



“Managing Change and Innovation in the Era of Sustainability: The Case of Textile Recycling in India”

¹ Meenu ² Debyani Mukherjee Rawat

Kendriya Vidyalaya Sangathan, HQ

ABSTRACT :

India's textile industry is essential to economic expansion, but it faces many obstacles because of resource inefficiency, environmental degradation, and the growing amount of textile waste. A significant amount of the recycling ecosystem remains unregulated and controlled by local operators who lack standardized procedures, despite ten years of financial incentives and policy interventions such as Extended Producer Responsibility (EPR). This research paper uses the textile recycling industry in Panipat, Haryana, as a case study to investigate how innovative approaches and change management techniques can fill in systemic and policy gaps. The study highlights strategies like inclusive stakeholder participation, informal sector integration, decentralized collection systems, and investment in cutting-edge recycling technologies as it examines the relationship between policy reforms, stakeholder collaboration, technological innovation, and behavioral change. According to research, these tactics may be useful in accelerating the shift to environmentally friendly textile recycling schemes. The study highlights the opportunities and challenges of creating a circular textile economy in India by placing the analysis at the nexus of applied innovation and policy reform.

Keywords: Textile Industry, Circular Economy, Sustainability, Change Management

Introduction

Introduction

India's textile industry is crucial to the country's economic growth, but it also faces increasing challenges due to environmental impacts, resource inefficiency, and textile waste. These problems have gotten worse due to rapid urbanisation, rising fast fashion consumption, and disjointed waste management systems, which call for a change in policy toward sustainable waste treatment techniques. Government programs, such as Extended Producer Responsibility (EPR) and specific financial incentives, have been implemented over the last ten years with the goal of institutionalising recycling procedures and encouraging manufacturer innovation. Despite these efforts, much of India's recycling ecosystem remains informal, with millions of unorganised workers and local operators handling textile waste through unregulated methods, lacking quality standards and regulatory oversight Garg and Verma (2025).

In order to analyze the textile recycling sector in Panipat, Haryana district, this study uses a case study methodology. It examines how innovative practices and change management can address current policy gaps and operational issues. This case study examines the relationship between policy intervention, stakeholder collaboration, technological advancements, and behavioural changes by analysing a real-world scenario Ayush (2024). The research intends to demonstrate how specific tactics, like inclusive stakeholder participation, the integration of informal sectors, decentralised collection systems, and investment in new recycling technologies, can effectively catalyze the implementation of sustainable textile recycling through a thorough case analysis. Garg and Verma (2025)

This paper provides practical insights for decision-makers seeking to support India's circular textile economy by situating the study at the intersection of applied innovation and policy reform Ayush (2024). In addition to highlighting the practical steps necessary to transition from intangible sustainability goals to concrete, scalable solutions, the case highlights the challenges and opportunities that policy actors encounter. Garg and Verma (2025).

Literature Review

Shamsuzzaman et al. (2025) conducted a PRISMA-based systematic review of 104 studies published between 2010 and 2024 on fashion and textile waste management in the circular economy. They concluded that the fashion industry generates more than 92 million tons of textile waste each year, with less than 20 per cent being recycled or reused, while most is landfilled or incinerated. Approximately 70% of the reviewed studies concentrate on downstream tactics like recycling, reuse, and circular transition models. It will take concerted changes in technology, policy, industry practices, and consumer behavior to move from a linear to a circular textile system. The study's findings highlight the difficulties in overseeing significant organizational and cultural transformation. Infrastructure and costs are examples of structural resistance, whereas a lack of supportive leadership and communication is indicated by low awareness and inadequate policies. Similar to the opportunities mentioned, if actors are prepared to adjust, change management can generate new value through job creation, new business models, material innovation, and other means. Therefore, future studies should not only concentrate on technical

fixes but also on supply chain change management tactics, incentive alignment, and fostering consumer confidence in circular practices. A number of gaps still exist, though, such as the paucity of studies on blended fabrics, the lack of research on upstream design for recycling, the poor comparative evidence across recycling techniques, and the scant attention paid to consumer interventions and the unorganized sector. Connecting this to change management, the results demonstrate that in order to overcome resistance and accomplish system-wide transformation, a shift to circularity necessitates coordinated structural, behavioral, and policy changes (Shamsuzzaman and Islam, 2025).

