

Weaving Sustainability: Uncovering Challenges in Pakistan's Textile Supply Chain- A Qualitative Perspective

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ARTICLE INFO			ABSTRACT
Article History:			<i>This paper explores the barriers faced by firms while implementing SSCM practices in Pakistan's textile industry. In-depth interviews were conducted with managers and directors of 15 firms drawn from the textile sector. Two broad themes of barriers are identified e.g. environmental and operational barriers. Weak regulations, socio-structural problems, and limited consumer awareness are a few of the environment-related barriers. Operational barriers include using outdated technologies, the expensive implementation of sustainable technologies, and poor collaboration among relevant stakeholders. Results show that these barriers are interlinked, and the need for collective actions among the government, industrial heads, and consumers is emphasized. The policy recommendations include stricter regulations, financial incentives to motivate firms that are implementing sustainable practices, and localized awareness campaigns. The study underlines cooperation, mutual learning, and moving away from a short-term survival mindset toward long-term sustainable practice.</i>
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Introduction

The core challenge of companies in the global textile industry is finding the right balance between competitive advantage and sustainable practices while satisfying the expectations of various stakeholders (Haseeb et al., 2019). Sustainable Supply Chain Management (SSCM) has emerged as a crucial element for business sustainability and ethical operations in the long run. The practice of SSCM includes the reduction of environmental impacts, improvement of labor conditions, transparency, and alignment of the supply chain with stakeholder demands and regulatory pressures that result in operational resilience (Nazir et al., 2024).

Firms implementing SSCM are granted additional brand equity and enhance customer trust since the brand is considered socially responsible (Hu et al., 2019). In developed economies, most consumers embrace products sourced from sources believed to be environmentally friendly; such actions force companies to switch towards SSCM, not as merely a means of complying, but also as a strategic choice (Kumar et al., 2021). On the other hand in developing economies like Pakistan, scarcity of resources and poor infrastructure pose specific challenges for textile companies while implementing sustainable practices (Abbas & Halog, 2021).

Investments in sustainable technologies such as water recycling systems and renewable energy have been shown to reduce costs in the long term while also improving environmental performance (Baleta et al., 2019). The process of SSCM supports both competitive advantage and sustainability objectives. Companies can lead in the market only if they become socially and environmentally responsible and at the same time if they fulfill stakeholder's expectations (Pfajfar et al., 2022). Textile indeed happens to be one of the backbone industries for many countries in general and specifically plays a significant role in the economy of Pakistan. It adds a value of around 8% to Pakistani GDP and contributes to nearly 40% of the country's total exports. This industry serves as the basis for economic stability and provides direct or indirect livelihoods to millions. Being one of the largest export-oriented industries, it contributes significantly to the growth and resilience of the nation. Despite being a crucial part of the economy, the sector faces a tremendous number of sustainability challenges that could pose a threat to its long-term viability (Ali et al., 2020).

The textile industry has resilient ecological problems because of its high water requirement, toxic effluents, and great consumption of energy. Many issues related to fair wage and ethical labor practices impede the industry image. Different social issues, such as poor labor conditions and weak regulations, also affect this sector (Farhana et al., 2022). The sector also faces economic vulnerabilities, such as the fluctuations in worldwide demand, changing fashion trends, and increasing costs of raw materials. The competitive tensions created by the textile industries of neighboring countries, such as Bangladesh, further emphasize a critical need for strategic reforms that can ensure sustainable growth and international competitiveness in the long run (Sadhna et al., 2021). Sustainability initiatives must be implemented in the Pakistani textile sector to ensure its future. Given the economic uncertainty of the country and with increased awareness of foreign customers, it would be reasonably argued that the role of SSCM practices in the Pakistani textile industry should not be discharged lightly (Mehar, 2022). Research indicates that more than half of the earth's consumers, mostly millennials, are willing to pay a price premium for sustainable products. This calls for an instant response from Pakistan's textile firms to these changing consumer expectations of international consumers (Nicolau et al., 2020).

The stakeholders of the textile sector including customers, investors, and regulators will be increasingly demanding sustainable investing, pushing the companies operating in the Pakistani textile industry to incorporate sustainable practices into their management frameworks of supply chain (Rathore, 2024). However, in the Pakistani context, current regulations at times have hampered the industry's efforts for sustainable transformation. To maintain competitiveness and be able to meet the standards prevalent globally, the Pakistani textile industry needs to work on strategies that ensure green productivity while meeting the sustainability standards prevalent globally (Memon et al., 2020). Such an approach will not only address the expectations of stakeholders but also ensure long-term resilience and contribution towards national economic stability.

The potential competitive advantage for Pakistan's textile companies in the world market lies in their ability to meet the increasing demand for ethically produced goods (Khurshid & Siddiqui, 2019). Adjustment toward ethical production would open businesses to an environmentally concerned consumer base. Yet, the current resources of the Pakistani textile industry remain sharply limited, hindering operational efficiency and the application of sustainable practices (Karimova et al., 2023). Many textile manufacturers operate out of old buildings, with inefficient and conventional energy systems, substandard water and waste treatment facilities, and inadequate transport infrastructure. These deficiencies are a limitation to productivity and simultaneously inflate environmental degradation in the sector (Malik, 2024). Many textile firms specifically SMEs are still using conventional processes and several social problems plaguing the industry remain very severe barriers to sustainability and productivity. Some chronic concerns include poor working conditions, insufficient occupational safety, and continued violation of employees' rights. Workers are affected by such practices, which further affects their health and well-being (Naqvi et al., 2024). Only with the proper care of the workforce, companies can enhance workforce engagement and retention, which eliminates turnover-related costs such as recruitment and training expenses. Improvement of the general social conditions also benefits the quality of products because motivated and empowered workers perform better work with fewer costly errors (Arslan, 2020).

