Journal of Informatics Education anda Research
ISSN: 1526-4726
Vol 5 Issue 2 (2025)

# Supply Chain Transformation and the Circular Economy Methods for producing Sustainable Textiles

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**Abstract**
Since the textile industry pollutes the world and uses up resources, it needs to transform quickly to become sustainable. This research investigates how supply chain transformation guided by circular economy ideas can support sustainable production in the textile industry. It brings together closed-loop models, eco-design, sustainable sourcing, recycling, and end-of-life textile recovery in existing supply chains. The study employs primary data gained from interviews with manufacturers and supply chain and sustainability officials. The research indicates that using circular economy approaches results in better use of resources, less impact on the environment, and greater innovation throughout the supply chain. Among the benefits are less trash, less energy use, and fewer carbon emissions. Still, it is difficult because recycling is costly, many regulations do not provide incentives and there aren't enough recycling facilities. This study introduces a Circular Textile Supply Chain Framework (CTS2CF) that shows stakeholders how to improve their supply chains to support circularity and sustainability. The findings provide useful and theoretical guidance for industry players to improve sustainability in the textile supply chain. Cross-sector partnerships, help from policies, and the use of technology are stressed as important for making the textile economy work at scale. The study's demographic data show a moderately varied respondent profile, with an average age of 3.69 and a higher male representation (gender mean = 1.37). Participants held diverse roles (mean = 2.10) and had several years of experience (mean = 3.22). Most respondents belonged to medium-to-large organizations (mean = 3.23), operating across wide geographic areas. In performance metrics, digital transformation (DTI = 3.62) and logistics integration (RLI = 3.60) scored highest, followed by workforce resilience (WRS = 3.57). Path analysis found RLI (0.227) and DTI (0.205) as the strongest predictors of circular economy practices (CEP). Workforce resilience (0.231) had the highest influence on strategic planning (STP). Supply chain coordination (SC) had no significant impact on CEP (p = 0.139). Overall, RLI, DTI, and WRS play pivotal roles in advancing CE and strategic outcomes.

**Keywords:** Circular Economy**,** Textile Industry**,** Sustainable Supply Chain**,** Recycling, Eco-design

## 1. Introduction

The change in supply chains is important to carry forward stability in the textile industry. Changing the managed supply chain is important to make the textile industry greenery. Many people are moving away from the old tech, tossing the make, and models for a more circular approach, focusing on re-use and recycling to reduce waste. Durable textiles often use better methods, such as organic materials, waterless dyeing, and closed-loop systems. These practices still help the planet by providing quality products. For this to happen, everyone needs suppliers and customers to join equally. With more people looking for moral fashion, companies are taking steps to meet their stability goals. This change is an important step towards a more responsible textile industry. Rapid fashion and moving textile production abroad have made the textile industry very unstable. There is too much waste, and only 1% of collected garments are converted into new products. Many fabrics that are collected are finished in the garbage as they are not enough to be reused, which combines landfill problems. Even if we have systems to collect clothes, recycling and recycling rates are very low. To deal with these issues, a circular economy approach is drawing attention. This means focusing on reuse, monitoring them, and taking the most advantage of each item. To embrace circular practices, we need to rethink how we make and use them. This study sees how we can make that change by searching for both technical and non-technical solutions in a straight manner. It keeps a mission-powered eye that different players either help or progress back. By checking various options, the purpose of the study is to provide insights that can help the textile industry move rapidly to a circular approach (Reike et al., 2023). Clothing and fashion industries are prominent contributors to global pollution, consume vast natural resources, and produce significant carbon emissions. Rapid fashion growth has intensified this effect with double production in 15 years, while the lifespan of clothes has decreased. Environmental damage can be greatly reduced by re-use and recycling of infection in a CE. However, it is challenging to apply CE to the textile supply chain, especially for small and medium-rich enterprises (SMEs). The existing solutions are scattered and a lack of an integrated structure for circular supply chain management. This paper examines CE adoption barriers and proposes orchestration strategies to support SMEs. Using a case study from Italy's Preto District aims to provide practical insights for permanent changes (Saccani et al., 2023).

Tamilnadu plays a significant role in Textile Industry and contribute to its growth at national level (Loganathan & Valarmathi, 2015). The textile and fashion industry has seen rapid global development, generating important economic value by employing millions of people. However, this expansion has caused serious damage to environmental damage including high carbon emissions, water pollution, and large-cycling waste. Traditionally operated by a linear economy, the industry is now under pressure to adopt permanent practices. A circular economy provides a promising option by reducing the model and focusing on recycling and reuse. Global initiatives, such as the European Union and by major brands such as H&M and Barbari, reflect increasing interest in circular strategies. The purpose of these approaches is to expand product life cycles and promote resource efficiency. This letter examines circular economy practices to make permanent changes in the textile sector (Das et al., 2025). The textile industry plays an important role in the European economy and is expected to move forward with rapid fashion rise. However, this growth comes at an important environmental cost due to resource-intensive production and increasing textile waste. In response, the industry is searching for recycling, recycling, and repairing CE systems to reduce environmental impacts. While CE adoption provides financial and structural challenges, especially for SMEs, it provides prolonged stability benefits. Leading companies and European Union policies are now promoting product life cycle thinking and green innovations. Both traditional and advanced recycling methods are being applied to close the textile loop. This letter introduces the innings to be developed towards circular practices in the textile sector (Furferi et al., 2022). Textile and Clothes (T&C) Sector is one of the most polluting industries globally, which contributes significantly to greenhouse gas emissions. Rapid consumption and lifetime of short clothing have intensified the problem, which is rapidly inspired by fashion and low production costs. This challenges the traditional linear models of growing waste production and disposal. In response, the circular economy model offers a permanent option by replacing waste in resources and expanding the product lifetime. It emphasizes reuse, repair, recycling, and environment-conscious production and consumption. This change not only reduces environmental damage but also promotes responsible consumer behavior. This paper examines circular economy strategies for the future of a permanent fabric (Cruz & Cruz 2023).

The textile industry is facing increasing environmental challenges due to rapid fashion, which increases the business of the product and shortens the lifetime of the clothing, resulting in important cloth waste. Although the strategies of the circular economy provide promising options such as other hand markets, recycling processes, and permanent business models, their implementation is inconsistent and unspecified. Research has highlighted that most circular practices focus on the stages of life, neglecting opportunities within the production process, especially pre-consumer waste. In addition, there is a lack of systematic reviews, assessing how circular strategies affect economic, social, and environmental stability. This difference indicates the requirement for broad studies that evaluate the effectiveness and purpose of circular solutions in the textile field. A deep understanding of these strategies can guide better decisions and policy development. Therefore, the objective of this study is to identify major strategies and assess their contribution to sustainable development to make a systematic review of circular economy practices in the textile industry (Escamilla et al., 2024). The textile industry is traditionally working on a linear "technique, make, dispose" model, its high resource consumption, pollution, and waste production faced serious stability challenges. Rapid fashion growth has accelerated these environmental and economic issues, causing permanent practices rapidly. In response, the circular economy provides a solution by focusing on resource efficiency, waste minimalization, and closed-loop production. This model encourages permanent sourcing, environmentally friendly construction, and improving life management for textiles. Applying circular supply chain strategies can significantly reduce the environmental impact of the industry. Additionally, these practices promote prolonged economic stability. This research highlights the importance of adopting circular principles in the textile supply chain (Cate 2025). This study aims to explore how supply chain transformation can support circular economy (CE) methods in the production of sustainable textiles, with a focus on improving process efficiency, resource optimization, and waste reduction. Although CE practices are increasingly discussed in the textile sector, there remains a significant research gap regarding the role of integrated supply chain strategies in driving these changes, particularly in developing economies and across fragmented value chains. Existing literature often addresses CE and sustainability in isolation from supply chain dynamics, leaving a lack of empirical insights into how these elements interact. The practical relevance of this study lies in its potential to guide manufacturers, supply chain managers, and policymakers in adopting scalable, CE-driven supply chain models. By identifying best practices and transformation strategies, the research can help reduce the environmental footprint of textile production, enhance material circularity, and promote long-term industry sustainability.

