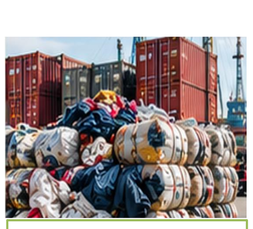
Developing a Digital Maturity Model for Indian Post-Consumer Textile Recycling MSMEs: A Digital Transformation Perspective

Astha Sharma*[1], Abhijit Majumdar[1]

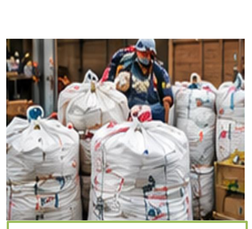
[1]Department of Textile & Fibre Engineering, Indian Institute of Technology Delhi (India)

Introduction

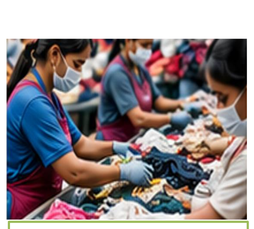
Indian Post-Consumer Textile Recycling Supply Chain


Post-Consumer Textile Sources

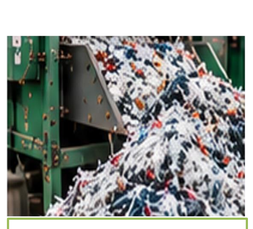
- Imported textile
- Domestic textile (households, institutions)


Collection & Aggregation

- Organized NGOs, social enterprises
- Informal waste pickers
- Municipalities & local bodies


Sorting & Identification

- Manual sorting
- Manual identification
- Manual grading


Pre-processing

- Cleaning & washing
- Cutting & shredding
- Baling for processing


Recycling & manufacturing

- Fibre & yarn production
- Fabric manufacturing

Why this research matters

~7 million tonnes of textile waste per year in India[1]

Fragmented, resource-constrained MSMEs with limited digital capabilities

No existing Digital Maturity Model fits Indian recycling MSMEs

Methodology

Systematic Literature Review
Database: Scopus & Web of Science
Keywords related to digital readiness/maturity models, SMEs/MSMEs

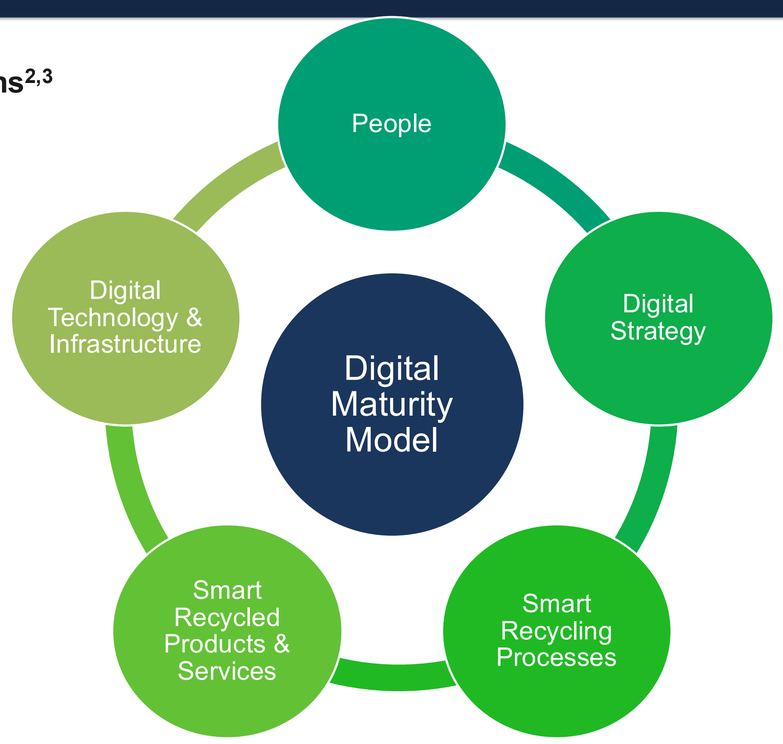
Screening & Selection
Apply pre-defined search, inclusion, exclusion, criteria to identify relevant studies

Thematic Synthesis
3 step process to identify maturity dimensions, sub-dimensions, and maturity levels

Framework Development
Reconceptualize dimensions for Indian post-consumer textile recycling context
Develop five maturity progression levels

Proposed Digital Maturity Model For Indian Post-Consumer Textile Recycling MSMEs

Maturity Dimensions[2,3]



Implications

- Helps MSMEs assess digital readiness and plan a phased roadmap.
- Shifts maturity models from technology-centric to capability-oriented.
- Supports traceability and Digital Product Passport readiness.
- Supports operational efficiency, resilience and circular economy objectives.

Five-level Maturity Progression[3]

Level 1: Initial	Level 2: Emerging	Level 3: Defined	Level 4: Integrated	Level 5: Optimized
• Manual; fragmented	• Basic, isolated tools	• Standardized practices	• Interconnected digital systems	• Advanced, predictive, and circular

Each level applies across all five dimensions

Future Scope

- **Empirical assessment:** Apply the framework across post-consumer textile recycling MSMEs to assess organizational digital readiness and identify capability gaps.
- **Maturity benchmarking:** Compare digital maturity across MSMEs, recycling clusters and organizational sizes to identify differences in digital capabilities.
- **Implementation roadmap:** Develop phased digital transformation strategies aligned with MSME resources, operational requirements and circular economy objectives.

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3. Pirola, F., Cimini, C. and Pinto, R. (2020), “Digital readiness assessment of Italian SMEs: a case-study research”, Journal of Manufacturing Technology Management, Emerald Group Holdings Ltd., Vol. 31 No. 5, pp. 1045–1083, doi: 10.1108/JMTM-09-2018-0305.

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