Editorial

Sustainability Issues in Textile and Apparel Supply Chains

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Abstract: Incorporating sustainability into the supply chain is becoming a key priority for many textile and apparel companies. For example, H&M, Patagonia, and The North Face have incorporated various approaches to enhance their levels of sustainable supply chain management. Typical approaches include sustainable product strategy, sustainable investment, sustainable performance evaluation, corporate social responsibility, and environmental management system adoption, which contribute to the development of sustainable supply chain management in the textile and apparel industry. In this paper, we introduce the fifteen articles published in this special issue, and summarize the key findings and future research directions in the area of textile and apparel sustainable supply chain management.

Keywords: textile and apparel industry; sustainable supply chain management; sustainable fashion; sustainability

1. Introduction

As one of the world's most polluting industries [1], sustainability issues in the textile and apparel industry have received great attention [2]. With geographically long and complex global production networks, as well as the dual pressure for cost and lead time, implementing sustainability in textile and apparel supply chains is challenging [1,3,4]. The process of turning raw materials into finished garments has significant negative environmental and social implications, including air and water pollution and exploitation of human resources, especially where production is outsourced to lower labor cost countries. The triple bottom line approach suggests that companies should consider social and environmental performance, not only financial performance, in their business operations. Furthermore, with increasing awareness of sustainability, there is evidence that some consumers are willing to pay more for sustainable textile and apparel products [5]. To meet stakeholders' increasing expectations and reduce the risk of negative social and environmental externalities, apparel firms across all market levels, such as fast fashion brand H&M, outdoor wear brand Patagonia, and luxury brand Louis Vuitton, have implemented various approaches to enhance the level of sustainability in their supply chain management [6–8]. Being more sustainable is now key to developing the textile and apparel supply chain, and a number of issues and innovations relating to this goal have been examined in academic literature so far, including product returns, low carbon supply chain, corporate social responsibility, sustainable design operations, and sustainable competition [3,4,8–19]. However, there is still a lack of further and intensive investigation of many other current issues relating to sustainable supply chain management in today's global textiles and apparel industry.

2. Sustainability Issues in Textile and Apparel Supply Chains

In this special issue, Köksal et al. [20] and Yang et al. [21] conducted comprehensive literature reviews to better understand the problems of sustainability issues, in addition to summarizing the relevant literature on sustainable textile and apparel supply chains. In the literature review of social issues in textile and apparel supply chain by Köksal et al. [20], the authors proposed a comprehensive map of the social dimension of sustainability. They argued that textile and apparel companies need to collaborate with suppliers to reduce social risks.

In their systematic review of sustainable retailing in the fashion industry, Yang et al. [21] found that the most prominent areas of literature include disposable fashion, fast fashion, slow fashion, green branding, and eco-labeling. They identified research opportunities in retailing of second-hand fashion, reverse logistics in fashion retailing, and emerging retailing opportunities in e-commerce.

Developing a sustainable textile and apparel supply chain should follow the theory of the triple bottom line, which refers to the three pillars of Profit (economic), People (social), and Planet (environment). Guo et al. [22] examined the green supplier evaluation and selection approach in global apparel manufacturing. They first developed a methodological framework for the evaluation and selection of green suppliers based on the triple bottom line, and then proposed a fuzzy multi-criteria decision-making model for evaluating and selecting the best material suppliers. A sensitivity analysis was conducted to verify the effectiveness of the proposed supplier evaluation and selection model.

Kim and Kim [23] analyzed data from news articles and firms' annual reports relating to sustainability in the textile and apparel industry. They used Leximancer, a computer-based content analysis approach, and DICTION, a dictionary-based text mining program, for textual and rhetorical analysis. They found the contents of their sources to be consistent with the concept of the triple bottom line and also identified cross-cultural differences between North American and European sources, whereby North American firms show relatively high commonality, while European firms show relatively high realism.

Lee and Ha-Brookshire [24] examined several factors within fashion retail businesses, including the ethical climate, employees' attitudes toward their jobs, and employees' turnover intention, that affect organizational performance in triple bottom line terms. Data from 278 U.S. fashion retail employees were analyzed using structural equation modeling. They found that an ethical climate can enhance employees' job attitude as well as all three dimensions of the triple bottom line. The results imply that organizational sustainability performance can be improved not only by employees' attitudes toward their jobs but also by the presence of an ethical working environment.

Developing a closed-loop supply chain is an important indicator of sustainability. Norum [25] investigated the consumer apparel disposal process using a qualitative approach, conducting semi-structured in-depth interviews with 24 female U.S. consumers. The author identified several important themes: the use of both "compensatory" and "non-compensatory" choice heuristics in decision-making, a "usable life" and the "personal nature" of garments as barriers to non-trash disposal options, and the need to "create awareness" and "provide assurance" to encourage alternative disposal modes.

Yang and Dong [26] investigated sustainable apparel product strategy where products are partially produced using recycled materials. They considered two types of consumers: environmentally conscious and regular consumers. Their analytical results indicated that if consumers value sustainable products more, the firm will increase its sustainability level and gain a higher profit. Moreover, if converting regular consumers to be environmentally conscious is not too costly, firms should provide sufficient sustainability information for consumers, in order to encourage all consumers to be environmentally conscious.

Li and Wu [27] examined how environmental management system (EMS) adoption affects changes of firms' performance in profitability, sales, and operational efficiency. Taking an event study approach, they analyzed 22 events of EMS adoption in China and found that EMS adoption decreased firms'

profitability, sales, and inventory productivity. Losses in operational efficiency and flexibility were found to be due to the requirements of the EMS adoption.

