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A COMPREHENSIVE STUDY OF BUSINESS OPERATIONS AND CONSUMER OUTREACH IN THE SUSTAINABLE RECYCLING INDUSTRY IN AHMEDABAD

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ABSTRACT

India is one of the world's largest producers of textile waste, generating over 5.2 million tonnes annually, of which less than 30% enters formal recycling streams. Ahmedabad, historically referred to as the 'Manchester of India', remains a major textile production centre and also one of the highest contributors to textile waste. This research examines operational practices, supply chain structures, and consumer behaviour within the sustainable textile recycling industry in Ahmedabad, with a detailed case analysis of ReVerse Green Clothing Pvt. Ltd.

A mixed-method research design was implemented incorporating surveys (N=200), field observations, and interviews with industry stakeholders. Findings reveal that although awareness of environmental issues is rising, behavioural conversion toward recycling remains limited due to infrastructural gaps, inconsistent waste inflow, lack of segregation, and low accessibility of collection points. Youth-driven sustainable fashion adoption is increasing, reflecting changing consumer values. The study recommends enhanced reverse logistics, digital transparency, decentralised collection points, and public–private partnerships to scale the circular textile economy.

Keywords: Business, Consumer, Sustainable, Recycling, Industry

INTRODUCTION

India's rapid industrialisation and increasing consumerism have significantly contributed to textile waste generation. UNEP and World Bank studies highlight that the majority of textile waste ends up in landfills, creating soil and water contamination, contributing to greenhouse gas emissions, and placing strain on municipal waste systems. Ahmedabad is a focal point due to:

- Its large-scale textile mills and garment clusters,
- Increasing fast-fashion consumption patterns,
- Lack of organised textile collection infrastructure,
- High dependency on informal waste workers.

The circular economy model repair, reuse, recycle represents a key opportunity to reduce environmental impact. However, the transition to circular fashion is challenged by fragmentation in supply chains, low automation, limited consumer engagement, and

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minimal government intervention at ground level. This study explores both operational processes and consumer outreach efforts that shape the textile recycling ecosystem.

RESEARCH OBJECTIVES and QUESTIONS

RESEARCH OBJECTIVES

1) To study the operational structure and business models adopted by recycling enterprises in Ahmedabad.
2) To analyses the efficiency and challenges in sourcing, processing, and distribution of recyclable materials.
3) To examine the level of consumer awareness, participation, and behavioral patterns toward recycling practices.

RESEARCH QUESTIONS

1) How do recycling businesses in Ahmedabad structure their operations to achieve sustainability and profitability?
2) What is the key operational challenges faced by recycling enterprises in the areas of logistics, supply chain, and resource management?
3) What role do technology, government policies, and collaborations play in promoting sustainable recycling ecosystems?

RESEARCH HYPOTHESES

- **H1:** Efficient supply chain management significantly enhances the scalability and profitability of recycling enterprises in Ahmedabad.
- **H2:** Higher levels of consumer awareness and accessibility to recycling facilities lead to increased participation in recycling initiatives.
- **H3:** Policy interventions and government-supported programs positively influence the performance and innovation of recycling firms.

GLOBAL CONTEXT

Studies from Japan, Sweden, and Germany highlight that the success of textile recycling depends on:

- Automated sorting technologies
- Integration of digital tracking systems
- Strong municipal waste policies
- Civic participation frameworks

Ellen MacArthur Foundation (2021) suggests that adopting circular fashion can reduce textile waste by up to 30–40% globally.

INDIAN CONTEXT

Indian recycling is characterised by:

- Heavy dependence on informal workers (handling nearly 70% of waste),
- Lack of automated sorting and categorisation systems,
- Minimal formal incentives for households to recycle textiles,
- High contamination of textile waste due to poor segregation.
- NITI Aayog (2023) highlights that India's circular textile potential remains underutilized due to gaps in infrastructure, awareness, and policy enforcement.

AHMEDABAD-SPECIFIC RESEARCH

Ahmedabad contributes significantly to India's textile footprint. AMC reports indicate:

- Growing volume of pre- and post-consumer waste,
- Limited textile-specific recycling facilities,
- Absence of community-level textile collection points.

There is almost no peer-reviewed research on startups like Re-Verse Green Clothing, indicating a major academic gap.

CONSUMER BEHAVIOUR STUDIES

Past studies conclude:

- Awareness does not equate behavioural action ("awareness–action gap").
- Convenience, trust, and incentives are major behavioural drivers.
- Gen Z and millennials are key consumer groups in sustainable fashion.

METHODOLOGY

A mixed-method research design was adopted:

Primary Data

- Survey with 200 respondents (students, professionals, homemakers, retailers).
- Interviews with Re-Verse's operational team, waste collectors, and sustainability experts.
- Field visits to collection units, sorting units, and recycling machinery.

