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3

From principle to practice

Embedding sustainability in clothing supply chain strategies

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The fashion clothing industry is particularly subject to strong external pressure for sustainable behaviour and the increased outsourcing of manufacturing has created long, globally fragmented supply chains. Supply chain management (SCM) has come to the fore in this industry, as the way a firm designs and manages its supply chain can provide competitive advantage in a market focused on cost, speed and availability. It also provides a relational view of the supply chain that can be used to evaluate and address the environmental, social and economic impacts of products, processes and practices.

Building on sustainability theory and supply chain strategy, this chapter attempts to provide an integrated understanding of how supply chains can be managed in practice to effectively address the dimensions of sustainability. It analyses all stages within the clothing supply chain and assesses the different environmental and social impacts that can occur throughout the product life-cycle. It considers the value of long-term, collaborative relationships in providing a coordinated supply chain strategy which addresses these serious, increasingly high profile issues, and in turn generates competitive advantage.

The chapter will address the following research questions:

1. How is sustainability interpreted academically and how does this translate into practice?

2. How is sustainability addressed in supply chains and what role does SCM play?
3. How does the clothing industry address environmental and social impacts within supply chains and how can this inform sustainable supply chain management (SSCM)?

The chapter commences with a discussion of the definitions and interpretations of sustainability followed by a review of the SCM literature. The two fields are then aligned, with a focus on the models/tools that can be applied to enable sustainable supply chains. The application of these models within the clothing industry is investigated and insights which can inform both theory development and supply chain practice identified and discussed.

3.1 Defining sustainability

The idea of sustainability was verbalised by Schumacher in 1972, as ‘permanence’, where ‘nothing makes economic sense unless its continuance for a long time can be projected without running into absurdities’ (Grinde and Khare 2008: 129). Sustainable as an adjective was institutionalised by the 1992 Rio Earth Summit conference and is seen as an indication of environmental goodness (Appleton 2006) and a long-term perspective (Orians 1990).

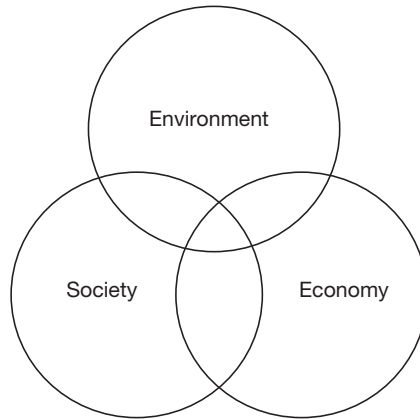
In 1983 the World Commission on Environment and Development (WCED) was established and the result of their work formalised in the 1987 Brundtland Report, *Our Common Future*. It defined sustainability as ‘development which meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED 1987: 43), and over 25 years later remains the most often quoted definition of this concept. Its two central tenets are:

- ‘the concept of “needs”, in particular the essential needs of the world’s poor, to which overriding priority should be given’
- ‘the idea of limitations imposed by the state of technology and social organisation on the environment’s ability to meet present and future needs’ (WCED 1987: 43)

Prior to the Brundtland Report, sustainability in the business context was seen as ‘a company’s ability to increase its earnings steadily’ (Werbach 2009), i.e. an emphasis on economic performance. The Brundtland definition however emphasises the importance of environmental and social sustainability, and the literature on this concept recognises that sustainability is multi-dimensional (Orians 1990; Dempsey *et al.* 2009; Udo and Jansson 2009).

The three pillars (Springett 2003; Vachon and Mao 2008; Hutchins and Sutherland 2008) or interconnected rings (Giddings *et al.* 2002) of economy, environment and

Figure 3.1 Three ring sector view of sustainability



society illustrated in Figure 3.1 are pervasive throughout sustainability literature and offer a holistic view of the concept. However the extent to which they can be fully integrated is frequently questioned and Gladwin *et al.* (1995) challenge the model as they believe it encourages a ‘technical fix’ approach. As each sector can be treated separately, fundamental connections may be ignored and there is an inherent assumption that trade-offs are permitted. While there is clear academic recognition of the need to integrate economic, environmental and social sustainability, there is limited guidance on how it can be achieved in practice.

3.2 Levels of sustainability

Expanding on the three ring sector view, Inyang (2009), Udo and Jansson (2009), Springett (2003) and Sathiendrakumar (1996) all identify different ‘strengths’ of sustainability from (very) weak to (very) strong, and align these with the idea of an achievable standard. Weak sustainability/technocentrism views that the stock of capital assets, whether man-made or natural, is perfectly substitutable, with technology replacing resources, while at the strong/ecocentric end of the spectrum natural capital *must* be protected and cannot be substituted.

