



A Review on Sustainability Management Strategies for Enhancing Capabilities in Textile and Clothing Supply Chains

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Abstract

Sustainability management has become a demanding challenge for the textile and clothing supply chain due to its extended and complex nature. An emerging trend of ethical consumerism and stringent policies of different monitoring bodies has potentially escalated the significance of sustainable supply chain management (SSCM). This study discusses the idea of the triple bottom line and establishes a relationship mechanism and governance for SSCM. The research addresses different strategies and diverse technology-based strategic approaches to ensure sustainable supply chain management and give the apparel industry a competitive edge for confronting future challenges.

Keywords: Sustainable supply chain, Triple bottom line, Close loop supply chain, Competitive advantages, Textile or apparel supply chain.

1. Introduction

Textile & clothing industries have one of the most extended supply chains responsible for both environmental & social impact on the planet and society [1, 2]. Scholars have endeavored much to prove the argument that sustainable management strategies and capabilities of these industries are essential not only for society but also for the present and future supply chain and competitive advantages of the apparel industries. Based on the literature presented by multiple scholars, this study will reflect on a few essential components of sustainability management strategies to gain competitive and comparative advantages in textile and clothing supply chain.

Sustainability management of the industrial supply chain has become a critical concern in the textile and clothing sector not only for the well-being of society but also to protect the long-term vision of the textile industry. Although the term 'sustainability' is established primarily on the triple bottom line - environmental, social and economic dimensions [3], the traditional and

dominant focus of academic and corporate interest escapes the social dimension due to either its complexity or just lack of awareness. It often becomes a critical dilemma for industrialists to maintain the overall supply chain sustainably while they have to satisfy changing customer needs within a limited lead time at an affordable cost [4]. Even though there is a persistent pressure from different NGOs and activists, a common perception is prevalent that ensuring sustainable management and industrial compliance pressure may harm economic gain and market competitiveness [5,6]. Thus, researchers have started emphasizing diverse strategic approaches to sustainability management of textile and clothing supply chain that include management of not only 'material, information and capital flows' but also cooperation among companies in terms of the triple bottom line of sustainability [7]. For example, Seuring & Muller [7] proposed two distinct strategies for sustainable supply chain management (SSCM): (1) supplier management for risks and performance and (2) supply chain management for sustainable products. The review of relevant literature



suggested that SSCM needs a longer time as it should critically consider a broader range of environmental-social-economic issues and performance indicators and ensure effective collaboration with the suppliers [7]. Perhaps, that becomes one of the barriers for the corporate community to go along with the sustainability agenda. Later, according to Chkanikova & Kogg [8], initiatives like the introduction of third-party product certification reduce the corporate need to have collaborative support from the suppliers, which somehow eases such obstacles to set an organizational goal toward sustainability.

The discussion in later sections is more focused on the environmental and social sustainability management strategies, which are yet less prioritized, as mentioned above, to reflect on their influence on the intergenerational textile and clothing supply chain management. Different strategic approaches such as circular or closed-loop supply chain management, reverse logistics activities, value creation, sustainable relationship mechanisms and governance, and digital technological innovations are required to accelerate the overall sustainable supply chain management.

The first section below demonstrates the fundamental conceptualizations regarding sustainability management. It entails the significance of environment and social sustainability management regarding mitigating the challenges of a sustainable supply chain for apparel and textile industries. The second discusses the influences of relationship mechanisms and governance for such management. It emphasizes the importance of third-party product certification and social management capabilities to ensure sustainable supply chain management and competitive advantages. Finally, the third section reflects on diverse contemporary strategies that render value creation and competitive advantages to meet future fashion and textile business challenges. It includes but is not limited to the inclusion of the circular business model and technology-based innovative approach to attaining the SSCM.