Biyada and Urbonavičius (2025), writing in *Cleaner Engineering and Technology*, review the environmental impact of textile waste and underline how fast fashion drives overproduction and unsustainable disposal. They argue that current management systems and weak regulations are insufficient to handle the growing volumes of waste. Their study highlights biotechnological innovations, particularly microbial and enzymatic treatments, as promising approaches to mitigate pollution and convert textile waste into valuable by-products or clean energy. This highlights the need for managed change in both technology adoption and regulatory structures to shift away from linear disposal models toward circular practices (Biyada and Urbonavičius, 2025).

Complementing this, Chen, Romero, and Wang (2024) in *Cleaner Logistics and Supply Chain* present a systematic review of digital transformation in textiles and apparel, covering studies from 2010 to 2023. They show how technologies such as AI, IoT, blockchain, digital twins, and big data are increasingly applied to supply chain management, production optimisation, and smart retail. These tools enhance traceability and support circular business models, such as rental, resale, and on-demand production. However, high costs, cybersecurity risks, lack of skills, and low adoption among SMEs remain obstacles. Their findings suggest that change management is critical: successful digital transitions depend on policy support, investment, and workforce training to align sustainability goals with industry practice (Chen and Romero, 2024).

4. Research gap:

The majority of textile sustainability research focuses on either the poor working conditions experienced by informal laborers or the waste and pollution generated by the textile industries. Research on the connections between these two problems and the ways in which communities, governments, and businesses can work together to promote change is lacking, though. There has been very little research done on how national policies like the GST affect recycling promotion.

The lessons learned from successful circular economy initiatives in nations like Bangladesh, Chile, and the Netherlands have not been sufficiently implemented in Panipat. Research on how to combine innovation and change management in a textile hub like Panipat to strike a balance between worker welfare, environmental sustainability, and economic development is lacking. The impact of fiscal reforms, like the GST, on sustainability shifts in the textile industry has also not been sufficiently studied. Although the goal of the GST reforms is to encourage the use of recycled products, there is a dearth of empirical data on how these reforms affect consumer behavior, business practices, and the involvement of the unorganized sector in communities such as Panipat. In the context of the Indian textile industry, there is also still a lack of research on stakeholder-driven change management, specifically how NGOs, small and medium-sized businesses (SMEs), informal workers, and municipal authorities can come together behind a common sustainability goal.

5. Research Methodology

The focus of this study is Panipat, Haryana, and it uses a qualitative case study research design. The case study approach was selected because it enables a thorough examination of a specific geographical and industrial setting highly relevant to textile recycling and circular economy principles. The design adheres to Yin's (2018) principles of case study research, which place a strong emphasis on thematic synthesis, context-specific analysis, and data source triangulation. The "Textile City of India," Panipat, Haryana, is well known throughout the world as a major center for the recycling of textiles and the manufacture of home furnishings. Despite facing significant environmental and sustainability challenges, Panipat is chosen because it provides a unique model of recycling and reuse, where domestic textile waste and imported second-hand clothing are turned into blankets, rugs, durries, and related products. To gain a deeper understanding of the textile industry in Panipat, the research draws on secondary sources, including government reports, industry data, published case studies, and scholarly literature. These resources are examined thematically along several critical dimensions, including waste production, recycling methods, socioeconomic effects, environmental issues, and sustainability projects (Bowen, 2009). To assess Panipat's role in India's textile recycling ecosystem, evaluate the effectiveness of current processes, and derive best practices and policy insights that can inform the development of circular and sustainable textile models in comparable regions, the goal is to gather available data. The analysis remains interpretive, aiming to synthesise the data into a logical narrative that explains Panipat's current practices and evaluates their effectiveness in the context of the circular economy.

6. Research Objective

1. To examine secondary data regarding the evolution of Panipat's textile recycling practices and their role in India's textile waste management mechanism.
2. To analyse the textile industry's socioeconomic and environmental effects in Panipat, with an emphasis on how stakeholders manage challenges in the transition to sustainability.
3. To determine how much the textile industry in Panipat is implementing the concepts of the circular economy, and to find lessons learned about change management that could be useful to other textile clusters.