**Objectives**

- To analyze current textile supply chain practices and identify areas for sustainable transformation using circular economy principles.
- To explore innovative circular economy methods such as recycling, upcycling, and closed-loop production for reducing textile waste and environmental impact.
- To evaluate the economic and environmental benefits of integrating circular strategies in textile production, distribution, and end-of-life management.
- To develop a framework for implementing circular supply chain models in the textile industry that enhances sustainability, resource efficiency, and stakeholder collaboration.

## 1.1 Theoretical Framework

A theoretical structure is a foundation of concepts and principles that guide a research study. This helps explain the relationship between the major variables in research. Using existing principles, it provides a clear structure to analyze and interpret data. Framework research supports questions and objectives. It also connects the study with prior knowledge in the field. Overall, it ensures that the research is based on established ideas and helps explain the findings. The theoretical outline for this study is based on circular economy theory, permanent supply chain management (SSCM) theory, institutional principle, and industrial ecological theory. The circular economy theory supports a change in textiles to relics from linear systems. The SSCM theory states how the supply chain can integrate environmental and social practices to achieve stability. Institutional theory highlights external pressures such as rules and consumer expectations that motivate firms to adopt permanent practices. Industrial ecological theory emphasizes the importance of looking at industrial systems as part of a comprehensive ecosystem, which promotes material cycling and resource efficiency in the textile supply chain.

Circular economy (CE) theory focuses on converting traditional production and consumption models into regenerative systems that reduce waste and make the most efficient use of resources. In terms of durable textiles, CE theory promotes designing products and supply chains that have as much prolonged use through recycling, reusing, and rematching processes. Vidal-Ayuso, Akhmedova, and Jaca (2023) stated that consumer behavior plays an important role in enabling circular economy practices by affecting the demand for permanent products and the acceptance of circular trade models. Their review emphasizes that not only technical and supply chain innovation is required to align textile production with CE principles, but also requires understanding and promoting consumer participation in circular consumption patterns. This theory thus underlines supply chain change efforts, aimed at creating a sustainable textile system by closing the resource ends and encouraging sustainable consumption. Sustainable Supply Chain Management (SSCM) addresses the integration of environmental, social, and economic stability principles in the supply chain, from the theory source to the end-of-life product management. In the context of the production of durable textiles, SSCM Theory guides how the supply chains can be replaced to reduce environmental effects while maintaining economic viability and social responsibility. Siring et al. (2022) reflect the development of SSCM theory, emphasizing the need for comprehensive outlooks that include multi-interest cooperation, transparency, and prolonged thinking to face complex stability challenges. For textile supply chains, this involves -designing processes to support circular economy methods such as permanent sourcing, environmentally friendly construction, reverse logistics, and waste deficiency. The SSCM theory thus provides an important framework for converting traditional textile supply chains into flexible and durable systems that align with broad environmental and social goals.

Institutional theory explains how organizations adopt some practices and structures in response to their external environment, such as rules, cultural norms, and stake expectations such as expectations. In terms of supply chain change and durable textile production, the institutional theory helps understand why firms are applied to the methods of circular economy and stability. According to Risi, Vigneau, Bohn, and Wickert (2023), institutional pressure related to corporate social responsibility (CSR) is strongly affected by the underlying organizational values that drive the firms not only to follow external demands but also to internal as a main principle. This theory highlights how regulatory structures, consumer demands, and industry-standard textile companies motivate their supply chains to change their supply chains towards more durable and circular models, promoting validity and long-term flexibility in the market. The industrial ecological theory focuses on adapting the flow of material and energy through industrial systems by mimicking natural ecosystems, where the waste becomes input to another by one process. In terms of durable textiles, industrial ecology supports supply chain changes by promoting resource efficiency, waste minimalization, and material recycling in the entire textile production life cycle. According to Awan (2022), industrial ecology contributed significantly to achieving sustainable development targets by encouraging closed-loop systems and industrial symbiosis, where industries collaborate to reuse and reduce environmental impacts. This principle provides a valuable framework to apply methods of circular economy in textiles, leading to more sustainable production and supply chains through systemic resource management. The circular economy provides a broad base for understanding the change of textile supply chains towards the integration stability of the permanent supply chain management theory, institutional supply chain management theory, institutional principle, and the integration of industrial ecological theory. These principles collectively explain changes in regenerative production systems, the inclusion of environmental and social practices in supply chains, the impact of external institutional pressures, and the systemic adaptation of resource flows. Together, they provide a strong structure to guide permanent textile production through methods of circular economy, enabling the firms to meet environmental challenges by fulfilling economic and social demands. This theoretical grounding ensures that the study is well deployed to analyze and support the transition towards more durable and flexible textile supply chains.

**Hypothesis**

- **H1:** Raw Material Sourcing Methods have a positive effect on Sustainable Textiles Production.
- **H2:** Manufacturing Process Innovations positively influence Sustainable textile production.
- **H3:** Reverse Logistics Implementation positively affects Sustainable textile production.
- **H4:** Supplier Collaboration has a positive impact on Sustainable Textiles Production.
- **H5:** Waste Reduction Strategies Positively Contribute to Sustainable Textiles Production.
- **H6:** Digital Technologies Integration positively influences Sustainable Textiles Production.
- **H7:** Circular Economy Practices mediate the relationship between Raw Material Sourcing Methods and Sustainable Textiles Production.
- **H8:** Circular Economy Practices mediate the relationship between Manufacturing Process Innovations and Sustainable Textiles Production.
- **H9:** Circular Economy Practices mediate the relationship between Reverse Logistics Implementation and Sustainable Textiles Production.
- **H10:** Circular Economy Practices mediate the relationship between Supplier Collaboration and Sustainable Textiles Production.
- **H11:** Circular Economy Practices mediate the relationship between Waste Reduction Strategies and Sustainable Textiles Production.
- **H12:** Circular Economy Practices mediate the relationship between Digital Technologies Integration and Sustainable Textiles Production.