Figure 3.2 aligns the range of different academic viewpoints into a single spectrum, with each horizontal division representing an individual author’s interpretation of the different ‘strengths’ of sustainability. It illustrates the overlap between viewpoints, as well as emphasising the many different ways of interpreting sustainability. Traditional economists are seen to have a ‘relaxed’ view of sustainability and measure it in monetary terms with economic growth taking priority, in line with the pre-Brundtland sustainability definition. Environmentalists take a more stringent

Figure 3.2 Sustainability spectrum

Weak sustainability (Neoclassical economics)		Strong sustainability (Ecological economics)
Utility is non-declining over time Substituting one form of capital for another (Nilson 2010)		Economy and nature complementary and should both be sustained
Technocentrism	Sustaincentrism	Ecocentrism
Right to master natural creation for human benefit	Economic and human activities inextricably linked with natural systems	Non-human nature should only be used to satisfy vital needs of sustenance
(Gladwin <i>et al.</i> 1995)		
Physical or human capital can substitute natural capital Technology provides the means		Natural capital needs to be maintained Technology not the answer, but some substitution possible
(Inyang 2009; Sathiendrakumar 1996)		
Status quo	Reform	Transformation
Need for change acknowledged but economic growth is the solution No major environmental or social problems	Acceptance of problems but belief that shifts in policy and lifestyle can be achieved over time and within present social and economic structures. (Brundtland Report sits here)	Social and environmental problems rooted in existing economic structures Strong commitment to social equity and justice
(Hopwood <i>et al.</i> 2005)		
Political reality		Material reality
Capitalist economy dominates environment and society		Economy dependent on society and environment
(Giddings <i>et al.</i> 2002)		
Rationalism	Communitarianism	Ecocentrism
Society = sum of individuals Greatest utility for greatest number – desires not needs Goal is maximum economic efficiency	Utility should not just apply at individual level All must partake, not just greatest number	Everything on planet interconnected and interdependent Humanity dependent on natural systems
(Sillanpaa 1998)		

and potentially extremist view where no growth can occur at the detriment of natural resources (Inyang 2009). This invites the criticism that this position does not adequately consider the needs of poor people, which is key to the Brundtland definition (Appleton 2006).

There is a general perception in the academic literature that weak sustainability is currently the prevailing approach in practice, where economic growth dominates and positive economic outcomes outweigh negative social or environmental impacts (Lamberton 2005). In this model engagement with social and environmental issues is typically kept at a superficial, 'green business as usual' level (Springett 2003). Strong sustainability in contrast emphasises the importance of sustaining the environment and is much more qualitative in its approach (Nilsen 2010).

The clothing industry has traditionally operated at the weak end of the sustainability spectrum with an emphasis on the economic dimension and transactional relationships, and an inherent acceptance of the negative social and environmental impacts that can occur along the supply chain (Allwood *et al.* 2006). Supply chain management (SCM) was used initially to achieve production efficiencies and maximise profit through a 'race to the bottom' outsourcing strategy focused on short-term, low-cost supplier relationships (Bruce *et al.* 2004). However in recent years the focus has shifted because of the growing pressure for supply chains to operate in environmentally and socially responsible ways (Birtwistle and Moore 2007; Goworek 2011), and how a supply chain is designed and managed has become of strategic importance (Bergvall-Forsberg and Towers 2007), as outlined in the following section.

3.3 The role of supply chain management

Most organisations are part of at least one supply chain (Samaranayake 2005) and competition is increasingly based on 'supply chain vs. supply chain' (Gold *et al.* 2009; Soler *et al.* 2010). Globalisation and economic trends have created highly complex supply chains (Varma *et al.* 2006) and the design, organisation, interactions, competences, capabilities and management of supply chains have become key issues (Gold *et al.* 2009). Under these circumstances SCM represents a key discipline for establishing strategies that successfully integrate economic, environmental and social issues and practices.

SCM has been practitioner-led (Burgess *et al.* 2006) and represents an evolutionary step beyond logistics (Samaranayake 2005) by integrating the management of cooperations with that of material and information flows (Handfield and Nichols 1999). The prime driver for the development of SCM has traditionally been economic sustainability, based on the premise that an integrated, efficient supply chain helps to minimise monetary risks and increase profits (Fawcett *et al.* 2008), aligning with the previously highlighted weak, 'business as usual approach' to sustainability. However increased consumer awareness and stakeholder pressure has

led to social and environmental sustainability becoming additional drivers in supply chain strategies.

3.4 Making connections: Supply chain relationships

A key strategic contribution of SCM is the development of difficult-to-imitate supplier relationships, and the strategic management of suppliers is linked to collaborative 'partnerships' (Preuss 2005a). When environmental and social sustainability is incorporated in these relationships there are tangible supply chain benefits. These include safer and cleaner facilities across the supply chain, reduced environmental and health risks and improved product quality (Sarkis 1995). They can also offer competitive advantage through positive PR, reduced long-term risks related to product liability, resource depletion and waste management, and the ability to proactively move ahead of regulation (Preuss 2005a).

