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Green Supply Chain Management to Promote Environmental Awareness of Consumers in the Fashion Design Industry

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Abstract

Purpose: Using green supply chain management (GSCM), the current study focuses on the fashion design industry as a central player in promoting an eco-conscious consumption culture by creating awareness of the need to produce and consume eco-friendly fashion products instead of only capitalizing on the shifting consumer tastes, preferences, and expectations. **Research design, data and methodology:** This study selected a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) checklist as a research methodology. The purpose is the detailed and disinterested evaluation of all the published information related to the topic of the research. **Results:** This study suggests brief solutions of the GSCM based on the five categories of sustainable fashion activities that contribute to the development of eco-friendly fashion designs and marketing strategies. This strategy employed by firms to promote sustainable production and consumption is a major factor in enhancing consumers' environmental awareness. **Conclusions:** The study delves into how brands in the fashion design industry provide a platform for collective action by investing in educational campaigns and transparent communication, collaborating with various stakeholders to maximize awareness of the need for eco-conscious consumption and the availability of green fashion products. Practitioners should consider developing a comprehensive framework to assess the feasibility of different awareness strategies and purchase stimulation approaches.

Keywords : Green Supply Chain Management (GSCM), Environmental Awareness, Fashion Design Industry, Customer Relationship Management (CRM), PRISMA Statement

JEL Classification Code : Q01, Q51, M31, C35, L79

1. Introduction

Eco-friendly fashion design is significant to reduce the environmental pollution generated from the manufacturing and consumption of fashion products, as well as to enable firms in the industry to adjust to market dynamics of rising demands for green fashion products. The fashion industry contributes significantly to global environmental pollution at every point of the supply chain due to carbon emissions in manufacturing, shipping, and packaging (Jutidamrongphan et al., 2021). Fashion production is directly linked to the emission of 10 percent of global carbon dioxide, the pollution of rivers and streams, and the drying up of water resources. Up to 85 percent of textiles also end up in dumps annually, while washing particular types of clothes, such as polyester, leads to discharge of high

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amounts of microplastics into the ocean, releasing close to three times more CO2 compared to cotton (Moazzem et al., 2021). Also, a transcendental rise is evident in the population of eco-conscious consumers due to the ease of access to information on the environmental impacts of the fashion supply chain, which drives the demand for green fashion products (Tran et al., 2022; Ray & Nayak, 2023). Therefore, to curb pollution, the need for designs and production mechanisms that mitigate these negative environmental impacts arises. Also, companies must adjust to the changing consumption dynamic of eco-conscious customers to reduce their carbon footprint.

The development of eco-friendly fashion designs and marketing strategies that firms employ to promote sustainable production and consumption is a major factor in enhancing consumers' environmental awareness. Scholars attribute the rapid increase in the rate at which consumers understand the environmental, as well as the social impact of the fashion industry, to the proliferation of the internet, which makes it possible to disseminate information concerning the need for eco-friendly fashion production and consumption. Notably, consumers can easily access articles, videos, audio, and social media content, educating them about the impact of fashion (Jimenez-Fernandez et al., 2023).

Different stakeholders in the fashion industry, including environmental advocacy organizations, government agencies, mainstream media, and independent journalists, use different Internet platforms to sensitize the public concerning the water, land, and air pollution generated by the fashion industry (Jimenez-Fernandez et al., 2023). The stakeholders also create awareness regarding actions that fashion design firms, suppliers, distributors, and consumers in the industry can take to mitigate the problem (Mandarić et al., 2021). The Corporate Social Responsibility (CSR) disclosure also ensures that companies become transparent concerning their supply chains, production processes, and sourcing materials (Brun et al., 2020). Consumers are becoming more aware of the need to support fashion design practices and adopt a consumption culture that aligns with environmental responsibility.

Using Green Supply Chain Management (GSCM) as a marketing strategy to promote environmental awareness and the sale of eco-friendly fashion items is a mainstream approach firms use to elevate their brand image in a competitive market landscape. Notably, firms invest heavily in GSCM due to the dynamism in which the fashion industry, similar to all other industries involved in manufacturing, is experiencing a transcendental rise in the population of consumers who are conscious about personal and environmental health, thereby motivating active support for greener lifestyles (Ahmed et al., 2018). Consumers in the fashion industry perceive GSCM as a demonstration of commitment among firms to execute their environmental and ethical responsibility (Akter et al., 2020). GSCM enables firms to perform competitively in driving the sale of eco-friendly fashion products because it leads to the production of green products that provide eco-conscious consumers with more environmentally friendly choices (Akter et al., 2020). Companies in fashion design also take a proactive approach to increased awareness among consumers on the significance of producing and consuming eco-friendly fashion products (Lee et al., 2021). Thus, firms use GSCM as a marketing strategy to improve consumers' environmental awareness and promote eco-conscious consumption.