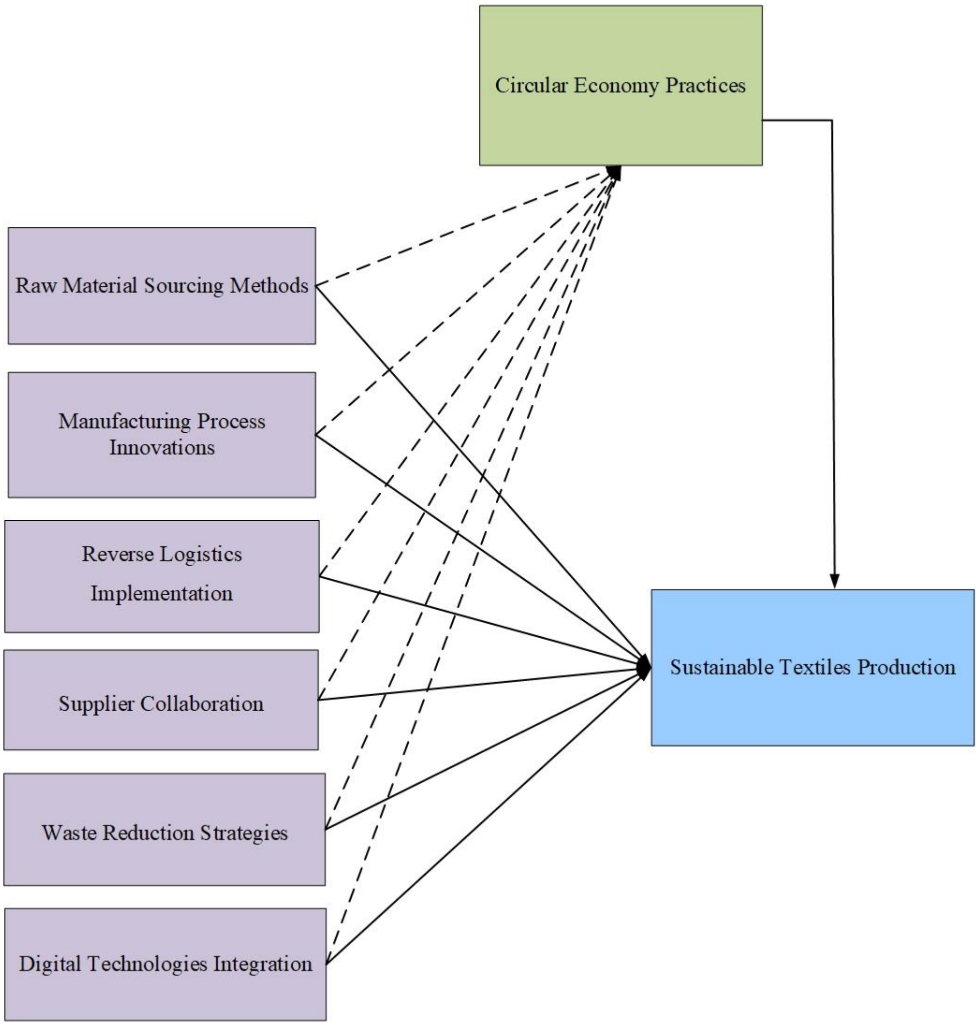


**Figure 1: Conceptual Framework of the Study**

## 2. Literature Review:

In 2023, Saccani et al. investigated the spherical supply chains can be effectively managed and coordinated within textile and fashion industries, where environmental effects are important. Researchers focused on addressing harmonious strategies and the lack of a theoretical framework to remove obstacles to adopting a circular economy (CE). A multiple case study method was employed in the Preto Revived Wool District, which practiced CE for more than a century. Paper integrated concepts from resource orchestration, supply chain orchestration, and CE theory to check organizational responses for these challenges. The findings showed that the current solutions in the literature were fragmented and there was a lack of practical coordination mechanisms. The study successfully conducted orchestration strategies to guide firms in the management of CE infections. This offered practical insight to supply series managers to design effective reactions to CE-related challenges.

In 2022, Saha et al. aimed to detect the current status of a circular economy (CE) in the textile and clothing (TC) industry, which identifies major challenges, opportunities, and necessary interventions for effective CE implementation. Researchers employed a survey method, in which data was collected from 114 TC companies located in Bangladesh, Vietnam, and India. The study examined the relationship between taking, creating, using, and recovering CE areas of action in economic, environmental, and social dimensions. It was found that with limited financial, technical, and human resources, managerial resistance, and consumer indifference, there were major obstacles. The conclusion showed that it was necessary to address industry-wide cooperation, government incentives, and active buyers and consumer engagement to remove these obstacles. The study emphasized that joint efforts, knowledge exchange in stability practices, and waste recycling were required to adopt successful CEs. Overall, it highlighted the need for systemic changes to effectively embed the CE principles within the TC industry.

In 2024, Escamilla et al. investigated the circular economy strategies applicable to the textile industry to evaluate their effectiveness in promoting stability. Using Prisma functioning, researchers analyzed 88 articles published over a period of ten years and selected 55 relevant studies for detailed evaluation. The review identified major strategies such as recycling, repair, and shortage to examine their environmental, social, and economic impacts. The findings indicated that reuse was necessary for waste reduction, but was limited by low consumer encouragement, while recycling faced technical and awareness challenges. Despite the issues of extended dress for lifetime and repair, offered economic gains, and lacking efforts were forced by a sharp fashion model. The study concluded that these strategies promise to pursue stability, although their success depends on significant changes in consumer behavior and industry practices.

In 2022, Kazancoglu et al. analyzed obstacles faced by textile companies in implementing circular supply chains within the circular economy structure. Researchers developed a comprehensive structure by incorporating all stakeholders to reveal these obstacles and their causes. Testing and development laboratory methods were implemented to classify obstacles and classify them and examine their interconnects. The study found that major obstacles included inadequate collections, sorting and recycling processes, resistance to adopting circular economy models, and issues with uniformity and standardization. Additionally, lack of technical knowledge emerged as the most effective obstacle, while challenges were the most affected in product design. These findings highlighted the important areas, for which the textile industry requires attention to facilitate transition in circular supply chains.

In 2021, Mishra et al. addressed limited research on unstable fashion consumption by developing a framework from a linear economy (LE) in a circular economy (CE) based on the infection theory. The research was conducted in two stages: a book list of existing literature and a case study that includes data collection through a semi-composed interview with the founders and designers of the business media and the company. The findings identified key drivers of the closed-loop fashion price chain, including collaboration, innovation, waste management, customer engagement, and changing patterns. The study concluded that CE principles, such as low, repair, recycling, and recycling require -defining value proposals and replacing business model elements. A practical three-level structure was proposed to guide fashion companies in collaborating with stakeholders to develop sustainable business models. This research contributed to the original insight into an Indian fashion company by implementing the structure, increasing the understanding of CE infection in the region.

In 2021, Wojciechowska investigated the opportunities and obstacles related to adopting a circular economy in the field of textiles and clothing. This reviewed the importance of textiles for global welfare and economic development, while rapid fashion and growing environment and social challenges within a linear textile system. The study investigated how ecological awareness is increasing among consumers and industry stakeholders, taking the initiative toward more durable and circular practices. This identified the four major principles of a new textile economy: eliminating harmful substances, increasing the use of clothing, improving recycling, and adopting resource usage. Conclusions were emphasized that infection from a linear to a circular system is complex and challenging. Overall, the chapter provided significant insights into the ability and difficulties of applying circular economy concepts in textiles.

In 2021, Repp assessed global social influences, especially employment innings, resulting in an infection towards a circular economy (CE) within the apparel sector of the European Union (EU). The study focused on imported costumes from its top five exporting countries- China, Bangladesh, India, Turkey, and Cambodia in the European Union. Using a moral structure for global transformational changes, research quantically analyzed employment effects and their justice implications. This was the first field-specific study to investigate CE-inspired employment changes globally from a moral perspective. The findings showed that there has been a decline in significant employment in labor-intensive dress production outside the European Union. In contrast, low labor-intensive reuse, recycling, and other hand increased employment in retail activities within the European Union and with the other hand. The study concluded that the benefits and burden of CE infections were unevenly distributed, which affected the stakeholders of the non-European Union.

In 2023, Colombi & D'Itria investigated the digital changes that run a circular economy (CE) in the European Fashion Industry and Business Model Innovation (BMI). The authors adopted a technology-focused approach to analyze the emerging digital-run practices that support fashion companies in furthering their stability agenda. Using a recurrence data modeling process, the study classified the business model innovations according to the eight archetypes of Bocken, including maximizing material efficiency, making value from waste, and promoting stewardship. The findings showed that these digital practices facilitate increasing resource security, social responsibility, and profitability towards CE. The study introduced a classification of current digital solutions that enable circular trade innovations in fashion. Overall, it highlighted the capacity of digital changes to promote permanent trade models addressing the challenges of the industry.