This research aims to offer a comprehensive understanding of the barriers Pakistan's textile industry faces while implementing SSCM practices. SSCM combines traditional supply chain management with sustainability principles to create green and pro-social practices in all aspects of the supply chain. This is an approach that encourages textile firms to strive for wholesome efforts toward reducing their environmental impact while protecting the rights of workers and enhancing economic resilience. In this paper the researcher builds the work on the definition of SSCM provided by Seuring and Müller (2008), describing SSCM as the management of resources, information, and capital flows while ensuring collaboration among companies along the supply chain, and taking into account the goals from all three dimensions of sustainable development, i.e., economic, environmental, and social. Sustainable practices along the textile supply chain in developed economies have been one of the areas previous SSCM studies have been focusing on. However, this is a huge research gap in the context of developing economies, since the three dimensions of sustainability interact in complex ways (Arshad & Arshad, 2019). For this reason, this study fills one such gap by concentrating on the internal and external dynamics within a textile manufacturing firm as a focal point in the supply chain specifically in the developing context e.g. Pakistan. By examining the inner culture and practice of the manufacturing organizations that are making cloth, apparel, and different household linen products the researcher attempts to understand the inner barriers to the successful implementation of SSCM in the sector. Along with the internal mechanism the researcher has explored the external dynamics that are hindering the SSCM practices implementation within the industry. Through this targeted approach, this research contributes to sustainable supply chain management by identifying actionable strategies for textile companies in developing countries. This research contributes by focusing on key aspects of the sector, by probing, the challenges faced by Pakistan's textile sector in adopting sustainability practices.

The researcher thus explores: ***“Which barriers occur in the implementation of sustainable practices within the textile industry of Pakistan, and how companies in this sector may seek to overcome these challenges?”***

This question thus identifies some previously known and several new atypical structural and operational challenges that hinder the proper implementation of sustainable practices in the textile

industry of Pakistan. Common barriers include limited financial resources, use of outdated technology, regulatory restrictions, and workforce-related challenges that oftentimes don't allow a smooth transition to sustainable practices in the textile industry (Kazancoglu et al., 2020). Our research goes even deeper in trying to understand what the context-specific challenges are and how textile firms can tackle these problems. The solutions were also extracted from the responses of industry experts thereby the recommendations provide an in-depth practical measure that firms can carry out to incorporate sustainable practices into their operations and supply chains. These recommended solutions therefore offer a roadmap for organizations in various industries facing equivalent challenges in other developing countries. In summary, the study contributes by providing a deeper understanding of how Pakistan's textile sector may enhance its sustainability in the context of its supply chain.

Literature Review

Along with infrastructural issues, people-related issues are one of the key barriers to implementing SSCM practices in the textile industry. Literature review reveals that problems faced in the textile sector often include a lack of commitment and support given by the top management as there exists a scenario where top management does not lead the cause and doesn't take sustainable business objectives as a priority (Giunipero et al., 2012; Majumdar & Sinha, 2019; Rao Tummala et al., 2006). Moreover, a lack of awareness and ignorance of sustainable principles by the various stakeholders who can essentially drive SSCM practices exacerbates these challenges (Raut et al., 2019; Sajjad et al., 2015). The human-centered barriers above result from a conventional organizational culture that is not evenly aligned and lacks sustainability-focused leadership at various hierarchical levels. Other strategy-related barriers are lacking the prioritization and integration of sustainability into the strategic objectives of textile firms (Sajjad et al., 2015; Souza Piao et al., 2024). Like any other developing country, the financial constraint of the business is one challenge that the Pakistani textile industry faces. There's limited availability of funding and capital, making the implementation of sustainability practices much tougher in such an environment (Ageron et al., 2012; Raut et al., 2019). This is more relevant to smaller firms, which have a specific limitation in terms of resource availability that would limit their ability to invest further in SSCM initiatives (Alam et al., 2023; Hervani et al., 2005). In addition, with unclear corporate structures and blurred official processes to support sustainable development, further barriers are created because the particular organization lacks the institutional frameworks necessary for efficient implementation of SSCM (Walker et al., 2008).

Apart from these strategic barriers, function-related barriers like insufficient managerial capabilities, absence of appropriate training programs, and inefficient awareness concerning the principles of SSCM; act as a setback for the successful implementation of sustainable practices in the industry (Majumdar et al., 2021; Walker & Brammer, 2009; Zhu & Sarkis, 2006). There are no incentives or reward structures to actively pursue sustainability-oriented objectives. As a result, employees lose motivation to achieve sustainability goals (Kazancoglu et al., 2020; Rossetti & Dooley, 2010). In combination, these barriers in human assets, strategic alignment, and functional inadequacies call for a more holistic approach that requires organizational, financial, and educational framework alignment. A multi-faceted strategy is essential for fostering SSCM advancements within Pakistan's textile sector to enable a robust integration of sustainable practices across the industry.