The current study fills an important gap in sustainable fashion research because it is based on GSCM and its influence in promoting environmental awareness and cultivating an eco-conscious consumption culture among consumers. The study specifically provides how GSCM can be leveraged to promote eco-consciousness and stimulate the purchase of eco-friendly fashion products among consumers in the fashion design industry. Extant studies on the same subject area predominantly focus on achieving eco-friendly supply chain management in the fashion design industry or capitalize on consumers' shifting perceptions, tastes, and preferences that favor eco-friendly fashion products. Essentially, this study focuses on the fashion design industry as a central player in promoting an eco-conscious consumption culture by creating awareness of the need to produce and consume eco-friendly fashion products instead of only capitalizing on the shifting consumer tastes, preferences, and expectations.

2. Five Categories of Sustainable Design Activities

To achieve the purpose of this study, we reviewed sustainable design guidelines optimized for the industrial design field and the prevailing methods for assessing sustainable design, including Life Cycle Assessment (LCA), Eco Design Wheel, and MET Matrix to derived common elements of sustainable fashion design strategies that have been through comparative analysis. This study classified sustainable design activities leading sustainable design into five categories: materials, manufacturing, distribution, use, and society based on the studies on design strategy elements applied to sustainable design guidelines.

2.1. Material

Materials has the greatest influence throughout the entire design process and has the characteristics of circular system; it is also highly related to concepts such as how to not contaminate the environment, recycling of chemical materials, and reuse, and there are numerous related studies

(Gwilt, 2014; Moktadir et al., 2018). The choice of materials is one of the most critical aspects of sustainable fashion design. Sustainable fashion design focuses on using materials that are environmentally friendly, ethical, and have a reduced negative impact on the planet. Sustainable fashion design requires the use of environmentally friendly and ethically produced materials (Gwilt, 2014). Even though the cost of eco-friendly materials is higher than that of basic materials, and reprocessed raw materials require high capital investment, eco-friendly materials are a very important factor to consider in sustainable fashion design.

Sustainable fashion design focuses on using environmentally friendly and sustainable materials that avoid causing pollution from the initial production phase to disposal. These materials include natural fibers, regenerated fibers derived from biodegradable polymers, and sustainable production processes. To sustainably acquire materials without harming the environment, various methods can be employed. These methods involve reducing pollution through eco-friendly dyeing processes, responsibly sourcing raw materials from nature while developing materials that are environmentally safe and maximizing material utility by minimizing waste. Additionally, enhancing material efficiency through reproduction techniques to prevent resource waste and achieve energy savings, as well as creating new materials through recycling, all contribute to preventing resource waste and realizing energy-saving effects (Kim & Lee, 2022).

Sustainable design prioritizes eco-friendly, renewable, and low-impact materials. Choosing organic fabrics, recycled materials, Tencel, bamboo fibers, and recycled polyester, among others, is crucial for minimizing the environmental impact. Organic cotton, hemp, Tencel, recycled polyester, and upcycled fabrics are examples of sustainable material options. Avoiding harmful materials such as conventional cotton and synthetic fabrics is vital. Grown without the use of synthetic pesticides and genetically modified organisms (GMOs), organic cotton reduces chemical pollution and promotes soil health. Combining different sustainable materials can create fabrics with desirable properties while minimizing environmental impact. Sustainable fashion design prioritizes these materials to reduce their environmental footprint and promote ethical practices in the fashion industry. Additionally, innovations in sustainable materials continue to emerge, offering new possibilities for eco-friendly fashion design.

2.2. Manufacturing

Manufacturing' is closely related to materials and refers to activities that can reduce material waste and environmental pollution and is a key factor that should be considered from the initial stage of the fashion design process (Kim & Lee, 2022). Ethical practice, the use of eco-friendly materials, and the minimization of fabric waste are suggested to realize sustainable fashion design; this phase also requires the minimization of environmental impacts in the production process. Eco-friendly production methods in fashion design are essential for reducing the industry's environmental impact. Traditional fashion production processes often involve harmful chemicals, excessive water usage, and high carbon emissions. Adopting eco-friendly practices can help minimize these negative effects (Townsend & Mills, 2013). There are several methods that fashion designers and manufacturers can implement to create sustainable and environmentally friendly fashion.

This can involve using recycled fibers, natural dyes, and creating employment opportunities in the production area. For example, design patterns to minimize fabric waste during cutting and manufacturing and recycling programs for fabric scraps and encourage upcycling initiatives to give new life to old garments. Utilize natural dyes or low-impact dyes that require less water and energy compared to conventional dyeing processes and invest in water recycling and treatment systems to reduce pollution and conserve water resources. Implement energy-efficient technologies and practices to minimize energy consumption during production processes. Use renewable energy sources, such as solar or wind power, to reduce the carbon footprint of manufacturing facilities. In addition, design products with longevity in mind, using durable materials and timeless styles to encourage longer product lifecycles. Explore innovative technologies like 3D knitting and 3D printing, which can reduce waste by producing garments directly from digital designs.

