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EXPLORING STAKEHOLDER PERSPECTIVES TOWARDS SUSTAINABLE PRACTICES IN TEXTILE INDUSTRY: IMPLICATIONS FOR ENVIRONMENTAL IMPACT

Mehreen Ijaz[1*], Namood-e-Sahar[1], Zohra Tariq[1], Rafia Fatima[1], Madeeha Tariq[1]
[1]Department of Home Economics, Lahore College for Women University

Article Info

*Corresponding Author
Email Id: mehreenijaz@hotmail.com

Abstract

This study aimed to investigate the perspectives of stakeholders in the textile industry regarding sustainable practices and their impact on waste reduction and environmental safety. Focus group discussions were conducted to gather the relevant data from the stakeholders, including industry representatives, designers, manufacturers, retailers, suppliers, and consumers. The study emphasized the importance of adopting sustainable practices in the textile industry to eliminate environmental impact and promote a safe and healthy environment. The findings of the study highlighted those stakeholders acknowledged and shared the sustainable practices that can be adopted in reducing waste accumulation and minimizing the industrial environmental footprint. Environmental safety and sustainability goals can be attained by implementing sustainable practices such eco-friendly dyeing and manufacturing techniques, effective resource utilization, design formation and responsible consumer attitude were highlighted as key components. The study emphasized the need for collective efforts to develop an eco-friendly and sustainable approach in the textile sector.

Keywords

Textile industry, Sustainable products, Waste management, Environment, Resources

1. Introduction

The current study aims at determining the perspective of stake holders within the textile industry regarding the environmental impact of their product development processes. Recognizing the need for sustainable practices, this research focuses on understanding how stakeholders in the textile industry address the environmental impact of their product development processes. The textile industry of any country is considered as one of the key sectors in determining its economic growth and development. The demand for textiles and clothes has significantly increased as a result of the expanding worldwide population, rising living standards, and evolving fashion trends. However, this growth in consumption has also been accompanied by a comparable rise in textile waste, which has resulted in major landfill buildup. Additionally, the packing of textile products adds to the waste materials (Xie *et al*., 2001). It has high chemical consumption especially in the dyeing and finishing units and related production procedures. It may cause water and air pollution if adequate measures are not taken. Textile wastes contain certain harmful agents including toxic solvents, resins, inorganic salts, heavy metals and other substances. These may produce environmental hazards for living beings. These pollutants can have a detrimental effect on human health when combined with inadequate ventilation or environmental changes (Pervez *et al*., 2021). Additionally, the raw materials used in the textile industry has also devastating results throughout the life cycle of a final product. From the production of raw materials through the final disposal of finished goods, the textile and clothing sector causes environmental damage at every stage of the product life cycle (Khan 2015 & Gam, 2011). Various chemical finishes may be applied to textiles during their production phase, which could lead to later consumption and disposal processes release these toxic chemicals into the environment (Wright & Mihelcic 2008).Workers who deal with such chemicals, load and unload their shipment are usually at risk for health-related issues. Sustainability of products is a strategic plan of their development without creating a negative effect on natural resources during gathering, producing, consuming, and disposing off (Toprak & Ais 2017). There is a strong relation between production and sustainability. The role of industry owners, textile technologists, designers, suppliers, retailers, and other stakeholders has a great impact on eco-friendly environment (Calamari & Hyllegard, 2015). The value of sustainability is embraced by numerous individuals and organizations, evident through their policies, everyday actions, and behaviors. These practices significantly influence consumer choices and contribute to shaping environmental and social conditions. Even ordinary individuals play a crucial role in driving positive change by actively selecting greener alternatives and supporting sustainable practices (Hiller & Kozar, 2017).