Regulatory barriers are also vital, as current regulations in developing countries are only a bare minimum discouraging innovation in SSCM. Customer-driven factors such as a price-conscious purchasing attitude or inadequate demand for sustainable goods, are also barriers to SSCM

adoption in the industry (Chhabra et al., 2022; Hall, 2006). Additionally, there are relationship issues between the buyer and the supplier; as most suppliers do not want to disclose information regarding their production processes and refuse to undertake new policies mainly because they do not see a reason or benefit (Hall, 2006; Shaw et al., 2024). The resistance is more enhanced by the potential lack of resources, capabilities (Ciliberti et al., 2011), and knowledge from the suppliers' side mainly due to ineffective communication or vague criteria (Peters et al., 2011; Vishwakarma et al., 2022). Cultural differences pose another obstacle in implementing SSCM, as suppliers view environmental and social standards as additional costs and invasive behavior in their operations (Schneider & Schwerk, 2010; Sirilertsuwan et al., 2019). Public perception is key in this matter; sustainability efforts are quickly misconstrued as "greenwashing," threatening to undermine a desirable impact on a company's reputation (Alizadeh et al., 2024; Greer & Bruno, 1996). Industry-based obstacles also stem from weak regulation in some industries that have permitted unsustainable practices for too long (Min & Galle, 2001). The cultural, public perception and industry-specific issues translate into multilayered complexities in SSCM adoption; that's why strategies should specifically focus on context-sensitive strategies to tackle the diverse obstacles ahead of creating an enabling environment for sustainable practices.

Textile companies mostly operate within globally dispersed supply chains (Perry & Towers, 2009; Tseng et al., 2022), having huge social and environmental costs (Gam & Banning, 2011). They also face numerous supply chain-related problems at the supplier level (Freise & Seuring, 2015). The diffuse network of suppliers makes scrutiny more intense on stakeholders as they are considered responsible for their contribution to issues related to social and environmental costs (Kozłowski et al., 2012). This has made sustainability the core priority; companies are thus pushed to focus on the adoption and implementation of proper sustainability policies in the entire chain (Niinimäki & Hassi, 2011; Warasthe et al., 2020). It depicts a sector-wide transition to growing recognition that incorporating sustainable practices is essential for handling reputational risks and long-term viability in a socially conscious marketplace.

A customized approach to sustainable supply chain management is required by the textile sector due to its unique nature. The industry is highly competitive, and it depends on the capability of firms to be responsive to changes in consumer demand while at the same time ensuring cost efficiency (Eid & Ibrahim, 2021; Turker & Altuntas, 2009). This competitive pressure has instigated a supply chain model dominated by a just-in-time production philosophy in the fast fashion paradigm (Karadag, 2023; Pookulangara & Shephard, 2013). This often makes textile firms prefer partnerships with lower-cost suppliers in developing countries, where regulations of any kind regarding social and environmental responsibility tend to be less stringent (Freise & Seuring, 2015; Wang et al., 2020). Thus, reliance on suppliers located in countries with loopholes in regulations accentuates the urgent need for sustainable practices to counteract the risks associated with spiraling production cycles, low-cost sourcing, and the discrepancies between interregional regulations.

The products of textile firms carry significant social and environmental impacts along all stages of the life cycle, and each stage of production brings different sustainability issues. This is even more prevalent in the upstream supply chain, especially concerning raw material sourcing and the production of yarn or fabric. (Clancy et al., 2015; Luján-Ornelas et al., 2020). At these stages, textile firms indirectly impact nature biodiversity, bio-productivity, and even welfare among local communities like standards of health and wage equality (Turker & Altuntas, 2014). Raw material sourcing and production often involve chemical inputs and the use of non-renewable resources that have high risks for ecosystems and environmental health (De Brito et al., 2008; Rovira & Domingo, 2019). This scenario calls for sustainability policies to bring down the environmental

footprint while ensuring a positive social impact is created throughout the textile supply chain. The pressure of costs and time often makes the textile industry suppliers practice exploitation of vulnerable local populations thereby creating further misunderstanding about the establishment of sustainable supply practices (Arslan et al., 2020; Barnes & Lea-Greenwood, 2006). Many firms focus on attaining economic gain as opposed to social responsibility which they treat as segregated objectives rather than collective priorities (Huang et al., 2021; Li et al., 2014). As the life cycle of the fashions is short-lived it requires the firms to make products on an urgent basis to meet the ever-changing demands and as a result, the manufacturers in the industry favor short-term gains above long-term ethics and sustainability.

Consumer behavior thus imposes paradoxical pressure on textile organizations, as they simultaneously want a variety of products at an affordable price. But at the same time, there are consumers with increased awareness and an expectation of sustainable products (Ribeiro et al., 2023). This contradiction further complicates the management of supply chains since companies now have to meet the frenetic tempo and cost-sensitive requirements of markets with sustainability. Moreover, with sustainability concerns in textile supply chains increasingly grabbing the attention of NGOs, local governments, and media, the pressure on businesses to work responsibly is mounting (Geissdoerfer et al., 2023). As a consequence, market participants in the business of textiles located in developed countries have increasingly taken up sustainability initiatives across the supply chain. Meanwhile, this encompasses open sourcing, investment in 'eco-friendly' materials, and collaborative initiatives with suppliers toward better working conditions and standards for the environment. There is also an interest in circular economy principles dealing with recycling and waste minimization to make supply chains more sustainable. This shift again creates an industry-wide challenge as firms are now expected to work with greater social and environmental responsibilities- at the same time driven by customer expectations, stakeholder pressures, and understood long-term economic benefits to becoming a sustainable business (Majumdar & Sinha, 2019)

Researchers have previously identified two sorts of textile companies: First are those; that go for survival in a very competitive market and who delay, to the largest extent possible, the introduction of sustainability practices that operate only at the minimum regulatory compliance level. On the other hand, there are companies actively seeking to adopt and develop sustainability within their supply chains. These companies employ a whole range of means including certification and labeling schemes, standards, Codes of Conduct (CoCs), and social and environmental auditing in addition to being part of initiatives and networks with other market stakeholders (De Brito et al., 2009; Jaiswal & Ha-Brookshire, 2019; Turker & Altuntas, 2014). With this concept, the researcher will then proceed to explore what kind of barriers both types of firms face in implementing SSCM practices.