Ethical production, ensuring fair labor practices and ethical working conditions is fundamental. Sustainable fashion work with manufacturers who pay fair wages, provide safe working environments, and have transparent supply chains. Ethical production practices reduce the human and social cost of clothing production (Brezet & Van Hemel, 1997). Supply Chain Transparency allow consumers to trace the origins of the products they purchase and collaborate with suppliers and manufacturers who adhere to eco-friendly and ethical standards. By incorporating these eco-friendly production methods, sustainable fashion can contribute to a more sustainable and environmentally conscious industry. Additionally, these practices can lead to a positive brand reputation and increased customer loyalty among environmentally conscious consumers.

2.3. Distribution

Sustainable fashion design is not limited to the creation of eco-friendly products; it also encompasses the entire

product lifecycle, including distribution. By adopting sustainable distribution practices, the fashion industry can reduce its impact on the environment, support ethical labor practices, and promote responsible consumption, ultimately working toward a more sustainable and socially responsible future for the fashion sector. Distribution plays a critical role in sustainable fashion design as it directly impacts how products are delivered to consumers and the environmental footprint associated with this process. 'Distribution' is the stage in which produced products are transported to consumers and seeks to introduce various methods to reduce environmental pollution factors that occur during transportation, and to reduce energy costs (Banister & Button, 1993)

To minimize environmental impact, it is necessary to consider the reduction of transport emissions, efficient transport, and sustainable packaging. Sustainable distribution strategies aim to minimize the carbon emissions associated with transporting fashion products. Locally sourced materials, production facilities, and distribution centers can significantly reduce the carbon footprint. Efficient shipping, optimizing transportation routes, consolidating shipments, and using eco-friendly transport options help reduce energy consumption and emissions related to product distribution (Huang et al., 2023). Sustainable fashion distribution involves using eco-friendly packaging materials and minimizing packaging waste, which reduces the environmental impact of shipping.

To promote ethical and fair practices, sustainable fashion distribution involves being transparent about the entire supply chain and supporting local communities. This transparency ensures that ethical and fair labor practices are maintained throughout the production and distribution processes and local or regional distribution can bolster local economies and support fair working conditions and wages (Chan & Wong, 2012). Sustainable fashion distribution can be used as a platform to educate consumers about the social and environmental impacts of the fashion industry to encouraging responsible consumption (Ray & Nayak, 2023). It also can encourage a shift away from fast fashion, promoting the idea of investing in high-quality, longer-lasting items instead of buying disposable, low-quality fashion products. Sustainable distribution may involve initiatives that allow customers to return or recycle old clothing, contributing to a circular fashion economy where products are reused or repurposed. Distribution methods can include clothing rental and resale options, which extend the lifecycle of garments and reduce the demand for new production.

Sustainable distribution aligns with the values of environmentally conscious consumers. Brands that prioritize sustainability in distribution often build a loyal customer base and enhance their reputation. It can set a brand apart from competitors and appeal to a niche market of consumers looking for eco-friendly and ethical options. Streamlined distribution processes can lead to cost savings for brands and retailers, which can then be reinvested in sustainable practices and materials (De Brito et al., 2008). By adopting these distribution practices, sustainable fashion brands can not only reduce their environmental impact but also create a more transparent and responsible supply chain, which can be an attractive feature for eco-conscious consumers.

2.4. Use

The concept of "use" is integral to sustainable fashion design because it pertains to how consumers interact with and utilize clothing and fashion products. How fashion items are used has significant implications for the environmental, social, and economic aspects of the fashion industry. The main actors in the 'Use' phase are consumers and users, and the phase indicates specific activities that occur throughout the stages of use after purchase, and disposal. It presents a method to minimize energy consumption in the process of using clothes (Lee et al., 2013). The term "use" in the context of sustainable fashion design refers to how consumers interact with and make use of clothing and other fashion products (Watkins, 1988). Promoting sustainable use is a crucial aspect of creating a more environmentally conscious and ethical fashion industry. Extending the lifespan of clothing is one of the most effective ways to reduce the fashion industry's environmental impact. Longer-lasting garments lead to fewer replacements and less waste. Therefore, sustainable fashion designers create durable, high-quality clothing that withstands wear and tear, encouraging consumers to keep and use their clothing for longer periods.

Overconsumption is a significant issue in the fashion industry, leading to excessive waste and overproduction of clothing. Sustainable fashion design aims to combat this problem. By promoting timeless designs, versatile pieces, and quality materials, sustainable fashion designers encourage consumers to purchase thoughtfully and reduce the need for constant new acquisitions. Repairing and upcycling clothing is an effective way to extend the life of garments and reduce waste (Syn, 2011). Sustainable fashion designers can offer or promote repair and alteration services, as well as provide guidance on how consumers can repurpose or upcycle their clothing.