7. A.Sustainable Waste Management in Panipat Textile Industry

For industries that are undergoing fast change, change management has become a crucial procedure. In India's textile industry, where global competition, shifting consumer preferences, and technological advancements constantly change market conditions, this is particularly evident. Due to its labour-intensive nature and strong reliance on exports, the textile sector is especially vulnerable to changes in trade regulations, supply chains, and labor stability. As Asia's largest textile recycling hub, Panipat, also known as India's "Textile City," has gained international recognition. Over 100,000 tonnes of used clothing are processed annually, and the resulting blankets, carpets, durries, and other recycled textile products are produced. Nearly a million livelihoods are supported by this activity, which also makes a significant contribution to both export and domestic markets. In addition, the city generates 350–400 metric tons of municipal solid waste (MSW) every day, the majority of which is disposed of in landfills without any sort of segregation. Despite being frequently hailed as an example of the circular economy in action, Panipat's industrial ecosystem and recycling have led to serious environmental and governance issues that require immediate attention.

Long renowned for its carpets, handloom goods, and home furnishings, Panipat has established a solid reputation for exceptional craftsmanship and dedication to hard work. However, foreign competitors in countries like China, Vietnam, and Bangladesh are putting more and more pressure on the region because they have developed affordable production techniques. Panipat's traditional manual processes are being challenged by the rise of automation and digital design technologies, which calls for large investments in both equipment and staff training.

An additional layer of complexity has been introduced by environmental sustainability, as local manufacturers have been compelled to adopt more sustainable practices, such as water recycling and energy-efficient machinery, in response to growing consumer and regulatory demands for eco-friendly textiles. The industry's weaknesses have been exposed by its reliance on migrant labour, which was especially evident during the COVID-19 pandemic when production was hindered by a lack of workers. These difficulties are exacerbated by the regular changes in government policies, such as those pertaining to tax reform, labour laws, and export subsidies, all of which have an immediate effect on the earnings margins and competitiveness of textile producers in Panipat. As a result, adapting to change is not only a strategic choice but also a necessity for survival. Whether Panipat businesses can preserve their traditional identity while thriving in a more dynamic global marketplace will depend on their ability to adapt to these changes, whether through strong leadership, engaging the workforce, or utilising structured models like Kotter's eight-step process or Lewin's three-stage framework. This study highlights how organizational adaptability and leadership impact resilience in the textile industry in Panipat by situating theories of change management within the real-world experiences of this industry.

B. Identified Challenges in Panipat

Environmental challenges:

Panipat's recycling economy has a startling environmental cost. Textile facilities release untreated dye effluents and toxic bleaching agents into surrounding ecosystems, agricultural soil, and groundwater aquifers. In addition to threatening biodiversity, this also poses a long-term risk to the public's health, including conditions such as skin diseases, respiratory issues, and waterborne infections.

Textile processing often results in the production of fiber waste, dyeing residues, and untreated sludge that contaminate surrounding waterways and agricultural areas. According to studies, biological health in effluent-affected soils drastically deteriorates; dehydrogenase activity decreases by more than 70%, soil respiration declines by 53.8%, and microbial biomass carbon decreases by 65.9% compared to control sites (Pokhriya et al., 2020). The issue is exacerbated by the high concentrations of hazardous heavy metals found in textile wastewater, including lead (Pb), nickel (Ni), chromium (Cr), and arsenic (As), which are linked to with reduced crop yield and long-term soil infertility (Gupta et al., 2025). Alongside textile residues, plastic waste from both household packaging and industrial operations exacerbates ecological degradation by releasing microplastics and non-biodegradable contaminants into soil and water systems.

A significant amount of this waste is managed informally by ragpickers, an essential but underappreciated labor force in India's waste management system. Without social security or protective gear, ragpickers frequently come into contact with dangerous materials. Because they are exposed both at home and at workplaces with inadequate safety and sanitation facilities, women ragpickers are particularly at risk for respiratory illnesses, skin conditions, and other occupational health issues (Iyer et al., 2023; Health Impact Study, 2024). In summary, poor waste management not only damages natural resources but also sustains hazardous and exploitative working conditions in the unregulated recycling industry.

According to a recent study, 32 illegal bleaching facilities are operating without the required effluent treatment plants (ETPs) or environmental permits. Untreated wastewater was discharged by these facilities straight into nearby rivers and canals. Thirty of these facilities received closure notices following the National Green Tribunal's (NGT) action. However, enforcement has often been temporary, and illicit activities frequently reappear, highlighting oversights and noncompliance.