Traditional supplier interactions have been predominantly 'arms length', focusing on increasing suppliers to economise transaction costs and minimise risk (Lowson 2002), whereas the more recent relational model focuses on sharing of information (Preuss 2005b; Power 2005). Collaborative relationships are characterised by information sharing as well as a long-term approach and mutual advantage (Preuss 2005a) with joint efforts achieving objectives and creating value that could not be realised otherwise (Gattorna and Walters 1996; Nyaga *et al.* 2010). Effective SCM relies on these close, long-term and committed working relationships (Spekman *et al.* 1998) and requires confidence and trust among partners (Varma *et al.* 2006).

Integrated supply chains are inherently strategic (Power 2005) and there has been a defined shift from a tactical focus to a more strategic approach in SCM (Attaran and Attaran 2007). The sharing of meaningful, rare, valuable, not imitable or non-substitutable information (Barney and Hesterley 2008) can create 'distinctive visibility', while relational embeddedness gained through a history of interactions can both improve performance and provide a sustainable competitive advantage (Soler *et al.* 2010; Bernardes 2010).

3.5 Addressing sustainability in supply chains

Building on the SCM principles outlined above, the emerging discipline of sustainable supply chain management (SSCM) explicitly incorporates the ecological and social aspects of business, as well as economic sustainability (Svensson 2007). It represents 'the strategic, transparent integration and achievement of an organisation's social, environmental and economic goals in the systemic coordination of

key inter-organisational business processes for improving the long-term economic performance of the individual company and its supply chains' (Carter and Rogers 2008: 368).

A sustainability strategy for managing the supply chain defines the firm's values, how the values will be enforced and the consequences for not achieving them (Mahler 2007). It is necessary to holistically and purposefully identify environmental and social initiatives which support a firm's sustainability strategy and have traceability and visibility into both upstream and downstream operations (Carter and Easton 2011). This is critical for the success of *whole* supply chain management (Ageron *et al.* 2011) and genuine sustainability results from making supply chains more sustainable (Mahler 2007), emphasising the need to apply a holistic model (Stokes and Tohamy 2009) which recognises and manages all three dimensions.

3.5.1 The environment

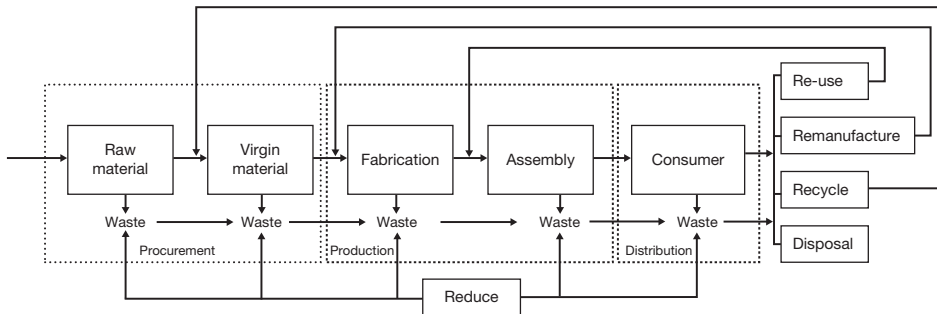
A firm's impact extends beyond any single process to the complete product life-cycle (Sharfman *et al.* 2009) and firms should be responsible for their products 'from cradle to grave' (Lippman 2001; Kleindorfer *et al.* 2005). Reverse logistics, where a manufacturer accepts previously shipped products or parts for possible recycling, remanufacturing or disposal (Varma *et al.* 2006) is increasingly included in SCM and effectively 'closes the loop'. This final stage is increasingly seen as a competitive necessity and has strong strategic relevance to addressing the environmental dimension in supply chains (Crandall 2006).

Forward and reverse supply chains form a 'closed loop' when managed in a coordinated way and can foster sustainability (Kleindorfer *et al.* 2005). Closed loop supply chains (CLSC) enable the 'cradle-to-cradle' approach by taking back products from customers and recovering added value by re-using the products and/or their components (Guide Jr and Van Wassenhove 2009). They are characterised by the firm's active involvement in the recovery process in order to extend a product's life or manage final disposal (Klassen and Johnson in New and Westbrook 2004). The key goal is to keep all materials within the life-cycle and minimise any flow into the external environment (Sarkis 1995), as illustrated in Figure 3.3. The concept of CLSC is of key importance in addressing the major environmental concern of waste and hazardous materials/processes, as well as generating economic value through extending product life and the re-use/recycling of products (Blumberg 2005).