Methodology

This research uses a qualitative design to explore the barriers of adopting sustainable supply chain management practices in Pakistan's textile sector (Maxwell, 2023). The data gathering was mainly done by conducting semi-structured interviews with industry experts (Crossley & Jansen, 2021). The study utilized thematic analysis on the data collected from semi-structured interviews to elucidate key themes and patterns regarding the barriers in the adoption of sustainable supply chain management in Pakistan's textile sector. This qualitative, interview-based approach facilitates direct interaction with industry people that provides first-hand information relevant and up-to-date in its context (Khan & Khan, 2010). Because the global requirements for sustainability are in constant change, using primary data helps the research to portray the current situation of industries and

challenges in Pakistan's dynamic textile sector. Philosophically, this research belongs to the interpretivist group, where the subjective world view of participants come into the limelight of the researcher. The research strategy emphasizes interviews with managerial-level employees who have knowledge of the supply chain operations and are well aware of sustainability initiatives. The researcher used a mono-method, strictly reliant on qualitative techniques of data collection. The time horizon applied was cross-sectional where the study used data collected at a particular point in time within e.g. 2024. Best practices in qualitative research meant that the rigor involved in collecting the data was given high consideration to ensure reliability and validity of findings. A systematic approach, as recommended by Kitto et al. (2008), was adopted to maintain the integrity of the research and to produce credible outcomes that reflect the complexities of the industry. In line with Guba and Lincoln's framework (1994), the study maintains the four core criteria of trustworthiness, which include credibility, transferability, dependability, and conformability. Since researcher interpretation inevitably shapes the qualitative data analysis, several steps have been taken towards the management of subjectivity constructively, including a clear declaration of researcher assumptions, interests, and the objectives within the context of the study (Pyett, 2003). This approach not only enhances the research process's transparency but strengthens the rigour and the reliability of the study also.

Interview Guide and Research Question

The semi-structured interview guide was meticulously developed to outline the main topic of the study, providing a structured framework while allowing flexibility to adapt to participants' responses. The guide ensured consistency across interviews while enabling the researcher to explore unanticipated themes through follow-up questions tailored to participants' insights (Kallio et al., 2016; Maxwell, 2012). Open-ended questions encouraged participants to share rich, spontaneous narratives, reflecting their personal experiences and perspectives (Adeoye-Olatunde & Olenik, 2021).

The main research question was: ***What are the main barriers your organization faces in implementing SSCM?***

The interview questions were designed using Stakeholder Theory (Freeman, 1984), which emphasizes addressing the needs and perspectives of all stakeholders. This lens enabled the researcher to examine diverse viewpoints within Pakistan's textile sector, assessing whether sustainable supply chain management (SSCM) practices align with the expectations of both local and global stakeholders. Zoom was utilized for conducting qualitative research via video conferencing for interview purposes (Archibald et al., 2019; Irani, 2019), following a clear protocol. Participants received an information sheet outlining the study's purpose, process, and confidentiality measures and provided electronic consent. Using an interview guide, the researcher actively listened, probed, and asked follow-up questions to delve deeper into participants' insights. With explicit permission, interviews were recorded for accurate transcription and thematic analysis using NVivo. A total of 15 interviews were conducted, achieving data saturation as responses became repetitive (Guest, 2006; LaDonna et al., 2021). Ethical standards were rigorously upheld, ensuring participants' privacy, anonymity, and their right to withdraw at any time.

Table 1: Details of the interviews conducted

Company	Designation
a	Manager Supply Chain
b	Director Supply Chain
c	Manager Sustainability

d	Manger Dyeing
e	Manager Weaving
f	Manager Procurement
g	Material Development Manager
h	Sourcing Manager
i	Environmental Compliance Manager
j	Production Planning Manager
k	Supplier Relationship Manager
l	Demand Planning Analyst
m	Director of Sustainability and Compliances
n	Manager Supply Chain

Data Analysis

The researcher used simple descriptive analysis, a qualitative research technique that effectively summarizes and interprets the responses obtained from interviewees (Taherdoost, 2020). Following transcription, the familiarization process begins. This involves an in-depth reading of the interview transcripts multiple times to gain a comprehensive understanding of the content, allowing the researcher to identify initial patterns and ideas within the data with the help of NVivo. These key points include significant statements, phrases, or words that are directly relevant to the regulatory, infrastructural, and social challenges discussed by the interviewees (Abelairas-Etxebarria & Astorkiza, 2020). In the next stage, these identified key points were organized into broad themes based on the research questions. The analysis was aimed primarily at identifying commonalities or differences across the various firms within the textile industry. The analysis considered both those factors that had already emerged in the literature as significant barriers to SSCM implementation and potential new elements.

Result Discussion

The interviews uncovered a diverse range of barriers to sustainable supply chain management (SSCM) practices implementation, surpassing those identified in the existing literature. These barriers are categorized by the researcher into two primary groups: operational barriers and environmental barriers. Environmental barriers encompass external challenges faced by organizations, such as regulatory constraints, market pressures, or infrastructure limitations that impede the implementation of SSCM. In contrast, operational barriers pertain to organization-specific challenges, including resource limitations, process inefficiencies, and gaps in expertise or technology.

Environmental barriers & proposed solutions:

The researcher identified the following environmental barriers:

Lack of awareness and knowledge at the end consumer level:

In developed economies, people have understood the importance of sustainable practices, but this is not the case in developing countries.