Industrial Challenges:

Panipat's textile recycling sector still employs outdated and environmentally harmful techniques, despite handling nearly half of India's recycled textiles. Significant carbon emissions are produced by the widespread use of coal-based bleaching and dyeing techniques in many facilities. Furthermore, insufficient funds are allocated to contemporary effluent treatment methods and environmentally friendly chemical techniques.

The economic inconsistencies surrounding recycling are one of the most essential industrial issues facing India's textile industry. Recycled textiles, in theory, should be more economical and environmentally friendly, offering both financial and environmental benefits. However, historically, their competitiveness has been weakened by the market and taxation structures. Up until recently, recycled textile products were more costly than newly manufactured ones because they were subject to a 12% Goods and Services Tax (GST), while virgin fibers were only subject to a 5% GST. The expansion of circular practices in the sector was constrained by this policy distortion, which deterred manufacturers and consumers from choosing recycled products.

Industry representatives argue that operational inefficiencies, disjointed supply chains, and the high costs of collection, sorting, and processing have prevented the full benefits of the GST rate reduction on recycled textiles from being passed on to consumers, despite the rate now being lowered to 5%. Customers find it difficult to distinguish between recycled and virgin textile products due to a lack of consumer awareness and insufficient labeling systems, which further exacerbates the problem. Furthermore, economies of scale continue to favor the production of virgin textiles on a large scale, whereas small and medium-sized businesses dominate the recycling industry. Challenges related to outdated technology and restricted access to financing and subsidies. Standardized quality certifications for recycled products are lacking, which further damages consumer confidence and hinders market penetration. Furthermore, insufficient waste segregation systems and the poor integration of informal waste pickers into official recycling channels are examples of infrastructure deficiencies that lead to the inefficiency of the recycling ecosystem.

Governance Challenges:

Inadequate cooperation between essential stakeholders is a defining feature of Panipat's governance structure. Because they frequently function independently, organizations like the Central Pollution Control Board (CPCB), the Haryana State Pollution Control Board (HSPCB), and the Panipat Municipal Corporation implement policies in a fragmented manner. The Comptroller and Auditor General (CAG) of India recently conducted a performance audit, which highlights the structural flaws in Haryana's waste management system. Nearly 63% (64.86 lakh tonnes) of the 103.58 lakh tonnes of municipal solid waste produced between 2017 and 2022 was disposed of untreated (CAG, 2025). As of April 2023, approximately 48.77 lakh metric tonnes of legacy waste remained at 77 unapproved disposal sites, and 29 of these sites still had unfinished bioremediation contracts (CAG, 2025). The integrated Sonipat–Panipat solid waste project has not advanced as planned, despite promises made under the Solid Waste Management Rules of 2016. Only one facility was operational by March 2023, underscoring ongoing delays, inefficiencies, and unmet policy goals (CAG, 2025).

Furthermore, at the governance level, there is a notable deficiency in data transparency and enforcement of regulatory standards. Numerous industrial facilities neglect to submit the required scrubber performance data or keep accurate waste management records. The weak institutional framework in place is further highlighted by the fact that crisis-management plans are either nonexistent or poorly executed, requiring frequent judicial oversight, including interventions by the National Green Tribunal (NGT).

C. Discussion on change management and sustainability:

Panipat is therefore at a turning point. On the one hand, it represents the leadership of the circular economy by illustrating the large-scale repurposing of discarded textiles. However, it is a hotspot for pollution due to its unchecked environmental degradation, unsafe and informal labor practices, and governance shortcomings. In addition to supporting a local economy centred on weaving, dyeing, recycling, and exports, Panipat significantly contributes to employment, especially for migrant workers. But the advantages are not shared equally. Large exporters have access to international markets, but small businesses frequently face low profit margins, unstable wages, and unsafe working conditions for unorganised labour. In terms of the environment, the industry has been linked to high energy and water consumption, as well as untreated dye effluents, sludge, and fibre waste contaminating soil and water resources. These methods reduce soil fertility, degrade groundwater quality, and exacerbate air pollution, resulting in trade-offs between economic prosperity and ecological sustainability.