Waste minimisation and recycling imperatives have placed greater emphasis on product life-cycle approaches (Stokes and Tohamy 2009). Closed loop concepts and life-cycle analysis (LCA) provide an appropriate focus for environmental sustainability research as they apply a more connected and holistic view of supply chains, especially as these approaches have been under-explored to date. A key way to improve sustainability in its true holistic context is to lengthen the life of materials and products. The recycling and re-use of materials can generate additional revenue streams while also reducing the level and cost of waste disposal (Sarkis *et al.* 2010).

Figure 3.3 Closed loop supply chain

Source: Sarkis 1995



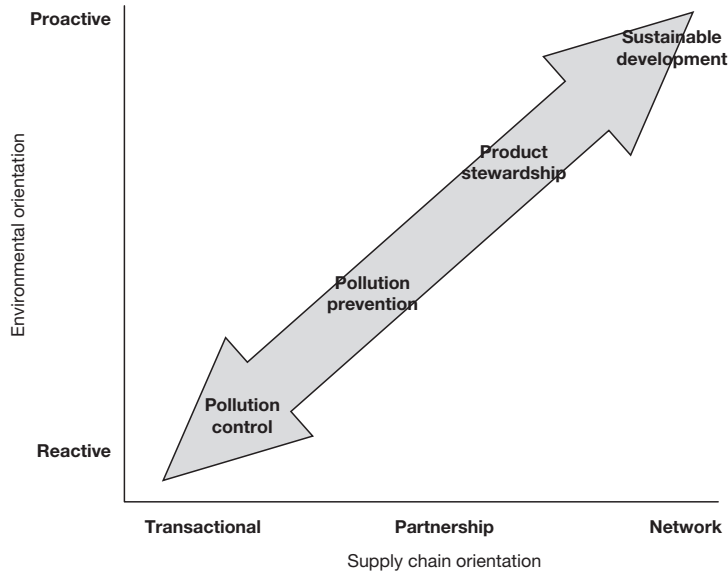
Every product generated, transported, used and discarded within a supply chain has some degree of impact on the environment, and is a function of the material and energy consumed, and wastes released in the product's life-cycle (Tsoufas and Pappis 2006). A 'green' supply chain is where a firm works with their suppliers to improve the environmental performance of products and processes (Simpson and Power 2005). There are three recognised strategies to managing environmental impact: reactive through minimum 'end of pipe' pollution control; proactive where firms recycle and re-use products and materials within their supply chains and aim to pre-empt new legislation; and value-seeking where environmental behaviour is integrated into the business strategy with a supply network-wide responsibility (van Hoek 1999; Preuss 2005a).

Relationships are key to successful implementation of value-seeking strategies and symmetrical, strategic partnerships focus on long-term, mutually beneficial supply chain alliances with joint goals and knowledge exchange (Forman and Sogaard Jorgensen 2004). This move away from purely transactional relationships produces a stronger and more proactive form of environmental management. Figure 3.4 illustrates the transition from reactive to proactive strategies against different forms of supply chain, and reiterates that a proactive network of committed suppliers is required to achieve sustainability (New and Westbrook 2004). However in line with the sustainability spectrum in Figure 3.2, most current environmental management investment tends to be in 'end-of-pipe' technologies (i.e. a reactive approach) (Vachon and Klassen 2006) as processes and products can remain largely unchanged.

The right supply chain orientation (SCO) can be seen as antecedent to successful SCM, with a firm recognising the systemic and strategic implications of managing the numerous flows in the supply chain (Defee *et al.* 2009). This emphasises that firms applying a systems rather than transactional approach are more likely to successfully address sustainability. SCO also represents a means for firms to compete through the creation of distinctive supply chain capabilities (Mentzer

Figure 3.4 Approaches to environmental management in supply chains

Source: New and Westbrook 2004



et al. 2001) and strong supplier relationships facilitate the adoption and diffusion of environmentally focused practices (Florida 1996) such as recycling and waste management.

3.5.2 Society

While the environmental dimension focuses on the responsible management of natural resources, social sustainability is concerned with the management of social resources, including people's skills and abilities, institutions, relationships and social values (Sarkis *et al.* 2010). At the business level this requires firms and their suppliers to add value by increasing the human capital of individuals, and the societal capital of communities (Dyllick and Hockerts 2002).

The issue of fair and equitable treatment within supply chains can be addressed through common standards applied by NGOs. The International Labour Organisation (ILO) has an established set of principles, which include aspects of human rights, child and forced labour, employment, wages and training (Leire and Mont 2010). Certification through these bodies is one of the few areas in sustainability research where social issues such as working conditions are explicitly addressed (Pagell and Wu 2009) and can be used to establish a set of social criteria to be applied to the supply chain, with suppliers monitored to ensure compliance (Leire and Mont 2010). Pojasek (2010) specifies the following seven principles of social

sustainability which are integral to the ISO 26000 standard for social responsibility; accountability; transparency; ethical behaviour; respect for stakeholder interests; respect for the rule of law; respect for international norms of behaviour; and respect for human rights.