In 2022, Akter et al. addressed upstream textiles and material waste management in the apparel construction sector in Bangladesh to support the Sustainable Development Target (SDG) 12 within a circular economy structure. Using a search multiple-case study approach, data was collected from 17 factories through semi-contemporary questionnaires, material stream mapping, and comments. The study recognized and classified the waste generated at various production stages and estimated the economic loss of about 0.70 per of the exported costumes. It also discovered informal waste trade, in which about 15 tonnes of waste was exchanged in the same underground market. Conclusions highlighted the significant lost value that can be recovered through circular economy practices. As a result, an ideological waste management model was developed to increase waste reduction and promote stability in the region.

In 2024, Sehnem et al. aimed to validate theoretical proposals about stability within fashion education in Brazil and to validate the teaching of circular economy practices. Focusing on graduate fashion design courses, data was collected through the questionnaire administered to teachers, coordinators, and students in 54 programs. The research found that good stability practices were largely absent from the political transport projects of these courses. Although the concepts of stability and circular economy were somewhat internal, the study concluded that the core needed more maturity and emphasis on circular economy practices. These practices were identified as important to add value, maintain the value of resources, and promote innovation in a sustainable fashion. The conclusion highlights the strategic role of the educational sector in running changes in the textile price chain.

## 3. Research Methodology

The research method refers to the systematic process used to collect, analyze, and interpret data for a research study. This outlines specific techniques and procedures applied to check a problem or question. The functioning research ensures the reliability, validity, and accuracy of the findings. This includes methods such as surveys, experiments, case studies, and a mixed-method approach. This also involves selecting appropriate devices for data collection, sampling, and analysis. Finally, the research functions guide researchers to create evidence-based conclusions. The research method in this study is based on a mixed-method research design, which focuses on the methods of production of permanent textiles, including both quantitative and qualitative techniques to detect the change of supply chains in terms of circular economy. Selected respondents, including textile companies and supply chain experts, were collected primary data using a structured questionnaire administered. An objective sampling strategy was employed to ensure that the study collected expert-driven insights that are necessary to understand the challenges of practical applications and circular practices. Quantitative data introduced average evidence at the limits of adopting circular exercises, while the qualitative component allowed for the thematic analysis of professional ideas on environmental impacts, implementation barriers, and potential reforms. The entire study gave priority to moral ideas, which included the participants about the purpose of research and their rights, including the option of privacy and withdrawal at any level. Data analysis included descriptive statistics, reliability testing, correlation analysis, and ANOVA.

### Data Collection Method

### Primary Data Collection:

The research design followed a mixed-method approach to achieve wide insight into supply chain practices within the textile industry. The data collection was mainly organized through the structured questionnaire distributed to the selected participants. The sampling strategy focuses on the supply of a series of experts to target textile companies with relevant experiences and knowledge. The reactions collected using thematic analysis were analyzed to identify common patterns and subjects. Ethical ideas were strictly followed, including informed consent, data privacy, and voluntary participation. This approach ensured that research was both reliable and morally sound, which provided a meaningful contribution to the field.

### Data Analysis

The study discovered supply chain changes and methods for the production of permanent textiles within the structure of a circular economy. Data collection methods included a combination of structured questionnaires and semi-composed interviews with stakeholders such as stability officers, textile manufacturers, and supply chain managers. The questionnaire aims to assess the current practices in the use of waste, resource efficiency, and the use of environmentally friendly materials. It also investigated how circular strategies such as recycling, and product line extensions were being implemented in various stages of the textile supply chain. Interviews provided deep insights into organizational changes towards stability, exposing obstacles to both drivers and obstacles to adopting spherical practices. Participants discussed innovations in textile production, such as closed-loop systems and biodegradable fiber, while also reflecting on policy effects and market demands, shaping a permanent infection. This phase was based on the collection of both quantitative and qualitative data to understand the supply chain change in permanent textiles and the methods of circular economy. The survey included close questions, Likert scale items, and demographic questions such as recycling, using recycling materials, and assessing waste deficiency initiatives. The survey was made available online in various fields using platforms, ensuring widespread access. To encourage participation, follow-up remakes were sent, and the survey was designed to be abbreviated, which required about fifteen minutes to complete. The objective of the semi-composed interview in the qualitative phase is to find out the experiences of the participants in implementing circular strategies within the text.

## 4. Results

**Table 1: Frequency distribution of sociodemographic characteristics of study participants**

| Socio-demographic characteristics | | Frequency % | Variance | Skewness | Kurtosis | t |
|---|---|---|---|---|---|---|
| Age | Under 25 | 5.1 | 1.225 | -.591 | -.205 | 62.307 |
| | 25–34 | 7.1 | | | | |
| | 35–44 | 29.4 | | | | |
| | 45–54 | 30.6 | | | | |
| | 55 and above | 27.7 | | | | |
| Gender | Male | 63.4 | .233 | .560 | -1.696 | 52.974 |
| | Female | 36.6 | | | | |
| Role | Manufacturer | 29.4 | .827 | .519 | .020 | 43.137 |
| | Supplier | 37.4 | | | | |
| | Logistics Manager | 28.6 | | | | |
| | Sustainability Officer | 3.1 | | | | |
| | Retailer | 1.4 | | | | |
| Experience | Less than 1 year | 11.1 | .944 | -.918 | .708 | 61.943 |
| | 1–3 years | 1.1 | | | | |
| | 4–7 years | 46.6 | | | | |
| | 8–10 years | 37.1 | | | | |
| | More than 10 years | 4.0 | | | | |
| Location | Urban area | 28.0 | 2.599 | -.427 | -1.466 | 37.960 |
| | Suburban area | 6.3 | | | | |
| | Rural area | 5.7 | | | | |
| | Multiple locations across regions | 30.6 | | | | |
| | International operations | 29.4 | | | | |
| Size | Micro | 4.6 | .637 | -.985 | .721 | 75.756 |
| | Small | 9.1 | | | | |
| | Medium | 44.9 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Large | 41.4 | | | | |

Table 1 Social-demographic data is presented, underlining the distribution of respondents in various categories, as well as statistical measures such as variance, obliqueness, kurtosis, and t-value. In terms of age, most of the respondents fall within the 35–54 range, with 29.4% 35–44 and 30.6% aged 45–54. A small portion is between 25 (5.1%) or 25–34 (7.1%), while 27.7%is 55 and above. The variance at age is 1.225, which reflects a moderate proliferation of reactions. The negative obliqueness of -0.591 reflects a slight concentration of reactions between the older classes, and the kurtosis of -0.205 suggests a relatively flat distribution. The t-value for age is 62.307. Regarding the penis, 63.4% are respondents and 36.6% are female. The penis variable has a low variance of 0.233, indicating minimal variability. The slant of 0.560 suggests a moderate inclination towards the male respondents, while the ketosis of -1.696 indicates a flattery distribution. The T-Value for the penis is 52.974. In terms of the role within the supply chain, the most common posts are suppliers (37.4%), manufacturers (29.4%), and logistics manager (28.6%). A small percentage of stability identifies as officers (3.1%) or retailers (1.4%). The role variable shows a variance of 0.827, a slant of 0.519 indicates a slight concentration around the supplier roles, and a kurtosis of 0.020 suggests a common distribution. The T-Value is 43.137. When examining years of experience, 46.6% of the participants have 4-7 years, and 37.1% have 8–10 years of experience. Only 11.1% have less than a year, 1.1% have 1-3 years, and 4.0% have ten years of experience. The variance of the experience variable is 0.944. A negative oblique of -0.918 indicates a trend towards more experienced individuals, while kurtosis