2. Discussion

2.1 Environmental and Social Sustainability: management, risks reduction and performance evaluation

Environmental and social activities are the most uttered dimension of sustainable supply chain management [9]. Heart's [10] idea of natural-resource-based management is one of the initial debates to put the environment on the priority while thinking about industrial management. It proposed a 'paradigm shift' for conventional resources and capabilities of the industries for the sake of immediate and intense negative impact on the earth's ecosystem. Besides, as per the argument, physical and financial resources or capabilities can be replicated by market competitors, thus making the business's future uncertain. Therefore, Heart's [10] set upon three overlapping strategic capabilities: pollution prevention, product stewardship, and sustainable development. Initially, it is assumed to be a radical approach to convince traditional corporate agencies to choose the method for the sake of the environment. However, adding this standard can be a great value addition to securing a stronger market position. Besides, Heart's [10] also claimed that adding environmental constraints to supply chain models can enhance future competitive advantages in the market by limiting the scope for random replications. However, this study creates only an ideological platform for the 'natural-based-resource' view of management, and it does not cover the detailed potential or barrier to this concept. The key challenge for such an idea can be the issues regarding raw material selection, choosing production methods and ensuring effective implementation of the overall agenda. Recent studies like [1] work reflect on such constraints and proposes best 'alternatives' for raw material and method selection. On other hand, Choudhary, et al [11] added that 'total quality management and 'technologies for cleaner production' can assist the decision-makers in



formulating robust business strategies to implement eco-friendly methods for the supply chain management.

There is a prominent call for social sustainability-related research on SSCM. Although limited to a few recent studies, social sustainability management strategies are striving to reduce long-term negative social impact and achieve market competitiveness in the textile and clothing industries. For example, Huq, et al. [12] drawing multiple evidence from Bangladesh, the world's second-largest textile and garments exporter, argues that Industrial hazards and other safety issues can have a long-term effect on industries' supply chain management and social sustainability. The study found key challenges to ensuring transparency and effective improvement of workers' education, training and working environment as the absence of intense stakeholder pressure. In response, they highlighted the "social management capabilities" (SMC) evaluation by consultative buyer-consortium audits and shared third-party audits to ensure social performance. Transparency and public accountability of SMC are essential to ensure a strong positioning in the market. Alongside, multiple stakeholders, NGOs, trade bodies and unions should be incorporated, and continuous measures should be taken to mitigate SMS's inconsistency and ambiguity to build a trustworthy brand image. On the other hand, Köksal, et al. [13] argue that, like the environmental performance certification system, social performance can be secured through a third-party certification system. Such initiative can also be beneficial to achieving trust and credibility from the buyers and the user group as well.

Another barrier to achieving market competitiveness identified by Govindan, et al. [14] is the complexities created by the unethical practices and violations of social

norms within multi-tiered supply chain management and proposed a framework of social sustainability linking drivers, issues, barriers, tensions, practices, and performances. There is always a conflict between Buyers and other stakeholders with suppliers in response to ensuring social sustainability and violation of compliance regulations. Govindan, et al. [14] argue that this tension can be managed by improving social sustainability indicators and supply chain performance by mitigating social risks. According to Köksal, et al. [13], a company's internal orientation is one of the key drivers for sustainable supply chain management practices, in addition to the harmonious relationship with suppliers and buyers. It is essential to see how organizations manage their social risks and maintains social performance to prove their integrity. Apart from affordability and product quality, such achievement (social performance) adds an extra dimension to a company's reputation in the long run. In general, the environmental and social dimensions of sustainable management focus on the company's performance rather than net economic gain. Some mechanisms can be helpful for the buyers to take decisions in favor of sustainability benefits before purchasing any product and thus reduce risk and transactional cost. One of which is sustainable sourcing, as discussed by Pagell, et al. [15], which incorporates the concept of purchasing portfolios to understand the products' position in terms of supply risk and profit contribution. The authors found that most organizations following SSCM buying leveraged commodities in a manner more appropriate for the strategic suppliers. To solve this problem, they provided a modified strategic tool integrating diverse attributes of other strategies to help academics and practitioners make environmentally conscious sourcing decisions. However, to promote a shift from conventional supply chain management to SSCM, it needs



significant strategic and methodological interventions to navigate potential changes in the context of the business embedded in the environmental and societal needs for sustainability.