"In Pakistan, there are people who are financially strong, brand-conscious, and have high disposable income, which is why they spend a lot of money on apparel and fashion accessories. However, there has never been a demand for sustainable products from the Pakistani public. People don't ask whether child labor was used in the production of these products or whether virgin materials were used. Those who are willing to pay a premium price for brand image and

quality have never questioned the concept of sustainability when choosing clothing or home linen." (Director of Sustainability and Compliance - M)

To resolve this issue:

"Firms, NGOs, and governments need to launch targeted campaigns to educate consumers about sustainability issues. Many people adopt various things as fashion trends, and if sustainability is promoted as both a social cause and a fashion trend, it could gain more traction. For example, influential figures can be used to advocate for sustainable consumption. Just like celebrities have endorsed campaigns for the importance of polio drops or breast cancer screening in Pakistan, sustainable consumption in the textile industry should also be endorsed through their influence." (Manager of Supply Chain - A)

"Previously, buying items from flea markets was seen as a sign of poverty, but now many startups have emerged that are selling used shoes, bags, and clothing through social media under the theme of pre-loved. There is a strong need to raise awareness among students in colleges and universities that discarding items after use is not something to be proud of. Instead, these items can be given to those in need for reuse. Platforms can also be created with an entrepreneurial perspective, where old clothes can be bought and sold." (Demand Planning Analyst - I)

"Youngsters always have a mobile phone in hand. If apps have already been developed for almost everything, why can't an app be created to promote sustainability in the textile sector? Gamification can be a powerful tool to promote sustainable fashion in Pakistan by engaging consumers through interactive apps or challenges. For example, an app could reward users with points for buying eco-friendly products, recycling old clothes, or supporting local brands that introduce sustainable products. These points could then be redeemed for discounts, free merchandise, or donations to environmental causes." (Director Supply Chain-B)

The perception that sustainability is limited to recycling only

Many people in Pakistan perceive sustainability as being solely about recycling, overlooking its broader scope. Sustainability also encompasses ethical sourcing, reducing waste, conserving resources, and adopting environmentally friendly practices throughout a product's lifecycle.

"[.....] from my observation, the narrow view of sustainability limited to being just recycling makes it hard to implement holistic sustainable practices in the textile. Stakeholders in the industry ranging from suppliers, and manufacturers to even consumers' think that recycling old fabrics or materials is sustainable. This has minimized attention concerning other key issues including cutting down on water and energy consumption, using renewable sources of energy, utilizing ethical labor practices, and reducing carbon emissions in the supply chain. SMEs even oppose the use of more environmentally friendly inputs or energy-efficient equipment due to initial higher costs and believe that recycling is enough. Buyers often focus on price further discouraging holistic sustainable practices". (Supplier Relationship Manager-K)

To solve this issue same interviewee recommended:

"For this, it is essential that the government collaborate with international bodies such as the Better Cotton Initiative, Fair Wear Foundation, and WWF Pakistan to conduct training for supply chain stakeholders. The aim would be to highlight the broader scope of sustainability, including energy conservation, ethical sourcing, and waste reduction." (Supplier Relationship Manager-K)

Perception of Sustainability as a Foreign Concept:

Islam encourages and promotes ethical business practices, but there might be a gap in knowing how such values are transformed into specific actions in areas such as sustainable supply chains. Unless environmental and social responsibility is presented as a continuation of religious teachings in the business context, some industry leaders would tend to neglect sustainability as a religious duty and instead perceive it as a Western concept or unnecessary cost.

"[...] flowing water is considered pure, yet it cannot justify mixing polluted water into rivers and streams. Similarly, Islam teaches that a laborer's wages should be paid before their sweat dries. Islam also prohibits wastefulness and advocates for moderation. Planting trees, for example, aligns with sustainable practices, which are fundamentally rooted in Islamic teachings. These teachings emphasize fulfilling the rights of others (Huqooq-ul-Ibad) and caring for the Earth." (Manager Sustainability-C)

Here comes the role of Muslim scholars and clergymen;

"Muslim scholars and clergy men can use religious teachings to push for sustainability. They can remind people about not wasting water in the production processes, ensuring fair treatment of the workers, and conserving nature. Educating people on these aspects through sermons and community-based activities can make them adopt sustainable practices as a moral and religious requirement." (Environmental Compliance Manager-I)

"Islam teaches maintaining transparency in business process and that shall be depicted in the supply chain, ensuring that all business practices are honest and free from deceit. Scholars can promote traceability of materials to ensure ethical sourcing and production processes." (Sourcing Manager-H)

Weak Regulatory Enforcement

Weak regulatory enforcement due to limited resources and corruption hinders the effective monitoring of compliance.

"Weak enforcement of environmental and labor regulations in Pakistan's textile industry leads to bypassing sustainable practices, such as clean water treatment, ethical labor standards, or control over pollution by factories. Mostly, inspections are irregular, and if there is any penalty for a violation, it will either be negligible or implemented inefficiently. Clearance reports can easily be obtained by bribing the inspectors. This kind of lack of accountability allows for short-term savings but contributes toward environmental degradation and poor working conditions." (Manager Supply Chain-A)

Interviewees suggested the following solution to the above-mentioned barrier:

"The Ministry of Commerce and the Trade Development Authority shall gather and present data to government officials that by ensuring compliance to national and international regulations the government can boost exports, attract foreign investment, and align the Pakistani textile sector with global buyer demands." (Director Supply Chain-A)

"[....] NGOs, media, and trade associations shall be mobilized to advocate for stricter regulations and accountability through campaigns and reports." (Director Sustainability and Compliances-M)

Limited resources of end customer

Undoubtedly, Gen Z in foreign countries along with customers in developed nations are willing to pay a premium for sustainable textile products. However, this is not the case in developing countries.