**Table 2: Descriptive Statistics**

| | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Age | 350 | 3.69 | 1.107 | .059 |
| Gender | 350 | 1.37 | .482 | .026 |
| Role | 350 | 2.10 | .910 | .049 |
| Experience | 350 | 3.22 | .972 | .052 |
| Location | 350 | 3.27 | 1.612 | .086 |
| Size | 350 | 3.23 | .798 | .043 |
| RMSM | 350 | 3.5663 | .79548 | .04252 |
| MPI | 350 | 3.5200 | .81279 | .04345 |
| RLI | 350 | 3.5971 | .75814 | .04052 |
| SC | 350 | 3.5531 | .79819 | .04267 |
| WRS | 350 | 3.5743 | .79318 | .04240 |
| DTI | 350 | 3.6194 | .75843 | .04054 |
| STP | 350 | 3.5543 | .78960 | .04221 |
| CEP | 350 | 3.5691 | .78435 | .04193 |

Table 2 presents a descriptive figure for the study variable, including demographic factors and major performance indicators. Each variable is based on the size of the sample of 350 respondents. The average age is 3.69 with standard deviations of 1.107 and a standard error of 0.059, indicating moderate variation in age distribution. The gender means 1.37, which suggests a high ratio of male respondents, and a standard deviation of 0.482 with a standard error of 0.026. The mean for the role is 2.10, with a standard deviation of 0.910 and a standard error of 0.049, which reflects a mixture of roles among the participants. 3.22 in experience means, indicating that most participants have many years of experience, with a standard deviation of 0.972 and a standard error of 0.052. The location variable has a relatively high standard deviation of 3.27, 1.612, and a standard error of 0.086, which suggests a wide distribution of operating areas. The average size of organizations is 3.23, with a standard deviation of 0.798 and a standard error of 0.043, indicating the majority of respondents from moderate or large enterprises. In performance variables, RMSM (flexible manufacturing and supply management) means 3.5663, with standard deviations of 0.79548. MPI (Market Performance Index) means 3.5200 and records a standard deviation of 0.81279. RLI (flexible logistics integration) shows a slightly higher meaning of 3.5971 with standard deviations of 0.75814. SC (supply chain coordination) means a standard deviation of 3.5531 and 0.79819. The WRS (workforce flexibility and stability) means a standard deviation of 3.5743 and 0.79318. DTI (digital change and innovation) presents the highest average price at 3.6194 with a standard deviation.

**Table 3: Correlation Analysis**

| | | RMSM | MPI | RLI | SC | WRS | DTI | STP | CEP |
|---|---|---|---|---|---|---|---|---|---|
| Correlation | RMSM | 1.000 | .610 | .568 | .490 | .562 | .573 | .562 | .573 |
| | MPI | .610 | 1.000 | .591 | .578 | .598 | .560 | .558 | .598 |
| | RLI | .568 | .591 | 1.000 | .582 | .586 | .573 | .585 | .616 |
| | SC | .490 | .578 | .582 | 1.000 | .607 | .555 | .557 | .542 |
| | WRS | .562 | .598 | .586 | .607 | 1.000 | .581 | .622 | .575 |
| | DTI | .573 | .560 | .573 | .555 | .581 | 1.000 | .550 | .600 |
| | STP | .562 | .558 | .585 | .557 | .622 | .550 | 1.000 | .589 |
| | CEP | .573 | .598 | .616 | .542 | .575 | .600 | .589 | 1.000 |
| Sig. (1-tailed) | RMSM | | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| | MPI | .000 | | .000 | .000 | .000 | .000 | .000 | .000 |
| | RLI | .000 | .000 | | .000 | .000 | .000 | .000 | .000 |
| | SC | .000 | .000 | .000 | | .000 | .000 | .000 | .000 |
| | WRS | .000 | .000 | .000 | .000 | | .000 | .000 | .000 |
| | DTI | .000 | .000 | .000 | .000 | .000 | | .000 | .000 |
| | STP | .000 | .000 | .000 | .000 | .000 | .000 | | .000 |
| | CEP | .000 | .000 | .000 | .000 | .000 | .000 | .000 | |

The table 3 presents a correlation matrix for eight variables: RMSM, MPI, RLI, SC, WRS, DTI, STP, and CEP. All correlations are positive and statistically important on 0.001 levels (1-tie), indicating strong relationships between variables. The RMSM shows strong positive correlations with all other variables, which range from 0.490 to 0.610 with SC with MPI. The MPI has moderate to strong correspondence with other variables, with the highest relationship of 0.598 with both WRS and CEP. There are similar patterns as RLI, which are all marginally correlated with variables, especially with CEP (0.616) and MPI (0.591). SC reflects its strongest correlation with WRS at 0.607, and moderate correlation with others, the lowest 0.490 with RMSM. WRS has the highest relationship with STP at 0.622 and also strongly belongs to DTI (0.581) and MPI (0.598). The DTI shows a moderate correlation across the board, with the highest 0.600 with CEP and 0.581 with WR. The STP is marginally correlated with all variables, which is the strongest with WR at 0.622 and CEP at 0.589. CEP also displays strong correspondence with RLI (0.616), DTI (0.600), and MPI (0.598). Overall, these results suggest that all variables positively belong to each other, flexible manufacturing, market performance, logistics integration, supply chain coordination, workforce flexibility, digital change, strategic plan, and interrelationship between aspects such as circular economy practices. The importance confirms that these correlations are statistically reliable.

**Table 4: ANOVA**

| | | | Sum of Squares | df | Mean Square | F | Sig |
|---|---|---|---|---|---|---|---|
| Between People | | | 5431.556 | 349 | 15.563 | | |
| Within People | Between Items | | 44.140 | 39 | 1.132 | .860 | .717 |
| | Residual | Nonadditivity | 26.706[a] | 1 | 26.706 | 20.312 | .000 |
| | | Balance | 17894.529 | 13610 | 1.315 | | |
| | | Total | 17921.235 | 13611 | 1.317 | | |
| | Total | | 17965.375 | 13650 | 1.316 | | |
| Total | | | 23396.931 | 13999 | 1.671 | | |

The table 4 presents the results of the analysis of the vision (ANOVA), which focuses on variation between individuals, as well as variation between objects. The total sum of sections for all comments is 23,396.931 with a freedom of 13,999 degrees, resulting in the average class value of 1.671. The variation between people is with freedom of 349 degrees with the sum of classes of 5,431.556, and an average class of 15.563 reflects the difference between individual respondents. Within individuals, the variation between objects shows the sum of classes of 44.140 more than 39 degrees of independence, with an average class of 1.132. The F value for this variation is 0.860, which has a level of importance of 0.717, indicating that the difference between objects within people is not statistically important. The residual conductivity component, which reflects the interaction effect or unexplained variation, has the sum of 26.706 classes with 1 degree of freedom and an average square of 26.706. The concerned F value is 20.312 and the importance is 0.000, which shows that this component is statistically important. The word balance has a huge number of classes of 17,894.529, which extends more than a freedom of 13,610 degrees, with an average class of 1.315, representing additional-subject variation. The total people of in classes are as well as 17,611 degrees of independence and 17,921.235 with an average class of 1.317. Summarizing the overall clan, the sum of classes with an average class of 1.316 is 17,965.375 above 13,650 degrees of independence, which is part of the total between individual variations and within. Overall, the table highlights that the greatest variation among people is found, and while the difference between objects within people is not statistically important, residual no additivity is important is important.

**Table 5: Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .915 | .915 | 40 |

The table 5 shows the results of a reliability analysis using the alpha of Cronbach for a set of 40 items. The alpha value of Cronbach is 0.915, which indicates a high level of internal stability between objects. This means that the items are highly correlated and measure the same underlying concept firmly. The honourable is calculated based on standardized objects, confirming that the scale of the scale is stable, whether items are standardized. Overall, it suggests that the measurement device used is highly reliable.