In this regard, the shift to sustainability necessitates analysing the ways in which stakeholders—business owners, governmental organisations, employees of the unorganized sector, non-governmental organizations, and consumers—handle these difficulties. While local authorities struggle with inadequate infrastructure and enforcement gaps, industry actors face increased compliance costs due to environmental norms and taxation policies. Although they are essential to resource recovery, informal workers—especially ragpickers and small recyclers—are not protected by formal policy frameworks and are not given incentives. Although international buyers and non-governmental organizations are pushing for cleaner production and eco-certifications, businesses are not all adopting these demands equally. Thus, the objective enables the study to highlight the adaptive strategies (technological innovation, cluster-based solid waste management, and the adoption of circular economy principles) and the tensions (such as short-term costs versus long-term benefits, formal versus informal sector integration, or export-driven compliance versus domestic neglect) that define Panipat's textile sector.

Panipat risks losing its financial gains and its status as a global recycling capital unless systemic changes are made to its governance and industrial processes.

D. Findings:

The case study reveals that Panipat's sustainability challenge is not primarily technological but systemic: a combination of weak enforcement, inadequate integration of informal labour, ineffective policy translation, and fragmented change management practices. Unless environmental safeguards, fiscal reforms, and social equity measures are synchronised through a robust change management framework, Panipat risks losing both its ecological base and international competitiveness.

Although Panipat is globally recognised as a recycling hub, it continues to function as a pollution hotspot. Untreated effluents, sludge, and fibre waste have degraded local soil and water quality, with studies showing reductions in soil fertility, microbial activity, and high accumulation of heavy metals (Gupta et al., 2025; Pokhriya et al., 2020).

The informal workforce, responsible for handling nearly 60–70% of Panipat's textile and plastic waste (Kaur & Chitkara, 2022), remains invisible in governance frameworks. Ragpickers report a high prevalence of respiratory diseases, dermatological conditions, and injuries (Iyer et al., 2023), yet they often lack basic protections, such as safety gear, health insurance, or financial inclusion. This underscores a paradox: Panipat's recycling economy is built on marginalised labour that bears the brunt of health and social risks.

The limited impact of GST reforms illustrates a failure of organisational and policy-level change management. Financial incentives alone do not translate into market transformation unless industries adapt their business models and consumers are encouraged to make sustainable purchasing choices. Innovative mechanisms—such as green labelling, digital marketplaces for recycled products, and blockchain-enabled supply chain transparency—could bridge this gap by building consumer trust and accountability.

Panipat's exposure to global trade risks highlights that competitiveness now depends on innovation-driven sustainability. The adoption of zero liquid discharge systems, eco-friendly dyes, and digital effluent monitoring is not merely a compliance measure, but an innovation that enhances resilience and global market access. Embedding these innovations requires structured change management: leadership buy-in, staff training, phased implementation, and certification systems that institutionalise new practices.

8. Required Transformational Changes for Sustainable Change Management in Panipat:

Transforming Waste Disposal Systems

According to the CAG (2025), Panipat generates 350–400 metric tonnes of municipal solid waste daily, most of which is still disposed of in a mixed form without segregation. The effectiveness of downstream recycling and treatment facilities is weakened by the low level of segregation at the source, despite numerous awareness campaigns. Enforcing the Solid Waste Management Rules 2016 strictly is crucial, as is providing rewards to households that comply and punishing those that do not. Even sophisticated recycling facilities are ineffective without separate transportation and treatment infrastructure, which is another requirement for door-to-door collection.

The textile industry, which generates approximately ₹20,000 crore for Panipat's economy each year and accounts for 60% of its exports to the US (₹12,000 crore), also requires a significant structural overhaul (New Indian Express, 2025). Due to the industry's current heavy reliance on chemical-based production and water-intensive dyeing methods, a considerable amount of sludge and effluent is released into nearby fields and drains. The implementation of zero liquid discharge (ZLD) systems, investments in contemporary effluent treatment plants (ETPs), and the use of natural fibers and non-toxic dyes could all significantly lessen this impact. Small and medium-sized businesses would especially benefit from a cluster-based treatment infrastructure, as it would reduce cost duplication. As global consumers become increasingly demanding, such reforms are not only necessary for the environment but also for the economy. Sustainably certified products; failure to adapt threatens Panipat's competitiveness in international markets (Alchempro, 2025).