Sustainable fashion should consider the entire product lifecycle, including use. This means considering factors like the eco-friendliness of detergents used, clothing care accessories, and responsible disposal. Designers can encourage the use of eco-friendly laundry detergents, laundry bags to prevent microfiber pollution, and natural

moth repellents. They can also create clothing care guides and resources for consumers. Sustainable fashion encourages a circular economy where products are reused, repurposed, and recycled. Use plays a vital role in this circularity. Sustainable designers can design with upcycling and recycling in mind, making it easier for consumers to extend the life of clothing and participate in circular fashion practices. By addressing the "use" aspect of sustainable fashion design, designers can contribute to a more responsible and conscious fashion industry, where products are cherished and preserved for longer periods, leading to reduced waste and a lower environmental impact. By focusing on sustainable use, fashion designers can contribute to reducing the overall environmental impact of the fashion industry and promote a more conscious and mindful approach to clothing consumption.

2.5. Society

A society dedicated to sustainable fashion design, or an organization focused on promoting sustainability in the fashion industry, plays a critical role in driving change and advancing eco-friendly practices. A society for sustainable fashion design can play a crucial role in driving positive change within the fashion industry, encouraging designers and stakeholders to prioritize sustainability and ethics in their practices. It can also serve as a resource hub for education, collaboration, and advocacy in the pursuit of a more environmentally and socially responsible fashion industry (Ray & Nayak, 2023). Society for sustainable fashion design could be a community or organization dedicated to promoting and advancing sustainability within the fashion industry. Such a society would aim to bring together designers, manufacturers, consumers, and other stakeholders to work towards a more eco-friendly and ethical fashion sector. A society or organization for sustainable fashion design acts as a catalyst for positive change in the fashion industry. Sustainability challenges in the fashion industry are complex and multifaceted.

By promoting education, advocacy, innovation, and collaboration, they help transform the sector into a more eco-friendly, ethical, and socially responsible one. A society or organization provides a platform for collective action, allowing individuals, brands, and other stakeholders to pool their resources and expertise to tackle these issues more effectively. They foster a sense of community among individuals and organizations committed to sustainable fashion. This shared sense of purpose encourages cooperation and the exchange of ideas. It can advocate for policy changes at local, national, and international levels to promote sustainable fashion practices. This includes pushing for regulations, incentives, and incentives that support environmentally friendly and ethical fashion (Thorisdottir & Johannsdottir, 2020).

Societies support research and innovation in sustainable fashion design. They provide grants, collaborate with research institutions, and encourage the development of eco-friendly materials, technologies, and processes. By facilitating networking and collaboration, societies create opportunities for designers, manufacturers, retailers, and other stakeholders to share knowledge, best practices, and innovations in sustainable fashion design. Societies may help sustainable fashion brands gain access to markets, retailers, and consumers, supporting the growth and recognition of eco-friendly fashion labels. Societies can serve as educational hubs, providing resources and platforms for raising awareness about the environmental and social impacts of the fashion industry. They educate both industry professionals and consumers about the importance of sustainable fashion.

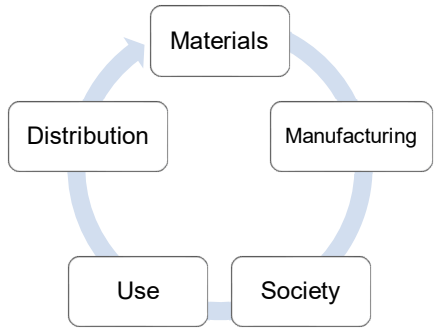

Figure 1: Example of a Figure Caption

Table 1: Four Key Roles of Retail Beauty Worker for GSCM

Key Role	Description
1. Material	Reduce Material use & waste. Minimize material variety. Use low embodied energy materials. Use biodegradable materials. Avoid hazardous & toxic materials, substances. Minimize composites or contaminative finish. Design for disassembly. Integrate disposal instructions and label materials. Integrate methods for used product collection. Add design on waste.
2. Manufacturing	Make it less complex. Make it more useful. Optimize manufacturing process. Fabric processing. Production technique. Transform manufacturing.
3. Distribution	Reduce transportation. Reduce size & weight Design packaging in parallel with products. Minimize energy consumption in production. Consider carbon-neutral or renewable energy. Provide information related with sustainability.
4. Use	Share among multiple users. Minimize energy consumption in use. Mimic or use living organisms. Create proper and durable design. Foster emotional connection to products. Create timeless aesthetic. Reduce

Key Role	Description
	consumable. Design for maintenance and easy repair. Consider upgradeability. Make it modular. Design for reuse.
5. Society	Encourage low-consumption user behavior. Design responsibly with responsible partners. Stimulate community. Consider inclusive design. Make it intuitive. Consider underprivileged people.

3. PRISMA Statement

3.1. Study Design and Data

Our approach to this study satisfies the recommendations in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page & Moher, 2017; Nguyen et al., 2022). The purpose is the detailed and disinterested evaluation of all the published information related to the GSCM to promote an environmental awareness of consumers in the fashion design industry. The search strategy involved a comprehensive search across six electronic databases: PubMed, Springer Linker, BMC, PLOS ONE, SCOPUS, and Wiley Online Library, as the sources of publications ensure an extensive and comprehensive data set for analysis and research. Some search terms were, for instance, "GSCM," "Environmental Awareness," "CRM," "Fashion Design Industry," or any synonyms related to these categories. Furthermore, as a divisibility of eligible articles part of this trial, their reference lists were manually searched for additional pertinent studies.