**Table 6: t-Test**

| | Test Value = 0 | | | | | |
|---|---|---|---|---|---|---|
| | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| RMSM | 83.873 | 349 | .000 | 3.56629 | 3.4827 | 3.6499 |
| MPI | 81.021 | 349 | .000 | 3.52000 | 3.4346 | 3.6054 |
| RLI | 88.765 | 349 | .000 | 3.59714 | 3.5174 | 3.6768 |
| SC | 83.280 | 349 | .000 | 3.55314 | 3.4692 | 3.6371 |
| WRS | 84.305 | 349 | .000 | 3.57429 | 3.4909 | 3.6577 |
| DTI | 89.281 | 349 | .000 | 3.61943 | 3.5397 | 3.6992 |
| STP | 84.213 | 349 | .000 | 3.55429 | 3.4713 | 3.6373 |
| CEP | 85.131 | 349 | .000 | 3.56914 | 3.4867 | 3.6516 |

The table 6 presents the results of a-rolled T-tests conducted for eight variables: RMSM, MPI, RLI, SC, WRS, DTI, STP, and CEP. Each test compares the sample mean against the test value of zero. For all variables, T-human is very high, from about 81 to 89, with a freedom of 349 degrees. Importance values are all .000, which indicates that the average score for each variable is quite different from zero. The average value for variables ranges from 3.52 (MPI) to 3.62 (DTI), showing 95% confidence with intervals that the actual population means within relatively narrow boundaries. For example, 3.57 of RMSM means, with confidence intervals between 3.48 and 3.65. Similarly, DTI has the highest mean at 3.62, with a confidence interval from 3.54 to 3.70. Overall, these results suggest that all variables mean significantly higher than zero, confirming that the reactions to each variable are constantly positive and statistically reliable within the sample.

**Table 7: Path Estimates from Structural Equation Modeling**

| | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| CEP | <--- | RMSM | 0.133 | 0.05 | 2.632 | 0.008 |
| CEP | <--- | MPI | 0.159 | 0.052 | 3.088 | 0.002 |
| CEP | <--- | DTI | 0.205 | 0.053 | 3.869 | *** |
| CEP | <--- | WRS | 0.109 | 0.053 | 2.077 | 0.038 |
| CEP | <--- | SC | 0.074 | 0.05 | 1.478 | 0.139 |
| CEP | <--- | RLI | 0.227 | 0.054 | 4.196 | *** |
| STP | <--- | RMSM | 0.131 | 0.052 | 2.531 | 0.011 |
| STP | <--- | MPI | 0.056 | 0.053 | 1.062 | 0.288 |
| STP | <--- | RLI | 0.142 | 0.056 | 2.515 | 0.012 |
| STP | <--- | SC | 0.113 | 0.051 | 2.205 | 0.027 |
| STP | <--- | WRS | 0.231 | 0.054 | 4.299 | *** |
| STP | <--- | CEP | 0.157 | 0.054 | 2.886 | 0.004 |
| STP | <--- | DTI | 0.074 | 0.055 | 1.357 | 0.175 |

The table 7 presents p-humans for standardized projections, standard errors, significant ratios (C.R.), and several prophet variables and two result variables, relationships between CEP and STP.

For CEP, prophets show RMSM, MPI, DTI, WRS, and RLIs showing significantly and statistically significant effects, estimated from 0.109 to 0.227. The highest impact on the CEP is from RLI (0.227), followed by DTI (0.205), both are accompanied by highly important P-values. RMSM, MPI, and WRS also make quite a considerable prediction of CEP but with small coefficients. However, the relationship between SC and CEP is not statistically important (P = 0.139). With estimates from about 0.113 to 0.231 about STP, RMSM, RLI, SC, WRS, and CEP, it significantly affects it. The WRS has the strongest effect on STP (0.231), followed by CEP (0.157) and RLI (0.142). RMSMs and SCs also make significant predictions of STPs, but do not show a significant impact on MPI and DTI STPs, with P-Value above the traditional limits (0.288 and 0.175, respectively). Overall, these results indicate that some factors such as RLI, WRS, and DTI have a strong impact on the CEP, while WRS, CEP, and RLI are the leading prophets of STP, which highlights their important roles in explaining the variation in these result variables.

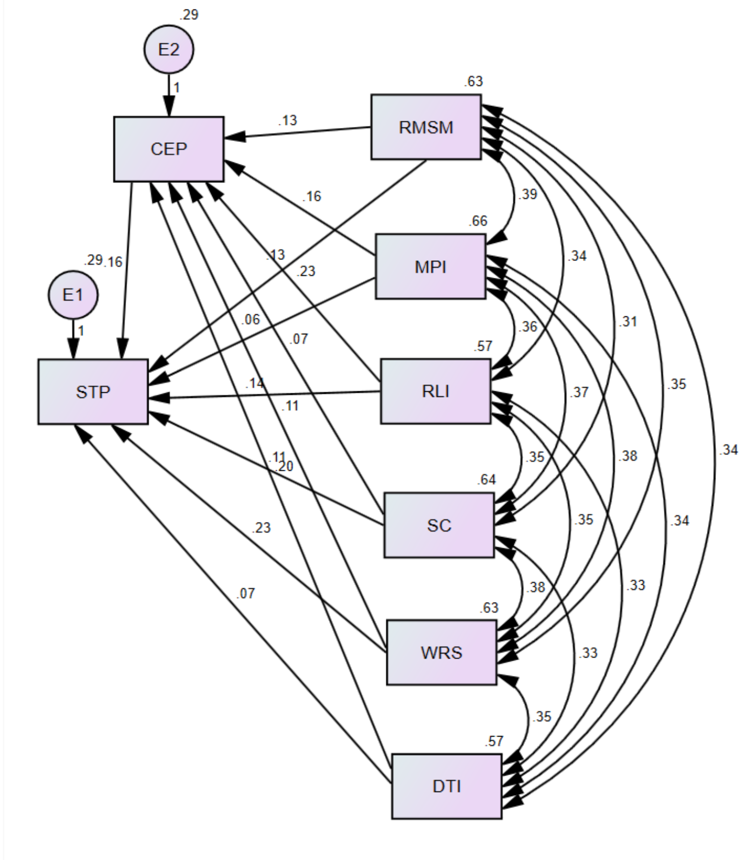


**Figure 2: Path Analysis**

**Table 8: Confirmatory Factor Analysis – Standardized Factor Loadings and Significance**

| | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| RMSM5 | <--- | RMSMe | 1 | | | |
| RMSM4 | <--- | RMSMe | 0.971 | 0.157 | 6.195 | *** |
| RMSM3 | <--- | RMSMe | 1.031 | 0.158 | 6.532 | *** |
| RMSM2 | <--- | RMSMe | 1.002 | 0.158 | 6.326 | *** |
| RMSM1 | <--- | RMSMe | 1.1 | 0.165 | 6.682 | *** |
| MPI5 | <--- | MPIn | 1 | | | |
| MPI4 | <--- | MPIn | 1.363 | 0.18 | 7.573 | *** |
| MPI3 | <--- | MPIn | 0.837 | 0.14 | 5.963 | *** |

| | | | | | | |
|---|---|---|---|---|---|---|
| MPI2 | <--- | MPIn | 1.031 | 0.156 | 6.6 | *** |
| MPI1 | <--- | MPIn | 0.966 | 0.15 | 6.451 | *** |
| RLI5 | <--- | RLIm | 1 | | | |
| RLI4 | <--- | RLIm | 0.873 | 0.139 | 6.259 | *** |
| RLI3 | <--- | RLIm | 0.724 | 0.128 | 5.679 | *** |
| RLI2 | <--- | RLIm | 0.996 | 0.145 | 6.851 | *** |
| RLI1 | <--- | RLIm | 0.812 | 0.127 | 6.414 | *** |
| SC5 | <--- | SCo | 1 | | | |
| SC4 | <--- | SCo | 0.901 | 0.134 | 6.742 | *** |
| SC3 | <--- | SCo | 0.96 | 0.142 | 6.775 | *** |
| SC2 | <--- | SCo | 0.777 | 0.13 | 5.989 | *** |
| SC1 | <--- | SCo | 0.803 | 0.131 | 6.117 | *** |