As previously discussed, SCM is of key importance for building strong, long-term relationships with suppliers (Spekman *et al.* 1998) and it also plays an important role in the creation of social capital. Social capital comprises human capital in terms of people's skills, motivation and loyalty, and societal capital which includes education and culture (Dyllick and Hockerts 2002). The relational embeddedness of social capital derived through ongoing interactions with suppliers is increasingly seen as a critical antecedent to firm performance (Bernardes 2010). Sustainable supply chains proactively invest in human capital, for example through HR practices which seek to improve employee well-being and commitment and build a culture that values both people and the environment (Pagell and Wu 2009).

Specific issues that need to be addressed in SSCM include the cooperation and communication between supply chain members which contributes to the required proactive approach highlighted in Figure 3.4; risk management to identify environmental and social problems before they are exposed publicly; and the total life-cycle of a product (Seuring and Muller 2008). This extends to the reconceptualisation of the supply chain by changing what it does, moving towards the closed loop system of Figure 3.3 and thinking differently about who is in the supply chain (Pagell and Wu 2009) and how to interact with them.

While supply chains may be defined as connected systems or networks, academic research to date has focused on the individual stages (Soni and Kodali 2011) with a distinct emphasis on 'hard', measurable processes rather than the less tangible interactions, relationships and flows which are considered key to SSCM (Fabbe-Costes *et al.* 2011). This bias aligns with the weak end of the sustainability spectrum and the transactional form of SCO illustrated in Figure 3.4, and translates to the reactive approach to sustainability which dominates in current practice. While this highlights the difficulty and complexity of managing supply chains sustainably, it also exposes this as an imperative area of research, and the closed loop model (Fig. 3.3) provides a positive means to proactively move towards strong sustainability.

3.6 Sustainability in the clothing industry

The clothing sector is organisationally complex (Forman and Sogaard Jorgensen 2004) and supply chains can be very long with many different parties involved. They are dominated by large, powerful retailers while at the other end are large numbers of small manufacturers with limited power (Bruce *et al.* 2004). The power concentrates in those companies selling products to the end consumers, who increasingly demand customised products within shortening life-cycles (Seuring 2001). Globalisation trends have made supply chains broader and more international (de Brito

et al. 2008) and the clothing industry has seen the outsourcing of most if not all production activities to overseas suppliers in developing countries (Bergvall-Forsberg and Towers 2007). Traditionally it has been characterised by market coordination on price (Goldbach *et al.* 2003) and this remains a key driver in the selection of suppliers.

There has also been an increasingly ‘throwaway’ attitude to clothing, especially within the fashion industry, as a result of increased purchase frequency and substantial reductions in pricing (Birtwistle and Moore 2007), which has resulted in an increased rate of garment disposal (Allwood *et al.* 2006). From the estimated 35 kg of clothing and textiles that each UK consumer purchases annually, approximately 75% goes to landfill (de Brito *et al.* 2008) despite the fact that more than 50% of all textiles thrown away are recyclable (Birtwistle and Moore 2007). However there are predictions that there will be a move away from disposable fashion as consumers become increasingly aware of ethical and environmental issues (Goworek 2011), and the economic and environmental benefits of re-use and recycling are increasingly being realised (Birtwistle and Moore 2007).

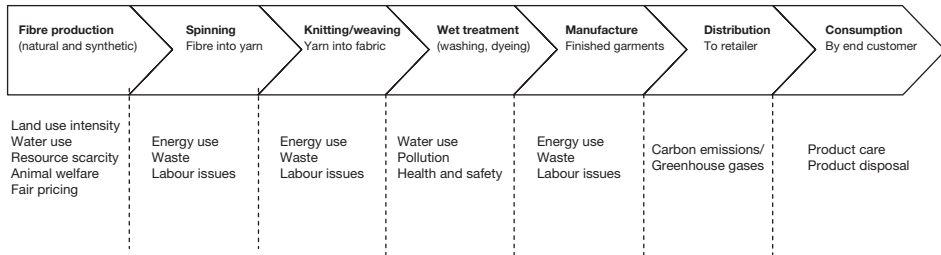
The clothing industry can be seen as an extreme case for managing environmental issues because of the frequent shifts in product portfolio and its internationally organised product chains that substantially influence and extend the stages where impacts can occur. Suppliers in both developed and developing countries are involved in these extended supply chains adding social and cultural considerations as well as differences between government regulations. Today, not only are environmental standards the focus in clothing supply chains, but also key social issues such as workers’ rights, working conditions and child labour (Forman and Sogaard Jorgensen 2004).

