new stakeholders (ecologist associations, citizens, etc.), with whom it is advisable to shape new coordination methods. The company environment is enlarged to include stakeholders’ needs and claims. The sphere of coordination is thus broadened to the non-production environment. The interaction methods change accordingly: coordination is placed on a different level. Internal and external organisations can evolve in a direction of sustainability to support different forms of interactions with new actors and stakeholders. Sustainability becomes thus a vector for the acceptability of firms’ strategies by these actors. The evolution of sustainable strategies also depends on the space of coordination that the firm decides to take into account, i.e. the respective weight granted to the so called production environment and to stakeholders which are not intervening directly in the value chain.

However, a common remark concerns the implementation of sustainable strategies within any supply chain. A deep reorganisation is needed, both inside each company and between the different actors in order to cope with the new sustainable challenges. Subsequently the performance paradigm of companies has to be revised according to the reorganisation. The challenge for companies is double: on the one hand the sustainability principle has to be translated into qualitative and/or quantitative indicators; on the other hand, the multiple SC actors have to co-produce the new performance paradigm. The enlargement of the coordination sphere means that the relationship issue within the context of the supply chain becomes more complex and requires the development of new competencies. Different negotiation skills have to be developed to set up and manage a reverse supply chain where public authorities, private companies and non-profit organization may coexist.

We discussed and we defend that a positive link can be established between sustainability, supply chain principles (internal and external integration) and coordination. We argue that companies can initiate a ‘virtual’ circle, leading to compatibility between sustainability, optimisation concerns and quality of coordination. On the one hand, sustainable initiatives call for higher coordination and can favour SC optimisation. On the other hand, new coordination modes may pave the way to new sustainable strategies at the same time that pursue an optimisation goal. Yet, there is a need for deeper investigation on the degree in which modern supply chain principles may conflict with sustainability. This is of particular interest to the fashion supply chain given that key-success factors are commonly based on quick-response principles.

Acknowledgements

We would like to acknowledge our colleagues involved in the projects on the sustainability of the clothing and textiles sector, respectively Dr. Julian Allwood, Sauren Laursen and Cecília Malvido de

Rodriguez (in the UK) and Amélie Gonçalves and Thomas Zeroual (the DURLOG project in France). We also would like to express our gratitude to all the stakeholders, who provided valuable input for the study.