"In developing countries, most economies are not strong, and people have to manage their basic needs within a certain salary bracket. In such circumstances, when it comes to spending on clothing, people prefer low-cost products over sustainable ones. In fact, in many countries, brands don't even offer sustainable products because they know these products won't sell at premium prices." (Sourcing Manager-C)

A few solutions suggested by stakeholders during the interviews are as follows:

"Producing sustainable products at the local level can help reduce costs. Compared to imported products, locally produced items are more affordable and accessible." (Supplier Relationship Manager-K)

"The government can provide tax relaxations or subsidies for sustainable products, which would help reduce their costs." (Director Supply Chain - B)

Operational Barriers & Proposed solutions

The researcher identified the following operational barriers.

Lack of collaboration between manufacturers and business customers

A recurring theme identified by the researcher is the lack of meaningful cooperation between the manufacturers and their business customers, who are not end-users but rather global brands. These global brands normally give orders to Pakistani firms to produce apparel. While these brands underline the need for following sustainability in processes and practices, they tend to award contracts based on cost-effectiveness.

"Undoubtedly, our business partners, who are international brands, require us to have various certifications such as the GOTS, SA8000, Carbon Neutral, and Better Cotton Initiative Certification. Acquiring these [certifications] and adhering to their defined processes and practices involves a significant cost for manufacturers. However, these business customers often invite bids for the same order from multiple manufacturers, who may sometimes be from the same country or different countries such as Bangladesh. Ultimately, the project is awarded to the manufacturer willing to produce the product at the lowest cost. In such cases, the entire burden of sustainability-related costs falls on the manufacturer. So, the question arises, do these international brands genuinely want sustainable practices? And if they do, why don't they share a greater part of the costs to support sustainability?" (Manager - Sustainability - C)

Such a barrier can be addressed by encouraging joint efforts among brands (business customers) and suppliers to share the costs of implementing sustainable practices. Shared responsibility can facilitate true sustainability in the textile industry.

"[...] if international brands genuinely want global textile supply chains to become sustainable, all stakeholders need to share the costs involved in the process."(Director Sustainability and Compliance - I)

Reliance on Traditional Processes

In Pakistan, most of the firms are still relying on traditional processes in textile manufacturing.

“Traditional methods of dyeing processes that consume ample amounts of water dominate Pakistan. These processes consume thousands of gallons of water and produce huge amounts of chemical-laden water waste. Advanced technologies for dyeing, like waterless dyeing or low-impact dyes, can significantly reduce the consumption of water while keeping pollution at bay. However, such technologies need expensive capital investments and technological know-how that is mostly unaffordable to most manufacturers, particularly small and medium enterprises. The initial investment in machinery, besides the unavailability of machinery locally and very high maintenance costs, discourages adoption despite long-term environmental and operational benefits.” (Material Development Manager-G)

HEIs are conducting research in the field of engineering and if they ensure technology transfer in the local market, textile manufacturers can be attracted to utilize contemporary machinery and manufacturing processes as they shall be of low cost due to their local production.

“Government should promote collaboration between local engineering firms, HEIs, and international technology providers so that the advanced dyeing equipment can be manufactured locally, at a reduced cost. Bodies like PEC and Pakistan Engineering Development Board can encourage local engineering firms for the purpose.” (Director Sustainability and Compliances-M)

The management of all textile organizations does not have the same level of exposure. Stakeholders in small and medium enterprises often view sustainable practices solely as an additional cost.

“Large organizations rarely share their real data and practices with textile SMEs. While their [sustainability] reports are available on their websites, practical discussions are far more impactful than simply reading electronic reports. Big firms do not share their success stories with SMEs, such as how transitioning to solar energy has significantly reduced their long-term energy costs or how they initially viewed the use of regenerated fiber merely as an expense. However, in the long run, it reduces raw material costs by utilizing waste textiles. Additionally, mass production and technological advancements are gradually lowering per-unit recycling costs over time.” (Manager Weaving - E)

The solution is that large firms should share their success stories with SMEs and provide them with the necessary knowledge.

“Government, APTMA, and chambers of commerce should create industry-specific forums where large firms and SMEs can engage in regular dialogue, share success stories, and discuss challenges. Additionally, they should organize workshops and webinars, led by large firms, to educate SMEs on the benefits and implementation of sustainable practices, such as using solar energy and regenerated fibers.” (Director of Supply Chain - B)

Another interviewee suggested that the textile industry will never progress if SMEs and large corporations continue to operate as siloed entities.

“The government and NGOs can act as mediators, encouraging large firms to share case studies, practical insights, and sustainability strategies with SMEs. Additionally, incentives such as tax rebates for knowledge-sharing initiatives can be provided to promote collaboration.” (Attributed to Production Planning Manager - J)

The high implementation cost of sustainable initiatives

It was mentioned by almost all the interviewees that the initial cost of putting up sustainable infrastructure is high.

“One of the main challenges towards embracing sustainability in Pakistan's textiles is that initiatives were expensive to implement. Especially when it comes to water treatment plants huge funding is required. A great deal of water is utilized during dyeing and processing in the textile industry, resulting in wastewater containing chemicals and dyes. Large factories can afford to install ETPs to clean this water before discarding it, but SMEs, the high installation and operational costs of these plants make it almost impossible for them to implement such measures. This results in untreated wastewater being discharged into rivers and soil, causing major environmental harm.” (Manager Sustainability-C)

Stakeholders suggested numerous solutions to this problem:

“Banks and government can provide low-interest loans or grants to SMEs for installing smaller, cost-effective water treatment solutions.” (Sourcing Manager-H)

“Enforce strict wastewater management regulations for all industries while providing transition time and financial support to SMEs.” (Manager Sustainability-C)

Survival Mindset in Business Operations

Many businesses, especially smaller textile manufacturers, operate in a “survival mode” due to economic instability, competition, and thin profit margins. This mindset prioritizes day-to-day survival over long-term investments, leading to decisions focused on immediate cost-cutting rather than sustainable development.