3.7 The clothing supply chain

There are seven key clothing supply chain levels: fibre production, which includes growing, harvesting and cleaning of fibres; spinning, where fibres are converted into yarn; weaving or knitting of yarn into fabric; dyeing and finishing of fabric; garment production; and finally the distribution of the finished product to the retailers and then the end customer (Allwood *et al.* 2006). Ecological and social impacts can occur at all of these levels, but at different intensities (Goldbach *et al.* 2003), as illustrated in Figure 3.5.

The greatest environmental impacts in clothing supply chains relate to the use of energy and toxic chemicals, while from the social perspective the concerns are around fair treatment, working conditions, worker rights and child labour (Allwood *et al.* 2006). Clothing production processes make intense use of chemical products and natural resources (land and water), generating a high environmental impact (Fletcher 2008). Furthermore, the search for lower cost production has led to a dramatic relocation of production sites towards the Far East (de Brito *et al.*

Figure 3.5 Clothing supply chain and its environmental and social impacts



2008), which brings social and regulation implications. There has been a growing response to many of these supply chain issues and since the 1990s a number of NGOs have been established to actively encourage 'ethical' clothing: for example, the Clean Clothes Campaign, Labour Behind the Label and the Ethical Trading Initiative (Goworek 2011).

In addressing the environmental dimension, organically grown fibres are actively promoted by pro-sustainability organisations (de Brito *et al.* 2008) because of their reduced impact on the environment. Organic cotton became commercially available in the early 1990s (Goworek 2011) and is grown without the use of synthetic pesticides and defoliated by natural means. Interest is increasing in this raw material through the growing awareness of problems of soil toxicity and harmful effects on workers from conventional pesticides. However, despite its positive benefits to the environment and continued growth in the sales of organic cotton products, it still only represents 1% of total world cotton production (Allwood *et al.* 2006).

Fairtrade is a well-developed social practice that, as well as seeking fairer relationships with suppliers, aims to establish more direct relationships between groups of producers and consumers (Barratt Brown 1993). It provides an alternative model of international trade based on better trading conditions and price, as well as educating consumers about the negative effects of traditional trade (Davies and Crane 2010). It has the underlying 'people' principles of good working standards and conditions for workers (Strong 1997); Fairtrade cotton farmers are paid a minimum price plus a premium that contributes to regional development projects (Goworek 2011).

Organic and Fairtrade cotton are the most prominent, recognisable approaches to environmental and social sustainability in the industry, and clear labelling systems exist which communicate these to the consumer. However they relate specifically to the raw material stage of a *natural* fibre and do not explicitly translate their principles along the entire supply chain. The extreme negative impacts of conventional cotton production are well acknowledged and organic and Fairtrade address these issues; however they also echo the current emphasis on the 'greening' of individual processes/products and represent a reactive SCO through the bias towards pollution prevention (see Fig. 3.4). While key environmental problems are being

resolved, the lack of coordination means that relationships are still largely transactional in nature, preventing the move towards a more ecocentric approach.

3.8 Are sustainable supply chains achievable?

Recycling and re-use are proactive methods of addressing sustainability and by 'closing the loop' inherently require a more collaborative form of supply chain. They can have a positive impact on a product's life-cycle and address the issue of resource availability which is especially important as virgin resources become scarcer (Sarkis *et al.* 2010). The most well known recycling method utilised in the industry is the conversion of plastic PET bottles into polyester fleece fabric, used by mainstream retailers such as Marks & Spencer. Leading supplier Teijin has extended this technology to allow worn polyester garments to be 100% recycled back into polyester fibre, and they actively promote a closed loop approach.¹ Such life-cycle responsibility aligns with product stewardship and therefore positions Teijin towards a proactive partnership approach to environmental management (Fig. 3.4).

Economies of scale need to be sufficient to make closing the loop viable (Sarkis *et al.* 2010) and the returning of used products by the end consumer is a key issue. It has been effective in the corporate clothing sector as it is feasible for large quantities of used garments to be returned to the fibre producer. However this technology has also extended into the fashion clothing sector with high profile sustainable brand Patagonia operating the Common Threads initiative which encourages re-use, repair and recycling of its products.² UK-based Finisterre has built on this closed loop approach offering a repair service for its outdoor clothing customers to ensure maximum product longevity, and will ultimately return garments to Teijin for recycling back into polyester fibre.³ Both firms have strong brands and a loyal customer base which makes this approach feasible, and involving all supply chain actors through the product life-cycle, including the customer, enables them to achieve a networked ecocentric supply chain strategy.