Bibliography

- Allwood, J. M., Laursen, S.E., Malvido de Rodriguez, C. and N.M.P. Bocken., 2006, Well-dressed? The present and future sustainability of clothing and textiles in the United Kingdom, Biffaward programme on sustainable resource reuse, Institute for Manufacturing, University of Cambridge.
- Al-Mudimigh, A.S., Zairi, M. and Ahmed A.M.M., 2004, Extending the concept of supply chain: The effective management of value chains, *International Journal of Production Economics* 87, 309–320.
- Amalou, F., 2003, Le textile et l'habillement français accélèrent leur délocalisation, *Le Monde* (in French).
- Ambec, S. and P. Barla, 2006, Can Environmental Regulations be Good for Business? An assessment of the Porter Hypothesis, *Energy Studies Review*, 14 (2), 42-62.
- Ayres, R., Ferrer, G., and T. Van Leynseele., 1997, Eco-efficiency, asset recovery and remanufacturing, *European Management Journal* 15 (5), 557-574.
- Baker, P., 2004, Aligning distribution center operations to supply chain strategy, *The International Journal of Logistics Management* 15 (1), 111-121.
- Barrett, S., 1991, Environmental Regulation for Competitive Advantage, *Business Strategy Review* 2 (1), 1-7.
- Bonacich, E., Cheng, L., Chinchilla, N., Hamilton, N. and P. Ong, eds., 1994, *Global Production: The Apparel Industry in the Pacific Rim* (Temple University Press, Philadelphia, PA).
- Bhamra, TA, Heeley, J. and D. Tyler, 1998, A Cross Sectoral Approach to New Product Development', *The Design Journal* 1(3), 2-15.
- Brägger, M., 2004, Supply Chain Management and Collaboration in the Apparel Sector – Learning from the best?, *ECR Journal, International Commerce Review*
- BSI, 2006, Proposal for Building a Community of practice: Ethical fashion. Devising collaborative solutions to social and environmental challenges in the fashion industry, www.bsistandards.co.uk.
- Capron, M., 2002, Le bilan sociétal vise un changement des comportements, www.novethic.fr (in French).
- Carbone, V. and C. Meunier, 2006, Supply Chain Management: portée et limites – L'apport des théories des réseaux, proceedings of the annual conference AIMS – Association Internationale Management Stratégique, (Annecy, France), (in French).
- Carbone, V., Allen, J., De Brito, M. P. and C. Meunier, 2007, The European Clothing and Textile Sectors. A preliminary comparison between France and the UK, *Cahiers de Recherche ESCE* (Paris, France).
- Carter, N.T. and Mol, a.P.J., 2006a, China and the Environment: Domestic and Transnational Dynamics of a future hegemon, *Environmental Politics* 15 (2), 330-344.
- Carter, N.T. and P.J. Mol, 2006b, China's environmental governance in transition, *Environmental Politics*, 15 (2), 149-170.
- CBC News, 2007, Marks and Spencer goes green, January 15th, 2007, www.cbc.ca
- Cerin, P. and P. Dobers 2001, What does the performance of the Dow Jones sustainability group index tell us?, *Eco-Management and Auditing* 8, 123–133.
- Chang, Y.-C. and M.-H. Chen, 2004, Comparing approaches to systems of innovation: the knowledge perspective, *Technology in Society* 26, 17–37
- Clean Clothes Campaign, 2006, Improving working conditions in the global garment industry, www.cleanclothes.org
- Chakraborty, S K, Kurien, V., Singh, J., Athreya, M., Maira, A., Aga, A. and A.K. Gupta, 2004, Management Paradigms Beyond Profit Maximization, *The Journal for Decision Makers*, Vikalpa , 29 (3), July-September.
- Choi, T. N., 2007, Pre-season stocking and pricing decisions for fashion retailers with multiple information updating, *International Journal of Production Economics* 106 (2007) 146–170
- Crampton, T., 2000, From Sweatshops to High Fashion : Thai Brands Seek To Upgrade Image, *International Herald Tribune*, March 2.
- Cook, D.T. , 2004, *The Commodification of Childhood: The children's clothing industry and the rise of the child consumer*, (Durham: Duke University Press)
- Chuan, Q., 2005, Australia, China share green product labelling, *China Daily*, January 26.
- De Brito, M.P., Carbone, V., Meunier, C. and J. Allwood, 2006, The clothing and textile sectors: preliminary comparison between France and the UK, Nofoma Conference, Oslo, 8-9 June.