Le and Wang [28] used grey prediction to forecast productivity for the 20 largest enterprises over six years (2016–2021) based on actual indicators and then adopted a window analysis to detect performance trend over 12 years (2010–2021) from a large number of inputs and outputs. They predicted that textile companies will be more stable in terms of supplying materials for the entire industry.

Supply chain leadership significantly influences the performance of sustainability. Niu et al. [29] developed an analytical model to examine the impact of suppliers' attitudes to loss on the fashion supply chain's sustainability and profitability. They evaluated wholesale prices and buyback contracts under various power structures, and found that buyback contracts can reduce the sustainability of the supply chain. Meanwhile, the sustainability index increases in the buyback price in the supplier-as-leader scenario, but decreases in the retailer-as-leader scenario. When the supplier acts as leader and the buyback price is lower than a certain threshold, the sustainability level improves.

Shi et al. [30] evaluated economic and environmental performance in the fashion supply chain from a power perspective. Their analytical results implied that the follower with less supply chain power has incentive to make more sustainable efforts and achieve a higher profit. In most scenarios, the optimal amount of sustainable investment is greater in the apparel manufacturer case than in the retailer case.

Incorporating sustainability into the textile and apparel supply chain is a value-added process. LoMonaco-Benzing and Ha-Brookshire [31] examined the personal and corporate moral values in the textile and apparel supply chain through semi-structured interviews. Three gaps were identified: the nature of the value gap, the frustration due to the value gap, and strategies to manage the value gap.

Yang et al. [32] evaluated the value creation mechanism based on a case study of Stella McCartney and parent company Kering. They developed a novel model for sustainable value creation, thus extending knowledge of value co-creation from co-creation with customers to co-creation with multiple stakeholders. Sustainable value co-creation mechanisms including the building blocks and specific practices are systematically and empirically identified.

Oelze [33] studied the existence of consensuses in the perception of barriers and enablers of sustainable supply chain implementation in the textile industry. The author conducted a case study with 23 interviews across 10 textile companies and showed that collaboration can enable sustainable policy implementation and reduce barriers. Furthermore, external pressure can support proactive changes and supply chain visibility.

Finally, Chen et al. [34] examined garment workers' concerns, satisfaction levels, and attitudes towards decent work in the Chinese garment manufacturing industry, collecting data from both blue-collar and white-collar workers. Results indicate that age, education level, and service length significantly influence workers' attitudes towards decent work. Their study provided insights for the development of social responsibility in the Chinese garment manufacturing industry.

3. Concluding Remarks

This special issue advances the theories and practical understanding of developing sustainability in textile and apparel supply chains. Table 1 below presents the core issues and the proposed future research directions in the featured articles in this special issue.

Table 1. Core topics and future research directions of the papers featured in this special issue.

Paper	Core Topics	Future Research Directions
Köksal et al. [20]	Sustainable supply chain management; social sustainability	• Environmental issues, such as the extension to environmental risk management
Yang et al. [21]	Sustainable value; value co-creation; luxury sustainability	• Use quantitative approaches to examine value creation • Develop a mechanism for sustainable value co-creation adapted from this one in response to the characteristics of the fast fashion industry
Guo et al. [22]	Fuzzy axiomatic design; evaluation criteria; triple bottom line	• Compare the performance of the proposed framework with other multi-criteria decision-making methods
Kim and Kim [23]	Triple bottom line; text mining	• A macroscopic image of sustainability and supply chain management
Lee and Ha-Brookshire [24]	Organizational sustainability performance; ethical climate; retailing	• Cultural influences on outcomes of the triple bottom line of organizational performance • Managers' or other higher-level positions' perception of perceived organizational sustainability performance
Norum [25]	Disposal; landfill and trash; post-consumer waste	• Test new conceptual models of consumer apparel disposal process within the textile and apparel supply chain
Yang and Dong [26]	Social responsibility; market segmentation; consumer behavior	• Explore the firm's incentive to adopt sustainable product strategies • Consider non-economic aspects of strategy implementation i.e., branding, reputation, innovation
Li and Wu [27]	Social sustainability performance	• Medium- and long-term abnormal performance after environmental management system (EMS) adoption • Effects of regulation changes and public concern about environmental problems on abnormal performance
Le and Wang [28]	Performance evaluation; sustainability performance; Vietnam	• More input and output variables in the proposed model • Different Data Envelopment Analysis (DEA) models to evaluate the performance of different industries
Niu et al. [29]	Sustainability; power structure; attitude to loss	• Explore the impact of a positive salvage value • Consider delay in payments, imperfect production, probabilistic deterioration, and setup cost
Shi et al. [30]	Sustainable investment; power structure; environmental tax	• Investigate stochastic demand models • Study supply chain coordination with different contracts • Explore multi-retailer and/or multi-manufacturer structures and explore how the spillover effect influences sustainable investment
LoMonaco-Benzing and Ha-Brookshire [31]	Corporate sustainability; moral values; employee and consumer identities	• Expand the research focus to non-industry professionals
Yang et al. [32]	Sustainable retailing; developing country	• Investigate the negative effects of sustainable retailing on the fashion industry
Oelze [33]	Sustainable supply chain management; responsible procurement	• Conduct a cross-cultural comparison of the sample • Expand the sample to furtherinstitutional contexts
Chen et al. [34]	Decent work; blue-collar workers; white-collar workers; China	• Explore the connection between decent work and employee productivity, recruitment, and retention

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