Finisterre's closed loop model (Fig. 3.6) incorporates all the key clothing supply chain stages, but also recognises the importance of the design function as well as the consumer's role. While recycling and re-use can close the manufacturing loop, the design function is key to making the most responsible and sustainable design decisions *before* the process begins. Design for the Environment (DfE) is a recognised tool which provides an avenue for firms to address the natural environment (Preuss 2005b), and to develop recoverable products which are durable, repeatedly usable, harmlessly recoverable and environmentally compatible in disposal

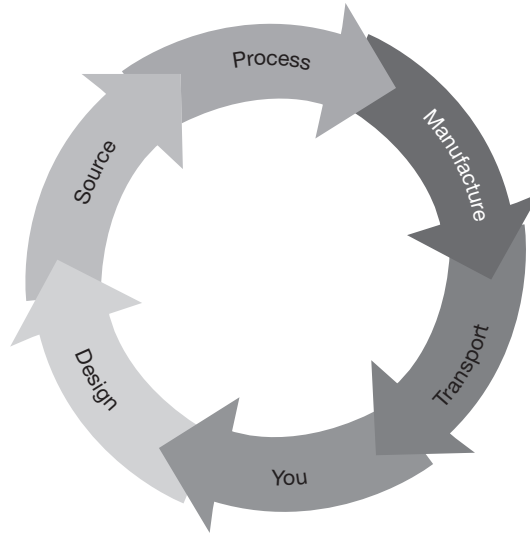
1 www.teijin.co.jp, accessed 17 September 2012.

2 www.patagonia.com, accessed 17 September 2012.

3 www.finisterreuk.com, accessed 17 September 2012.

Figure 3.6 Closed loop clothing supply chain

Source: www.finisterreuk.com



(Tsoufias and Pappis 2006). The consumer's role is multifaceted as they are responsible for the use, after care and disposal of the finished product, but as Figure 3.6 indicates, their demands and requirements will also influence the design process.

The major challenge in creating sustainable supply chains, especially in such a complex industry, is not in creating standards or technical measures, but the management and coordination of all actors (Goldbach *et al.* 2003). Organic cotton, Fairtrade and the recycling of synthetic products into useable raw materials are all positive recognitions of the importance of operating more responsibly, but there is a need to move away from changing processes to embedding sustainability in the relationships that connect the stages and promote supply chain transparency. While collaborative long-term relationships are considered vital for SSCM, the fashion clothing industry has traditionally been highly transactional in nature focusing on minimising costs, and while supply chain partnerships exist there are questions as to whether these are mutually beneficial relationships (Bruce *et al.* 2004).

Patagonia was established in the 1970s and grew out of a small company making tools for climbers. It produces clothing for outdoor sports and activities and is a recognised industry leader in sustainability. It explicitly puts the planet at the heart of operations with the mission statement 'build the best product, cause no unnecessary harm, use business to inspire and implement solutions to the environmental crisis' (Chouinard 2006). It also does business with as few suppliers as possible to develop long-term, transparent and mutually beneficial relationships. Established in 2006, Finisterre is a UK surfing lifestyle brand which echoes many of Patagonia's

principles in its approach, aiming to make the best technical apparel with minimal environmental impact. From the beginning, Finisterre has always stood for three points of commitment—product, people and environment—and also focuses on long-term relationships and a fully transparent, traceable supply chain.

Patagonia is a profitable company with sales in excess of \$300 million: evidence that all three sustainability dimensions can be balanced. Finisterre is working towards that balance, strongly adhering to its key commitments to establish the brand and product credentials, and will not compromise these for short-term financial benefit. Both firms are particularly committed to the environment, which may contribute to Finisterre's current imbalance, and it positions them towards the ecocentric end of the sustainability spectrum. Their visibility of and commitment to each stage of the product life-cycle and coordinated, committed supplier relationships means they operate at the optimum network SCO necessary for achieving sustainability. However, while both new and long-established clothing brands such as Patagonia and Finisterre show that closed loop chains with strong supplier relationships are achievable, this proactive, responsible supply chain strategy is still far from being the industry norm.

Translating the closed loop model into mainstream, commercial supply chains is an important challenge for the clothing industry and there are signs that the practices of re-use and recycling are becoming sources of added value in supply chains, creating new products from 'waste' (Fletcher 2008). Charitable organisation TRAIID Remade⁴ reconstructs second-hand clothing into customised one-offs and Junky Styling has applied a similar approach to develop a unique fashion brand from recycled men's suiting.⁵ From Somewhere progresses this model from specific customer niches into mainstream retail, transforming 'liability stock', that is, finished fabrics which manufacturers order as a contingency, into affordable fashion clothing which is sold via major retailers. Its recent collaboration with F&F at Tesco has enabled From Somewhere to apply a replicable strategy to a highly commercial supply chain, and illustrates that closed loops can be achieved at a scale to make a tangible impact on the industry as a whole.