- De Brito, M.P., 2007a, Embedding sustainability in supply chain management, working paper OTB, TU Delft, The Netherlands.
- De Brito, M.P., 2007b, Towards sustainable supply chains: a methodology, SIMPOI/POMS Proceedings, 8-10 August, Rio de Janeiro, Brazil.
- Emmelhainz, M.A. and R.J. Adams, 1999, The Apparel industry response to "sweatshop" concerns: a review and analysis of codes of conduct, *The Journal of Supply Chain Management: A Global Review of Purchasing*, Summer, 51-57.
- EURATEX, 2004, European technology platform for the future of textiles and clothing: a vision for 2020, the European Apparel and Textiles association, December.
- European Commission, 2000, European Employment and social policy: a policy for people, http://ec.europa.eu/publications/booklets/move/24/index_en.htm.
- Ferdows K, Lewis M.A. and J.A.D. Machuca, 2004, Rapid-fire fulfillment, *Harvard Business Review*, Nov1, 105-110.
- Fernie, J., 1997, Retail Changes & Retail Logistics in the UK: Past Trends & Future Prospects, *Service Industries Journal* 17 (3), 383-96.
- Férone, G., d'Arcimoles, C.-H., Bello, P. and N. Sassenou, 2001, *Le développement durable*, Editions d'Organisation (Paris, France), (in French).
- Forrester J.W., 1958, Industrial Dynamics, a major breakthrough for decision makers. *Harvard Business Review*, July-August, 37-66.
- Forza, C., 2002, Survey research in operations management: a process-based perspective. *International Journal of Operations & Production Management* 22 (2), 152-194.
- Freeman, R. E., 1984, *Strategic management: a stakeholder approach* (Boston: Pitman).
- Freeman, R.E., Wicks, A.C. and B. Parmar, 2004, Stakeholder theory and the corporate objective revisited, *Organization Science* 15 (3), 364-369.
- Ganeshan R., Jack E., Magazine M. J., Stephens P., 1999, A taxonomic review of supply chain management research,. In: Tayur S., Ganesham R., and M. J. Magazine, (eds.), *Quantitative Models for Supply Chain Management*, Kluwer Academic Publishers: Massachussets, USA.
- Gereffi, G., 1996, Global commodity chains: new forms of coordination and control among nations and firms in international industries, *Competition and Change* 4, 427-439.
- Griffis, S.E., Goldsby, T.J and M. Cooper (2003). Web-based and mail surveys: a comparison of response, data, and cost. *Journal of Business Logistics*, 24 (2), 237-258.
- Hojensgard, N., 2005, It simply works better, Campaign Report on European CSR Excellence, www.csrcampaign.org.
- IBM, 2004, Deeper Customer insight. Understanding today's complex shoppers. An IBM Institute for Business Value executive brief, (New York, U.S.)
- Lambert, D.M., 2001, The supply chain management and logistics controversy, in: A.M. Brewer, et al., eds., *Handbook of Logistics and Supply Chain Management*, vol.2, 99-125 (Elsevier Science, London).
- IISD (2004), An environmental impact assessment of China's WTO assessment, An analysis of six sectors, A Report by the Task Force on WTO and Environment China Council for International Cooperation on Environment and Development (CCICED), October.
- Lane C. and Probert J., 2004, Between the global and the local: a comparison of the British and German clothing industry, *Competition & Change* 8 (3), 243-266.
- Larson, A. L., Teisberg, E. O. and R.R. Johnson, 2000. Sustainable Business, *Interfaces* 30 (3), 1-12.
- Lindner, S.H., 2002, Technology and textiles globalization, *History and Technology* 18 (1), 1-22.
- Loch, C.H. and C. Terwiesch, 1998, Communication and uncertainty in concurrent engineering", *Management Science* 44 (8), 1032-48.
- Marshall, R.S. and Brown, D., 2003, The strategy of sustainability: a systems perspective on environmental initiatives, *California Management Review* 46 (1), 101-126.
- Martinet A.C. and E. Reynaud, 2004, *Stratégies d'entreprise et écologie*, Editions Economica (Paris), Série Politique générale, finance et marketing. (in French)
- Mentzer, J.-T., Dewitt, W. and J.S. Keebler, 2001, Définir le Supply Chain Management, *Logistique & Management*, 9 (2), 3-18 (in French)
- Murphy, P.R. and R.F Poist, 2002, Socially responsible logistics: An exploratory study, *Transportation Journal*, Summer, 23-35.
- OECD, 2004, Policy brief: a new world map in textiles and clothing. Adjusting to change, *OECD Observer*, October.
- Oliver, C., 1991, Strategic Responses to Institutional Processes, *Academy of Management Review* 16, 145-179.
- Phillips, R., 2003, Stakeholder legitimacy, *Business Ethics Quarterly* 13 (1), 25-41.