2. Materials and Methods

The research methodology involved engaging with many stakeholders including manufacturers,

suppliers, designers, retailers, and policymakers through focus group discussions. These interactions helped to provide valuable insights into the stakeholders' opinions, strategies, and initiatives related to environmental sustainability in the textile industry.A total of twenty-five participants comprised various stakeholders within the textile industry were selected. A combination of websites on the internet and trade magazines and industry-specific platforms were used as sources for finding potential participants in order to create a broad and representative sample. A list of potential participants was gathered. Factors such as organisational functions, location, and diversity within the stakeholder groups were taken into account. This helped to gather a wide range of viewpoints, thoughts and experiences necessary to the environmental impact of product development processes adopted in the textile industry. Upon identifying the potential participants, invitations were extended to them, explaining the purpose and significance of the study. The participants were selected based on their willingness to contribute to the research and their ability to provide valuable insights into the environmental aspects of the textile industry. The participants' job titles, educational backgrounds, experiences, organizational structure, culture, size of business, nature of product, available resources and their design methods were varied in nature.

3. Results and Discussion

Seven major themes emerged from focus group discussions conducted with the participants. These were utilization of resources, selection of raw materials, design formation, technology employed,dyeing, printing and finishing techniques, waste management system, and consumer behaviour.

3.1 Utilization of Resources

The first theme identified through data was the availability of resources. The participants highlighted the fact that available resource either natural or man-made play a significant role in investigating the environmental impact of a textile industry. They suggested that with the utilization of renewable energy like solar system can easily reduce carbon emissions during manufacturing processes (Kimutai *et al*., 2019). In this way, a particular industry can contribute to a sustainable future for nation. One of the participants focused on production of eco-friendly fibers such as organic cotton, jute, hemp and recycled fibers instead of synthetic materials. The industry may minimise environmental damage and lessen its influence on ecosystems by employing such type of sustainable materials (Kousar *et al*., 2022). Another participant added that if certain resources are used improperly, such as chemicals and synthetic dyes, they can lead to air emissions and water body pollution. Waste items, such as fabric remnants and chemical residues, should be disposed of properly to prevent environmental contamination and harm to nearby ecosystems (Bilińska & Gmurek, 2021).

3.2 Selection of Raw Materials

This theme recommends to use sustainable raw materials as a part of sustainable innovation rather than using unsustainable products like fibers which are derived from fossil fuel. Regenerated cellulosic materials, organic cotton, bamboo or recycled

polyester should be employed in manufacturing procedures (Adu *et al*., 2021). The respondents commented that the biodegradable materials have the potential to biodegrade thus reducing waste and promoting an eco-friendlier approach (Celep *et al*., 2022). Wool, linen, and silk are few examples of renewable and biodegradable materials, which lessen their impact on the environment. Recycled polyester and denim are other examples of sustainable options that contribute to a circular economy. Synthetic fibres as well as non-biodegradable materials should be avoided as they are the cause of landfill problems and long-term waste accumulation (Patwary, 2020).

3.3 Design Formation

Most of the participants were of the view that unlike the conventional product design, an eco-design adopts a more holistic and thorough approach by taking the entire supply chain into account. It aims to design products which are durable as well as aesthetically pleasing. By designing products that are built to last, the environmental impact associated with manufacturing and disposal can be minimized. The design formulation encompasses the decisions and considerations made by textile and fashion designers with reference to material used, processes adopted, and product attributes. One of the participants elaborated the idea that designers have the flexibility to choose eco-friendly and sustainable materials for their production. Selection of natural fibers, organic materials, and eco dyes can reduce the environmental negative impacts (Sondhi, 2020). By embracing sustainable practices and ideas, it seeks to reduce the environmental impact at each level. Eco-design supports the circular economy by adding design elements that facilitate quick and effective recycling, hence minimizing waste and resource consumption (Salo *et al*., 2020). Design decisions which involve the use of chemical treatments like synthetic dyes, finishes, laminations, and other coatings, can have detrimental effects on the environment. If these chemicals are not utilized properly, they can lead to water pollution, air pollution, soil contamination, and even ecosystem disruption. Designers need to be careful while selecting such substances. They need to explore alternative ways to minimize the environmental impact.