Secondary Data

- AMC waste management reports
- Government policy documents
- Research journals
- Sustainability industry portals

Tools Used

- Descriptive analysis
- Crosstab analysis
- Consumer charts and graphs
- Thematic qualitative analysis

RESULTS AND ANALYSIS

OPERATIONS AND SUPPLY CHAIN ANALYSIS

Key findings show:

- 40–45% households segregate waste regularly.
- 60–70% of recyclable material sourced through informal workers.
- Manual sorting increases labour time by 35–40%.
- Contamination rate of textile waste is approx. 48%, reducing recycling efficiency.
- Logistic inefficiencies lead to cost increases of 20–25% per cycle.

Company-Level Findings (Re-Verse Green Clothing)

Re-Verse uses a reverse logistics pipeline:

1) Collection (doorstep drives, retail bins, NGO partnerships)
2) Sorting (colour, fabric type, condition)
3) Mechanical recycling (shredding → fibre → yarn)
4) Upcycling into new garments
5) Distribution through D2C channels

Technological additions include RFID batch tracking, solar-powered units, and biodegradable packaging.

CONSUMER BEHAVIOUR ANALYSIS

Survey of 200 respondents revealed:

Awareness

- 70% aware of general recycling

- Only 32% aware of textile recycling specifically

Motivators

- Environmental concern – 55%
- Accessibility of collection points – 65%
- Incentives or discounts – 42%
- Transparency & trust – 47%

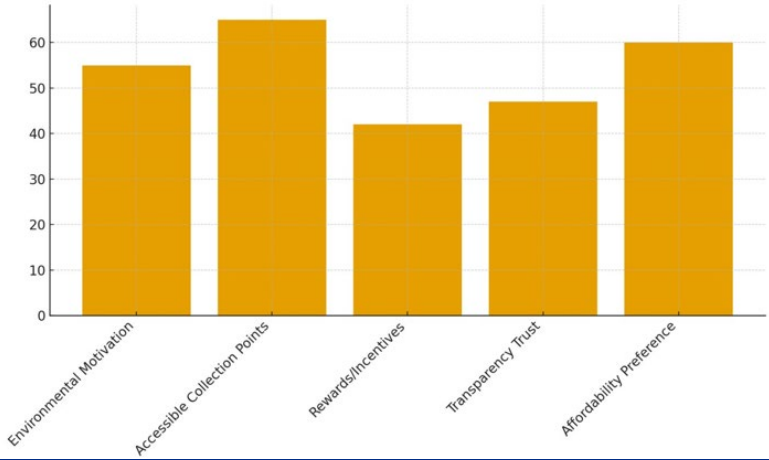
Barriers

- Low accessibility – 58%
- Confusion about what materials can be recycled – 41%
- Distrust in process – 44%
- Time constraints – 39%

Purchase Behaviour

- 62% willing to buy recycled products
- Stronger acceptance among 18–30 age group
- Women more likely to recycle than men

Graph 1



Graph 1 Consumer Motivation and Behaviour

The graph presents key behavioral drivers identified in the survey. Accessibility to collection points is the highest motivator, followed by environmental concern, affordability, and transparency.

DISCUSSION

Major findings show:

- **Structural Gaps:** Fragmented supply chains, lack of proper collection infrastructure.
- **Behavioural Gaps:** High awareness but low behavioural consistency due to trust and convenience barriers.
- **Technology Gaps:** Limited automation slows processing.
- **Policy Gaps:** Weak enforcement of textile-specific segregation rules.
- **Market Trends:** Youth are driving a shift towards sustainable fashion.

Re-Verse Green Clothing serves as a model but requires:

- Greater integration with informal sector
- Larger-scale logistics support
- Stronger community outreach

CONCLUSION

Ahmedabad is poised to become a major circular textile hub but requires:

- Structured waste collection networks
- Enhanced transparency through digital tools
- Awareness campaigns targeting households
- Technology investments in sorting and recycling

Consumer behaviour trends show strong future potential, especially among youth, but the industry must address accessibility, trust, and pricing concerns.

RECOMMENDATIONS

For Industry

- Establish ward-level textile collection points.
- Integrate informal workers into formal systems through training.
- Develop RFID and QR-based transparency tools.
- Scale up reverse logistics networks.

For Government

- Offer subsidies for recycling machinery.
- Implement textile-specific segregation rules under AMC.
- Facilitate public–private partnerships for recycling hubs.

For Future Research

- Longitudinal tracking of textile waste flows.
- AI-based classifications of recyclable textiles.
- Psychological determinants of sustainable fashion adoption in Tier-1 and Tier-2 cities.

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