This table 8 displays the level of importance for standardized projections, standard errors, significant ratios, and relationships between observation indicators and their respective latent constructions: RMSM, MPI, RLI, and SC. For RMSM construction, all five indicators (RMSM1 to RMSM5) are strong and statistically significant loading on RMSME. The estimate ranges from 0.971 to 1.1, which contains a significant ratio above 6, and p-humans indicate a lot of importance. Similarly, MPI construction shows that all five indicators (MPI1 to MPI5) load significantly on the latent variable MPIn. Estimates vary between 0.837 and 1.363, with all significant ratios, above 5.9, reflecting strong and reliable relationships. Five indicators of the RLI construct also display significant loading on the latent variable RLIm, with an estimate from 0.724 to 1.0. All significant ratios are more than 5.6, and P-human are highly important, strong measurements confirm validity. For SC construction, all five indicators load significantly on latent variable SCOs, with estimates between 0.777 and 1.0 and a significant ratio above 5.9. The higher importance of these loadings confirms that these views are reliable measures for their underlying construction. Overall, this table indicates that the measurement model has good reliability and validity, as all observed variables contribute significantly to their respective latent factors.

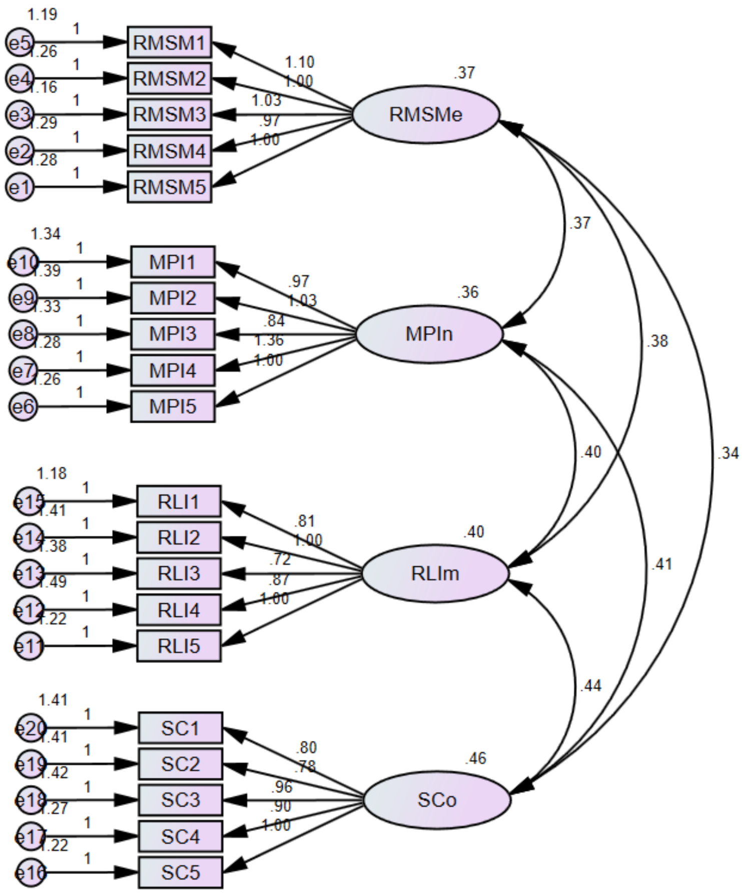


**Figure 3: Confirmatory Factor Analysis**

**Table 9: Measurement Model Estimates**

| | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|
| WRS5 | <--- | WRSt | 1 | | | |
| WRS4 | <--- | WRSt | 1.155 | 0.187 | 6.187 | *** |
| WRS3 | <--- | WRSt | 1.248 | 0.199 | 6.286 | *** |
| WRS2 | <--- | WRSt | 1.147 | 0.187 | 6.138 | *** |
| WRS1 | <--- | WRSt | 1.027 | 0.178 | 5.771 | *** |
| DTI5 | <--- | DTIn | 1 | | | |
| DTI4 | <--- | DTIn | 0.919 | 0.149 | 6.161 | *** |
| DTI3 | <--- | DTIn | 0.893 | 0.151 | 5.919 | *** |
| DTI2 | <--- | DTIn | 1.002 | 0.156 | 6.43 | *** |
| DTI1 | <--- | DTIn | 0.966 | 0.154 | 6.272 | *** |
| STP5 | <--- | STPr | 1 | | | |
| STP4 | <--- | STPr | 0.886 | 0.129 | 6.851 | *** |
| STP3 | <--- | STPr | 0.831 | 0.125 | 6.638 | *** |
| STP2 | <--- | STPr | 0.945 | 0.133 | 7.096 | *** |
| STP1 | <--- | STPr | 0.721 | 0.12 | 5.984 | *** |
| CEP5 | <--- | CEPr | 1 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CEP4 | <--- | CEPr | 1.064 | 0.152 | 6.98 | *** |
| CEP3 | <--- | CEPr | 0.908 | 0.141 | 6.455 | *** |
| CEP2 | <--- | CEPr | 0.82 | 0.139 | 5.905 | *** |
| CEP1 | <--- | CEPr | 0.92 | 0.141 | 6.532 | *** |

The table 9 presents standardized projections, standard errors, significant ratios, and importance levels for the indicators and their respective latent variables: WRS, DTI, STP, and CEP. For WRS manufacture, all five indicators (WRS1 to WRS5) have significant loading on the latent variable WRST, which ranges from 1.027 to 1.248. The significant ratio is above 5.7, which reflects strong and statistically important relations. DTI construction suggests that all five indicators (DTI5 to DTI5) load the latent variables significantly on DTIN. The estimate varies between 0.893 and 1.002, with a significant ratio from about 5.9 to 6.4, which confirms the reliability of these indicators. Regarding STP construction, five indicators (STP1 to STP5) also show strong loading on latent variable STPR, with 0.721 to 1.0 to 1.0 to 1.0 and significant ratios above 5.9, all are statistically important. Similarly, for CEP construction, all five indicators (CEP1 to CEP5) load the latent variables significantly on CEPR. The estimate ranges from 0.82 to 1.064, with a significant ratio above 5.9 consecutive, which indicates strong measurement validity. Overall, the table indicates that the variables seen firmly represent their respective latent constructions, which confirms the sound of the measurement model.