3.4 Technology Employed in an Industry

Technological advancements help to improve sustainable practices, increase efficiency, and reduce environmental hazards. Respondents suggested that innovations in the field of textiles such as digital fabric printing, laser cutting, and waterless dyeing help to reduce water, chemical and energy consumption (Akiwowo, 2015). The textile industry can maximize the benefits of technology using digital tracking system to process textile waste and minimize its drawbacks through enhancing sustainable production ways, encouraging recycling and controlling electronic waste.

3.5 Dyeing and Printing and Finishing Techniques

The dyeing, printing, and finishing procedures in an industrial sector significantly contribute to its environmental impact (Varadarajan & Venkatachalam, 2016). This theme was gathered

from the opinion of most of the respondents that procedures including low-liquor ratio dyeing, digital fabric printing, and dye extraction through natural sources such as plants, herbs, insects, or minerals can help to reduce the consumption of water, chemical or other dangerous solvents (Parisi *et al*., 2015). The industry may encourage sustainable practices, reduce pollution, and most importantly conserve resources by using these strategies. Additionally use of noon-toxic dyes and pigments minimize air and water pollution by restricting the release of dangerous chemicals into the environment (Mamun *et al*., 2023). An environmentally friendly alternative to traditional pretreatment and effluent treatment methods is the use of biochemicals like enzymes. The employment of enzymes in pretreatment shows benefits over traditional methods (Harsanto *et al*., 2023).Technologies like water recycling system, and energy-efficient machines can reduce the amount of water and energy used for finishing operations in an industry. These actions promote resource conservation and help to decrease in greenhouse gas emissions (Panda *et al*., 2021).

3.6 Waste Management System

One of the most important themes is the waste management system prevailing in a textile industry. Reprocessing, recycling, material recovery, and source reduction are few methods that aim to reduce the quantity of waste delivered to landfills and incinerators (Behera *et al*., 2021). Reducing waste output allows for the conservation of precious resources including raw materials, electricity, and water, thus promoting environment sustainability. Environmental protection depends on the proper treatment and disposal of hazardous waste produced throughout the textile production process. Utilizing protocols for the secure handling, disposal, and treatment of hazardous waste reduces the possibility of contamination of the land, water, and air.

3.7 Consumer Behaviour towards Sustainable Products

All the respondents agreed that there is no better approach for ultimate consumers to make conscious decision about their shopping practices, clothing care habits and disposal behaviour. The consumer should value the quality of clothing and textile items over quantity. He / she should create market demand for sustainable products; they can drive the manufacturers towards sustainable fashion. This demand will encourage all the stakeholders to adopt sustainable practices. One of the respondents suggested that consumers should be educated regarding the proper disposal of garments and other textile related products (Bhamra *et al*., 2018). Consumers can promote the adoption of ethical standards in the business by purchasing products from companies that place a high priority on supply chain transparency, traceability, and fair working conditions. One of the respondents also highlighted the fact that consumer demand for fast fashion leads to an inexpensive and rapidly changing clothing styles which in result contributes to overconsumption and excessive wastage. Consumers can be empowered to make ecologically responsible decisions and help bring about good change in the textile sector by promoting responsible consumption behaviours, supporting sustainable companies, and promoting a

culture of conscious decision-making (Cachon & Swinney, 2011).

4. Conclusion

The use of chemicals, trash production, and resource consumption are only a few examples of how the textile business has a huge negative influence on the environment. There are, however, several tactics and procedures that might lessen this effect and advance sustainability. These include of using eco-friendly methods for printing and dyeing, managing waste efficiently, utilizing renewable energy sources, and encouraging ethical consumer conduct. The textile industry may reduce its environmental impact and progress towards a more sustainable and ecologically conscious future by implementing these steps. The findings of this study contribute to the existing knowledge base by shedding light on the perspectives of textile industry stakeholders regarding environmental sustainability. By understanding their viewpoints, it becomes possible to develop targeted strategies and interventions to promote more sustainable practices within the industry.

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