“In a country like Pakistan, where there is significant political and economic instability, running a business is not an easy task. The high cost of electricity already increases production costs, which is why SME textile firms often operate with a survival mindset. Business owners worry that political or economic instability might force them to wind up their businesses, which prevents them from making significant investments. This makes it challenging for companies to justify the upfront costs of adopting sustainable practices.” (Manager Supply Chain-N).

Interviewees came up with a couple of solutions to this barrier:

“Government can provide subsidies or low-interest loans specifically for sustainability initiatives to reduce the financial burden on SMEs.” (Manager Supply Chain-N)

“International organizations such as GGGI and UNDP can offer grants or technical support to help firms transition gradually.” (Sourcing Manager-H)

“Creating public-private partnerships can also foster shared investment in sustainable infrastructure, easing the risk for SMEs.” (Supplier Relationship Manager-K)

Misconception that sustainability only applies to large corporations

As there is a general perspective that sustainable initiatives come with a cost, the smaller firms consider it as a responsibility for big firms only.

“Smaller firms may see sustainability as something relevant only to large corporations with substantial resources. This misconception creates a psychological barrier, as smaller companies might feel that sustainable practices are out of their reach or unnecessary for their scale of operations.” (Environmental Compliance Manager-I).

Sustainable initiatives don't always need solutions that require a hefty amount.

“[...] in addition to big steps, small-scale changes can also make a significant impact, such as treating employees better, ensuring that workplaces are free from harassment for women, avoiding the hiring of individuals under 18, planting trees around factory premises, and replacing conventional lights and fans with energy-saving equipment. These actions don't require substantial investments but can create overall improvements in society.” (Material Development Manager-G)

The hierarchy chart and word clod of all the barriers and their solution is depicted hereunder:

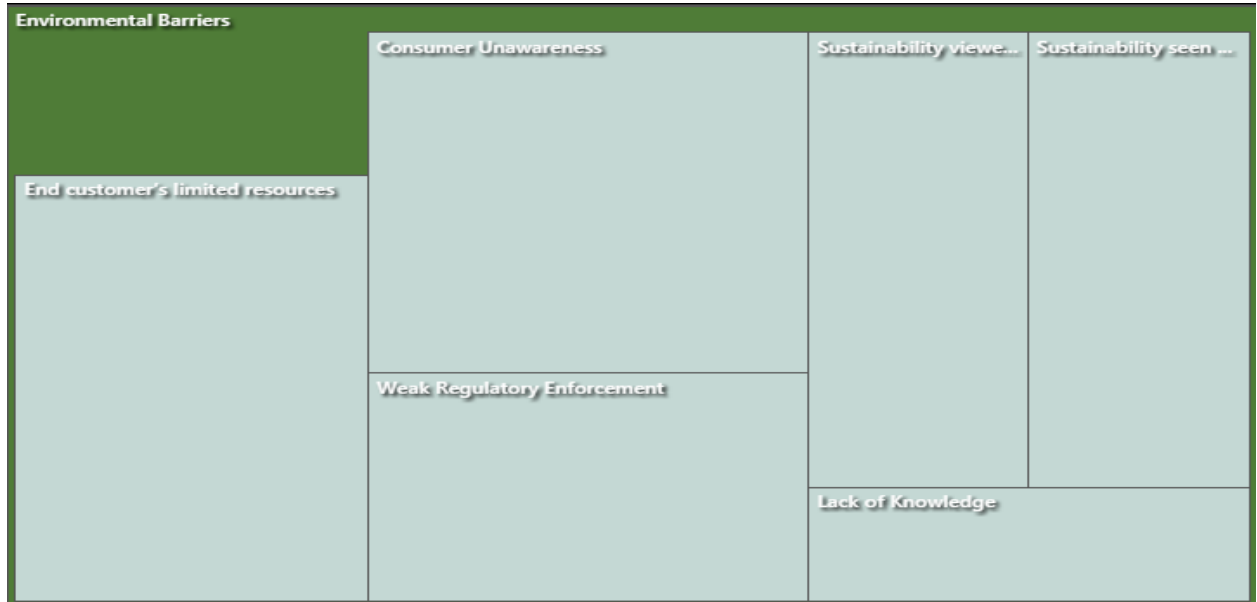


Figure 1: Hierarchy chart of Environmental Barriers



Figure 2: Hierarchy chart of solutions to Environmental Barriers



Figure 3: Hierarchy chart of Operational Barriers



Figure 4: Hierarchy chart of solutions to Operational Barriers



Figure 5: Word cloud of themes

Discussion

The researcher has categorized the barriers faced by the textile sector in Pakistan while implementing sustainable supply chain management practices, into operational and environmental barriers.

The main research question of the study was: *“Which barriers occur in the implementation of sustainable practices within the textile industry of Pakistan, and how companies in this sector may seek to overcome these challenges?”*

While exploring the answer to this question the researcher discovered that the implementation of sustainable practices in the Pakistani textile supply chains faces several challenges. The identified environmental and operational problems create a complex atmosphere. Environmental barriers are mainly socio-structural issues. The lack of awareness at the level of the end user exemplifies a massive disconnection between end-users and the more general implications of the concept. Most consumers perceive sustainability narrowly; here, they equate it simply with recycling, failing to capture the spectrum of environmental and ethical practices involved. Sustainability is also commonly understood to be a "foreign" notion, wrongly removed from the local context. This perception reflects the lack of well-tailored communication strategies that are linked to local values and economic benefits of sustainable practices. Weak regulatory enforcement enhances these problems since companies often enjoy limited accountability for non-compliance, reducing motivation toward sustainable measures. Finally, consumers' limited financial resources will further limit their ability to choose sustainably, thus undermining market demand for such practices.