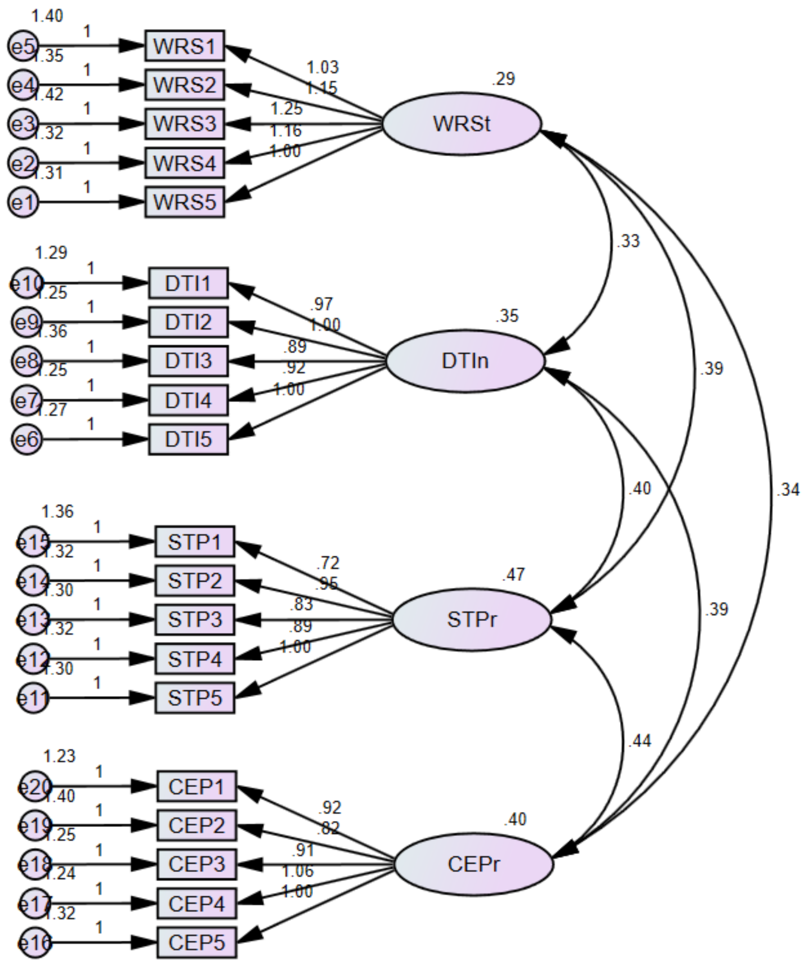

**Figure 4: Measurement Model**

## 5. Discussion

Recent research on CE in textile and fashion industries emphasizes strategic, operational, and socio-technical dimensions of stability. This discussion integrates empirical and theoretical conclusions to expose the challenges, progress, and major drivers of CE change. A review of recent studies on circular economy (CE) in the textile industry increases the strategic, operational, and behavioral aspects of stability changes. Saccani et al., and Saha et al., The study emphasized the importance of joint efforts, knowledge sharing, and waste recycling to remove these issues. Eskamila et al. (2024) offered a systematic review of CE strategies such as recycling, repair, and reuse, and found that these practices promote stability, but their success is forced by consumer behavior and industry norms. Kazancoglu et al., In parallel, the socio-demographic analysis provides a statistical profile of the supply chain stakeholders, which covers aspects such as age, gender, role, experience, location, and company size. Findings indicate a task force that is composed of experienced professionals from medium to larger outfits operated in various geographical regions. These characteristics suggest a defendant pool with the ability to meaningfully affect CE implementation. Descriptive statistics of major demonstration areas- flexible manufacturing and supply management (RMSM), market performance index (MPI), flexible logistics integration (RLI), supply chain coordination (SC), workforce flexibility and stability (WRS), Digital Transformation and Innovation (DTI), strategic planning (STP), storage (STP), storage Internalising (STP), Strategic Planning (DTI), these domains. Correlation analysis suggests that these elements are positively interconnected, supporting the approach that progress in one region reinforces others. Bringing both sets of insight together, it becomes clear that while literature emphasizes theoretical intervals and practical challenges in CE change, demographic data suggests a promising foundation of competent actors already in the domain. However, intervals were identified as limited awareness, infrastructural weaknesses, and policy incompetence should be addressed through target interventions related to cross-sector partnership, technical investment, and policy support to intensify CE infection in the co-textiles industry.

Akar et al., His case-based study highlighted significant waste in several production stages and exposed informal waste trade practices. He proposed an ideological waste management model to improve regional stability. Sehenm et al. (2024) Focus on fashion education in Brazil, checking how CE principles have been integrated into graduate programs. The study detected limited inclusion of stability practices in the course and emphasized the role of the educational field in shaping the textile price chain. Statistical results show variation between individuals, more prominent than differentiation within individuals or objects. Although the item-level differences within individuals were not statistically important, a remarkable residual interaction effect indicates the underlying complications. High reliability was confirmed through internal stability analysis, suggesting that all objects effectively measured the same concept. RMSM, MPI, RLI, SC, WRS, DTI, STP, STI. Expressed, while STP was the most affected by WRS, CEP, and RLI. Repp (2021) and Columbia and D'Tria (2023) provide supplements on circular economy (CE) practices in the European fashion industry. The study of Repp highlights the social and moral dimensions of CE by examining employment innings as a result of the European Union's infection for CE. The analysis has shown that when there was a decrease in labor-intensive costume production in exporting countries like China and Bangladesh, the European Union saw an increase in jobs tied to reuse and recycling. This suggests an uneven distribution of benefits and burdens, pointing to potential justice issues in the global apparel supply chain. In contrast, Colombi and D'Tria detected the role of digital change in advancing CE through business model innovation. His study classified the CE-powered business model and displayed how digital equipment could support sustainable practices, such as waste evaporation and resource storage. Together, these studies suggest that while social equity is a concern in the international implementation of CE, technological progress provides opportunities for structural innovation within local industries. When the measurement model is compared with statistical conclusions, a similar subject of structural harmony emerges. Constructions such as flexible manufacturing RMSM, MPI, RLI, and SC are measured by their respective indicators, suggesting a stable and well-defined correction. Similarly, WRS, DTI, STP, and CEPs were also confirmed as statistically sound construction. These results support the theoretical insights from Repp Colombi and D'Itria, which strengthen CE-related constructions to be measured and validated in employment justice or digital innovation. Thus, empirical results align with the thematic concerns of the two studies, confirming the strengthening of both social and technical aspects in advancing circular fashion. Reviewed studies confirm that both structural and practical factors seriously affect CE implementation. A combination of stake capacity, digital innovation, and targeted policy support is necessary to intensify circular changes in the textile sector.

## 6. Conclusion

Finally, the study states that changing supply chains through circular economy principles is an important step toward permanent textile production. The adoption of closed-loop systems, eco-design, durable sourcing, and recycling practices has shown average benefits, including less waste, energy consumption, and carbon emissions. The introduction of the circular textile supply chain framework (CTS2CF) provides practical guidance for stakeholders to increase stability efforts in the price chain. Despite its promises, the infection faces obstacles such as high recycling costs, insufficient infrastructure, and limited regulatory incentives. To address these challenges, cooperative efforts are required in areas supported by policy reforms and technological innovation. The study confirms that circular is not only an environmental strategy but a path to long-term flexibility and competition. This durable supply chain provides both empirical and ideological contributions to the field of chain management. Finally, enabling circular changes on scale calls for integrated strategies that align economic, environmental, and social objectives within the textile industry.

Future research should find out the practical implementation of circular textile supply chain structure (CTS2CF) in various fields and textile sub-areas to assess its adaptability and effectiveness. Positive Mental Attitudes of employees influences the organisational commitment towards improving productivity and sustainability (K. Durai, et al. 2022). Studies, especially in developing economies, can focus on the identification of field-specific obstacles and ambitions for circular practices. There is a need to check its effect on consumer behavior and permanent textile demand to better align supply chain strategies with market expectations. Future work should also be assessed in increasing digital technologies such as blockchain and IOTs such as traceability, recycling efficiency, and transparency. Comparative studies between linear and circular textile supply chains can achieve insight into long-term economic and environmental benefits. Additionally, the impact of developing policy scenarios and international trade rules on adopting a circular economy attracts the attention of warrant. More case-based research associated with SME can help stitch circular strategies for small enterprises. The interdisciplinary study of the combination of supply chain management, environmental science, and behavior economics can provide overall solutions. Finally, longitudinal research will deepen the understanding of stability effects and guide policy development by tracking the performance of circular initiatives over time.

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