Building Inclusive and Sustainable Governance

Nearly 60–70% of textile and plastic waste is handled by ragpickers and small-scale recyclers, who make up Panipat's informal workforce and recycling chain (Space and Culture, 2022). Despite the high occupational health risks reported in surveys, these workers are not included in municipal records. Specifically, 19% have respiratory disorders, 40% have eye disorders, 22% have dermatological conditions, and more than 60% report frequent injuries (Kaur & Chitkara, 2022). The welfare of these workers and their recycling efficiency would both be enhanced by official recognition as "green workers," the issuance of ID cards, protective gear, and access to health insurance and microfinance programs. Their bargaining power could be increased, and exploitation could be decreased by connecting them with cooperatives or Self-Help Groups (SHGs).

Fiscal and economic realignment is also essential. Benefits are still limited because businesses frequently retain cost advantages rather than passing them on to customers, despite the government's decision to lower the GST on recycled textiles from 12% to 5% being a positive move. Campaigns to raise awareness, green labeling initiatives, government tenders that give preference to recycled goods, and specific tax breaks could all boost consumer demand. Ultimately, integrating sustainability into governance structures is essential for Panipat's future, as it enables the balance of social justice, environmental protection, and economic growth. Stricter compliance audits, open data exchange, and cooperative alliances between the public sector, private sector, and civil society are all part of this. In the absence of these structural changes, Panipat faces the risk of further ecological deterioration, which will weaken its resource base and long-term industrial competitiveness.

Integrated Strategies for Sustainable Change

Coordinated changes spanning from households to businesses and governance structures are necessary for Panipat to transform from a pollution hotspot to a model of the circular economy. In order to mobilize stakeholders—households, textile units, municipal authorities, non-governmental organizations, and informal recyclers—around a common sustainability agenda, change management is essential. Establishing quantifiable goals, such as percentage decreases in untreated effluent and improvements in waste segregation, is necessary for municipal leadership and industry associations to demonstrate that sustainability is essential to economic growth (CAG, 2025). Behavior change is essential at the household level, where 350–400 MT of municipal waste are generated daily but are mainly not segregated. Waste segregation can become a social norm through persistent campaigns run by local influencers, resident associations, and schools, along with the use of incentives such as rewards and penalties. Likewise, industrial facilities—many of which still use antiquated methods—need to be trained in the modernization of production through the use of ISO 14001 or comparable environmental certifications, sludge treatment, and low-water dyeing (Gupta et al., 2025).

The unorganized sector, which manages between 60 and 70 percent of Panipat's textile and plastic waste, still operates without social security, safety equipment, or recognition (Kaur & Chitkara, 2022). In addition to enhancing their dignity, formalizing these workers as "green workers," providing them with identity cards, connecting them to Self-Help Groups (SHGs), and giving them access to protective gear and microfinance would also improve the recycling chain's efficiency. These behavioural changes must be accompanied by infrastructure support. According to Pokhriya et al. (2020), SMEs should establish common effluent treatment plants (CETPs), larger units should implement zero liquid discharge (ZLD) systems, and real-time monitoring tools should be implemented. Material recovery facilities (MRFs), biogas plants, and decentralised composting can also reduce landfill pressure while

producing revenue. New technologies, such as AI-powered waste monitoring and IoT-enabled smart bins, along with public-private partnerships, have the potential to further enhance collection and recycling systems.

Handloom units that combined ethical trade practices, environmentally conscious production (using natural dyes and low-impact processes), and fair labor standards achieved positive socio-economic and environmental outcomes, according to a 2017 case study of Sri Lanka's handloom textile industry. Many small and medium-sized textile businesses, some artisanal and some traditional, can be found in Panipat as well. Worker dignity, export competitiveness (particularly in markets that demand ethical/sustainable certification), and less environmental harm could all be improved by using comparable practices.

Policy and Fiscal Realignment for Circular Growth

Reforms in finance and regulations are equally crucial to Panipat's transition to sustainability. Industry compliance has been streamlined and costs for clothing and man-made fibers have decreased as a result of recent GST reforms that combined several tax slabs into 5% and 18% (New Indian Express, 2025). The potential for cost-competitive eco-friendly products is created by the 5% GST reduction on recycled textiles; however, it is frequently not realized by consumers because small-scale businesses lack the incentive or ability to pass on savings (Alchempro, 2025). This ongoing disparity highlights Panipat's paradox: despite the city's international recognition as a recycling centre, its sustainability credentials are still being weakened by legacy waste, untreated effluents, and hazardous informal labour practices.