- Porter, Michael E. and C. van der Linde, 1995, Towards a New Conception of the Environmental-Competitiveness Relationship, *Journal of Economic Perspectives* 9, 97-118.
- Porter, 1985, *The competitive Advantage*, The Free Press (New York, US).
- Rreuse, 2005, RREUSE opinion on current crisis in textile sector, www.rreuse.org/
- Rosen, E., 2003, *Making Sweatshops*, University of California Press (Berkeley, CA).
- Ron, A.J., 1998, Sustainable production: The ultimate result of a continuous improvement, *International Journal of Production Economics*, 56-57, 99-110.
- Sarkis, J., 2003, A strategic decision framework for green supply chain management, *Journal of Cleaner Production* 11 (4), 397-409.
- Sarma, D., 2004, Screen printing versus ink-jet printing, *Textile World* 154 (10), October.
- Sissel A. W., Geiserb, K., Irwinc, F., Weissmand, A.B., Bertolucci, M.D., Fiskf, P., Basilea, G., Cowang, S., Cauleyh, H. and A. McPhersoni, 2005, Fitting together the building blocks for sustainability: a revised model for integrating ecological, social, and financial factors into business decision-making, *Journal of Cleaner Production* 13, 1145-1163.
- Smith, N.C., 2003, Corporate Social Responsibility: Whether or How?, *California Management Review* 45 (4), 52-76.
- Sohelenius, G, 1992, Concurrent engineering, *Annals of the CIRP* 41, 645-656.
- Stengg, W., 2001, The textile and clothing industry in the EU: a survey, *Enterprise Papers*, N°2, DG Enterprise, (Brussels).
- Stigler, G., 1971, The Theory of Economic Regulation, *Bell Journal of Economic and Management Science* 2, 3-21.
- Strauss, A. and Corbin, J., 2000, Grounded theory methodology. In Denzin, N. K. and Lincoln, Y. S., editors, *Handbook of qualitative research*. Sage, Thousand Oaks, CA, USA. 2nd edition.
- Sum, N.-L. and P. Ngai, 2005, Globalization and Paradoxes of Ethical Transnational Production: Code of Conduct in a Chinese Workplace, *Competition & Change* 9 (2), 181-200.
- Tam, F.Y., Chan, T.S., Chu, P.W., Lai, T.C. and L.L. Wang, 2005, Opportunities and challenges: Hong Kong as Asia's fashion hub, *Journal of Fashion Marketing and Management* 9 (2), 221-231.
- Taplin, I.M. and J. Winterton, eds., 1997, *Rethinking Global Production*, Ashgate (Aldershot, UK).
- Taplin, J., 2006, Restructuring and reconfiguration the EU textile and clothing industry adapts to change, *European Business Review* 18 (3), 172-186.
- Tulder, M. and A. Kolk, 2001, Multinationality and corporate ethics: codes of conduct in the sports goods industry, *Journal of International Business Studies* 32 (2), 267-283.
- Veleva, V., and M. Ellenbecker, 2001, Indicators of sustainable production: framework and methodology, *Journal of Cleaner Production* 9 (6), 519-549.
- Vermeulen, W.J.V. and P.J. Ras, 2006, The Challenge of greening global production chains: meeting both ends, *Sustainable Development* 14, 245-256 .
- Waste Watch, 2006, Textile recycling information sheet, www.wasteonline.org.uk/
- Welford, R., 2002, Beyond systems: A vision for corporate environmental management for the future, Background paper for the Studia Economica lecture series at the Helsinki School of Economics, Hong Kong, December.
- Welford, R. and S. Frost, 2006, Corporate social responsibility in Asian supply chains, *Corporate Social Responsibility Environmental Management* 13, 166-176.
- Whipple, J. M. and R. Frankel, 2000, Strategic alliance success factors, *Journal of Supply Chain Management*, 36 (3):22-40.
- Witherell, B. and M. Maher, 2001, Responsible corporate behaviour for sustainable development, *OECD Observer*, July.
- Wolff, D. and F. Mauléon, 2005, *Le Management Durable*, Editions Lavoisier, (Paris, France), (*in French*).

TABLES:

Table 1.

The structure and content of the questionnaire (open-ended questions).