The inclusion criteria for the studies were as follows: The inclusion criteria for the studies were as follows:

1. The study must involve consumers in the fashion design industry as the target population.
2. The study must examine the environmental awareness pursued by this group.
3. The study must assess the customers' willingness or motivations to purchase eco-friendly fashion products.
4. The study must analyze the GSCM based on the five categories of sustainable fashion activities in the literature review section to promote an environmental awareness of customers in the fashion design industry.

Exclusion criteria were also set to ensure the relevance of the studies. Studies were excluded if they did not pertain to established target population specifically, only covered generalized consumers, did not measure environmental awareness, or did not assess a GSCM in the fashion design sector. The figure 2 indicates the PRISMA diagram of the present study and the final usable prior dataset revealed a total of 33 studies.

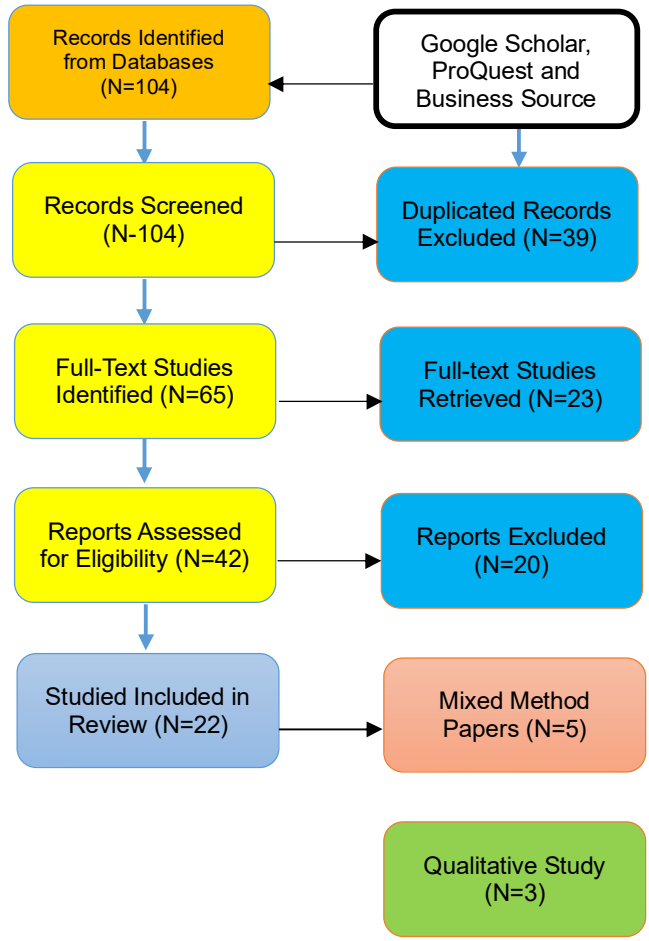

Figure 2: The Procedure to Obtain the Final Dataset

4. Solutions of Green Supply Chain Management (GSCM)

4.1. Transparency in the Use of Eco-Friendly Materials

The fashion industry should invest in producing eco-friendly materials as an initial approach to GSCM to reduce the waste generated in the material preparation process. Eco-material production means generating organic fabrics produced with less water, which minimizes the use of harmful chemicals so that the final fashion products are sustainable (Daukantienė, 2022). To ensure continuous eco-material production, companies involved in the manufacturing of fashion apparel should be directly involved in the production of raw materials either by leasing farms or by partnering with farmers because the process requires control of product and information (Shen, 2014;

Daukantienė, 2022). Examples of companies already invested in the eco-material production initiative include Timberland, Mark & Spencer, and Nike; the firms engage in biological textile production (Shen, 2014). Firms dealing with suppliers should also deliberately switch to using biodegradable materials (Shafie et al., 2021). The ideal essence of emphasizing biodegradable materials is that an adequate supply and extensive use of eco-friendly materials leads to a significant reduction in the level of waste generated in the processing stage of manufacturing.

Embracing transparency in material sourcing enables firms to communicate their environmental commitment and stir consumer interest in eco-friendly fashion products. Publishing the source and type of materials used is an important way of enabling consumers to understand a firm's commitment to environmental responsibility (Jutidamrongphan et al., 2021). Customers also learn the extent to which the choice of materials positively impacts minimizing brands' level of pollution, especially water and land, in the material extraction process. The approach enables firms to achieve differentiation in competitive markets where sustainability is valued (Lee et al., 2021). Firms needing more transparency regarding the materials used in their fashion design processes are often disfavored in the fashion industry, a highly competitive business marketplace.