Aligning fiscal reforms with firm-level strategies and the tenets of the circular economy is essential for future competitiveness. Textile manufacturers can benefit from rebates and green credits by utilizing GST relief to encourage resource-efficient production, recycling, and life-cycle management. However, formalising informal suppliers like ragpickers through social protection and GST registration may increase their access to financial systems and markets. Demand can be further increased by consumer awareness campaigns that highlight the cost-effectiveness and environmental advantages of recycled goods. Through the use of transparent data, compliance audits, and collaborations between government, business, and civil society, Panipat's textile cluster can establish itself as a national model of sustainability. Industrial sustainability development involves finding a balance between social justice, ecological preservation, and economic growth.

The Goods and Services Tax (GST) reform can be interpreted through the lens of change management frameworks currently in use. According to Lewin's three-stage model of organizational change, the reform functions as an external "unfreezing" force, upending the cost structures that deterred the production of recycled textiles. The policy's reduction of tax rates and standardization of input treatment across the value chain enable the "change" phase, which compels companies to restructure supply chains, modify pricing strategies, and reevaluate investment decisions. As recycling-focused production models are integrated into standard operating procedures, the reform may allow for a "refreezing" phase as these practices become more established in the industry over time.

According to Kotter's eight-step change framework, the GST reform, on the other hand, functions as a structural intervention that reduces systemic barriers and generates "short-term wins" by lowering immediate costs, thus generating momentum for broader transformation. This illustrates how, in the Panipat context, fiscal policy can act as a catalyst for long-term institutional change, as well as a regulatory tool, by creating an atmosphere that enables industry players to align their current recycling practices with the objectives of the circular economy.

From the perspective of institutional theory, the Panipat GST reform can be seen as a driving force behind institutional adaptation through several isomorphic pressures. Businesses are compelled to adjust their supply chain and pricing strategies to comply with the simplification of the tax regime, driven by coercive pressures such as the state's fiscal intervention. Normative pressures begin to surface as industry associations and sustainability discourses increasingly portray recycling as a desirable and legitimate practice that aligns with the broader goals of the circular economy. Finally, mimetic pressures are likely to arise as companies imitate competitors who successfully transfer tax benefits and recycle, thereby reducing market volatility. Therefore, the GST reform integrates sustainability into the core of the operational logic of Panipat's textile industry, acting as a catalyst for institutional realignment and a change management tool.

Strict enforcement of environmental regulations is still necessary, particularly with regard to bleaching and dyeing operations. Although the recent interventions by the National Green Tribunal (NGT) are a significant step, their efficacy is still being weakened by the absence of continuous monitoring and compliance oversight. In order to operationalize integrated waste management infrastructure and address systemic issues, it is imperative that common effluent treatment plants (CETPs) be established that are appropriate for the scale of Panipat's textile industry. Implementing scientifically sound disposal techniques and enforcing municipal solid waste (MSW) segregation are equally crucial for long-term viability, and sustainable financing mechanisms back both. Additionally, there is an opportunity to promote cleaner production by combining economic tools with regulatory frameworks. Compliance with Goods and Services Tax (GST) rebates and proven environmental benefits may be related. Support the industry's adoption of sustainable practices, improve cost pass-through to customers, and internalize externalities by acting as a policy lever.

9. Conclusion:

In the context of industrial transformation, Panipat's experience demonstrates the close relationship between sustainability and change management. Change management offers proper instruments to accomplish it by enlisting stakeholders, overcoming opposition, and integrating new practices. At the same time, sustainability provides the normative framework that strikes a balance between social justice, environmental preservation, and economic growth. For example, implementing zero liquid discharge systems or effluent treatment technologies satisfies environmental objectives, but their success hinges on efficient change management procedures, including stakeholder engagement, capacity building, and leadership commitment, within textile clusters. Similar to this, incorporating ragpickers into official recycling programs promotes social sustainability. Still, it calls for planned change tactics, such as redefining institutional norms to acknowledge their contributions, providing incentives, and portraying them as "green workers." In this way,

Panipat's transition involves more than just implementing fiscal or sustainable technology changes; it also entails handling the organizational, policy, and human changes necessary to guarantee that these changes are accepted and maintained over time.

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