On the operational front, the challenges are deeply rooted in the structure and mindset of the industry. The collaboration between manufacturers and business customers is limited, thereby minimizing opportunities for collective innovation as well as shared goals about sustainability. Traditional processes dominate the industry, with many companies using outdated technologies and methods that, although inefficient, are also detrimental to the environment. This is further

exacerbated by the fact that not enough knowledge-sharing platforms are available, which can otherwise be used to share best practices and innovative solutions. In terms of implementation costs, it remains one of the largest barriers, especially for SMEs, who cannot afford to allocate resources for sustainable initiatives with the present pressure on profit margins. Furthermore, the "survival mentality" that characterizes the industry chooses short-term profits over a sustainable future, which eliminates the focus on long-term incentives for investment in sustainable practices. Lastly, the false perception that sustainability only applies to multinationals creates a gap in which SMEs often feel left out of the discussion and perceived belief that they cannot achieve real change based on the present scale and available resources.

These barriers are interdependent and result in a cycle of inertia that is difficult to disrupt. For instance, weak regulatory enforcement not only limits industrywide accountability but also reduces the pressure on companies to innovate or collaborate. Similarly, the absence of consumer demand for sustainable products perpetuates reliance on traditional processes, where market support for such an initiative is not evident, leaving little incentive on the part of firms to invest in costly upgrades. All these challenges have to be met by involving several stakeholders such as government, industry leaders, consumers, and international organizations working together.

In this connection, the role of the government cannot be overemphasized in creating the enabling environment for sustainability. More strict regulations supported with effective and stringent enforcement mechanisms can force companies to become sustainable. Simultaneously, providing incentives like tax breaks or subsidies for adapting green technologies helps to counterbalance costs associated with implementation. Awareness campaigns targeted at both consumers and businesses shall be an impetus behind changing the perception of sustainability. These campaigns must first contextualize sustainability in the local framework as a concept that sustains economic growth, job creation, and even environmental protection.

Collaboration along the supply chain is therefore vital for businesses. Partnering with suppliers, manufacturers, and ultimately customers may result in resources being shared that ultimately result in cost cutting as well as sustainability goal-alignment. Knowledge-sharing platforms may be in the form of industrial conferences, digital forums, or training programs that share best practices and innovative solutions. These platforms should always be inclusive, allowing SMEs the same access to resources and opportunities that larger corporations receive. A phased approach to sustainability in which companies gradually make shifts from the conventional way of doing things shall also be facilitated.

Another critical area is the survival mentality of the industry. Changing this culture of short-term gains toward long-term resilience requires pointing out the various benefits of sustainability for environmental protection and business continuity. Some examples include investment in energy-efficient technologies: as years pass, production and operational costs decline; sourcing of sustainable material that opens up new market possibilities and enhances brand reputation. Highlighting these tangible benefits can help businesses see sustainability as an opportunity rather than a burden.

Finally, consumer-level barriers must be addressed through innovative solutions, such as making sustainable apparel options priced affordably and widely accessible. Governments, industry associations, and NGOs shall interact to popularize low-cost sustainable solutions for local markets. To make changes more relevant to the general well-being, education programs can have tremendous potential for restructuring attitudes and behavior. This way, by aligning sustainability with local priorities and values, these efforts can create a stronger demand for sustainable products, thereby driving change throughout the supply chain.

Conclusion

In this article, the researcher empirically investigated and confirmed the existence of consensus in the perception of barriers to SSCM in the Pakistani textile industry and explored the perceived solutions to sustainable supply chain implementation within the sector. Our findings are not only in alignment with previous research focusing on barriers (Majumdar & Sinh, 2019; Panigrahi & Rao, 2018; Rashid et al. 2024; Vishwakarma et al., 2022) but also add new contextual perspectives to the body of knowledge. The results extend insights into the highly competitive textile industry with its globally fragmented supply chains. However, the study shows that specific forms of collaboration can enable sustainable policy implementation and decrease the barriers in place.

The findings of the study provide significant implications for policymakers, practitioners, and managers in the Pakistani textile industry in terms of initiating sustainable supply chain practices. The research outlines actionable areas for improvement such as raising consumer awareness, demystifying sustainability concepts, and developing stronger collaboration among textile stakeholders. For managers, the results indicate that making a capacity-building initiative will be a good investment for them along with adopting knowledge-sharing platforms to bridge informational gaps.

Further, the study calls for the transition beyond a "survival mindset" and adopting a strategic outlook to ensure sustainability along with profitability. Government and regulatory authority enforcement mechanisms and encouraging incentives for embracing sustainability will also play a significant role in building an ecosystem that truly supports sustainability. Though the study provides a strong knowledge base for practitioners and policymakers, still the study has several limitations. Research of a qualitative nature limits the generalization of findings to other industries or regions. However, the sample size, while adequate for exploratory purposes, may not fully capture the diversity of perspectives within the textile sector. Future research could aim to bridge gaps through mixed methods or longitudinal studies that focus on examining the evolving dynamics of sustainability barriers over time in the textile industry. Comparative research across different sectors or countries would throw light upon contextual influences on the adoption of sustainable supply chains. Lastly, future research may examine how emerging technologies like blockchain or AI can help in overcoming operational and environmental barriers while exploring consumer behavior to devise more impactful awareness campaigns.

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