4.2. Manufacturing: Adopting Innovative and Green Production Practices

The adoption of sustainable manufacturing practices is an indication of a brand's focus on environmental protection by minimizing its carbon footprint. Myriad innovative manufacturing processes are adopted by firms in the fashion industry, particularly in lean production, with minimal environmental pollution. For instance, adopting 3DVD technologies as a form of digital technologies in manufacturing enables structural changes in the traditional supply-chain model of fashion firms (Arribas & Alfaro, 2018). The tech model allows manufacturers to integrate, optimize, and enhance the design and development workflow through complete digitalization and integrated processes of design and iterative prototyping (Casciani et al., 2022). The processes encompass test of fit, simulation of functional performance, visualization of aesthetic features like materials, color and patterns, and manufacturing specifications (Demarco et al., 2020). The essence of shifting to digital innovation in the manufacturing phase of the supply chain is to optimize material-resource consumption for physical sampling, foster design creativity, shorten the lead time in production, and reduce costs associated with the manufacturing process (Demarco et al., 2020). Hence, using advanced tech innovations in manufacturing would significantly boost eco-friendly production in the fashion design industry.

Firms that adopt green manufacturing strategies and publish their commitment to the reduction of carbon footprint succeed in enhancing environmental awareness among stakeholders while increasing consumers' purchase intention for eco-friendly products. Innovative and green production processes are always implemented alongside waste management procedures to limit land and water pollution (Ikram, 2022). Companies that invest in minimizing their industrial impact on the environment due to manufacturing are considered leaders in sustainability commitment by consumers because of their immense investment in corporate social responsibility (CSR) (Mandarić et al., 2021). Fashion brands can stimulate the purchase of eco-friendly products due to their good CSR standings, thus elevating their brand appeal.

4.3. Distribution: Leveraging Sustainable Packaging and Shipping

Fashion brands need to leverage sustainable packaging and shipping to create environmental protection awareness and stimulate purchase intentions of eco-friendly products. When fashion companies embrace innovative concepts for packaging, such as phasing out plastics, they improve their environmental footprint (Moorhouse, 2020). The alternatives include the use of biodegradable materials, such as mushroom packaging made from mycelium, and biodegradable polybags made from cornstarch or recycled paper bags, which can be used instead of traditional Styrofoam (Freichel et al., 2020). Additionally, fashion farms can adopt minimalist packaging designs that reduce material waste while giving brands sleek and modern aesthetics; such examples include reusable packaging solutions and compact size, which helps minimize the amount of material required (Landi et al., 2023). Sustainable packaging and shipping are important ways of minimizing the environmental impact of the fashion design industry by working with suppliers and distributors to obtain biodegradable materials and reduce carbon footprints during transit.

Contemporary fashion enthusiasts are eco-consumers increasingly seeking to buy from brands that prioritize environmentally friendly practices, making sustainable packaging and shipping a critical factor for business success. Firms that leverage sustainable packaging and shipping, as well as any other element of eco-branding, manage to differentiate themselves from competitors based on environmental features. Eco-branding enables firms to improve their competitive advantage and enhance their market outreach to eco-conscious consumers (Ly, 2021). Notably, sustainable packaging and shipping enable fashion

firms to stimulate the purchase of their products because the strategy elevates brand image (Aftab et al., 2018). A brand that embraces a sustainable packaging approach and shipping demonstrates to consumers its commitment to environmental responsibility, a strategy that resonates with eco-conscious consumers who attach high value and prefer to shop from such brands (Aftab et al., 2018). Therefore, leveraging sustainable packaging and shipping is inclined to boost the fashion firms in the fashion market due to enhanced capacity to promote the sale of eco-friendly fashion products.

4.4. Use: Promoting Sustainable Consumption of Fashion Products

GCSM is attainable if firms in the fashion design industry take a proactive approach to cultivate an eco-conscious consumption culture. Besides material selection and manufacturing approaches, the customers' consumption behaviors have significant implications for the industry's environmental, social, and economic aspects, which is the main reason firms should target to foster a positive use culture among consumers (Amoako et al., 2020). Firms should consider using different communication channels and marketing strategies to convey the message of responsible and sustainable consumption. One of the most effective ways to promote sustainable consumption is by using online influencers with the power to influence a positive fashion consumption culture consciously and unconsciously (Chetioui et al., 2020). Online influencers are effective information disseminators; millennial and Gen Z consumers follow them on their social networking sites as they are considered relatable, unlike traditional celebrities, including sportspeople, musicians, and actors (Johnstone & Lindh, 2022). Other ways of encouraging sustainable consumption include promoting recycling and reusing fashion products.

Firms in the fashion design industry need to promote sustainable use of fashion products by taking proactive approaches to educate consumers about the importance of buying sustainable products and how to use them to minimize negative environmental impacts. According to the value-belief theory, which predicts environment-friendly behavior, environmental beliefs influence consumers' awareness of the consequences of specific behaviors (Hong et al., 2024). The consumer's awareness leads to the ascription of responsibility, that is, the belief that one's actions can restore environmental values, averting the harmful consequences of anti-environment behaviors (Lind et al., 2015). The theory explains why targeted communication and marketing strategies promoting sustainable consumption yield success in promoting environmental awareness and stimulating purchase intentions for eco-friendly fashion products.