2.2 Sustainable Relationship Mechanisms and Governance

Governance provides guidelines for structuring, starting and constructing a relationship among the supply chain participants [16]. Liu et al., [17] claims governance is a set of activities in which both parties ought to achieve a common goal. Due to the considerable significance of supply chain stakeholders, it is important to understand the sustainable relationship mechanism along with the governance. Hands-on and hands-off are the two most basic mechanisms that govern the supplier and buyer relationship [18]. Previous research mostly emphasized hands-on approach in which buyers personally invest time and money to enhance the supplier's performance [19, 20]. However, when it comes to sustainable relationship mechanisms hands-off approach is more suitable where the supplier selection is solely based on the social and environmental performance of the supplier.

Effective relationship mechanism and governance is necessary to ensure strategic management of environmental and social sustainability of the textile and apparel supply chain. Sustainability governance assists a company in executing a proper sustainable strategy across the business, managing a vision and evaluating the processes to strengthen the relationships within internal (e.g. supplier and buyer) and external stakeholders (e.g. NGOs, unions and activists), and ensure overall social accountability. Huq, et al.'s [12] imply that social management capabilities (SMC) can be another approach that enables both multinational buyers and their emerging market suppliers to share their ideas and experiences and collaborate with other stakeholders. Even in the absence of

stakeholders' pressure, buyers can use their own regulatory system and lay the groundwork to develop social performances by collaborating with stakeholders [12].

On the other hand, issuing the third party certification is another effective governance mechanism to ensure sustainability [8]. The authors suggest that the intrusion of a third-party decision-making body mitigates the tension between buyers and suppliers, and it sets a standard for the social and environmental performance for them. Although, there is a range of factors—the buyer's intention, supply context, and the design of the certification scheme that includes 'market coverage, the scope of requirements, and services'—can influence 'the corporate need for additional work to facilitate supplier compliance' [8]. The corporate choice of credible certification schemes may increase the corporate reputation in the market and its efficiency in implementing the life cycle management. Product certifications reduce the complexity for the buyer to follow up on life cycle assessment data and improve the overall sustainability of the supply chain. However, although this paper does not prioritize the better relationship between the buyer and suppliers, the relationship among different levels of stakeholders that reflects integrity and transparency can be easier not only to maintain the company's sustainability agenda but also to secure a competitive position in the market by earning the trust from different level of stakeholders.

2.3 Strategic Approaches: Circular or closed-loop supply chain management, reverse logistics activities and value creation, and digital innovations

Circular or close loop design is one of the sustainable strategies that will not only give a competitive advantage to the firm but also an ultimate solution to overcome the challenges of finite resources and adverse socio-environmental impacts [21,



22]. The traditional take-make-disposal or linear economic model will no longer be valid as the negative environmental and social impacts of production, consumption, and disposal have grown substantially in recent years [23]. Thus, the fashion industry is considered a means of overcoming different sustainable issues by integrating a circular or close loop supply chain. Different approaches, such as remaking, repairing, and exchanging, are usually popular steps towards sustainability among fashion brands. In one directional value chain, retailers expect a return of 16.6% of sold items which has jumped on 21% due to large-scale online shopping during the pandemics [24]. In the close loop supply Chain Company should think of it as a way of value creation rather than a complex, less profitable business solution. Still, many companies are neglecting the idea of scaling up returned products. Consumers can return a product for many reasons. However, having a pleasant experience of returning the product and getting a fair value makes them loyal to that brand. A loyal client is an asset for a brand that helps attract new consumers through word-to-mouth marketing. On the other hand, converting waste to wealth is essential for revenue earnings and helps build a green corporate image for the company, which can give them an excellent competitive edge in the market. Even the discarded products can be scaled up by dismantling and refurbishing in the close loop supply chain where the products' life cycle is elongated or never ends.

The circular or close loop management strategies have benefits of different dimensions. It can help build relationships with customers and maintain a consistent consumer base. On the other hand, there are some eco-conscious customers who like to spend their money on sustainable and ethical products. They become attracted when a brand has nearly zero

waste, recycling and remanufacturing policy, at least to some extent. In many countries' manufacturers are obliged to take back and recover the waste to avoid landfill deposition.