3.9 Conclusion

This chapter has set out to review relevant sustainability and supply chain strategy literature to establish current academic viewpoints and has applied these findings to the clothing industry to understand how sustainability and supply chain management (SCM) concepts are being achieved in practice. In today's global marketplace a firm cannot ignore its suppliers' practices and must be acutely aware of stakeholder expectations (Lippman 2001; Handfield *et al.* 2005; Bansal 2005;

4 www.traidremade.com, accessed 17 September 2012.

5 www.junkystyling.co.uk, accessed 17 September 2012.

Sharfman *et al.* 2009). Expectations are increasingly focused on environmentally and socially responsible principles and practice which need to extend across the entire supply chain. SCM offers substantial potential for translating sustainability theory into practice, but a persistent gap exists between the diffusion of sustainability discourse and its practical application (Hamdouch and Zuindeau 2010), as well as a lack of impact of research on practice (Ghoshal 2005).

The application of sustainability theory to SCM has only recently started to receive significant academic attention (Sarkis *et al.* 2010), but the alignment of the two concepts offers great potential for gaining a holistic understanding of sustainability in practice. SCM extends organisational boundaries (Frankel *et al.* 2008), and the coordinated, proactive model (Lippman 2001; Kleindorfer *et al.* 2005) that evolves from this aligns strongly with the key principles of sustainability. It requires responsibility for the full life-cycle of a product, and could move the environmental dimension beyond the dominant and reactive 'greening' of supply chain processes.

Closed loop concepts provide a much more appropriate focus for environmental sustainability research as they apply a connected and holistic view of supply chains, and have been under-explored to date in research and practice. The clothing industry is particularly relevant for illustrating the needs, but also the major challenges of closed loop supply chains. In alignment with the research literature, current practice in this industry tends to focus on processes or supply chain stages and therefore only addresses specific environmental or social problems: for example, the use of organic farming methods to address the environmental issues surrounding conventional cotton production. While these are positive actions which can inform practice in other industries, it highlights the difficulty in achieving a coordinated response to sustainability across the supply chain.

The challenge for researchers is to develop appropriate methods and tools to capture the evolving field of sustainable supply chain management (SSCM), and a key research direction is the role and impact of supply chain relationships in achieving sustainability. To fully understand sustainable supply chains there needs to be closer analysis of the relational aspects of SCM and how they can be used to address both environmental *and* social sustainability. SCM literature places emphasis on supplier relationships, but there is limited discussion in the literature on how these can be harnessed to achieve sustainability. This represents a key area for future research; its lack of focus to date suggests the challenge of researching the field from a more holistic viewpoint, but it also offers the greatest potential for progressing SSCM from 'greening' to a 'virtuous circle' that addresses sustainability at all stages and interactions.

Strategically SSCM can provide tangible benefits and value including shorter development cycles, increased revenues and decreased costs, and increased agility and flexibility (Samaranayake 2005; Fawcett *et al.* 2008). There is strategic and competitive advantage in sustainable supply chain behaviours, with the effective management of risk through SCM (Reinhardt 1999) and the tacit knowledge and relational embeddedness from a history of interactions offering the potential of a

sustainable competitive advantage (Soler *et al.* 2010; Bernardes 2010). Competitive advantage also serves as a powerful driver for organisations moving towards sustainable supply chains/networks (Sharma and Ruud 2003).

The strong relationships with suppliers that can result from SSCM provide the opportunities for environmentally conscious practices: for example redesigning products and processes, reducing waste and controlling pollution (Florida 1996). Long-term relationships also improve a firm's awareness of the social and cultural issues that need to be addressed in a supply chain (Sarkis *et al.* 2010), and can create the level of collaboration, commitment and trust (Varma *et al.* 2006; Attaran and Attaran 2007) required to go beyond the short-termist approaches of prevention and compliance. An emphasis on relationships can enable a shift from the prevailing metaphor of 'greening' to where the holistic nature of sustainability is addressed in the supply chain strategy and concerns the social dimension as much as production and consumption (Preuss 2005a).

There is a major opportunity for future SSCM research to focus on key individual industries such as clothing as sample frames. SSCM can inform clothing supply chain strategy and practice, but how this industry is addressing the multifaceted issues of sustainability can also directly impact how this important research field evolves (Carter and Easton 2011). If social and environmental sustainability can be successfully integrated into clothing supply chains then it will be applicable to practice in other key sectors and industries (Forman and Sogaard Jorgensen 2004). Given the highly inter-disciplinary nature of sustainability it will also inform and develop academic theory beyond supply chain strategy to include governance, legislation and policies, and marketing and branding.

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