4.5. Society: Providing a Platform for Collective Action

Firms in the fashion design industry can extend their GSCM initiatives to society by creating platforms for collective action on environmental responsibility. Collective action is achievable if firms leverage collaborative strategies to bring different stakeholders on board to combine efforts to build GSCM capacity (Di Lodovico & Manzi, 2023). Collaboration and partnerships are part of firms' sustainable social responsibility strategies to increase stakeholders' awareness of social initiatives that should be undertaken to create shared value between business and society (Goworek et al., 2018). Strategic collaborative partnerships in the fashion industry would benefit from research that informs how to build capacity for sustainable production while also obtaining legitimacy among consumers for demonstrating commitment to environmental responsibility (Liu et al., 2020; Gnes & Vermeulen, 2019). Research institutions would also help firms understand the most effective marketing communication strategies to use to improve customers' environmental awareness, as well as stimulate eco-conscious consumption of fashion products (Todeschini et al., 2020). Therefore, firms must leverage strategic partnerships to broaden societal involvement in GSCM.

Firms can apply the loose-coupling theoretical framework to promote GSCM. The theory, which proposes a system in which every party is connected while also preserving their independence to ensure they are not wholly determined by their connected counterparties, enables diverse parties, in this case, firms, to work together towards a common goal by leveraging strong leadership, shared values, and focused targets. By working with other organizations in unrelated industries, such as research and environmental justice advocacy groups, firms in the fashion industry can initiate loosely coupled relationships to collaborate with the organizations while retaining distinctive autonomy (Liu et al., 2020).

The entities include non-governmental organizations (NGOs) and research-based institutions with different purposes, segmented external environments, and distinctive organizational cultures (Acharya et al., 2020). The partnerships are important in enabling research and advocacy groups to access financial resources to contribute to GSCM by publishing studies on evidence-based green production and consumption, as well as pushing for legislation of sustainable business practices respectively (Liu et al., 2020). Markedly, the loose-coupling framework provides a framework to guide firms in fashion design to capitalize on collaboration to enhance societal involvement in green production and consumption.

Table 2: Four Key Roles of Retail Beauty Worker for GSCM

Key Role	Description
1. Green Product Promotion	Characteristics and advantages of environmentally friendly products, the differentiation and positioning strategies for such products, and the process of recommending and persuading consumers to choose green products.
2. Green Customer Education	Environmental awareness and knowledge. 2. Dissemination of green product information and advice. 3. Fostering green product involvement and trust
3. Green Service Provision	Utilization and implementation of environmentally-friendly products, the quality and satisfaction of eco-conscious services, and the innovation and customization of sustainable service offerings
4. Green Waste Reduction	Consumption and disposal of environmentally-friendly products, the return and recovery of such products, and the reuse and recycling of green products.

Table 3: Findings of the Research

Gap in the Literature	Final Selected Resources
The current study focuses on the fashion design industry as a central player in promoting an eco-conscious consumption culture by creating awareness of the need to produce and consume eco-friendly fashion products instead of only capitalizing on the shifting consumer tastes, preferences, and expectations	Daukantienė (2022), Shen (2014), Shafie et al. (2021), Jutidamrongphan et al. (2021), Lee et al. (2021), Arribas and Alfaro (2018), Casciani et al. (2022), Demarco et al. (2020), Ikram (2022), Mandarić et al. (2021), Moorhouse (2020), Freichel et al. (2020), Landi et al. (2023), Ly (2021), Aftab et al. (2018), Amoako et al. (2020), Chetioui et al. (2020), Johnstone and Lindh (2022), Hong et al. (2024), Lind et al. (2015), Di Lodovico amd Manzi (2023), Goworek et al. (2018), Liu et al. (2020), Gnes and Vermeulen (2019), Todeschini et al. (2020), Liu et al. (2020), Acharya et al. (2020)

5. Discussions

5.1. Academic Implication

The current research focuses primarily on integrating multiple dimensions of sustainability, encompassing materials, manufacturing, distribution, use, and packaging into a cohesive framework for exploring green fashion design. However, a need exists to develop more knowledge in this area of study by ensuring that research on sustainable fashion design continues to explore each dimension of sustainability. Researchers can achieve this goal by introducing new theoretical approaches to empirical research, thus broadening the academic understanding of sustainable fashion design. In essence, this study assumes a holistic perspective focused on exploring the interplay between the different factors to consider in developing a green supply chain management in fashion and how they can enhance environmental awareness while stimulating an eco-conscious consumption culture.