Due to high consumption and short product life cycle, it is necessary to adopt the reverse logistic process for the environment's sake. It is a method of close loop supply chain where value has been created in a reverse supply chain. Pal, et al. [25] addressed the idea of 'waste to resource' for developing new products, primarily through a set of efficient reverse logistics activities that include 'acquisition, grading, re-processing, and redistribution'. Reverse logistics can be tricky because companies should measure the condition of the returned or discarded products and decide what they will do with them. For example, if the product quality is good enough to sell again, they might sell it second-hand or refurbished with a minor change and add some value. Again, if it is well worn or discarded, it may be remanufactured or recycled. However, value addition is the most challenging part of reverse logistics or remanufacturing. The manufacturer must try to make it as attractive as possible with minimum medication, which will be the most sustainable and viable option. Unfortunately, in most cases, the discarded product is unusable, which has to be recycled as the least beneficial option in the case of value creation. However, the products are still converted to low-graded raw materials, and most importantly, they do not deposit in landfills. Therefore, reverse logistics is a great sustainable management strategy and gives competitive advantages to a firm by attracting conscious customers and keeping good relationships with existing customer groups. Moreover, it gives some financial advantages and helps to build a 'green' image as well.

Finally, digital innovation can be an



excellent way for sustainable development strategy, which helps minimize waste and improve competitive advantages. Larsson [26] has worked on four research and innovation projects which are feasible and sustainable apparel solutions and provide a company with a competitive advantage. The four projects are- Knit on demand (2006-2011), from roll to bag (2015-2016), Digimode (2017-2018) and Retextile (2014-2018). Knit on demand develop a new logistic and production solution for agility in customer relations. In this solution, a customer comes to a knitting shop to order his knit garments, and the products will be ready within a few days to a few weeks. The best sustainable part of the "knit on demand" system is demand-driven and locally produced. It does not require a typical long textile supply chain and uncertainty of excess production. Roll-to-bag projects include 3D virtual customization and fitting,, reducing 10 percent of material use than conventional pattern and cutting. Here, a novel design method, 'kinetic garments construction', was introduced, which can reduce fabric wastage more than conventional cutting. This fabric is saved due to the curved shape of the human body. When a garment is measured in body shape in the paper pattern, it cannot be calculated accurately as it is two-dimensional. However, in 3D virtual fitting, it is possible to measure and cut the fabric according to the perfect body shape and size, saving up to 10% fabric. Digimode was another technology initiated as a bi-product of research results from the 'Knit on demand' and 'Roll to bag'. Digimode is more suitable for SME and small-scale production. It allows to some extent of size adjustments and customization. In digimode, customer can see their virtual avatar and personalize it according to their choice with different colors and designs. Finally, 'Retextile' is another digital innovation that has extended the textile's lifecycle and created circularity. The core idea of 'Retextile' is to keep products functional and fully

recyclable. It includes some design criteria such as mono-material (to recycle and dismantle easily), white or light color base (to redye according to customer desire), and module-based design (to impart flexibility during remanufacturing).

There are some other digital innovations which have been promoting circularity. For example, a garment can notify the user if it has been left alone for long, which eventually helps consumers to decide whether that particular piece is no longer required or not. Even if the overall sustainable practice is concerned, fuel cost and personal effort can often be more costly than the recycled value of the products. In that case, a remote-controlled electric vehicle can be used to pick and drop off the used piece for recycling.

4. Conclusion

This study indicates the complexities and fragmentation of the apparel supply chain. The research finds some inevitable dilemmas in making the long apparel supply chain at once environmentally, socially and economically feasible. In general, social, environmental sustainability is the mostly uttered while considering the sustainable development of a specific field. However, nothing withstands "Sustainable" without economic feasibility. Reasonably the idea of "three p- people, planet and profit" by Marrewijk [28] is relatively similar to Elinkington. J [27] triple bottom line (Environmental, social, and economic sustainability). Hence, a remunerative business model that keeps the planet intact with social inclusiveness is the key to sustainable development.

The research has conferred sustainability's environmental and social aspects and emphasized sustainable relationship mechanisms and governance. It also explores some strategic approaches, such as close-loop supply chain management, value creation by reverse logistics, and digital innovation to ensure



profitability and sustainability in the apparel supply chain. The benchmark and compliance imposed by the regulatory bodies may come up burdensome initially to some suppliers. However, in the long-term perspective, it gives a competitive yield to them. In conclusion, the study implies that technology-based sustainable supply chain management strategies will be the prime approaches to gaining competitive advantages in the apparel market.

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