Part I- PAST DEVELOPMENT	
•	Stimulating and inhibiting factors that have shaped the supply chain
•	Main events impacting the supply chain
Part III- FUTURE DEVELOPMENT	
•	Challenges and tools to deal with them
•	Trends and breakthroughs
•	Trends in technology, logistics and sustainability issues

Table2.

Profile and number of respondents.

	Profile	N.
SUPPLIERS	Weaving Machinery	1
	Dyeing Machinery	2
	Fiber Technology	1
	Fibers	2
	Chemicals	2
MANUFACTURERS	Clothing	5
	Fabrics	3
	Technical textiles	2
RETAILERS	Shop Retailers	4
	Mail-order retailer	1
POST-CONSUMPTION ('RECYCLERS')	Charity Organisation & Recycling processor <i>(jointly answered the questionnaire)</i>	1
	Recycling Association & Recycling processor <i>(jointly answered the questionnaire)</i>	1
	Textile recycling association	2
SERVICE PROVIDERS	Fashion Bureaus	2
	Software provider	2
	Consultants	3
	Fashion media	2
	Professional Associations	3
EXPERTS on the fashion chain	Academic & designers	4
	Academic & ex-employee	2
	Academics	3
TOTAL		48

Table 3.

The clothing a textile SC: the view and attitudes of stakeholders [Groups A and B] on the pillars of sustainability

	Economic	Environmental	Social
Main view [Groups A and B]	It's central, a pre-requisite	It's enforced (legislation)	Cannot be ignored (in current society)
Attitudes:	Compete and A: survive; B: improve;	A and B: Cost and legislation driven	A: someone's else responsibility; B: internalisation of sustainability responsibilities

Table 4

The path for sustainable internal organization: stakeholders' views

SD Pillars	WHAT	HOW
Economic	. Competitiveness	. process innovation; . product innovation
Environmental	. clean outputs . recycling	. clean (and recycling) technologies
Social	. social fairness and . sustainable human resource management	. better skilled human resources (in some market segments)

Table 5.

The path for sustainable external organization: stakeholders' views

SD Pillars	WHAT	HOW
Economic	. Optimisation of flow management . Flow consolidation	. Logistics integration
Environmental	. Environmentally-friendly transport; . Resource sharing solutions	. Clean transport modes (rail, maritime and waterways) . Intermodal transport solutions
Social	. Consumer's health	. Improved security (track & tracing)

URES:

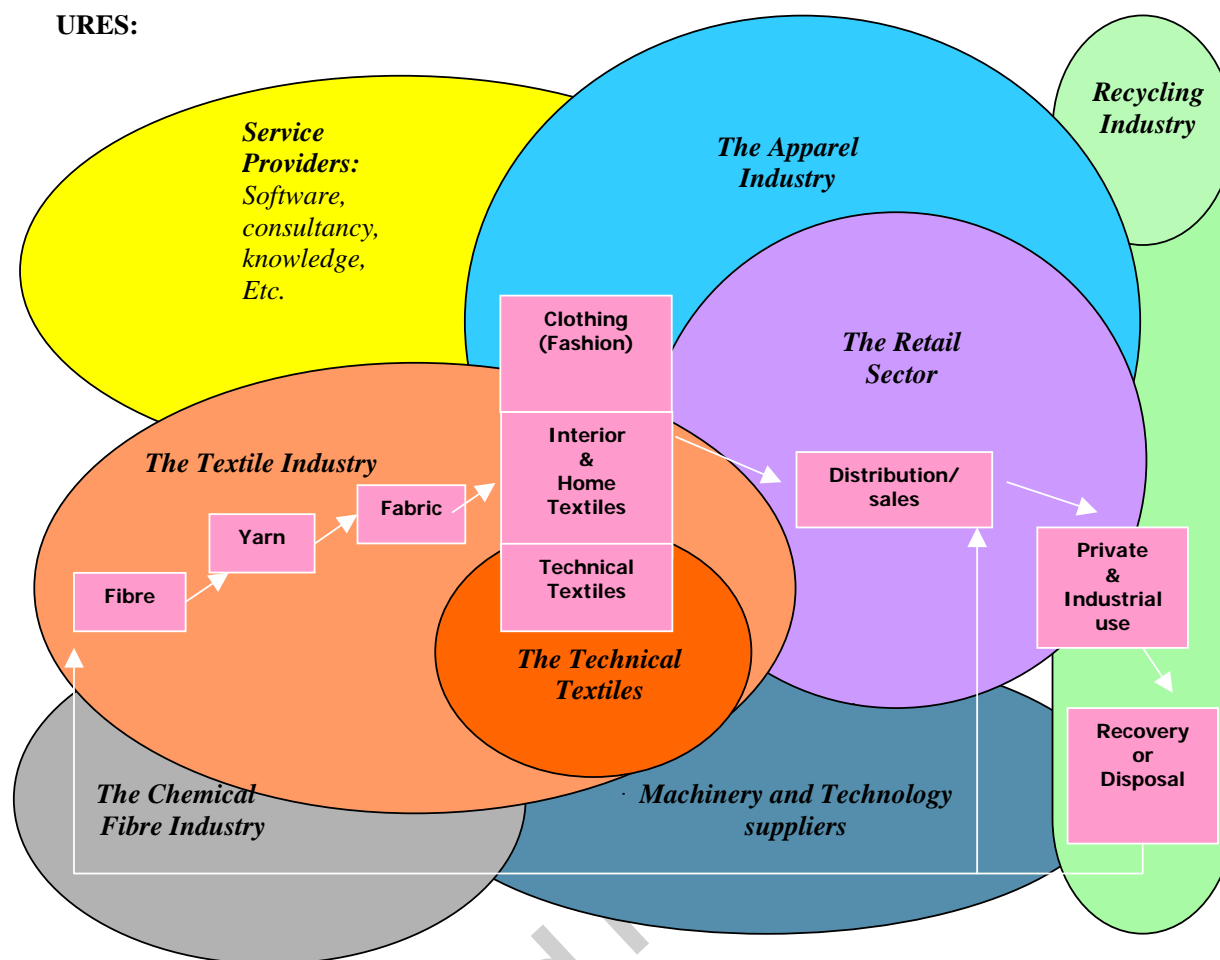


Fig. 1. The fashion supply chain: a stakeholder map (adapted from EURATEX, 2004).