The current study differs from extant research on GSCM based on its specific area of focus. The focus of extant research is limited to achieving eco-friendly supply chain management in the fashion design industry or creating awareness among different stakeholders on the need to embrace eco-friendly production and consumption (Ahmad et al., 2022). Another area of focus encompasses studies aiming to inform stakeholders on how a shift to sustainability provides value at the environmental, social, and economic (business) levels (Dhillon et al., 2022). However, this study adds value to sustainable fashion design scholarship because it assumes a holistic perspective focused on exploring the interplay between the different factors to consider in developing and marketing a GSCM in fashion. This study emphasizes the argument research by Gazzola et al. (2020) that there is a substantial growth in the population of eco-conscious consumers who pay attention to sustainability in the business models of firms in the fashion industry. Also, this study underscores the importance of using GSCM as a marketing strategy to promote consumers' environmental awareness and consumption of eco-friendly fashion products. Notably, this research makes a fundamental academic contribution to green production and consumption to perpetuate the benefits of a sustainable business model in the fashion industry.

5.2. Practical Implication

The current study provides essential insights that can be valuable to practitioners in the fashion design industry on how to create environmental awareness and stimulate the purchase of eco-friendly fashion products among eco-conscious consumers. Practitioners in the industry can adopt new material selection and manufacturing practices to minimize the environmental impact of their practices. Similar to extant research from scholars such as Lim et al. (2022), the current study also establishes that achieving eco-friendly fashion design begins by prioritizing biodegradable materials whose processing and use have minimal carbon footprints. Notably, besides lean manufacturing and the use of advanced tech in the process, it is important to ensure that a company's green fashion design effort is effectively communicated to consumers to enable them to understand the logic behind sustainable production. Communicating a company's green fashion design initiative creates awareness of the company sustainability efforts, which also sensitizes consumers on why using such products is good for the

customer and the environment at large (Turunen & Halme, 2021). Hence, synthesizing empirical evidence from diverse scholars and materials makes the study invaluable to practitioners because it contributes to developing guidelines with actionable recommendations for implementing sustainable fashion design initiatives.

From the current study, practitioners can use the suggestions to increase consumer awareness and stimulate the purchase of eco-friendly products by leveraging consumer education and engagement strategies. The study delves into how brands in the fashion design industry provide a platform for collective action by investing in educational campaigns and transparent communication, collaborating with various stakeholders to maximize awareness of the need for eco-conscious consumption and the availability of green fashion products. Practitioners, especially researchers in the sustainable fashion field, should consider developing a comprehensive framework to assess the feasibility of different awareness strategies and purchase stimulation approaches. Using a clear assessment framework for sustainable fashion promotion would enable organizations to select the most potent practices that can produce the best results in generating business value from promoting sustainable production and consumption.

5.3. Limitations

The current study is potentially vulnerable to subjectivity bias because of the methodological shortcomings of the integrative review on which it is based. Conducting secondary research where the foundation of the evidence used to back arguments is based on previous research leads to the use of diverse methodologies, populations, and outcomes, which increases the chances that the study will need more rigor (Cronin & George, 2020). Essentially, the heterogeneity of the different sources means that the evidence provided incorporates diverse methodologies, which increases the likelihood of biases and inaccuracy (Cronin & George, 2020). In sum, the methodological limitation of this evidence synthesis makes it harder to control against biases and maximize rigor.

The current research is not based on an established theory, nor was there an attempt to develop a definite framework for the study. Without a theoretical framework guiding the study, a researcher's ability to interpret and analyze research findings becomes limited since basing research on a theory provides a perspective through which to examine questions and interpret results (Fried, 2020). Notably, a theoretical framework is necessary to develop a rigorous analytical approach, which is essential to advance knowledge in the subject area (Garvey & Jones, 2021). Hence, lacking a theoretical framework limits the depth and breadth of knowledge concerning how green supply chain management can be leveraged to enhance consumers' awareness of eco-production and consumption in the fashion design industry.

5.4. Recommendations

Future studies exploring the subject area should consider using an established theory or developing a theoretical framework for research. Basing a study on a definite theoretical framework would enable the researchers to enter into broader academic conversations within and outside the research topic but on related subject areas (Collins & Stockton, 2018). Anchoring a study on a theory would be essential in helping researchers expand opportunities for linking research findings to other studies, hence enhancing the understanding of foundational issues and problems associated with research approaches targeting a subject area (Heng, 2020). Most importantly, applying a theoretical engagement in future studies would enable a more comprehensive and in-depth understanding of a phenomenon since a theory can pluralize human knowledge and provide multiple and diverse perspectives on a research topic (Yahaya et al., 2019). Future researchers should apply a theoretical framework in the analysis process to improve the depth and scope of their understanding concerning promoting sustainable production and consumption of fashion products.

Future research should leverage diverse empirical methods to investigate the relationship between existing variables. Researchers should investigate the effectiveness of the different sustainable design guidelines optimized for firms in the fashion industry. The goal is to broaden understanding regarding which sustainable design guidelines provide the most value in creating awareness of green consumption while stimulating the purchase of eco-friendly fashion design products. Using different empirical methods would enable practitioners in the sustainable fashion design industry to ensure that GSCM guidelines generate business value for firms in terms of higher sales and competitiveness and cost efficiency.

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