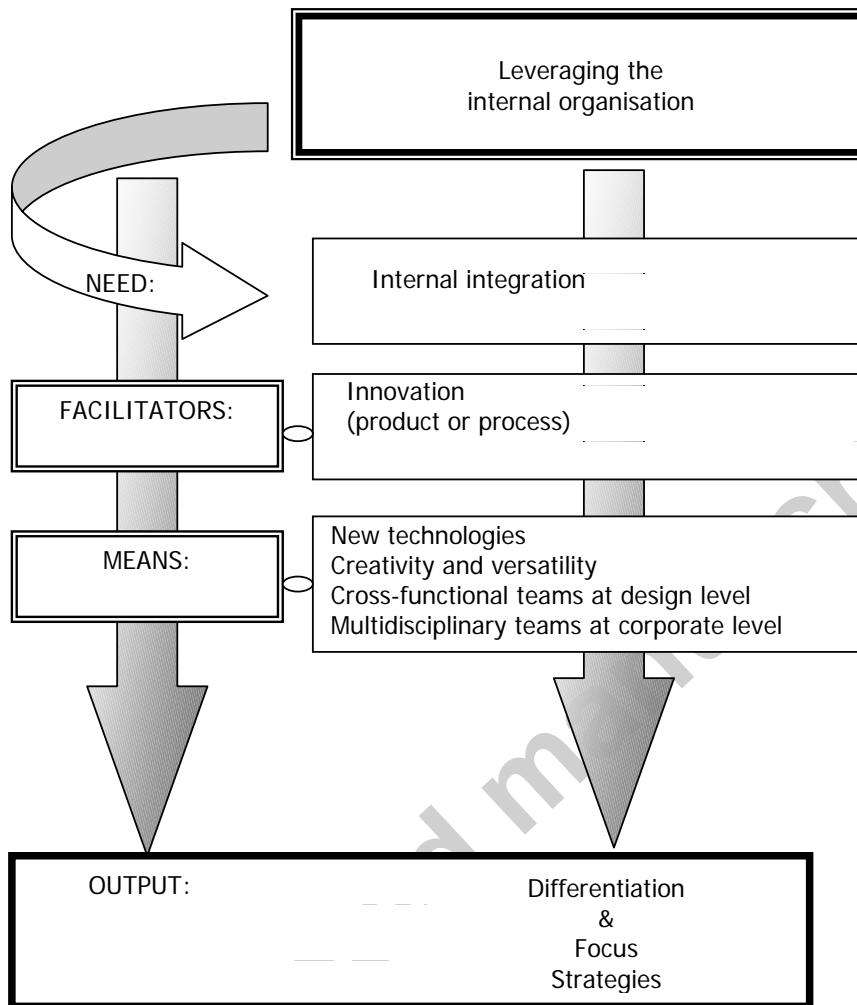


Fig.2: The process of leveraging the internal organisation

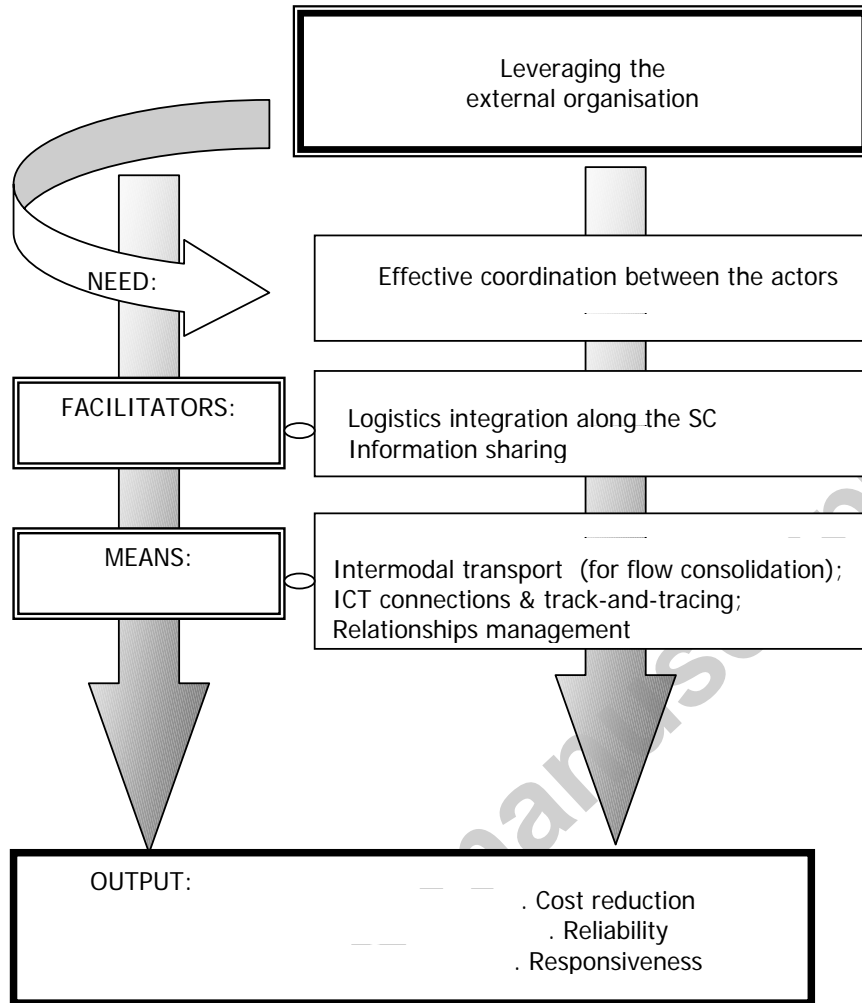


Fig.3: The process of leveraging the external organisation